THE MARIN COUNTYWIDE PLAN

Revision 0 October 1973

Approved by

City-County Planning Council April 12, 1973
Marin County Planning Commission August 6, 1973

Adopted by

Marin County Board of Supervisors October 30, 1973

Published by

Marin County Planning Department
Room 308 Civic Center
San Rafael, California 94903
Phone (415) 479-1100 ext. 2526

First Printing	October 1973	100	Eighth Printing	May 1978	100	Price	
Second Printing	April 1974	350				Text and maps	$2.50
Third Printing	July 1974	300				Text only	$2.00
Fourth Printing	January 1975	350				Maps only	$1.00
Fifth Printing	May 1976	100					
Sixth Printing	December 1976	200					
Seventh Printing	November 1977	100					

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In addition, there were countless numbers of citizens who attended meetings, listened, gave their opinions, talked to their friends and their governments. The Plan was greatly improved by their contributions. The Staff expresses heartfelt thanks to all who participated.

The Plan has been the primary project of the County's Advance Planning Section who also provide staff to the City-County Planning Council. 1980 and 1990 forecasts and computer modelling efforts were made by the Balanced - Transportation section.

This October 1973 edition of the Plan was prepared under the direction of Sol Silver, written by Marge Macris, graphics by Larry Smith and George Johnson, and typed by Linda Downey.

Except where noted in the table of contents, all of this text was adopted by the Marin County Board of Supervisors as the Marin Countywide Plan. The tables and figures are derived from the concepts in the text but are not part of the adopted plan. In addition to this text, there are four maps which are also part of the adopted plan and are available separately. These maps are: Summary, Environmental Quality, Community Development, and Transportation.

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PREAMBLE TO COUNTYWIDE PLAN

as requested by Mayors & Councilmen

The Marin Countywide Plan has been prepared under the supervision of the City-County Planning Council, an organization made up of the eleven cities and the county under joint powers agreement. It is essentially a political document.

The Countywide Plan provides a general guide for the preparation of more detailed local plans. It does not replace or substitute for local plans which continue to be the responsibility of each jurisdiction.

The plan speaks to issues of countywide importance, regardless of location within specific jurisdictions. Adoption of the Countywide Plan by a jurisdiction would expand rather than limit its authority. Through an advisory review agency, all jurisdictions would have a coordinated procedure for commenting on issues of countywide importance throughout the county, as well as being the recipient of such comments from other jurisdictions.

Legal responsibility for carrying out a plan rests with the jurisdiction which adopts it within its boundaries. Such implementation tools as zoning, capital improvement programs, precise plans and development ordinances will continue to be the responsibility of individual cities and the county. The Countywide Plan does provide a basis for voluntary cooperation among jurisdictions. It is hoped that mechanisms will be established for joint inter-jurisdictional administration of commonly desired programs, in line with the adopted goals of the Countywide Plan.

Part 1. Summary: The Marin Countywide Plan

CONTENTS

Thes pages contain background material
which is not part of the adopted plan:

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Part 1. SUMMARY: THE MARIN COUNTYWIDE PLAN

Introduction

The Marin Countywide Plan is a plan for today, although it looks at trends extending 20 years into the future. Its source is the county as it is now, socially, economically, physically, and politically.

The Plan expresses concerns of the people of Marin at a time when the environment is threatened, when the costs of living here have risen beyond the reach of families of moderate means, when local government units, acting alone, are too fragmented to deal effectively with the resulting wide range of issues.

Studies for the Countywide Plan indicate that Marin has serious problems, and that they will continue to get worse unless definite, coordinated action is taken now to change what is happening.

We want to retain the open spaces surrounding our communities, but development continues to encroach upon the hillsides before they can be secured in open space. Market projections show population increasing at an average of about 7,700 per year until 1990, compared with about 6,300 per year over the past decade. The Countywide Plan would result in an average annual increase of about 4,500 persons over the next 18 years.

We would like to live and raise our families in diverse communities with many kinds of people, but rising housing costs are making it difficult for any but the rich and childless to live in Marin.

Many Marin residents would prefer working close to home, but are forced into the daily commuting routine because of the lack of job opportunities here.

Many of us would be willing to leave our cars at home and take transit, but adequate service for trips within the county is still not available.

Present individually adopted plans for local communities, if carried out, would not reverse these trends, but in many cases would make Marin's problems worse. Many of these plans accommodate growth trends rather than changing them, and they would produce an ultimate population of about 800,000 in Marin, with little open space remaining. These individually adopted plans have generally been prepared by different jurisdictions at different times, without regard for their relation to plans for other communities or for their cumulative effect on the county as a whole.

The Countywide Plan recommends decisive actions that can be taken now by city and county governments acting together to change directions for Marin--by programs to acquire open space, discourage precipitous growth, diversify the housing supply, increase jobs in Marin, and provide transportation that will support these development objectives. The plan's recommendations are based on careful data analysis, but more importantly upon the non-measurable qualities of Marin--its physical and social diversity, beauty, and uniqueness.

Because the Countywide Plan deals with these concerns at this specific time, it advocates particular points of view. There are obviously disagreements among Marin residents about many of the plan's recommendations. Where there are conflicts the plan seeks to identify them, rather than glossing over them with generalities, so that divergent points of view can be heard and if possible resolved. Many of the conflicts expressed during review of the Preliminary Countywide Plan in 1971-1972 have been resolved in this document.

The City-County Planning Council of Marin, consisting of elected and appointed representatives of governments of all cities and the county, has guided preparation of the plan and its background studies.

I. Goals

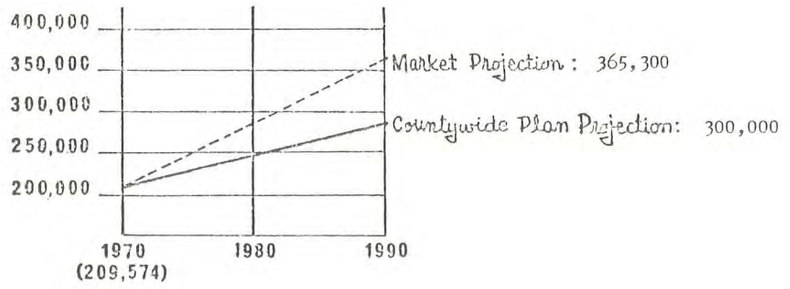
The plan's three basic goals represent real choices for changing current trends. These goals were expressed in the Preliminary Plan and gained substantial consensus.

Goal 1: Discourage rapid or disruptive population growth, but encourage social and economic diversity within communities and in the county as a whole. This is a choice in favor of a slower growth rate and positive action to meet the needs of all social and economic segments of Marin's population instead of the current trends of uncontrolled development and an increasingly high-income population.

Under the controls recommended by the plan, Marin's population would grow at an annual average rate not to exceed 1.9 percent between 1970 and 1980. This would produce a maximum population of 260,000 (± 2%) by 1980, compared with 297,000 in an uncontrolled market, and a Population of 300,000 (±5%) by 1990 compared with 365,300 in an uncontrolled market. The county's 1970 population was 209,574.

Figure 1.2

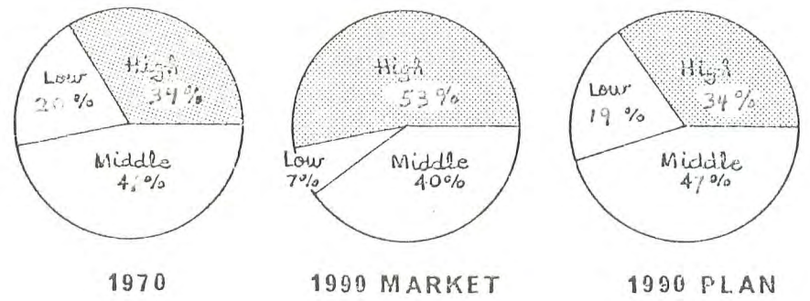
Marin County Population



The plan also recommends measures to increase the supply of low and medium -income housing, so that the county's income distribution in 1990 would be about the same as in 1970. "Low-income" is defined as less than $8,000 per year, "medium" as from $8,000 to $15,000, and "high" as more than $15,000 in 1972 dollars.

Figure 1.3

Housing Distribution of Marin County Population

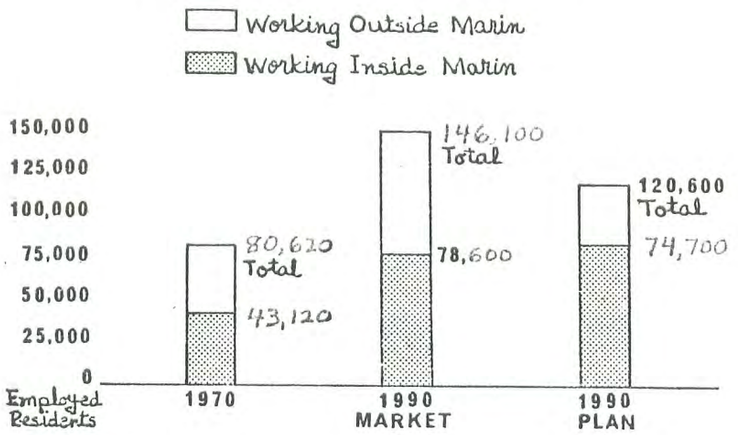


Goal 2: Achieve greater economic balance for Marin, by increasing the number of jobs and the supply of housing for people who will hold them--becoming more self-sufficient economically by reducing the present heavy reliance on the commute to San Francisco.

Plan projections indicate that Marin's employment could reach about 93,000 in 1990, compared with 57,700 jobs in 1970.

Figure 1.4

Where Marin Residents Work



MILITARY JOBS EXCLUDED

Goal 3: Achieve high quality in the natural and built environments, through a balanced system of transportation, land use, and open space. This goal is a choice against suburban sprawl and development that deteriorates or pollutes the environment in favor of a better balance between the uses to which land is put and the public interest.

Under the plan41.5 percent of the land in the City-Centered Corridor will be secured as open space by 1990, by a variety of means, including purchases, open space easements, clustering, etc.

All of the Countywide Plan's recommendations for policies and programs are based on these interrelated goals. To the greatest extent possible, objectives for one element of the plan support those for another.

Figure 1.5

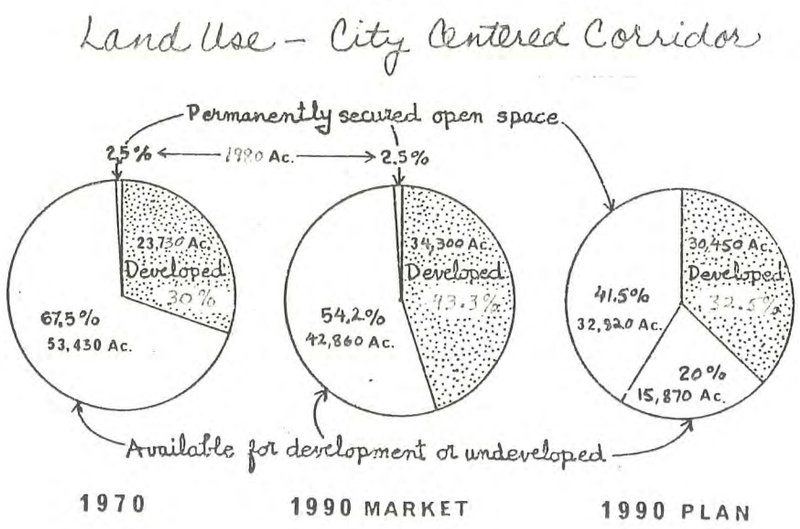
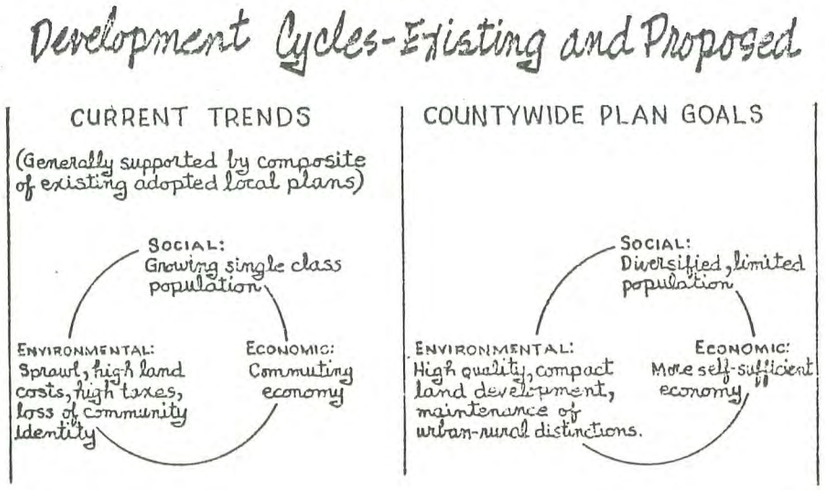


Figure 1.6



Current trends have imposed on Marin a self-perpetuating cycle of an increasingly single-class population, a commuting economy, sprawl, environmental deterioration, and high housing costs--all reinforcing each other. Presently adopted local plans do little to change these trends, but merely accommodate them in an orderly way. The Countywide Plan proposes "shifting gears" into a new cycle of beneficial, mutually reinforcing trends.

II. Policies

These are the plan's major policy recommendations:

A. ENVIRONMENTAL QUALITY

Open Space

1. Open space shall be secured by a variety of means, including purchase, agricultural preserve contracts, open space and scenic easements, and clustering of developments.
2. The Marin County Regional Parks & Open Space District should secure the open space intended for purchase.
3. Reinforce agricultural use in the Inland Rural and Coastal Recreation Corridors, through taxing and zoning policies.
4. Acquire open space and park land in the Coastal Recreation Corridor through federal and state programs.
5. Limit encroachment on open water to public purposes, and only where environmental damage will be kept to an absolute minimum.

Conservation

All public and private actions that significantly affect the quality of the environment will be reviewed in accordance with the unique characteristics of each proposed action and each potential location, under specific, mandatory procedures to be adopted.

For the county, this will be done through the expanded Environmental Protection Committee, including directors of all agencies most concerned with development and environmental quality. Cities are required by state law to establish similar mechanisms for reviewing public projects and private developments.

Conservation Zones

This zone would allow only limited development under strict controls. These controls must be exerted to prevent deterioration and hazards in conservation zones designated in the plan:

1. All streams and buffer zones 300 feet wide* on each side wherever possible.
2. 1,000 yards inland from the shores of the ocean and bays wherever possible.
3. Safety areas, such as rift zones or airport approach zones.
4. Watershed zones, for water quality protection.

Development standards in policies and procedures in the conservation zones shall be coordinated with appropriate regional agencies.

*Based on stream buffer standard recommended in The Plan and Program for the Brandywine, U.S. Geological Survey, Institute for Environmental Studies, 1968.

The Built Environment

Control all public projects in the county and offer incentives to private development, such as higher densities in appropriate locations and modification of site development standards where suitable, in accordance with the following policies:

1. Design developments so that they fit into and enhance the natural environment, rather than destroying or disrupting it.

2. Relate new development to existing community character, to community centers, and to transportation.

3. Provide access by trail systems to parks, open space, and public facilities in new and existing development.

4. Preserve views of major scenic natural and man-made features.

5. Concentrate commercial and high-density residential development in high-intensity, transit-accessible nodes, rather than allowing sprawl or continuous strip development along freeway corridors.

Safety

1. Closely regulate development in areas prone to fire, flood and landslides.

2. Prohibit the construction of concentrated or hazardous uses, including schools, hospitals, other institutions, high-density housing, or reservoirs, in fault zones, flood plains, and severe geologic risk areas.

3. Require thorough field investigation of geologic hazards as a prerequisite to development approval, and require site work to minimize such risks.

4. Regulate development in areas subject to extreme noise such as airport approach zones and freeway corridors.

Recreation

1. Federal, state, county, and local governments will each provide the appropriate level and scale of recreation facilities.

2. Recreation projects will be subject to environmental impact review, as any other type of development.

B. COMMUNITY DEVELOPMENT

Housing

Growth 1. Regulate the locations and rates of residential growth, in accordance with the objectives of the plan.

Hsng 2. Maintain the ratio of the low and moderate-income housing supply, in a dispersed rather than concentrated pattern and in conjunction with regional housing policies. ~~This will be done by voluntary measures to limit prices~~ and rents in existing housing and by including low and moderate-income units in new developments.

Hsng 3. Expand public and non-profit sponsored housing programs.

Hsng 4. Increase the supply of family-size units in multiple structures.

Growth 5. Include housing in non-residential areas, where appropriate.

Hsng 6. Preserve and rehabilitate older housing, without significantly increasing costs to low and moderate-income present residents.

Hsng 7. Using precise criteria and assuming neighborhood acceptance, permit second units in selected single-family areas, with strict controls over building standards, rents, and incomes of occupants.

Hsng. 8. Establish a city-county land bank to secure suitable sites for low and moderate-income housing as soon as they become available.

Economic Development

1. Attract businesses that will:

Emp.

   a. Reduce the present level of out-commuting by providing more local jobs for Marin residents, and for in-commuters

   b. Provide more jobs for low and moderate-income skilled and semi-skilled workers, with emphasis on jobs for Marin residents who are now unemployed or underemployed.

   c. Maintain and improve the variety of jobs to cushion the county's overall economy against a slump in any one sector and against seasonal fluctuations.

   d. Provide supporting goods and services to attract other businesses.

   e. Provide facilities for visitors who wish to stay in the county for more than one day.

   f. Not cause undue air, water, or noise pollution, or reduce environmental quality.

   g. Not overburden the community's parking or traffic capacity or government services.

h. Develop buildings and site improvements which are visual assets to the community.

2. Locate new economic activities in areas designated by the plan as countywide activity centers, community activity centers, and busines development areas.

3. Secure suitable sites for economic development when they become available through a cooperative city-county procedure such as land banking.

4. Reduce inter-city competition for sales tax revenue through a revenu sharing agreement among the cities and the county. A portion of eac jurisdiction's sales taxes could be pro-rated to the others on a per capita basis, with the balance being retained by the originating cit or county.*

5. Encourage agriculture, commercial fishing, and other rural economic activities to become more viable, through zoning and taxation policies.

6. It is understood that should the demand for industrial and commercia development exceed the land areas set aside by the plan by 1990, the plan should be amended to provide for additional lands.

Community Facilities and Utilities

1. Provide an urban level of public and private services in developed and developable portions of the City-Centered Corridor and **appropriate level of services in village areas as necessary; provide a rural level of services elsewhere in the county.**

2. Recycle waste water for reclamation and reuse as soon as feasible. Bay and ocean outfalls will be for interim and emergency discharge only.

3. Improve utilities and treatment facilities serving developed areas and those areas designated as developable before extending service to new areas; provide new services only for those areas designated as developable in the plan.

4. Plan projections indicate the need for two new high schools.

5. Build one new College of Marin campus; express to the state the county's policy of establishing a 5,000 student maximum capacity for both the Kentfield and Novato campuses.

6. Provide for hospitals and other health care facilities in accordance with policies adopted by the Comprehensive Health Planning Council of Marin.

7. Place libraries, social service offices, recreation centers, and other community facilities in locations served by public transportation.

*The Minneapolis-St. Paul Metropolitan area has already established a shared property tax base. See Minnesota's Fiscal Disparities Bill, American Society of Planning Officials, February 1972.

C. TRANSPORTATION

Transit and Highways

1. Limit capacity of transit and highway improvements to the needs produced by development under the Countywide Plan. (No greater capacity than can be provided by an exclusive bus right-of-way and an eight-lane freeway in the City-Centered Corridor.)

2. Retain the level of mobility at or near 1973 levels. Highway service levels would continue to be only "fair" in 1990 rush hours. A congestion-free or "good" level of service would be impossible to achieve without major roadway expansion and resulting environmental disruption.

3. Expand the transit system, along with some highway expansion, in order to provide this level of mobility. Highway expansion projects should favor transit improvements.

4. Build no new freeways.

5. Defer a decision on a transit deck on the Golden Gate Bridge until the impact of other improvements is fully tested. If congestion is intolerable, the next step in increasing corridor capacity would be the new transit deck.

6. Develop an intra-county transit system in logical, programmed steps.

7. Leave options open for innovative transit systems which appear to be probable by 1990, rather than committing the county to a huge, one-time capital investment.

8. Develop these new routes: The San Rafael Waterfront Parkway, and Smith Ranch Road, but only when the designated open space through which they pass has been permanently secured.

Ferries

Locate ferry terminals at sites that will serve recreational as well as commuting needs and that will cause a minimum of environmental damage and maximum patronage.

Airports

1. Develop no new major airport in Marin during the foreseeable future.

2. Permit no commercial aviation use of Hamilton Air Force Base.

Recreational Travel

Use transit for recreational travel, in a system producing minimum environmental damage. Automobiles must not be further emphasized as the primary means of access to coastal recreation areas.

Paths and Trails

Develop a system of bicycle, hiking, and riding trails connecting with open space, residential areas, and activity centers.

D. LAND USE

The use of land throughout the county would differ significantly under the Environmental Quality, Community Development, and Transportation policies of the Countywide Plan from what it would be if the market were to operate without restraints.

Land use data for the plan are based on detailed compilations and projections for the eight planning areas into which the county is divided. Although the Countywide Plan projections are based on precise information, they are not intended to serve as specific plans for each small area of the County. Rather, the projections are designed to show broad trends within the county as a whole and within the eight large planning areas. It is the function of local plans for cities and unincorporated communities to specify detailed land use policies.

Land permanently secured by the public, including open space, is the one category with the greatest difference between the plan and the market by 1990. This is because the plan assumes that about 32,000 acres of open space in the City-Centered Corridor will be secured publicly, while under the market model much of this land would be developed.

The amount of agricultural land would only decrease about 25 percent (almost all of it going into public open space) under the plan, through the application of zoning, contracts, and other controls.

More land would be occupied by housing through the market than under the plan, because of the open space acquisition proposed in the plan.

The ultimate land use, population, and traffic volume that would result from the composite of current adopted local plans in Marin was analyzed as the first step in the Balanced Transportation Program. These results were so clearly beyond the limits of livability* that the "composite plan" is no longer used as an alternative in analyzing possible futures for Marin. Rather, the two main alternatives that are used for plan analysis are the "market" projection of 1990 population, land use, and transportation that would result from unconstrained operation of the market, and the "plan" projection, which is the "market" adjusted downward to provide for the open space recommended in the plan.

*See page I-10 on "Background of the Plan".

Table 1.1

Marin County Land Use

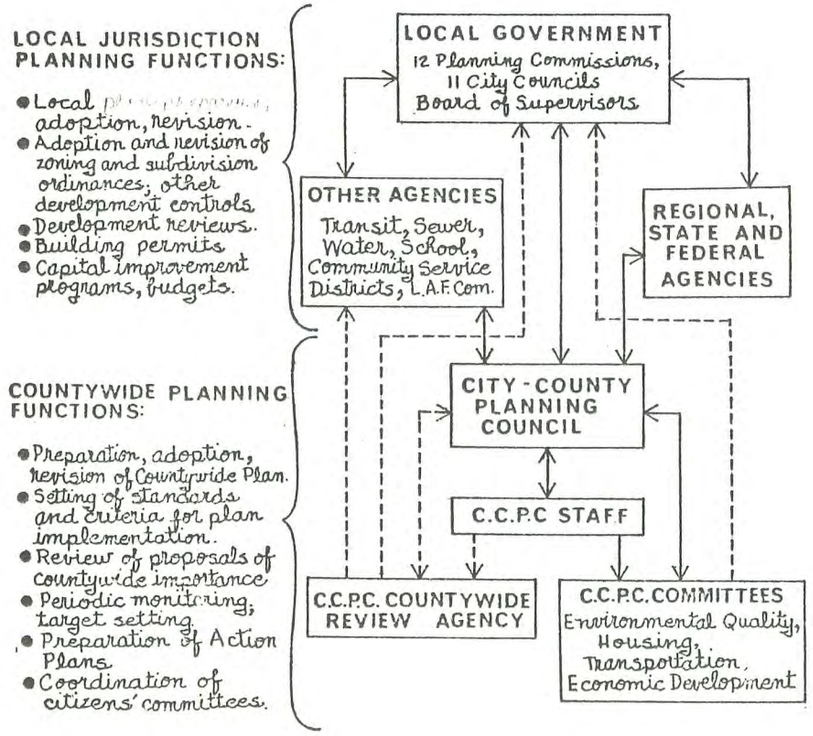
(GROSS ACRES, INCLUDING STREETS AND HIGHWAYS)

TYPE	1970	1990 MARKET	1990 PLAN
Public Ownership (Including Open Space	87,500	101,410*	136,230
Agricultural	167,720	153,810	125,650
Residential	22,800	35,720	30,210
Industrial	470	1,050	840
Commercial	1,010	1,990	1,790
Vacant, Other	53,880	39,400	38,660
TOTAL	333,380	333,380	333,380

*Assumes Golden Gate National Recreation Area would be only addition to 1970 supply.

Figure 1.7

Regulations And Functions of Jurisdictions In The Countywide Planning Process



A. Environmental Quality

1. Acquire open space in the City-Centered Corridor through the newly formed countywide open space district.

2. Establish county environmental protection procedures, with mandatory review over major public projects and private developments in accordance with an adopted environmental protection policy. Members would represent all county agencies concerned with environmental quality, health, and development. The committee would report to the County Planning Commission or the Board of Supervisors.

3. Cities are required to establish similar environmental protection procedures. Proposals affecting unincorporated areas should also be referred to the county Environmental Protection Committee for comment.

4. Adopt county and city open space zoning, in accordance with state law, for all areas so designated in the plan.

5. Adopt county and city special regulations for control of development in conservation zone areas and in areas subject to geologic and seismic hazards, fire, and flooding.

6. Require public trail access through adjacent private developments to all parks, public open space, and coastlines.

7. Offer incentives for exceeding the environmental design standards of the Countywide Plan.

B. Community Development

1. Adopt county and city ordinances requiring specific proportions of low and moderate-income housing and family-size units in new developments, allocated by an equitable distribution pattern. Assure continued low and moderate-income occupancy by working with the Marin County Housing Authority and the Ecumenical Association for Housing, as sponsoring agencies.

2. Control rents and prices on as many existing low and moderate-income units as possible, through voluntary agreements with owners resulting in tax reductions, through registration and control of second units on second units on single-family lots, through formation of housing cooperatives, and other methods.

3. Provide county aid to such agencies as the Housing Authority and the Ecumenical Association for Housing, to expand their ability to assist and sponsor low and moderate-income housing developments.

4. Use available federal aids (such as under Section 235 of the Housing Act for non-profit sponsors) to improve the quality of deficient housing, while minimizing cost increases to low and moderate-income tenants and owners.

5. Encourage use of the Marin County Housing Authority by the cities, by individual agreements with jurisdictions.

6. Provide relocation services to residents--financial aid and help in finding new housing--where existing housing is replaced by new development.

7. Make available appropriate public land for low and moderate-income housing through long-term leases.

8. Work with federal, state, and Bay Area agencies in developing and carrying out these housing policies.

9. Encourage new and expanded business activity in Marin, in accordance with the plan's policies and in cooperation with the private sector. Conduct ongoing studies of the economic validity of agriculture in Marin County, the merits of density transfer, compensable zoning, land banking, and inclusion of Marin in a nine-county open space agency.

10. Coordinate utility district programs with Countywide Plan policies; give preference to improving service in existing areas and extend lines only to areas designated in the plan as developable.

11. Establish waste water recycling lakes.

C. Transportation

1. Obtain federal funds for transit and highway improvements and for carrying out the recommendations of the Recreational Travel Study.

2. Work with regional and state agencies in effectuating Marin's policies for airports and other transportation facilities.

3. Provide funds for bicycle paths serving employment centers, transportation terminals, residential areas, and recreation areas.

4. With expanded transit, begin reducing the number of employee parking spaces at the County Civic Center and at city halls, to encourage use of transit.

D. General Implementation Methods

Development Controls

1. Expand the functions of the City-County Planning Council, as the single organization representing all government jurisdictions in Marin, to include the following additional major responsibilities:

   a. Establish a countywide review agency, to exercise review over public projects and private developments of countywide importance, in order to prevent the destruction or serious impairment of the goals and objectives of the Countywide Plan by actions of the county or any of the cities within the county. Membership would consist of one elected voting CCPC member of each city and the county.

      The review agency should have advisory powers only under joint powers agreement during its initial operating period.

   b. *To the extent allowed by law,* establish a procedure for monitoring and controlling the rate of residential and non-residential growth in the county and cities, in accordance with the Countywide Plan.

   c. Oversee the continuous monitoring and periodic revision of the Countywide Plan, in accordance with changing needs and new findings.

   d. Establish countywide policy regarding future forms of regional government and Marin's participation in them.

2. The County Environmental Protection Committee, and similar city committees when established, will report to the appropriate Planning Commission on project proposals' conformity to environmental quality standards. Each proposal of countywide importance will then be referred to the countywide review agency for review as to its conformance to the Countywide Plan.

3. Each jurisdiction will revise and adopt specific plans in accordance with the goals and policies of the Countywide Plan.

4. Each jurisdiction will rezone all incorporated and unincorporated areas in accordance with the land use designated in the Countywide Plan and in specific plans, when adopted, as required by state law.

Public Investment Programs

1. Acquisition of open space land.

2. The City-County Planning Council should review all capital improvements and budgets of the county, the cities, and special districts for their conformity to the adopted plan.

3. The cities and the county will seek funds from regional, state, and federal agencies to supplement inadequate local resources.

4. Establish a system of countywide revenue sharing, so that a portion of each jurisdiction's revenues would be allocated to countywide needs in an equitable manner.

Action Plans

1. Short range action plans should be adopted at regular intervals to implement plan goals.

E. Citizen Participation

Citizen involvement is essential to implementation of the Countywide Plan. Regardless of how soundly based a plan is on facts and analysis, and regardless of how much support it has at the time of adoption, the plan's policies will not be achieved without continuous, dedicated work by well-informed citizens. The effectiveness of a plan in solving current problems and controlling future development depends on actions in the political arena, as well as on the quality of the plan itself.

The Countywide Plan has been shaped according to the expressed will of the citizens, to the greatest extent possible. Specific actions that should be taken by citizens now to assure plan adoption and implementation include:

1. Participation in hearings on the plan by the City-County Planning Council, city councils and planning commissions, the County Planning Commission, and the Board of Supervisors.

2. Participation in meetings by city and county policy-making bodies where matters relevant to the Countywide Plan are being considered. Each proposal should be examined in the light of how it affects the plan's goals and policies.

3. Legal actions to carry out the plan, such as referendums, initiatives, suits, and class action suits, should be used only when necessary.

4. Continuing review of the plan by both countywide and local citizens groups. Findings and recommendations from this review should be presented to the County Planning Department, which will use these proposals in further work on the plan.

5. The committees of the City-County Planning Council (Environmental Quality, Housing, Economic and Transportation) will be expanded to include more citizens, representing all geographic areas and interest groups, including unincorporated areas as well as cities. The committees will function as special advisory groups to represent the countywide interests reflected in the Countywide Plan at meetings of policy-making bodies discussing related issues. Since members of local planning commissions and city councils are often too busy to keep informed on the Countywide Plan, these committees could provide a valuable service of information and citizen input to these local bodies.

IV. Evolution of the Plan

A. CHARACTERISTICS OF THE PLAN

The Marin Countywide Plan seeks to express the specific desires of a majority of Marin residents for how their county should develop, rather than a planning technologist's abstract vision of the future. It is essentially a political document, to be used and changed by the people and their elected representatives in making decisions. Thus it differs from a conventional land use plan.

The plan is a guide to decision-making now, rather than a picture of a future end product. It establishes countywide standards by which actions can be judged, while encouraging a wide variety of available options for decision-making. The test for a decision is whether it helps to solve a problem we can see today, more than whether it helps to achieve a land use pattern envisioned 20 years from now. Still, the widespread and long-range consequences of present actions must be evaluated. There will be deviations from the plan in individual decisions, but the plan provides a benchmark for evaluating the long-range effects of each deviation, and the cumulative impacts of many such changes.

The plan seeks to deal with matters that are of countywide importance, as distinct from local importance only. There is a growing public demand for government participation in an increasing number of areas--such as housing, business development, environmental quality--as problems become more difficult and complex. But the plan does not attempt to deal with all problems in detail. It is not a substitute for local plans, and it does not speak to all local decisions. The countywide planning process offers an opportunity for all local jurisdictions to share in significant decisions outside their boundaries--for example the development of Marin's coastline.

Several criteria can be used to determine if an issue is of countywide importance:

1. Impact on communities and individuals outside the local community. (Example: a regional shopping center.)

2. Conflict among communities. (Example: an inter-valley connector desired by one community but opposed by another.)

3. Economies of scale made possible by cooperation among two or more jurisdictions. (Example: acquisition of a total ridge open space by a countywide agency, rather than individual cities acquiring pieces of it.)

4. Widespread use of a facility by people from outside a given community. (Example: a ferry terminal.)

5. Equity in dealing with countywide problems. (Example: the need for low and moderate-income housing, which can't be left to "elsewhere".)

NOTE: This page not part of adopted text

6. Actions by one community which have detrimental effects on countywide goals although they may seem desirable locally. (Example: large-lot zoning in one area may increase development pressure in another.)

The plan recognizes that Marin is an integral part of the Bay Area, physically, socially, and economically. Many of the decisions that shape Marin are made on the regional, state, or national levels. The plan seeks to express Marin's point of view regarding these externally determined policies. Just as Marin benefits when the Bay Area prospers, the county also shares the responsibility for helping to solve the region's problems. In this sense, the plan represents an intermediate step in detail between the 1970 Regional Plan of the Association of Bay Area Governments and the general plans adopted by cities.

The City-County Planning Council approved the regional plan's city-centered concept as the basis for preparation of the Marin Countywide Plan. Basic ideas of this concept are that:

1. Urban communities should be closely interrelated to each other, and in harmony with open space and nature.

2. Permanent open spaces should separate the individual communities and connect to form a continuous open space system.

3. Jobs should be diversified and convenient to residents, resulting in short home-to-work trips.

4. Communities should be organized around one or two major activity centers, designed to include a relatively complete range of jobs, stores, services, and entertainment.

B. USES OF THE PLAN

Once it is adopted, the Countywide Plan can serve five major purposes:

Educational. To enable Marin citizens to inform government bodies of the public's needs and objectives, as well as for government to inform citizens about issues, interrelationships, and recommendations for solving problems. To assist in school and college educational programs on planning and community development.

Political. To aid decision-makers in achieving maximum contributions to countywide objectives in each policy decision; to aid in coordination among government agencies and jurisdictions; to set priorities for and the scale of future capital improvements.

Legal/Fiscal. To clarify both property owners' development rights and the public's interest in land development. To meet state and federal requirements for a general plan. (See table of Mandatory General Plan Elements.) These requirements are intended to assure efficient management and resource allocation by local jurisdictions, so that local, state, and federal funds will be effectively used.

Technical. To guide city and county staffs in amending and implementing local plans and ordinances and to assist special districts in planning future programs.

Representational. To present Marin's position on regional, state, and national policy issues to the appropriate bodies, which affect our development so importantly.

C. ASSUMPTIONS OF THE PLAN

Major factors which shape development, but which are judged most unlikely to change in the foreseeable future are assumptions that were not tested, but accepted as givens in shaping the plan. It is conceivable that conditions could change drastically so that one or more of the assumptions would no longer be true in the future. (For example, major communications system changes could make it unnecessary for people to travel to work.) In this case, basic changes in the plan would be essential.

The accompanying diagram illustrates the relationships among the plan's assumptions and its three basic goals. (see fig. 1.8)

D. BACKGROUND OF THE PLAN

Work on the Marin Countywide Plan began in 1968, with the initiation of the Balanced Transportation Study, after a citizens' "freeway revolt" brought a halt to proposed extensions of Routes 17 and 37 through the county. The state's plans for these roadways had been based on population growth anticipated in adopted local plans.

The first phase of the Balanced Transportation Study estimated the highway capacities needed by future population that would result from existing plans. The results: The county's ultimate population of about 800,000 would create a demand for massive road-building; by the year 2020, Route 101 would have to be expanded to 12-18 lanes in width, and a second deck on the Golden Gate Bridge would be an absolute necessity because of the widely distributed development pattern, requiring a highway-oriented solution. These findings dramatically illustrated the need to bring land use and transportation planning into better balance, through a Countywide Plan. Phase II of the Balanced Transportation Study (recommendations from which are included here) proposes balanced systems of transit, highway, and ferries that will support the environmental quality and community development proposals of the Countywide Plan.

Figure 1.8

Countywide Plan Goals and Assumptions: Interrelationships

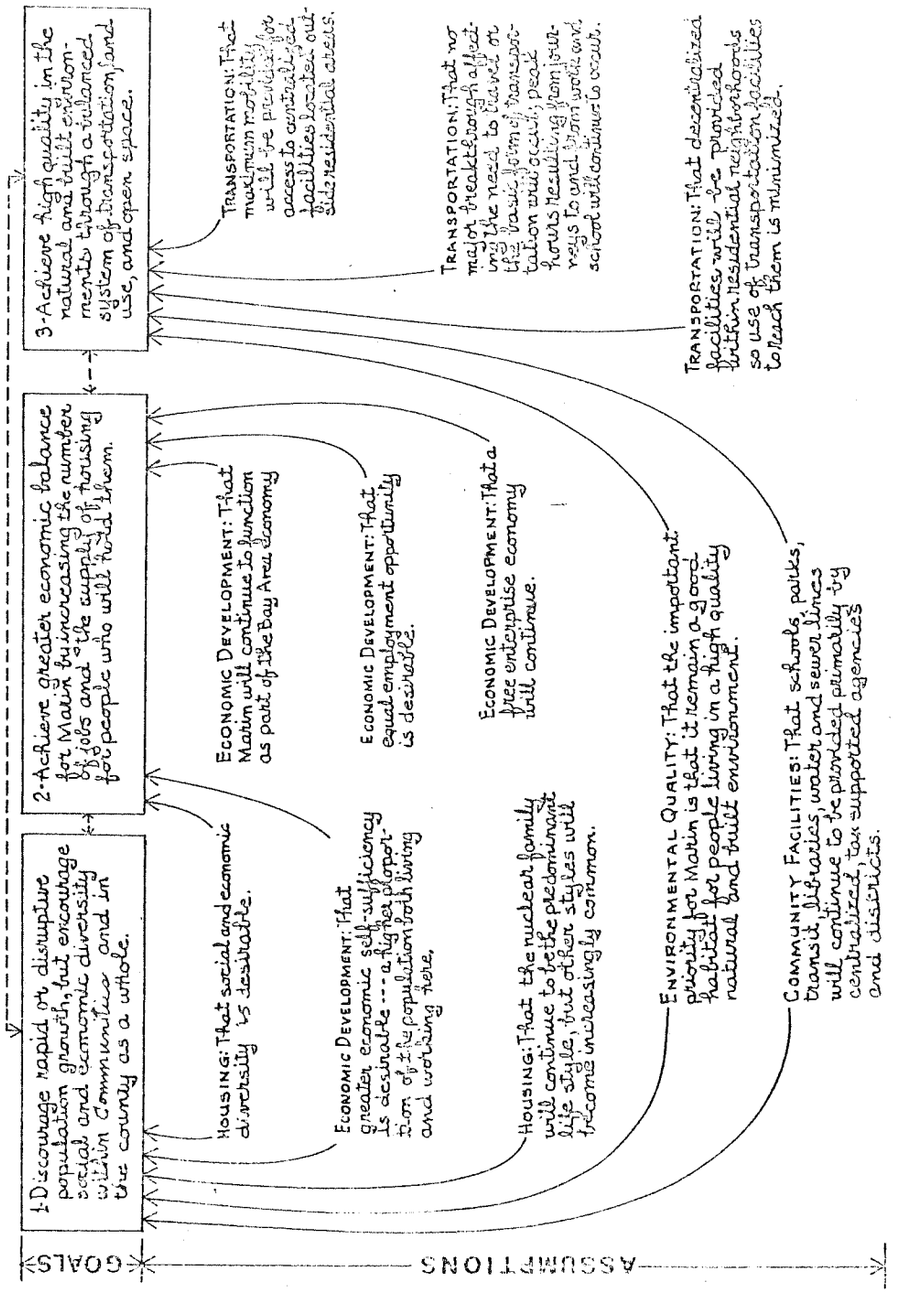


Table 1.2

Mandatory General Plan Elements

California Government Code, Sections 65302, 65302.1, 65560

State law now requires nine general plan elements. This table lists the mandatory components of each element, and where they are included in this document. Incomplete parts will be included in forthcoming documents related to the Countywide Plan.

	Location in Marin Countywide Plan			
I. Land Use Element	Environmental Quality	Community Development	Transportation	Implementation
A. Distribution, location, extent for:				
1. Housing		x		
2. Business		x		
3. Industry		x		
4. Open space	x			
5. Education		o		
6. Public buildings and grounds		o		
7. Waste disposal facilities		o		
8. Other				
B. Standards of population density, building intensity	x	x		x
C. Areas subject to flooding	x			x
II. Circulation Element				
Location and extent for:				
A. Major thoroughfares			x	
B. Transportation routes			x	
C. Terminals			x	
D. Other public utilities and facilities		o		
III. Housing Element				
A. Standards and plans for improvement		x		
B. Adequate sites		x		
C. Needs of all economic segments		x		
IV. Conservation Element				
Conservation, development & utilization of:				
A. Water and its hydraulic force	x			
B. Forests	x			
C. Soils	x			
D. Rivers and other waters	x			
E. Harbors	x			
F. Fisheries	x			
G. Wildlife	x			
H. Minerals	x			
I. Other natural resources	x			

x In this Countywide Plan report
o Further preparation necessary

Table I.2 (cont.)

		Location in Marin Countywide Plan			
		Environmental Quality	Community Development	Transportation	Implementation
V.	Open Space Element				
	Designation of:				
	A. Natural resource land	x			x
	B. Agricultural land	x			x
	C. Recreation land	x			x
	D. Watershed land	x			x
	E. Wildlife habitat	x			
	F. Scenic land	x			
VI.	Seismic Safety Element				
	Identification and appraisal of susceptibility to:				
	A. Surface ruptures from faulting	o			
	B. Ground shaking	o			
	C. Ground failures	o			
	D. Wave effects	o			
VII.	Noise Element				
	Contours of present and projected noise levels from:				
	A. Highways and freeways			o	
	B. Ground rapid transit			o	
	C. Airport ground facilities			o	
VIII.	Scenic Highway Element				
	Development, establishment, protection of scenic highways			x	
IX.	Safety Element				
	Protection from fires and geologic hazards through:				
	A. Evacuation routes			o	
	B. Peak load water supply requirements		o		
	C. Minimum road widths			o	
	D. Clearance around structures		o		
	E. Geologic hazard mapping	o			
X.	Solid Waste Management Plan	o			

x In this Countywide Plan report
o Further preparation necessary

In 1969 the State Legislature ordered that general plans include a housing element for housing improvement and housing sites, with "adequate provision for the housing needs of all economic segments of the community." The Planning Department staff completed a countywide housing element report, Don't Leave It to Elsewhere, in 1970. It presented findings and recommendations for improving the housing supply, and most of the cities in the county used the report as a starting point in drawing up their own housing elements. A Marin County Housing Policy Statement, adopted by the County Planning Commission and the Board of Supervisors, was based on the county housing element. The main points of this statement were included in the Preliminary Countywide Plan.

Staff work on the Environmental Quality Study also began in 1969. The report, Can the Last Place Last?, describes Marin's natural and built environments and recommends policies and actions for enhancing their quality, including a preliminary open space plan.

A study on tourism potential, The Visitor in Marin, provided information on this aspect of economic development.

These studies were used for the Preliminary Countywide Plan, published in mid-1971. The more comprehensive Economic Development Study was initiated in 1972, after completion of the preliminary plan; its findings are included in this document.

About 3,500 copies of the preliminary plan were distributed to the public. Before the revised Countywide Plan was completed, Planning Department staff members discussed the plan with citizens at more than 70 meetings throughout the county.

A majority of persons who expressed views on the plan generally supported its goals and policies, although representatives of some organizations objected to the costs and possible property rights infringements of the proposals for open space and limited growth rates. (see Table 1.3)

The City-County Planning Council adopted revisions to the preliminary plan in February 1972, taking citizen response to date into account. A staff recommendation for establishing a countywide review agency, responsible for plan implementation, was not accepted by CCPC pending further study. CCPC directed the staff to use the preliminary plan, as amended, as a guide to preparing this more detailed Countywide Plan.

E. THE COUNTYWIDE PLANNING PROCESS: NEXT STEPS

Following adoption, state law requires that the Countywide Plan be used as the basis for subarea and local jurisdiction plans and for drafting revisions of zoning and other ordinances. The plan will also be used for preparation of the first five-year Action Plan and for other implementation measures. (see Figure 1.9)

Figure 1.9

The Countywide Planning Process

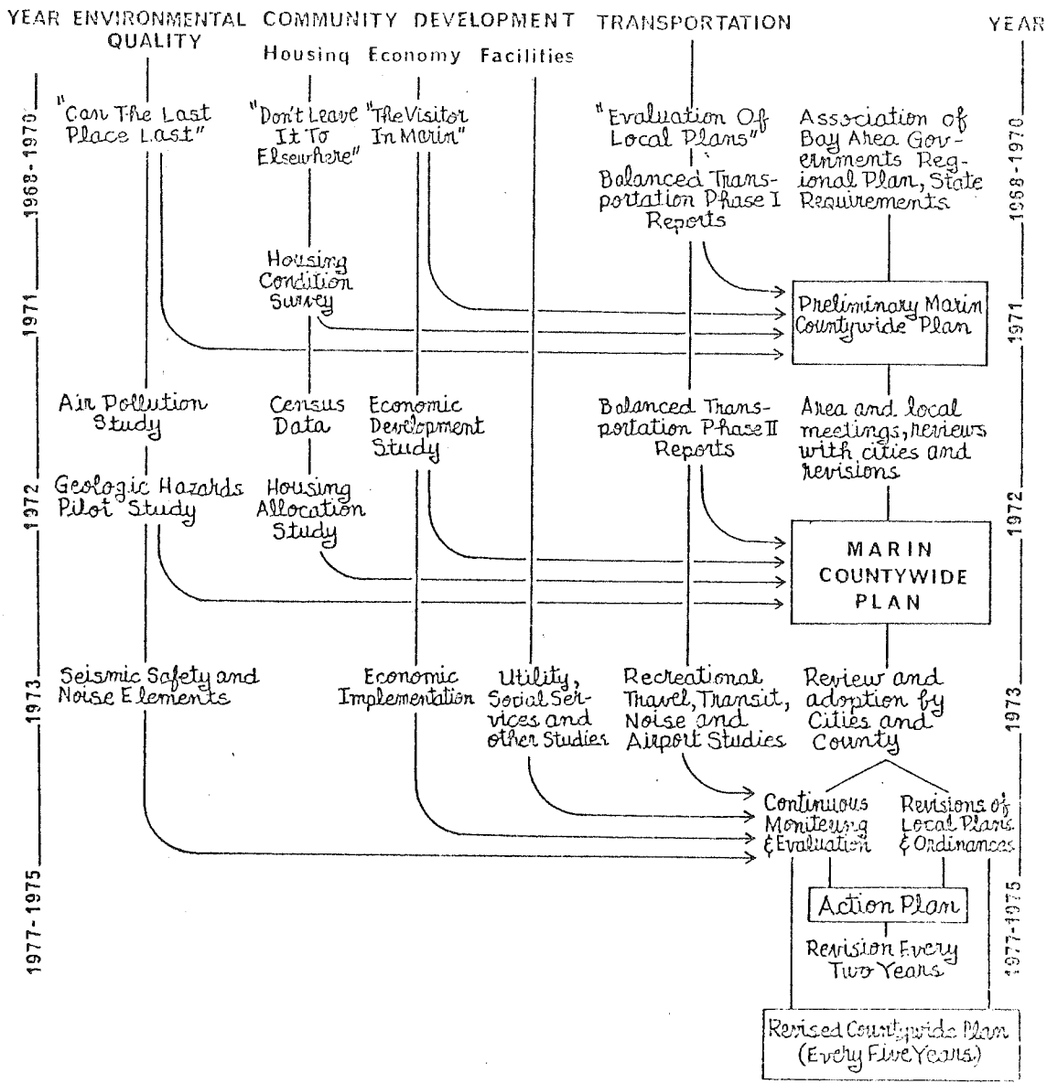


Table 1.3

How Citizens Shaped The Countywide Plan

This table summarizes the recommendations of the preliminary plan, the citizen response, and how the Countywide Plan was changed accordingly.

Preliminary Countywide Plan Recommendations	Citizen Response	Countywide Plan Recommendations
GROWTH AND URBANIZATION • Growth not to exceed 60,000 persons/decade	• Should emphasize control of rate of growth, not end with numbers	• Limited, coordinated growth, resulting in a maximum increase of about 45,000 persons/decade, rather than population "targets"
• Growth focused on existing city centers, not sprawling into central and western Marin	• General support; some concern about limiting property rights	• Same as preliminary plan; more detailed explanation
• Urban densities at selected locations	• Opposition to widespread density increases	• Better definitions of centralized nodes for higher densities to discourage "wall" effect along 101
ECONOMIC DEVELOPMENT • Positive visitor enterprise policy	• Opposition to widespread tourism in West Marin; consider tourism in Northeast Marin also	• Variety of accommodations--some low-cost, some in East Marin--all with environmental controls
• Selective industrial development	• Request for documentation of economic self-sufficiency argument	• More detailed, substantial proposals for business development based on economic study
• Four countywide activity centers	• General support; request for more information; request to include San Rafael	• Addition of San Rafael; definition of community-level centers and business development areas

Preliminary Countywide Plan Recommendations	Citizen Response	Countywide Plan Recommendations
ENVIRONMENTAL QUALITY • Eastern Urban Corridor: Preserve ridges and water edges. • Inland Rural Corridor: Preserve agriculture • Coastal Recreation Corridor: Expand public parks and other open land • Control development according to geologic hazards • Limit extensions to control development	• General support; some reservations until costs were clearly spelled out; opposition from Marin Property Owners and Irate Taxpayers; opposition from San Rafael to extensive open space north of Civic Center	• Detailed analysis of areas and costs; revisions to include new local open space plans and proposals for public acquisition; reduction of open space area north of Civic Center
HOUSING • Preserve and improve existing housing • Expand the supply of low and moderate-income housing • Expand the supply of family-size units • Expand public housing • Include housing in non-residential areas • Permit the addition of second units in selected single-family neighborhoods • Replace units removed by new development	• General support; concern that these policies conflict with Environmental Quality policies*	• Generally same, with more details and recommendations for planning areas

*In specific instances where these policies are to be implemented, there has been outspoken opposition and fear of decreasing property rights. Citizen response to the housing policies at Countywide Plan hearings was probably not conclusive.

Preliminary Countywide Plan Recommendations	Citizen Response	Countywide Plan Recommendations
TRANSPORTATION		
• Establish transit system in Golden Gate Corridor	• Not enough emphasis on transit compared to roads	• Expanded transit recommendations including intra-county
• Ferry system, with three terminals	• General support; some reservations about costs and environmental impacts	• Only two immediate terminals
• Use transit for recreation travel	• Support; some doubt on effectuation	• Same, with details to come in recrational travel study
• Limit highway expansion to city-centered Corridor	• Some support, some opposition to any expansion	• Limited widenings, to allow for busways
• Build parkway to Point Reyes National Seashore	• Strong opposition; some support	• Consider as one possibility in recreational travel study
• Inter-valley connectors: Terra Linda-Sleepy Hollow, Lucas Valley Road-White's Hill	• Opposition from areas immediately affected. General support from areas not impacted	• No inter-valley connectors
• San Rafael Parkway	• Some opposition, but support from San Rafael	• Inclusion, provided open space is obtained; addition of Smith Ranch Road
• Scenic highway treatment of routes to coast	• General support	• Same, with some additional details; no state designation
• No proposal for Hamilton Field	• Requests for analysis	• No new major airport in Marin; no joint commercial use of Hamilton.
• Heliport or STOL facility in Civic Center area	• Opposition, because of noise pollution	• Dropped, until noise problem can be overcome
IMPLEMENTATION		
• No proposals for plan implementation	• Concern that plan will not be carried out	• Countywide Review Agency, Environmental Protection Committee, Other proposals for zoning regulations, capital improvements

The City-County Planning Council and planning staff will continue the work needed to complete state requirements for new mandatory plan elements and obtain other needed information. Studies will be continued on geologic hazards, seismic, noise, and safety, as part of the revision of the Environmental Quality plan component. Additional studies of economic development and housing implementation, schools, health facilities, and social services will be conducted as part of the revised Community Development component. Studies of recreational travel, scenic highways, and specific transit routes will be done under Phase III of the Balanced Transportation Program. Findings and recommendations from these studies will be published as they become available, and incorporated into subsequent revised versions of the Countywide Plan.

Important countywide issues remain unresolved as this report is printed, including the use of the San Quentin Prison site and the formation of redevelopment districts by local governments. As each major issue is resolved, its impact on the Countywide Plan will be analyzed.

The countywide planning process includes continuous monitoring of changing conditions, periodic Countywide Plan review, and preparation of a revised version approximately every five years. In 1977 we should be able to look at the next 20 years in the light of what has happened during the last five, and revise the 1970-1990 plan for 1977-1997. The City-County Planning Council will oversee staff work in revising the Countywide Plan and preparing the Action Plan.

The Action Plan is another basic step in the countywide planning process. It will be a coordinating link between the Countywide Plan and specific implementing programs, based on countywide priorities.

The first Action Plan could be completed in 1974. It will include:

1. Specific action programs for each of the three plan components (Environmental Quality, Community Development, Transportation), each of the three environmental corridors, and each of the eight planning areas, in more complete and specific versions than can be included in the Countywide Plan. Alternative program approaches will be presented for review.

2. Five-year targets for attainment in each action program. (For example, how much open space to be acquired in each corridor; how many jobs to be added in each planning area.)

3. An assessment of the effectiveness of current programs in meeting these targets.

4 Recommended improvements in programs to achieve the targets.

5. Re-evaluation of the targets as changing conditions warrant.

6 Costs and benefits of each alternative program.

This countywide planning process offers a means by which citizens can express their views about how the county should develop, and what the priorities should be. The process is designed to be workable, as well as democratic. The Countywide Plan and the subsequest Action Plan must express the public will, and the public must be given the tools to assure that their will is carried out. This will require adoption and implementation of a Countywide Plan that is:

- Usable by citizens in helping to shape public opinion and affect decisions by government bodies.

- Effective in structuring the course of events caused by actions by private developers and by local, county, regional, state, and federal governments.

- Responsive to changing needs and conditions, as new information becomes available. The plan is not a static, frozen document, but part of an evolving planning process.

Part 2. Environmental Quality

CONTENTS

These pages contain background material which is not part of the adopted plan:

R-right side only L-left side only

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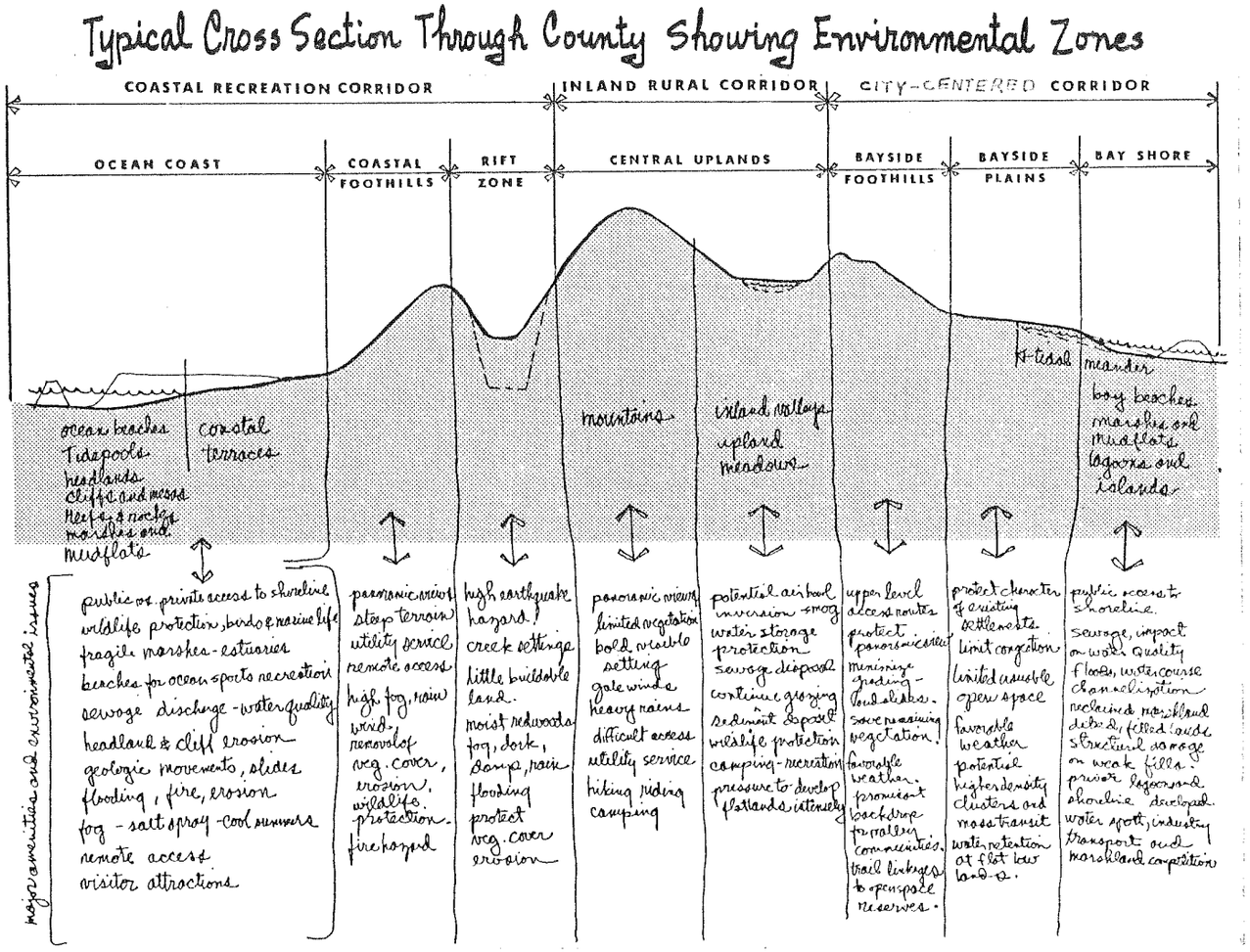
Part 2. ENVIRONMENTAL QUALITY

Introduction

For purposes of environmental analysis, the Countywide Plan divides Marin into three corridors where open space and development issues are different: the City-Centered Corridor, Inland Rural Corridor, and Coastal Recreation Corridor. A major policy of the Countywide Plan is that all types of development will be concentrated in the City-Centered Corridor so that the rest of the county can remain as open as possible, in accordance with the Association of Bay Area Governments' Regional Plan.

Figure 2.2



Research on Marin's environmental quality was described in the 1971 report Can the Last Place Last? The findings from this research were not good. Development in eastern Marin continues to obliterate hillsides and ridges that give form and beauty to communities. Air and water pollution are increasing and a recent study indicates that air pollution will exceed tolerable limits by 1990 unless Marin controls its rate of growth and switches from auto to transit emphasis in its transportation system*. There are no effective countywide regulations to assure that development is controlled to a planned rate.

The 1971 Preliminary Countywide Plan designated 270,000 acres for open space, in parks, agriculture, and conservation zones--about 80 percent of the county's total land area.

Citizens generally expressed strong support of the open space and conservation proposals of the preliminary plan. An upsurge of development proposals beginning in mid-1970 has threatened areas of open space shown in the plan and could produce a rate of growth far exceeding the county's capacity. Marin County voters have established a Countywide Park and Open Space District and citizens in Lucas Valley, San Rafael, and Tiburon have passed bond issues for open space acquisition. Cities in Marin are preparing open space and conservation elements of their general plans.

I. COUNTYWIDE POLICIES

A. Open Space

The Countywide Plan designates for permanent preservation open space in the following categories:

Resource Production: Agricultural, timber, fishing areas, sand and gravel deposits.

Resource Preservation: Water edges, watersheds, tidal areas, wildlife reserves, marshes, mudflats.

Scenic: Greenbelts, separators, open land, forests, grasslands, views, trails.

Safety: Geologic risk areas, airport approach zones, floodplains, noise areas, dikes, fire hazard areas.

Recreation: Public parks, trails, water sports areas, commercial recreation (golf courses, motels, stables).

*Bay Area Air Pollution Control District, A Study to Assess the Impact of Growth Upon the Air Quality of Southeastern Marin County, June 1972.

Land to be permanently preserved in all these categories totals about 80 percent of Marin's total acreage. About 40 percent of the land in the City-Centered Corridor would be secured by the Marin County Regional Park and Open Space District, through purchase and other means. However, even with the massive open space program in East Marin, there would still be more than 14,500 acres of developable land remaining in 1990, approximately 19 percent of the total.

In the City-Centered Corridor the Marin County Regional Park and Open Space District has established the following criteria for priority selections:

Criteria

1. Projects must be identified in the Open Space Element of the Marin Countywide Plan or other adopted general or specific plan.
2. Projects should have the general support of the local jurisdictions within their sphere of influence.
3. Acquisition of lands should be undertaken only for projects of districtwide significance.

Priority Selection

1. Ridge tops will be relatively more important than stream beds and shorelines because they play a much more obvious role in shaping the development of the county.
2. Areas under immediate threat of development or irreversible damage will be given high priority.
3. The visual or ecological importance of the area in the county will have significance.
4. Local contributions in cash, land areas, or land use regulations will be considered but are not essential.
5. Projects which are contiguous and which will extend their usefulness to existing open space preserved areas are important.
6. Attractive purchase considerations and conditions will be significant.
7. Adoption of the Open Space Element of the Countywide Plan by the jurisdiction involved will be significant, but not mandatory.

B. Conservation

Marin County will establish specific procedures for reviewing public and private actions that significantly affect the quality of the environment throughout the county, in accordance with the characteristics of each proposed action and each potential location.

This will be done through the work of the county's Environmental Protection Committee, which now reviews action under the Tidal Waterways Ordinance and consists of directors of the Public Works, Parks and

Recreation, and Planning Departments. Its functions will be broadened to include review of all types of environmental impacts, and its membership expanded to include directors of all county agencies most directly concerned with development and environmental quality. Its findings and recommendations will be presented to the Marin County Planning Commission,and, as appropriate, to other local, regional, state, and federal agencies and policy-making bodies. Cities are now required by law to establish similar mechanisms for reviewing public projects and private developments.

The purpose of the Environmental Protection Committee is based on a changed philosophy of development. It assumes that maintaining the present ecological balance and environmental quality is a prime concern for the public, and that the invididual who wishes to make a change must demonstrate that the action will not cause severe or irreparable damage. Traditionally, the burden of proof has rested on the agency reviewing proposals; now it is shifting to the developer or agency wishing to take action. This philosophy, of requiring the applicant to show cause, underlies the work of the Bay Conservation and Development Commission, which controls actions within 100 feet of San Francisco Bay. The North Central Coastal Zone Regional Commission, established in 1972 by referendum, now must issue permits for all development within 1,000 yards of the ocean coast in Marin, San Francisco, and Sonoma Counties.

Shifting the burden of proof is only one step in establishing understanding of the environmental impact of a proposal. In addition, the county must have adequate data bank of general information against which to evaluate specific site details.

The plan recommends that the following policies apply throughout the county in reviews by the Environmental Protection Committee and similar agencies to be established by cities. Specific standards will be developed for applying these principles where they do not already exist.

1. Air, water, and noise pollution shall be prevented or minimized.

2. Radioactive, chemical, and biological health hazards to man or wildlife shall not be created, and existing levels shall be reduced.

3. Agricultural lands shall be preserved and soil capability shall be maintained. Premature subdivision of agricultural lands shall be prevented.

4. No operation shall cause irreversible damage or more than minimum reversible change to natural hydrological and biological processes.

5. Streams, estuaries, marshes, bays, and tidelands shall be maintained in their natural state.

6. Unique geological, ecological, archeologic, and historic sites shall be protected. Significant natural features shall be included for preservation in their natural state and in an appropriate setting in any design or plan.

7. A diversity and abundance of wildlife and marine life shall be maintained. Vegetation and animal habitats shall be preserved wherever possible.

8. Construction and operations shall be located and designed to avoid or minimize the hazards from earthquake, erosion, landslides, floods, fire, and accidents.

9. Adequate parks, recreation facilities, and open space shall be provided. Appropriate public access shall be established.

10. Man-made environments, where people spend most of their time, shall be healthful, safe, quiet, and of good design both functionally and aesthetically.

11. Projects shall not cause significant adverse impacts on water supply, fire protection, waste disposal, schools, traffic and circulation, or other services and facilities, or on the financial or social environment of the community.

12. Water supply, flood control, waste water and solid waste disposal, soil conservation, open space preservation, and natural resource extraction shall be coordinated to create the greatest public benefit and the least degree of environmental damage.

13. Visual qualities and view potential of both natural and man-made settings shall be an equivalent consideration with other factors in any project or operation review. Tree-cutting and damage shall be avoided wherever possible.

14. Resource use shall be the minimum necessary. Recyclable and biodegradable materials shall be utilized, and used materials shall be recycled or reused whenever possible.

15. Rapid or disruptive population and economic growth shall be prevented by limiting permit approvals in accordance with growth rates recommended in the Countywide Plan.

State law requires that a general plan include "A conservation element for the conservation, development, and utilization of natural resources including water and its hydraulic force, forests, soils, rivers and other waters, harbors, fisheries, wildlife, minerals, and other natural resources." The county already has ordinances controlling mining and quarrying, excavation and grading, timber harvesting, and filling of tidal waterways, which relate to some of the state requirements. Reviews under all these ordinances will become the responsibility of the Environmental Protection Committee, and additional ordinances specifying standards for protection of soils, creeks, fisheries, wildlife, and other subjects will be prepared for adoption.

Conservation Zones

This zone would allow only limited development under strict controls. The Countywide Plan designates specific conservation zones where special controls must be exerted, because of particularly strong dangers of environmental deterioration or hazards. The above criteria to be used in reviews by the Environmental Protection Committee would apply here as elsewhere. But in addition the criterion of finding of need would apply to conservation zones. This means that the applicant (a developer or agency proposing an action in the conservation zone) must demonstrate that the

proposed use requires a site within the conservation zone, and that alternate sites outside the zone cannot be found.

Other special findings would be required, related to the characteristics of the four types of conservation zones:

1. Buffer zones along all streams, 300 feet wide on either side.[1]

2. 1,000 yards inland from the shores of the ocean and bays.[2]

For categories 1 and 2, it would be necessary for the applicant to demonstrate that the proposed use would not damage water quality, the land along the water's edge, fish and aquatic habitats, navigation, and public use of the water, in addition to showing that another usable site is not available for the contemplated use and that other environmental standards have been met.

3. Safety areas, such as rift zones, flood plains or airport approach zones. A specific finding of safety of the proposed use will be required, in addition to findings of need and other criteria.

4. Watershed zones, requiring a specific finding of water quality protection, in addition to findings of need and other criteria.

Lands with varying environmental characteristics have been included in each of these zones. For example, water edge lowlands include natural marshes and other areas that have been diked. All of these are lands with water access, a scarce natural resource which should be used carefully. Moreover, all lands in conservation zones require special regulations because of potential environmental damage and hazards.[3]

C. The Built Environment

The man-made setting plays as important a role as the natural environment in the quality of life in Marin, especially in the City-Centered Corridor, where more than 90 percent of Marin's citizens live. It is critical to relate buildings and other facilities such as transportation lines to their natural settings in both rural and urban Marin, through careful siting and use of materials.

The accompanying development review checklist indicates criteria for evaluating the design quality of structures in various environmental zones. The Environmental Protection Committee will use these measures in reviewing proposed actions and in establishing requirements and incentives for developers.

On open, grassy hillsides, buildings should be clustered well below the ridge, rather than scattered or grouped at the ridge top, to avoid the appearance of sprawl. On wooded hillsides the preservation of trees is of amount concern; here, a more spread-out development pattern is desirable.

1) Based on stream buffer standard recommended in The Plan and Program for the Brandywide, U.S. Geological Survey, Institute for Environmental Studies, 1968.

2) Based on area designated for regulation in Coastline Initiative.

3) The 19 existing subdivided lots on the Bolinas Lagoon side in Seadrift are excluded from the Conservation Zone designation.

Table 2.1

Suggested Development Review Checklist For Environmental Zones

Environmental Zone	Important Should be Required	Desirable Negotiate with Incentives
(1) Wooded Hillsides, Coastal Foothills, Central Upland Mountains, and Bayside Foothills (see Fig. 2.3)	trees retained in natural setting leave substantial area where natural litter and soil build up can occur	buildings set apart (scatter okay) buildings grouped naturally in tree area, no detrimental grading or runoff ridge line not developed
(2) Open Grassy Hillsides, Coastal Foothills, Central Upland Mountains, and Bayside Foothills (see Fig. 2.4)	rural roads and minimal lighting graded cuts and fills replanted with fire protective plant material	buildings clustered in pockets below ridge line (no scatter) grazing or management plan for retaining grassy hillside character planting program with native growth predominant
(3) Creek Settings, Coastal Terraces, Inland Valleys, and Bayside Plains (see Fig. 2.5)	use of creek as common open space in natural setting management program for preventing excess stream blockage and maintaining natural riparian vegetation prevent gullying by diversion of excess surface runoff creek setting as buffer to development with connecting trails to larger usable open space reserves	

Figure 2.3

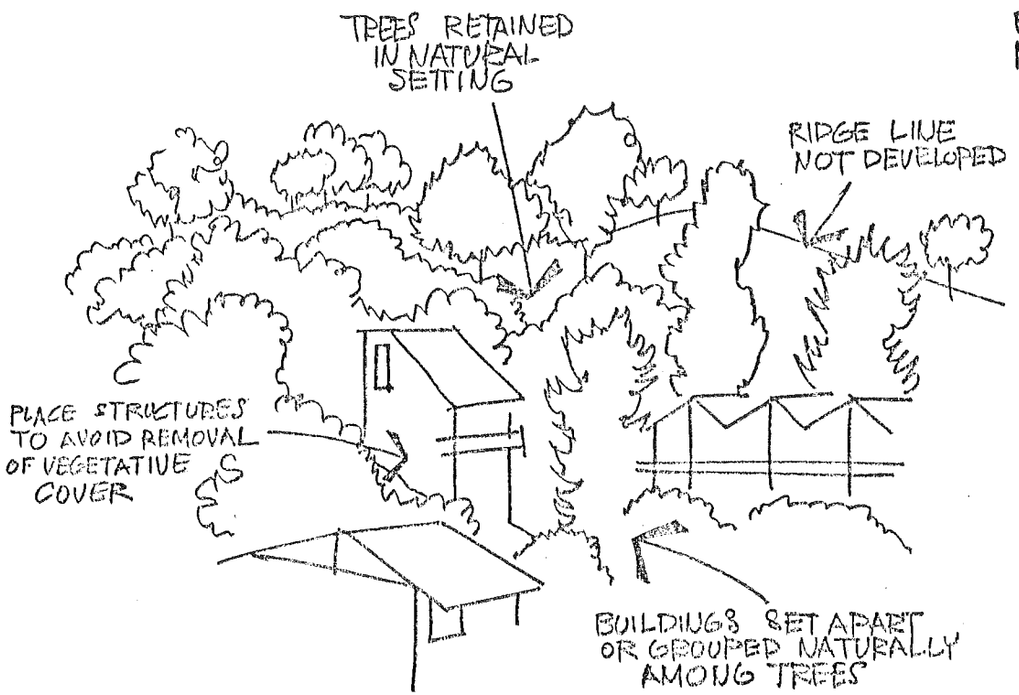


Figure 2.4

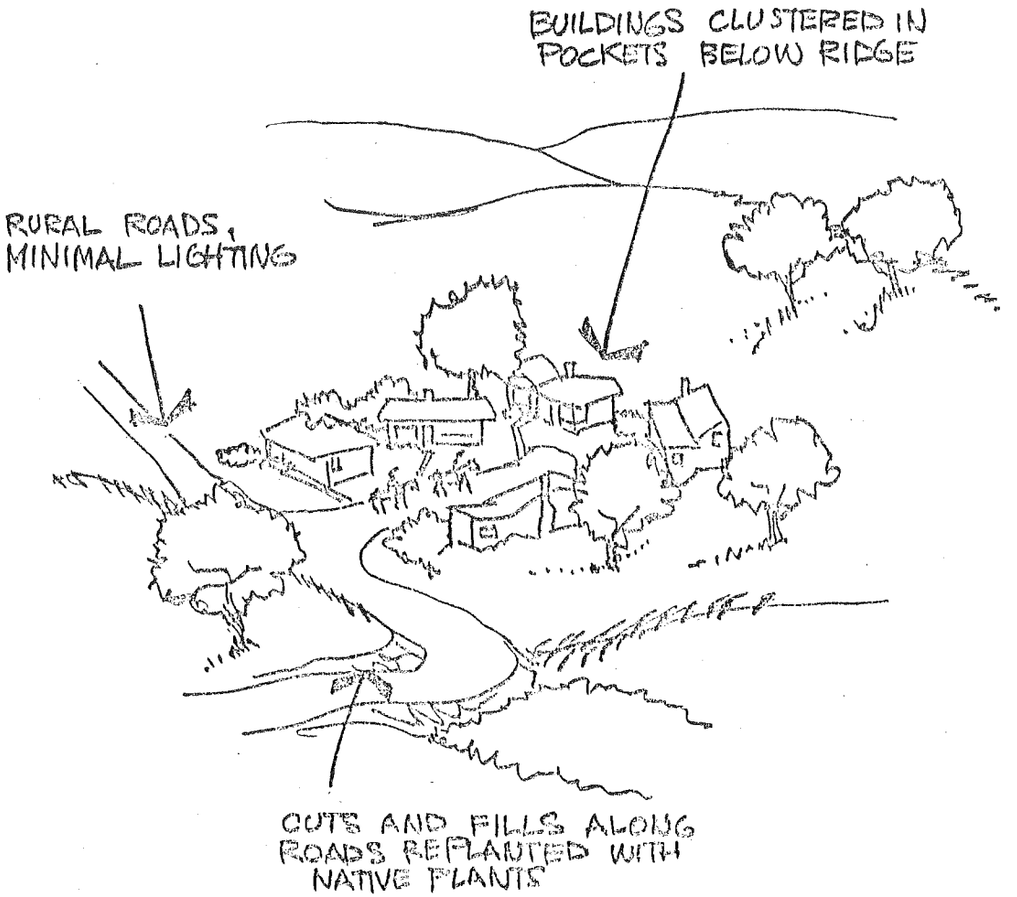


Table 2.1 (cont'd.)

Environmental Zone	Important Should be Required	Desirable Negotiate with Incentives
(4) Low-lying Mudflat or Tidal Fill Area (see Fig. 2.6)	public access to shoreline and ample open views to water area adequate proportion of marsh and wildlife zone protected from incursion channel improvements in natural configuration, spoils for nesting provision for flushing and pollution protection, in ecological reserves	pier structures instead of fill where possible for structures low silhouette building forms
(5) Enclosed Valley or Area Exposed to Travel Corridor in Bayside Plains (see Fig. 2.7)	sympathetic relationship to existing built environment in vicinity central usable open space linked to perimeter open space areas	buffer zone landscaped, not fenced at traffic corridor on boundary focal or prominent feature protected, rock outcrop special wall, clump of trees
(6) All Environmental Zones (see Fig. 2.8)	cluster for reducing cost of roads and utilities; savings passed on in reduced unit cost charges dedicated or managed usable open space in ratio to developed area exterior grounds and building maintenance program usable greenbelts, landscaped or natural with paths and trails	sediment production increased minimally or stabilized provision for elderly handicapped group care facilities recreation facilities, clubhouse, tennis courts, swimming, other walk system to reach schools, church, shopping with traffic conflicts minimized road system easily understood by visitors

Figure 2.5

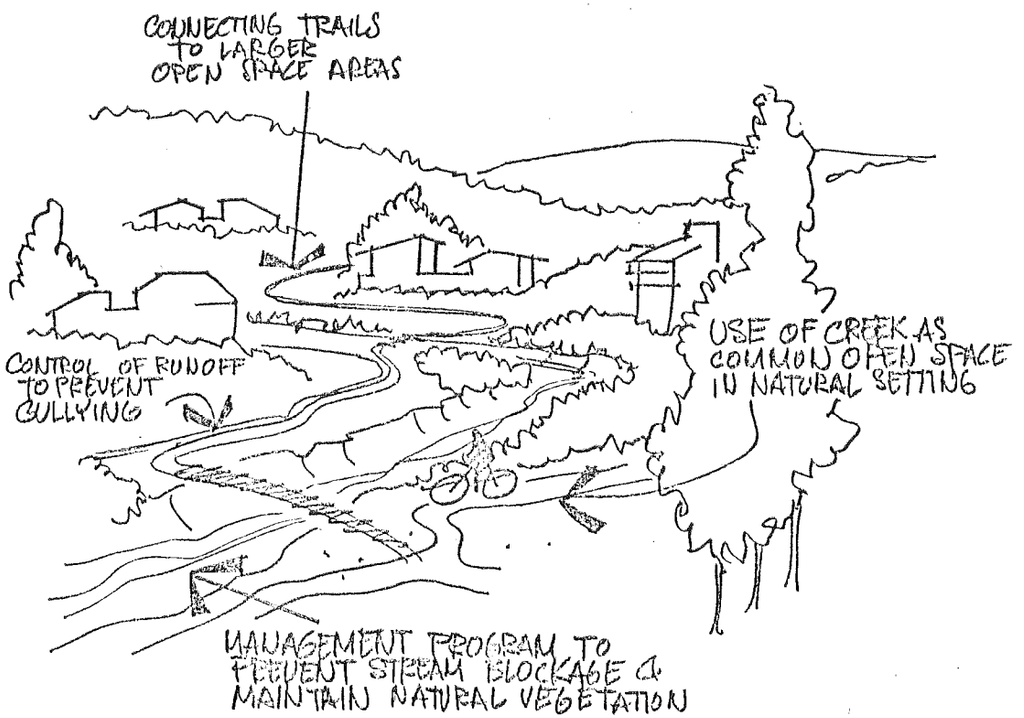


Figure 2.6

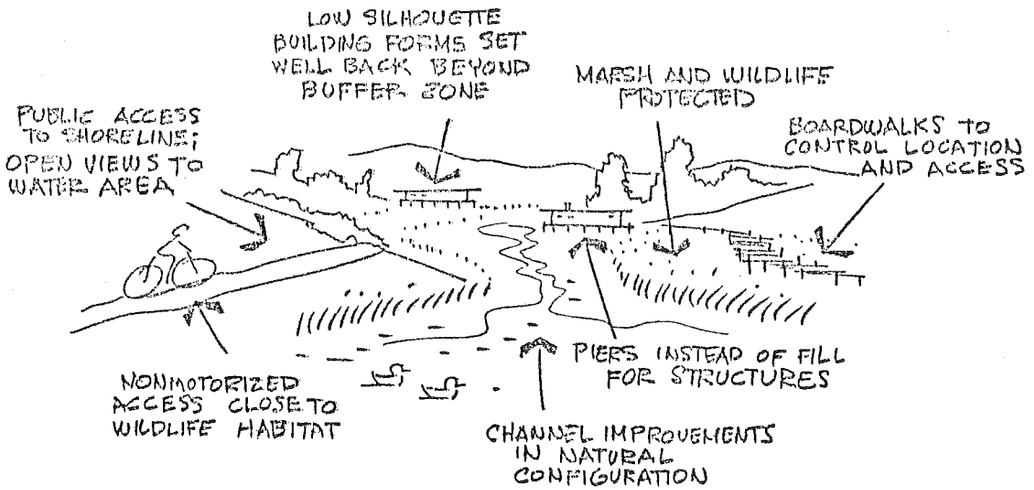


Figure 2.7

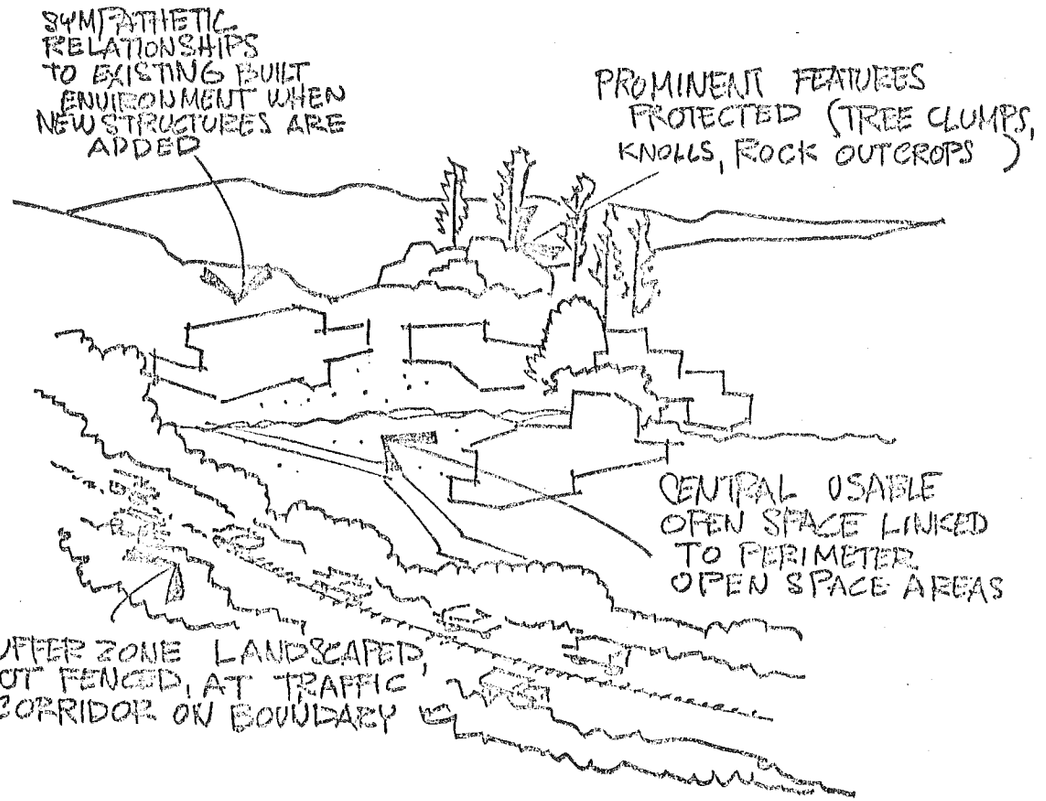


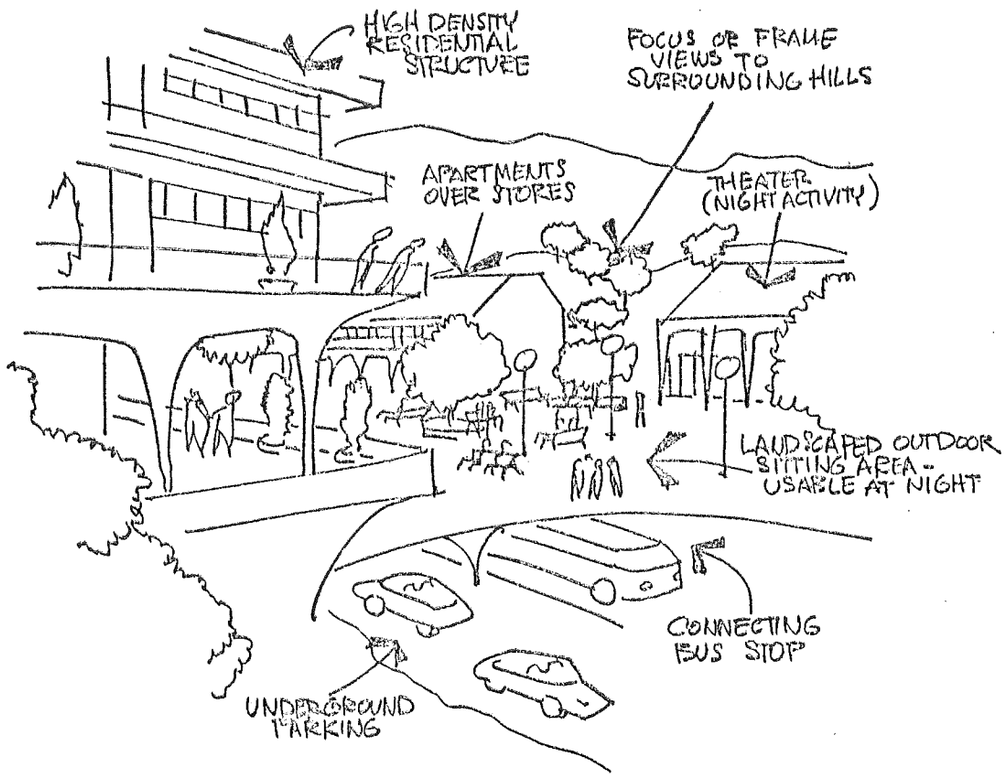
Table 2.1 (cont'd.)

Environmental Zone	Important Should be Required	Desirable Negotiate with Incentives
(6) All Environmental Zones (continued)	adequate safe children's play area away from auto circulation usable private outdoor living space for each unit underground utilities, cable TV, emergency power back-up dwelling units buffered from exterior noise and visual intrusion reasonable growth and expansion or phasing increments plan on-site storm water runoff retention or control of off-site effects special safety considerations incorporated; earthquake, fire, police	plan for expanding size or flexibility of units climate considerations, glare, shade, ventilation, screening, privacy outdoor signs and road hardware, benches, trash collection, storage, lighting recycling water for irrigation compatible appearance to community patterns already in existence covered or structured off-street parking

The following bonus opportunities for encouraging quality would be based on individual circumstances and subject to negotiation:

1. Deferred or reduced taxes for a limited time period.
2. Direct government assistance or participation in road, utility, flood control and fire protection services.
3. Increase in number of units allowed for development.
4. Purchase and lease back open space or other land holding.
5. Assistance in providing library, school and health services.
6. Assistance in providing for transit stop or link in transport system.

Figure 2.8



Along creeks, development must retain the natural appearance, prevent water pollution, and minimize flood hazards from runoff. On low-lying mudflats or tidal fill areas, public access to creeks, streams, and the shoreline and protection of plant and animal habitats are essential.

The design of high-intensity nodes of development in the City-Centered Corridor is especially important, because these areas are viewed and visited by large numbers of people. They include countywide activity centers, smaller community activity centers, and business development areas such as office concentrations and industrial parks. Business, commercial, and high-density residential development should be concentrated in these centers, shown in the Community Development section of the plan.

Four major principles should guide the design of countywide and community activity centers and business development areas:

- Accessibility. Centers attracting large numbers of people must be well-served by transportation lines, especially by public transit. Walkways should connect buildings conveniently with nearby transit stops. Bicycle and walking paths should connect with adjacent areas, to encourage local access by means other than the automobile.

- Concentration. Intensive development must be concentrated at relatively few highly accessible locations. Development along 101 or other major roadways must not take the form of a solid, or even intermittently broken, wall of high-density development. Rather, there must be widely spaced, compact, fairly dense centers at carefully selected locations, separated by low-density development and green space. This configuration along Marin's major transportation corridor would support efficient transit, stimulate the creation of accessible jobs, and make it possible to reduce sprawl, in addition to providing a pleasant view from the freeway.

- Multiple uses that are mutually supporting will be encouraged. For example, providing housing in business and commercial areas can have the beneficial effects of making services and jobs readily available to residents, supporting a wide range of commercial activities in the evening and on weekends, and increasing the use of public transit. Activity centers should also provide spaces for formal and informal public gatherings.

- Amenity. Centers of business and employment must offer an attractive environment, with landscaping, distinctive lighting and outdoor furnishings, and public sitting areas. Public access to waterfront areas should be provided, and historic buildings and sites should be preserved. The visual impact of parking must be minimized by placing it underground where possible and landscaping surface lots. Views of important natural and man-made features will be preserved and enhanced.

D. Seismic Safety

State law requires general plans to include a seismic safety element "consisting of an identification and appraisal of seismic hazards such as susceptibility to surface ruptures from faulting, to ground shaking, to ground failures, or to effects of seismically induced waves such as tsunamis and seiches."

Most of Marin County is sandwiched between two major active fault zones, the San Andreas and the Hayward, both of which have generated great earthquakes during the 200 years of the recorded history of the area.

There are many factors that determine structural damage from earthquakes, some more important than proximity to the epicenter. Different geological materials react differently to earthquakes, depending on such factors as density, cohesiveness, and water content. In general, the greatest earthquake vibrations will occur within the superficial unconsolidated materials--bay mud, artificial fill, landslide deposits, alluvium, and colluvium. The dangers in landslide-prone areas will be greatly multiplied if a great earthquake occurs during a period of saturation.

While the frequency of major earthquakes cannot be reliably predicted now, studies by the California Division of Mines and Geology indicate that at least one or two per century can be anticipated.

To reduce potential damage from future earthquakes, the Countywide Plan recommends that within designated fault zones, all concentrated or hazardous uses be prohibited, including schools, hospitals, other institutions, high-density housing, and reservoirs.

In addition, steps should be taken as soon as possible to minimize earthquake damage from existing buildings. Deficient structures in fault zones should be amortized or rehabilitated, and special methods should be adopted to assure earthquake-resistant construction of critical buildings such as hospitals, schools, high-density buildings, bridges, overpasses, and dams.

Further studies are needed to fulfill state requirements for a seismic safety element. This will include determining the extent of seismic risks that are acceptable to the county, presenting contingency plans (developed by the Marin Office of Emergency Services), identifying natural and man-made hazards, and recommending detailed policies for minimizing earthquake damage. Many of the findings from the continuing study of geologic hazards in Marin will be applicable to seismic safety planning.

E. Safety

The Environmental Protection Committee will review each proposal for possible damage from all natural hazards including landslides, settling of structures, flood and other hazards, as well as earthquakes.

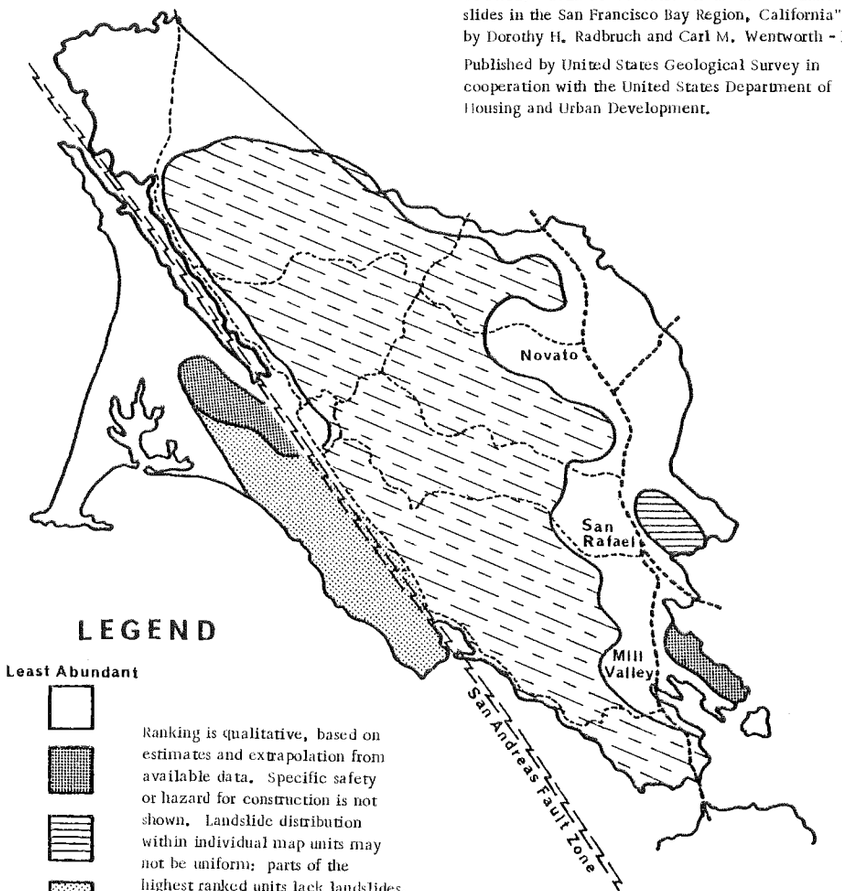
Soil conditions, and resulting geologic hazards, usually vary greatly within one development site, and structures must be located and designed accordingly. The map in Figure 2.10 shows that approximately 250 square miles fall within the "most abundant" landslide categories. This map provides only a rough picture of general differences. Final determination of safety hazards must be based on thorough field checks of the underlying soil and rock, slopes, and potential effects of faults.

Figure 2.10

Estimated Relative Abundance Of Landslides In Marin County

SOURCE: "Estimated Relative Abundance of Landslides in the San Francisco Bay Region, California" by Dorothy H. Radbruch and Carl M. Wentworth - 1971

Published by United States Geological Survey in cooperation with the United States Department of Housing and Urban Development.



Development will be closely regulated in other hazardous areas and areas subject to extreme noise, such as airport approach zones. Additional studies will be conducted to provide the information needed to complete the noise and safety plan elements required by state law. Findings from these studies will be reported as soon as they become available.

F. Recreation

Marin's extensive recreation facilities contribute to the quality of life as well as the economic base of the county. The accompanying map and chart indicate the various types of facilities operated by federal, state, county, city and district governments and by private organizations.

Generally, federal and state governments will continue to finance and operate the large facilities, mainly in the Coastal Recreation Corridor, that attract people from outside the county.

The County Parks and Recreation Department and Marin Municipal Water District provide facilities serving people from beyond the immediate local area. The county department is now serving as staff for the Marin County Regional Park and Open Space District. The new agency's primary function will be to acquire open space. One criterion that should be used to determine acquisition priorities is open space that can serve recreational purposes.

Recreation facilities will be subject to environmental impact review in the same manner as any other type of development. It is usually assumed that recreation is desirable from an environmental as well as a social point of view. However, heavily used parks and trails can have adverse effects on ecologically fragile areas and on agriculture. These impacts will be evaluated by the Environmental Protection Committee, and recreation projects will be planned to minimize them. In agricultural areas of central and western Marin, recreational activities in open space will be planned for compatibility with existing farming operations.

Cities and recreation districts will continue to provide parks, playgrounds, playfields, and other facilities of a smaller scale and serving local requirements.

Table 2.2

Types Of Recreation Facilities In Marin County

Responsible Agency	City-Centered Corridor	Inland Rural Corridor	Coastal Recreation Corridor
Federal	--	Muir Woods National Monument	Pt. Reyes Nat'l Seashore, Golden Gate Nat'l Rec. Area: beaches, camping, trails, outdoor education, wilderness preservation, picnicking
State	Angel Island Park: Boating, trails, picnicking, beaches	Samuel Taylor and Mt. Tam. Parks: Camping, trails, picnicking, outdoor education	Stinson Beach, Tomales Bay Parks: beaches, picnicking,
County Parks & Rec. Dept.	Beach parks, marinas, upland parks, wetland and botanical reserves, trails	Trails, stream reserves, reservoir parks: Fishing, picnicking	Beach parks, marinas, trails, wetland and botanical reserves, trails
Water District Lands	--	Watershed reserves: Camping, trails, fishing, picnicking, bike paths	--
Local: Cities and Recreation Districts	Community parks, playgrounds, tot lots, swimming pools, indoor facilities, athletic fields, golf, tennis, bike paths, historic landmarks	--	--
Commercial Firms	Boating, swimming, golf, sports arenas, indoor recreation, tourist facilities, stables	Golf, tourist facilities, stables	Tourist facilities, boating, stables

The order in which open space areas are listed in this section does not imply a priority for acquisition or regulation. This is being determined after detailed study of areas and consultation with local jurisdictions, by the Marin County Regional Park and Open Space District and by other operating agencies.

A. CITY-CENTERED CORRIDOR

Most of Marin's people live here, in a series of bayfront towns around inlets and peninsulas, separated by ridges. The City-Centered Corridor consists of three main environmental zones, which affect the kind of development that is appropriate, as described in the suggested development review checklist.

1. The bay shore, consisting of tidelands, marshes, and flat land. Some of this zone has remained in its natural state, but there has been extensive land fill for housing, commerce and industry.

2. Bayside plains, generally semi-circular, separated by ridges extending into the bay. Most of Marin's development has occurred here.

3. Bayside foothills, knolls and ridges, generally heavily wooded on the north slope and grassy on the south slope. This area is experiencing the most pressure, as development moves up out of the bayside plains.

The major environmental issue confronting the City-Centered Corridor is that present development trends, if unchecked, would cause great environmental and aesthetic damage. The unconstrained market would continue to develop housing on slopes, ridges, and bay shore lands; air pollution, congestion and general environmental deterioration would continue to rise. Communities would gradually lose their natural beauty and their distinctive qualities in a sea of sprawl. There would be much greater potential damage to life and property from landslides, floods, fires and earthquakes.

The map of Major Developments in the City-Centered Corridor (Fig. 212) clearly shows how currently approved developments, if built, would seriously jeopardize Countywide Plan goals for open space and a controlled growth rate.

Marin's Citizens share a strong concern for taking some kind of action to stem these damaging trends, as clearly shown during the review of the Countywide Plan. However, there are still important differences among various jurisdictions about which areas should be protected from development and how open space and conservation policies should be applied. Several cities in Marin are now preparing their own open space elements, in accordance with state law. When timing permitted, recommendations from these elements were incorporated in this report.

Another issue that arose during review of the plan was concern over designation of the eastern corridor as urban. Some citizens felt that this word implies widespread high densities and general loss of amenities throughout the whole eastern zone. Consequently, the name has been changed from "Eastern Urban Corridor" to "City-Centered Corridor" reflecting the guiding principle of the ABAG Regional Plan. Nevertheless, it should be recognized that the real choice in the developed eastern part of the county is between suburban and urban, not between rural and urban. The suburban development pattern has been a major contributor to many of the environmental ills we experience today--sprawl, air pollution from automobiles, loss of community identity, high public and private service costs. Moving toward a more urban development pattern, with higher densities in some selected locations, can help to preserve open space within the eastern corridor, and to retain the truly rural character of central and western Marin. However, achieving a quality city environment will require application of high design standards. The Countywide Plan seeks to set principles for urban-density locations and functional interrelationships, as a basis for achieving high design quality.

RECOMMENDATIONS FOR THE CITY-CENTERED CORRIDOR

Because development pressures are strong, open space in the City-Centered Corridor should be secured (by purchase and other means) by the Regional Park and Open Space District or other public agency in order to assure preservation. Acreage and estimated market values, based on the current Assessor's rolls, are shown on Table 2.7 for each area.

The open space district has designated six areas in the City-Centered Corridor for first priorty acquistion: Mount Burdell, Big Rock Ridge, San Rafael-Sleepy Hollow Divide, San Pedro Peninsula, Cascade Canyon, and North Ridge.

Community Separators

These ridge and upland greenbelts will separate and beautify Marin's communities and would be of benefit to all. Some will include hiking, biking, or horseback riding trails.

Table 2.3

CITY - CENTERED CORRIDOR

Total Acres	Acres in Secured Public Open Space		Developed Areas	
	1970	1990 Plan	1970	1990 Plan
79,140	1,980	32,820	23,730	30,464

1. Wolfback Ridge to Tennessee Valley, west of Highway 101, around to Oakwood Valley, will preserve Marin's southern gateway. It will connect the Golden Gate National Recreation Area with Sausalito and Marin City.

2. Ridges Above Tamalpais Valley, along Panoramic from Tennessee Valley westward, includes trail links with Mount Tamalpais State Park. It may not be possible to acquire some parts of this area which have already been developed. Portions are included in the Golden Gate National Recreation Area.

3. Tiburon Peninsula Ridge includes trails to several points along the bay. The City of Tiburon's open space element recommends this ridge be preserved through a combination of public acquisition and land use regulations.

4. North Ridge. This is one of the most important community separators still remaining in Marin, connecting Mill Valley, Corte Madera, and Larkspur with the water district lands to the west. These cities have expressed their intention to retain these lands as open space, and not allow auto access to them.

5. Rim of the Corte Madera Creek Watershed connects the Upper Ross Valley communities with the Marin Municipal Water District open land. Includes Cascade Canyon, a priority open space area.

6. Southern Heights Ridge, dividing San Rafael and the Ross Valley, has already experienced extensive development. However, this important community backdrop and as much of the area as possible should be retained in a greenbelt through scenic easements.

7. San Pedro Peninsula Hills provides a backdrop for the Civic Center and offers panoramic views of the bay region. It should become a major regional park. The City of San Rafael has acquired a postion of the area, but development pressures threaten remaining sections.

8. San Rafael-Sleepy Hollow Divide is an important separator where housing has already begun to intrude. There is extensive open space remaining in the western part, which should be preserved. To the east the remaining ridge including a trail extending from the Civic Center to Loma Alta should be preserved through easements and other methods.

9. Big Rock Ridge separates the Novato basin from the Lucas Valley-Marinwood communities; extends to Stafford Lake Park and borders the new College of Marin Indian Valley campus.

10. Hills East of 101 Near St. Vincent's School. These two open areas will provide a continuous greenbelt system between Big Rock Ridge and San Pablo Bay. This space will separate new development in the Silveira-St. Vincent's area from other development north and south.

11. Bahia and Black Point Knolls and Ridges will preserve the scenic backdrop for the Route 37 entry into Marin. This area has also been partially developed.

12. Mount Burdell, the major landmark of North Marin, should be included in a permanent scenic reserve extending from Gnoss Field to Stafford Lake. It is threatened by strong development pressures. Park facilities and bicycle, hiking, and riding trails connecting with adjacent communities should be included. The nearby Olompali Ranch should be preserved as an historic site.

Water Edge Lowlands

13. Richardson Bay. These sections of shoreline should be acquired by county or city agencies for recreational purposes or resource protection: Manzanita Green, connecting Marin City with the bay, could provide a shoreline park for Marin City; a small salt marsh, one of the most valuable still remaining in the bay; the head of Richardson Bay, where Mill Valley intends to develop a small boat harbor and other recreation facilities; Strawberry Cove; and strips along the Tiburon shoreline.

14. East Side of Tiburon Peninsula, now partially developed, from Keil Cove northward adjacent to Tiburon Ridge, should include expansion space for Paradise County Park and a trail.

15. Corte Madera Bay Front. Existing marshes should be preserved, and the San Quentin site should be considered for public recreation as well as other uses when it ceases to operate as a prison. Open space here should adjoin and provide a backdrop for the Larkspur ferry terminal and future commercial developments. A Corte Madera Bayfront Park covering part of this area is included in the county's current capital improvements program.

16. San Rafael Bay. Land along the bay shore should be permanently secured for open space before the proposed San Rafael Waterfront Parkway is built. The road should be inland from the park. This is the highest density residential area in the county, but it lacks adequate open space.

17. San Pedro Peninsula Shoreline should be acquired for water-oriented recreation from McNear's Beach north to Las Gallinas Creek. Tidelands and marshes should be preserved, and there should be trail connections with the proposed San Pedro Peninsula Hills regional park.

18. San Pablo Bay Front, Las Gallinas Creek to Novato Creek, should be kept open for flight approach zone safety and to preserve the tidelands. The creekside should be kept free of developments which would contribute to siltation and loss of navigational use in the stream channels. This area contains the county's future North Bayfront Park and a possible ferry terminal site.

19. Novato Creek to Black Point, a valuable flood ponding area, should be acquired for this purpose and also to provide a connector across Bel Marin Keys and access from Highway 37.

20. Petaluma River. Natural marshes, river bank areas, and wildlife refuges between Bahia and the bay should be preserved. The Marin Parks and Recreation Department will cooperate with Sonoma County in locating and developing the planned Petaluma River Park.

Stream and Creek Reserves

Most stream buffers in the City-Centered Corridor have already been encroached upon by development so that in many cases it is no longer possible to attain the desirable standard of 300 feet on each side. In any case, strict controls and high environmental standards must be maintained in these zones.

21. Mill Valley Area Creeks. Local jurisdictions should provide adjacent parks and regulate development to protect streamside vegetation along Arroyo Corte Madera del Presidio, Old Mill, Cascade, Homestead, and Coyote Creeks.

22. Corte Madera Creek. Although much of this creek has already been lined with concrete, a landscaped bicycle path alongside has been started. It should be extended from the Larkspur ferry terminal through the Ross Valley.

23. Las Gallinas Creek. The north edge should remain open and landscaped, providing a connection between the Civic Center and the new North Bay Front Park.

24. Miller Creek from 101 to Big Rock should provide a continuous natural strip through Marinwood and Lucas Valley. This should be assured as development plans are reviewed.

25. Arroyo San Jose through Rafael Village and the Novato Golf and Country Club area should also be kept open through regulation.

26. Novato and Warner Creeks, among the few remaining natural streams in East Marin, should be kept as reserves as far to the west as possible, through acquisition of streamside development rights.

Safety Zones

27. Hamilton Field Approach Zone.

28. Gnoss Field Approach Zone.

Hazardous uses should be prohibited in these areas. No public acquisition is required. Studies for the safety element of the County-wide Plan will present more detailed recommendations.

B. INLAND RURAL CORRIDOR

Agriculture continues to function as an important part of Marin's economy, and most of the land still used for this purpose is in the Inland Rural Corridor. Two environmental zones extend through this corridor: the belt of inland valley and upland meadows, where farms, ranches, rural villages, and water reserves are located; and the county's central range of mountains, generally with access too difficult for any but recreational uses.

Dairying remains the leading agricultural activity in Marin, although it has been declining because of increasing costs, sluggish demand, and rising land values. Livestock, poultry, and horsebreeding operations have been growing and now represent the second most important farming operation.

Much of this corridor is now in agricultural preserves, lands whose owners have agreed that they will leave the land undeveloped, in return for the county assessing its value based on agricultural uses only. State law, the Williamson Act, requires that areas including agricultural preserves be zoned for uses that are compatible with agriculture. The county is now rezoning the rural portions of central and western Marin into 3 to 60-acre minimum lot sizes, in order to stabilize land values, taxes, and rural settlement patterns.

Table 2.4

Gross Dollar Value Of Commercial Agriculture In Marin County

	1960	1971
Dairy Products	79.1%	65.6%
Other Livestock and Poultry Products	2.6	3.9
Livestock and Poultry	9.3	20.0
Field Crops	6.5	6.7
Nursery and Cut Flowers	2.5	3.8
	100.0%	100.0%
Gross Dollar Value	$13,942,000	$18,439,680

Source: Marin County Agriculture Commission

Table 2.5

Inland Rural Corridor

Total Acres	Acres in Secured Public Open Space		Acres in Agricultural Areas		Village Acres	
	1970	1990 Plan	1970	1990 Plan	1970	1990 Plan
130,280	23,490	39,290	105,790	89,090	1,000	1,900

RECOMMENDATIONS FOR THE INLAND RURAL CORRIDOR

A combination of agricultural and open space zoning and contracts with land owners will be used to preserve open land in the Inland Rural Corridor. In addition, government agencies and local groups will undertake special land management programs to protect streams, grasslands, and forests. Some acquisition by public agencies is needed, to expand public parks and watersheds. Acreage and (where appropriate) cost figures for open space in the Inland Rural Corridor are shown in Table 2.8.

Public Open Space

1. Marin Municipal Water District Lands include hiking, riding, and bicycle trails and limited recreation facilities such as scout camps, in addition to their primary function of providing watershed reserves and reservoirs. This area should be expanded to the north around the Kent Lake Watershed to include the Carson Creek drainage. The Water District is now studying the recreational potential of all its lands.

2. Samuel P. Taylor State Park should be expanded to include Devil's Gulch to the north, thus meeting the proposed new Nicasio Reservoir Park and providing a continuous park strip from the Golden Gate.

3. Nicasio Reservoir Park. This area offers excellent potential for fishing and boating, but it is likely to be subject to development pressure that would preclude public use. The County Parks and Recreation Department has programmed a part of this area for purchase.

4. Stafford Lake Park. The county has recently opened a park in a portion of this area, which includes the lake owned by the North Marin Water District. Additional land should be acquired to provide recreational opportunities and prevent encroachment by development in the watershed which drains to the lake.

Agricultural Areas

Agricultural preserve contracts and zoning to minimum lot sizes of 3 to 60 acres should be the primary means used to preserve open space in these areas while allowing for the pursuit of agricultural activities. Some limited recreational use, such as dude ranches, campgrounds, and hostels for bicycle travelers, should be permitted, to allow for reasonable use of private lands.

Lakes holding treated and reclaimed sewage water are being considered for recreation and for possible agricultural use, in Chileno Valley, Bulltail Valley, and Walker Creek drainage basin. These lakes should be used as alternatives to ocean or bay outfalls.

Rural lands retained for agriculture should not be expected to pay urban service districts assessments, and public investments should be scaled accordingly. The countywide soils district should manage agricultural soils to protect them from erosion and pollution from livestock.

Conservation Areas

Stream courses in the Inland Rural Corridor are especially prone to environmental damage. They will be carefully protected from pollution, bank erosion, and destruction of native plants, animals, and fish in Environmental Protection Committee reviews of any proposed activities affecting watersheds. These activities include agricultural uses, such as damming for holding ponds, pumping water, and disposing of cattle waste.

A conservation zone with a stream buffer 300 feet on each side is proposed for the following streams: Estero Americano, Estero San Antonio and Stemple Creek, Keys Creek, Chileno Valley and San Antonio Creek, Walker Creek, Arroyo Sausalito and Salmon Creek, Novato Creek, Halleck Creek, Nicasio Creek, Lagunitas Creek, and San Geronimo Creek. These areas, subject to regional water quality controls, will also be zoned for open space. Development and use will be carefully controlled in accordance with environmental protection policies for conservation zones.

COASTAL RECREATION CORRIDOR

Marin's ocean coast is a rugged, dramatic meeting of land and sea that attracts visitors from throughout the world. Its limited accessibility has prevented extensive development, but the pressure for second homes and sub-divisions is increasing on the remaining private land.

Much of the corridor has been or will be acquired by public agencies for recreational purposes--Point Reys National Seashore, the Golden Gate National Recreation Area, and the Mount Tamalpais, Stinson Beach, and Tomales Bay State Parks. The county has recently acquired Bolinas Lagoon and plans another park on Tomales Bay. Because recreational facilities here primarily serve people from beyond Marin County, they should continue to be the responsibility of Federal and state governments. Acreage and cost figures for open space in the Coastal Recreation Corridor are shown on Table 2.9.

The use of private land in the corridor is also critically important, not only because of the area's great regional and national importance, but also because of the fragile quality of the natural environment. Previously adopted plans for West Marin and Bolinas-Stinson Beach assumed, like other plans of their time, that most lands not publicly owned would be developed. The resulting pattern would have been a continuous spread of suburban sprawl along the coast. Both plans have been rescinded by the Board of Supervisors, and revised plans will be prepared in accordance with the Count-wide Plan.

The Preliminary County-wide Plan recommended establishing resort complexes at selected locations in West Marin, to achieve economic benefits to the county and allow for reasonable use of private land. A number of citizens objected to this proposal, because of the potential for environmental damage. The City-County Planning Council approved the following statement as an amendment to the preliminary plan: "Visitor services and resorts should be encouraged at carefully selected locations, provided the environmental change will be minimized, and that they will produce social and economic benefits to the county. These facilities should vary in type and size and should enclude low-cost accommodations and nature study centers, as well as small convention hotels." The Countywide Plan now designates no specific areas for tourism, but provides for their development under careful review, if suitable sites are proposed. (See Village Development Policies section part 3). Another controversial proposal of the preliminary plan for the Coastal Recreation Corridor was the Point Reyes National Parkway, intended as a means of accommodating recreational travel needs. The Countywide Plan does not recommend a parkway as aspecific facility but proposes instead that a parkway be considered as one of several possible methods of solving the problem of traffic congestion in West Marin on weekends and holidays. (See part 4, Transportation.)

Several studies affecting this corridor are now underway or recently completed including the Association of Bay Area Governments' Ocean Coastline Study, the Tomales Bay Study sponsored by the Conservation Foundation and other organizations, and a study of geologic hazards in Marin being conducted by the State Division of Mines and Geology. Findings from these studies have been incorporated here wherever possible.

RECOMMENDATIONS FOR THE COASTAL RECREATION CORRIDOR

Public Open Space

1. Golden Gate National Recreation Area. Congress has authorized creation of this major new national park, generally including the southern tip of the county, extending east to the boundary of the Eastern Urban Corridor and north to Muir Beach and Taylor Park; and the Olema Valley, north to Sir Francis Drake Boulevard, excluding the Town of Olema. This configuration assures a continuous corridor of public land for recreation and open space along Marin's southern coast and adjacent to Point Reyes National Seashore. The Countywide Plan recommends that the area be retained in its natural state to the greatest extent possible, and that recreational uses be low density.

2. Mount Tamalpais-Stinson Beach State Parks. These state park lands surrounding Muir Woods National Monument have recently been expanded to the north by a land donation. The area should continue to be used for fairly intensive public recreation.

3. Point Reyes National Seashore and Tomales Bay State Park. The National Park Service is now completing land acquisition and developing facilities at Point Reyes. The Countywide Plan recommends that the National Seashore be retained in its natural condition to the greatest extent possible, and that it provide primarily low-intensity recreational uses such as hiking and wilderness education. High-intensity uses (picnicking, sports activities) should be provided only in areas that can resist environmental damage, such as beaches. These areas should be served by convenient public transportation, but ecologically fragile areas should remain relatively inaccessible. It is hoped that the National Park Service will establish interpretive resource centers before opening up environmentally sensitive areas and that it will plan and work toward the establishment of an internal transit system as soon as possible. A broadly based GGNRA Citizens Advisory Committee composed of persons also familiar with Point Reyes Seashore (as described in Congressional legislation) should be appointed immediately so that public input in the planning process will be assured.

4. Bolinas Lagoon has recently been acquired as a county park, primarily as a reserve in a fragile natural environment. A limited amount of public facilities will be provided over time with the impact monitored through a research program by the County Parks and Recreation Department.

Agricultural Areas

Agricultural zoning and contracts should be used to help preserve and encourage the retention of these activities and preserve portions of this corridor in their present dairying and ranching uses, as recommended for the Inland Rural Corridor. Further analysis is now being conducted to determine how agriculture can continue to operate feasibly in Marin, as part of the study of the plan's economic impacts.

Conservation Areas

Designated conservation zones in the Coastal Recreation Corridor will be carefully controlled in accordance with the special environmental protection policies for these areas. Duxbury Reef, Bolinas Bay Cliffs, Bodega Bay Front from Dillon Beach to Sonoma County, the east side of Tomales Bay and the lower end of the Tomales Bay estuary are shoreline areas. Land up to 1,000 yards inland are within the permit area of the North Central Coastal Zone Conservation Commission and development there must meet the environment standards of that agency.

Table 2.6

Coastal Recreation Corridor

Total Acres	Acres in Secured Public Open Space		Acres in Agricultural Areas (Outside Secured Open Space)		Village Acres	
	1970	1990 Plan	1970	1990 Plan	1970	1990 Plan
123,960	60,560	88,960	62,380	33,040	1,020	1,960

NOTE: The above table not part of adopted text.

Land along the San Andreas Rift Zone is subject to severe impacts from earthquakes. No concentrated or hazardous uses will be permitted here, including schools, other institutions, high-density housing, or reservoirs. The inclusion of much of this zone in the Golden Gate National Recreation Area would prevent development along a large extent of the fault. These policies are in accord with planning by the North Coast Commission.

III. Implementation and Next Steps

Open Space Acquisition

Formation of the Marin County Regional Park and Open Space District was authorized in a referendum on the November 1972 ballot. It will be able to raise funds by imposing a county property tax rate of 10 cents per $100 of assessed valuation. (A $40,000 home would pay $10 per year.) The County Parks and Recreation Department, is providing staff services. A State law requires a specific program for carrying out the open space element of the Countywide Plan. This will involve studying the recommended open space areas in detail, determining their potential uses, making estimates of costs and benefits, and setting priorities for acquisition in accordance with the Countywide Plan's policies, now being done by the open space district. It will also be necessary to revise the Marin County Parks and Recreation Plan, adopted in 1965.

The Countywide Plan designates about 31,000 acres which are desirable to preserve as open space in the City-Centered Corridor if such is legally and financially possible. The cost of these areas designated for possible acquisition would be about $49 million, as shown on Table 2.7. If it is assumed that half of this acreage could be reasonably preserved by means other than outright purchase, this would leave open space valued at about $25 million to be acquired, or $1.25 million per year over the next 20 years. The 10 cent tax rate available to the Marin County Regional Park and Open Space District would produce about $750,000 annually at 1972 assessed valuation, which can be expected to increase. If this money can be matched with funds from other sources, such as federal, state, and regional open space grants, the total amount required to secure designated land appears to be feasible.

One approach recommended by the Countywide Plan to secure open space is to consider a program which would enable the development rights on lands designated as open space to be transferred to areas designated as high intensity centers. If this approach proves feasible and is authorized by law, it should be applied only in designated areas which meet Countywide Plan standards for density increases. (See Community Development section.) The policy should not be applied wholesale throughout the City-Centered Corridor. Specific ratios of amounts or dollar values of open space to density bonuses to be allowed will have to be worked out. It should be possible for a developer to transfer development rights from selective open space areas in any part of the county, not just in the immediate community where a project is proposed.

Table 2.7

Open Space Areas In The City-Centered Corridor

AREA	ACRES	ESTIMATED VALUE
COMMUNITY SEPARATORS		
1. Wolfback Ridge to Tennessee Valley	820	$ 1,805,774
2. Ridges Above Tamalpais Valley	640	No acquisition
3. Tiburon Peninsula Ridge	1,740	6,775,275
4. North Ridge	1,120	2,571,222
5. Rim of Corte Madera Creek Watershed	1,750	1,229,528
6. Southern Heights Ridge	(Minimal easements only)	
7. San Pedro Peninsula Hills	1,860	1,916,242
8. San Rafael-Sleepy Hollow Divide	3,890	6,273,122
9. Civic Center	130	No acquisition
10. Big Rock Ridge	6,400	4,705,200
11. Hills East of 101 Near St. Vincent's School	1,070	7,737,621
12. Bahia and Black Point Knolls and Ridges	970	2,166,744
13. Mount Burdell	1,400	1,000,963
Subtotal	21,770	$36,181,691
WATER EDGE LOWLANDS		
14. Richardson Bay	330	$ 4,384,741
15. East Side of Tiburon Peninsula	80	336,809
16. Corte Madera Bay Front	390	468,417
17. San Rafael Bay	380	2,139,040
18. San Pedro Peninsula Shoreline	680	1,454,451
19. San Pablo Bay Front, Las Gallinas Creek to Novato Creek	1,850	1,558,615
20. Novato Creek to Black Point	790	1,277,000
21. Petaluma River	950	1,144,556
Subtotal	5,450	$12,763,629
STREAM AND CREEK RESERVES		
22. Mill Valley Area Creeks	90	No acquisition
23. Corte Madera Creek	120	" "
24. Las Gallinas Creek	110	" "
25. Miller Creek, 101 to Big Rock	50	" "
26. Arroyo San Jose	20	" "
27. Novato and Warner Creeks	90	" "
Subtotal	480	
SAFETY ZONES		
28. Hamilton Field	2,370	No acquisition
29. Gnoss Field	770	" "
Subtotal	3,140	
TOTAL, CITY-CENTERED CORRIDOR	30,840	$48,945,320

Other methods for securing open space include cooperative purchase arrangements with local communities, contributions from individual owners and private organizations, open space dedications of areas being developed simultaneously, scenic easements, and open space contracts similar to agricultural preserves under the Williamson Act.

When a public agency is unable to purchase or otherwise permanently secure an area designated for open space, a reasonable use must be permitted under zoning and other regulations. This might be, if the site is suitable, low density residential with provision for clustering to preserve maximum open space.

Proposed open space areas in the Inland Rural and Coastal Recreation Corridors are listed on Tables 2.8 and 2.9. Only the Nicasio Reservoir Park and Stafford Lake Park expansions would require county acquisition funds. Other areas would be acquired with federal or state funds or retained in open space through regulation or management.

The County Parks and Recreation Department should use whatever funds it can obtain immediately to secure critical high priority space, designated in the Countywide Plan, pending funding of the new district. The county should also press for early action by the appropriate state and federal agencies to implement the plan's open space and recreation policies.

Development Regulation

The countywide Environmental Protection Committee should be expanded immediately, to review and control public projects and operations and private development, as recommended in the section on countywide policies for conservation. The committee's reviews should be in accordance with the policies of the Countywide Plan, as they are adopted and as they are revised in the future.

Planning Commissions should adopt and use a system of bonuses and incentives for design quality, and they should apply requirements for transferring open space development rights for density increases, as described above.

Other studies to be done by the Planning Department in order to expand the Countywide Plan will produce findings that should be applied by the Environmental Protection Committee. These include the geologic hazards study and the preparation of the seismic, noise, and safety elements of the plan.

Zoning is a major regulatory measure, which is now required by state law to conform to adopted general plans. Agricultural and open space zoning have a particularly close relationship to environmental quality policies. The county will continue to zone agricultural areas for low densities in a consistent manner, and both the county and the cities are required by state law to zone open space areas designated by the adopted Countywide Plan accordingly. Agricultural preserve contracts and open space easements will be used to assure that land owners are taxed equitably, in open space areas temporarily or permanently in private ownership.

Table 2.8

Proposed Additional Open Space Areas In The Inland Rural Corridor*

PUBLIC OPEN SPACE	ACRES	ESTIMATED VALUE
1. Marin Municipal Water District Lands Expansion	2,450	$ 323,806
2. Samuel P. Taylor State Park Expansion	1,150	290,500
3. Nicasio Reservoir Park	1,850	618,533
4. Stafford Lake Park Expansion	2,920	608,548
Subtotal	8,370	1,841,387
CONSERVATION ZONES: STREAM COURSE BUFFERS		
5. Estero Americano	530	Regulation: No Acquisition Required
6. Estero San Antonio and Stemple Creek	910	
7. Keys Creek	140	
8. Chileno Creek, Laguna Lake, and San Antonio Creek	1,600	
9. Walker Creek	1,000	
10. Salmon Creek and Arroyo Sausal	870	
11. Novato Creek	300	
12. Halleck Creek	620	
13. Nicasio Creek	610	
14. Lagunitas Creek	400	
15. San Geronimo Creek	450	
Subtotal	7,430	
TOTAL ADDITIONAL PUBLICLY SECURED OPEN SPACE	15,800	

*Not Including Agricultural Areas.

Table 2.9

Proposed Additional Open Space Areas In Coastal Recreation Corridor*

PUBLIC OPEN SPACE	ACRES	ESTIMATED VALUE
1. Golden Gate National Recreation Area	13,910	$10,434,750
CONSERVATION ZONES		
2. Bolinas Bay Cliffs, Audubon Canyon	3,470	Regulation: No Acquisition Required
3. Duxbury Reef	1,160	
4. Cliffs at Bodega, Mouth of Estero San Antonio	2,010	
5. Tomales Bay Front, Walker Creek Mouth	4,570	
6. San Andreas Rift Zone	3,140	
7. Olema Creek (outside GGNRA)	140	
Subtotal	14,490	
TOTAL ADDITIONAL PUBLICLY SECURED OPEN SPACE	28,400	

*Not Including Agricultural Areas.

Table 2.10

Open Space Implementation Techniques

The following are the means of implementing the recommendations set forth in this report. The regulation list involves the use of governmental powers principally police powers like zoning to achieve public benefits from open space and conservation programs. The acquisition techniques mainly involve use of government fiscal resources including trade-offs for tax reductions. The priorities for action by governmental level are also listed below.

REGULATION

1. natural hazards
   geologic risk zones (fault, bay mud, landslide)
   flooding risk zones (flood plain, stream buffer)
   fire risk zones (grass, dry brush, dead-end canyons)
2. noise and flight path safety zones (airport, freeway)
3. special recreation-visitor destination facilities (golf courses, hunting preserves, special event areas, etc.)
4. agricultural and rural zones
5. historic preservation areas (including archeological sites)
6. marine and wildlife resource conservation reserves
7. view protection zones
8. density transfer zones
   planned unit (cluster) zones
9. scenic travel corridors
10. Gion right of public access by historical precedence*
11. compensable zoning-freeze value with government guarantee of price difference

MANAGEMENT

1. countywide management board to administer management programs for public and private open space
2. private landowner management plan
3. agricultural/rural management plan
4. coastal recreation/resource protection management plan
5. multi-use management plan (recreation, marsh, wildlife, flood control, water, sewer, fire, school, etc.)

*The California Supreme Court has ruled (in the Gion decision) that public right of access is implied on beaches where the public use has occurred for a number of years.

ACQUISITION

1. outright purchase (full fee)
2. installment purchase (no title change until last payment)
3. purchase in advance as landbank, leaseback or resale a portion as surplus
4. excess condemnation with road, school, flood district, etc.
5. purchase option to buy in future (first right of refusal)
6. purchase right of entry plus floating trail easement
7. easement partial purchase (development rights) for specific limited use
8. require open space dedication as conditional development approval
9. trade or transfer of lands with other public/private bodies
10. long term lease (no purchase)
11. gifts and voluntary land donations
12. estate settlement, life estate, or in lieu of back taxes
13. by private or semi public non profit land trust
14. voluntary agreements to permit scenic, recreational uses
15. tax reduction contracts, agreements and write-offs

Part 3. Community Development

These pages contain background material which is not part of the adopted plan:

R-right side only	L-left side only
3-10	3-16
3-11L	3-17
3-12	3-18
3-13R	3-19R
3-14L	3-20
3-15L & upper half of R	3-39 thru 3-44

Part 3. COMMUNITY DEVELOPMENT

Introduction

The Community Development section sets forth countywide residential and economic policies and applies these policies to the eight planning areas into which the county is divided. These recommendations are countywide in scale, and in less detail than local general plans.

Two basic goals of the plan speak to community development issues:

Goal 1: Discourage rapid or disruptive population growth, but encourage social and economic diversity within communities and in the county as a whole.

Goal 2: Achieve greater economic balance for Marin, by increasing the number of jobs and the supply of housing for people who will hold them.

Yet housing and economic studies reveal opposing conditions. The number of building permits being issued since 1970 now far exceeds growth rates anticipated by the Countywide Plan.

In spite of this increase in supply, the seemingly unlimited demand for high-income housing in Marin keeps prices high and rising.

Table 3.1

1970 Owner Occupied Housing Units By Value Categories

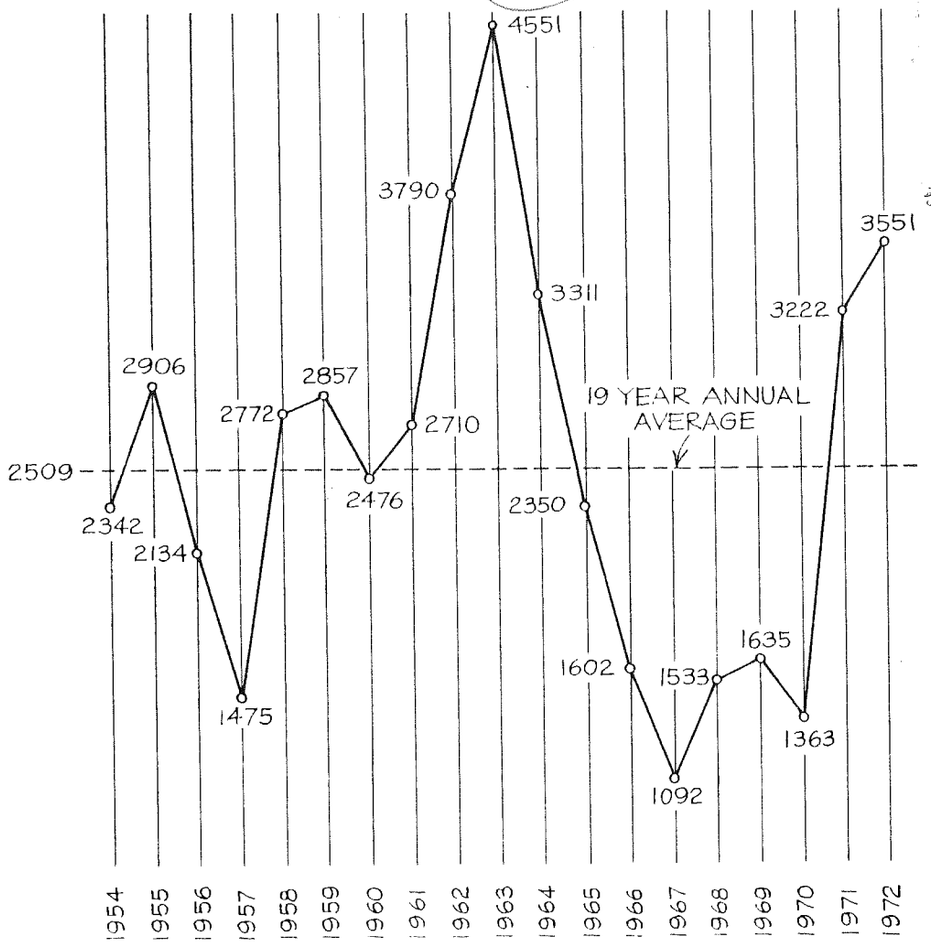
	Under $5,000	$5,000 -9,999	$10,000 -14,999	$15,000 -19,999	$20,000 -24,999	$25,000 -34,999	$35,000 or more	Total Units*	Median
Belvedere					4	12	618	634	$50,000
Corte Madera	1	3	15	67	169	929	605	1789	$31,900
Fairfax	1	11	87	308	376	487	200	1470	$24,400
Larkspur	1	6	23	68	159	380	1519	2156	$41,900
Mill Valley	2	6	47	115	395	876	1586	3027	$36,200
Novato	8	6	34	364	1096	2129	1018	4655	$28,800
Ross			3	12	22	88	515	640	$50,000
San Anselmo	1	13	66	294	689	1246	683	2992	$28,500
San Rafael	5	10	58	243	774	1639	3674	6403	$38,000
Sausalito	3	1	16	24	43	123	617	827	$48,300
Tiburon		1	2	7	50	184	941	1185	$50,000
Unincorporated Areas	28	75	261	567	1362	4574	5799	12666	
County Total	50	132	612	2069	5139	12667	17775	38444	$33,900

Source: Marin County Chamber of Commerce and Visitors Bureau, published in Pacific Sun April 27-May 3, 1972 issue; U.S. Census 1970 General Housing Characteristics.

*Not adjusted for corrections. Total shown is 3,536 units less than 41,980 used by Marin County Planning Department.

FIGURE 3.2

SINGLE & MULTI-FAMILY BUILDING PERMITS ISSUED
MARIN COUNTY TOTAL: 1954-72

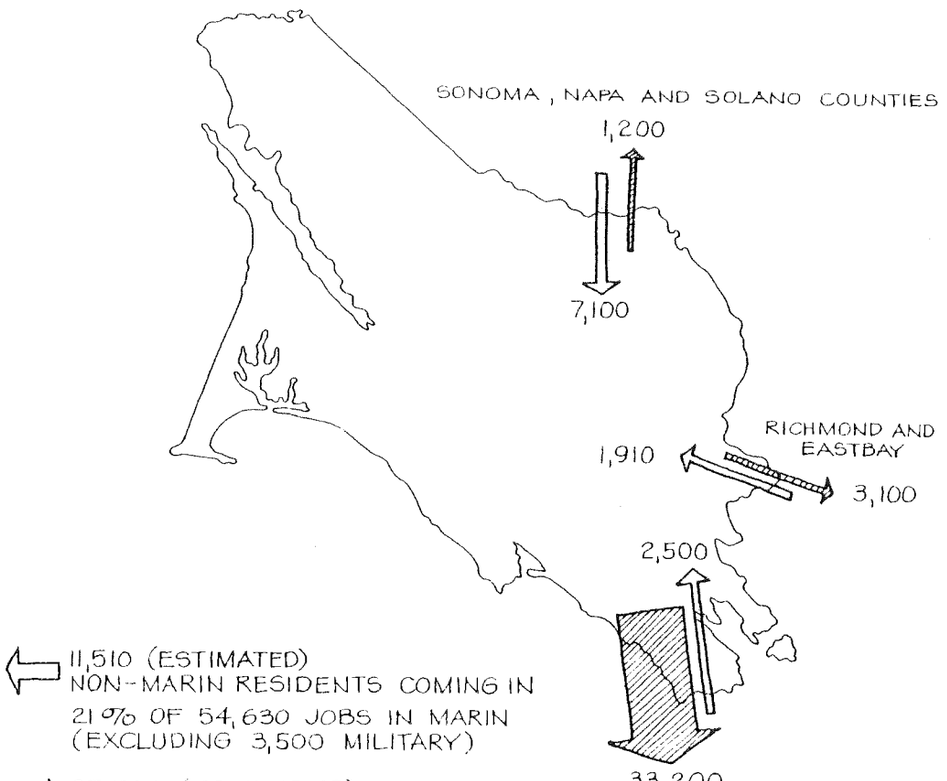


SOURCE: MARIN COUNTY CHAMBER OF COMMERCE AND COUNTY BUILDING INSPECTION DEPT.

3-2 On the economic side, Marin continues to rely heavily on the commute to San San Francisco for its livelihood.

FIGURE 3.3

DAILY TRAVEL TO AND FROM MARIN: 1970



TRAVEL ESTIMATES BASED ON 24 HOUR DAY. NUMBERS WILL DIFFER FROM FIGURE 4.2 WHICH IS BASED ON 3 HOUR PEAK COMMUTING.

SOURCES: CALIF. DEPT. OF HUMAN RESOURCES; 1970 CENSUS AND STAFF ESTIMATES

Findings from the Economic Development Study indicate that even a five percent increase in the number of commuters would have a chaotic impact on Golden Gate Bridge traffic. Marin does have potential for growth of offices which could employ present commuters in a Marin location, and thus reduce the trans-bay commute. However, Marin's disadvantages of topography, high housing costs, and lack of a central location in the region will make it very difficult to achieve significantly more economic self-sufficiency.

I. COUNTYWIDE POLICIES

A. COUNTYWIDE HOUSING POLICIES

Growth Rate

If the plan's *recommendations are implemented,* the county's total population *will be* no more than about 300,000, *allowing* a five percent fluctuation up or down, by the year 1990--an increase of about 90,000 people from 1970. These figures are based on these considerations: Open space needs; a balance among population and transportation; housing and job goals; and the tri-corridor concept.

1. *Reduced* growth would assist the county to preserve the open space designated in the plan. The unconstrained housing market would produce a population of about 364,000 in Marin by 1990. *A* lower rate of growth would reduce pressure on available land and thus make the open space program more feasible.

2. *Growth is limited by* what the county can accommodate without overburdening transportation and other public facilities. Between 1950 and 1970 the county grew at an average of about 60,000 per decade. Studies of transportation and air pollution indicate that this same amount of growth over the next 20 years would adversely affect the county's balance of land use, transportation, and environmental quality. Moreover, because of the much reduced family size, the number of dwelling units needed to house a given number of people now is higher than it was in the 1950's and 1960's.

3. The plan figure represents a reasonable share of the regional housing market. Marin contained 4.4 percent of the Bay Area's population in 1970. With a population of 300,000 in 1990, Marin would have 4.6 percent of the region's 6,500,000 people, as projected by the State Department of Finance.

The 1990 population *projection indicates* no more than about 37,000 additional housing units in the county during the two decades. This would mean an annual average of about 2,100 units between 1970 and 1980 and 1,600 units between 1980 and 1990; however, the past 18 years have been running at an average of about 2,300 units authorized by permit.

Development approvals appear to be even more out of line with *the* Countywide Plan than building permits. As of mid-1972, approved developments in the City-Centered Corridor contained well over 20,000 units--already more than half of the 1970-1990 plan total. (See Fig. 2.12 in Environmental Quality section.) Although it is unlikely that all these units would be developed, the danger of overbuilding is great.

The plan's *recommendations allow* annual growth rates for the eight planning areas into which the county is divided, based on the land available, market potential and proposed open space in each area. New development review methods will be required to *key* growth *to available public facilities* and protect open space, within communities and in the county as a whole. (See "Implementation and Next Steps" in this section and Part 5, Implementation.)

Appendix 2 contains background information on how the Countywide Plan population projections were prepared.

Table 3.2

Population In Marin County 1970 And 1990

Sub-areas & Corridors	Countywide Plan 1970 Population	Countywide Plan 1980 Population	Countywide Plan 1990 Population	Market* 1990 Population Market
Novato	39,220	55,200	68,600	74,400
Las Gallinas	25,800	33,200	39,700	56,100
San Rafael	31,600	37,700	41,000	45,600
Upper Ross Valley	26,950	29,600	32,200	33,700
Lower Ross Valley	31,950	37,100	41,800	48,300
Richardson Bay	45,060	54,200	60,500	74,400
City-Centered Corridor	200,580	247,000	283,800	332,500
Two Rural Corridors	8,994	13,000	16,200	32,800
Countywide Total	209,574	260,000	300,000	365,300

*Bay Area Simulation Study V projection, modified to account for family size reported in the 1970 Census and for technical "bias" in the model.

Housing Policies

Price Level Distribution

Marin's two basic goals for housing, adopted by unanimous vote of the Board of Supervisors in 1971, are:

"1. To encourage continuation of social and economic diversity in Marin County communities through a variety of housing types.

2. To expand the supply of decent housing for low and moderate-income families.*"

In fact, the reverse is happening. Between 1960 and 1970 the proportion of the county's housing in the low price category went down from 41.8 percent to 19.4 percent, while the proportion of high price units went up from 12.1 percent to 34.1 percent. This occurred despite a 46 percent increase in the overall supply of housing.

As a result of rising prices, an increasing number of Marin's low and moderate-income families, including especially young families and the elderly, are being forced to seek housing elsewhere. Census data from 1970 indicate that low and middle-income families are in fact being squeezed out of Marin.

Tables 3.3 and 3.4 show households and housing units in the low, moderate, middle, and high categories for 1960 and 1970. These categories approximate what a family can reasonably spend on housing. Low and moderate-income families generally poorly served by the private market are eligible for public housing, leased housing, or interest-subsidized housing if they apply.

Many workers who hold jobs in Marin cannot afford to live here, which deters attainment of the goal of a better economic balance. Of the 57,700 Marin jobs in 1970, 12,600 were held by in-commuters. A survey of these in-commuters by the Economic Development Committee revealed that over half believed that housing in Marin would be too expensive for them, though about one-fourth definitely wished to move here.

If this housing price trend continues during the next two decades and no programs are instituted to affect existing housing, it would be necessary for over 80 percent of newly constructed units to be in the low and middle value categories, in order just to maintain the 1970 proportions in the City-Centered Corridor.

*As used in the Countywide Plan, family income and housing ranges are as follows, in 1970 dollars: Low, less than $8,000/year, able to afford rental unit up to $150/month or owned unit valued at less than $20,000; middle, $8,000 to $15,000/year, able to afford rental unit of $150 to $250/month or owned unit valued at $20,000 to $35,000; high, more than $15,000/year, able to afford rental of more than $250/month or owned unit valued at more than $35,000. Moderate income families are within the lower range of the middle category, $8,000 to $12,000/year.

Table 3.4

Family Income and Housing Price Categories 1960 and 1970

Marin County

	INCOME		HOUSING			
	Annual: Families & Unrelated Individuals		1960		1970	
	1960	1970	Sales Price	Monthly Rent	Sales Price	Monthly Rent
Low	Less than $6,000	Less than $8,000	Less than $15,468	Less than $116	Less than $20,000	Less than $150
Medium:						
Moderate	$6,000-9,000	$8,000-12,000	$15,468-21,284	$116-155	$20,000-27,500	$150-200
Middle	$9,000-12,000	$12,000-15,000	$21,284-27,069	$155-193	$27,500-35,000	$200-250
High	More than $12,000	More than $15,000	More than $27,069	More than $193	More than $35,000	More than $250

1960 prices expressed in 1970 dollars, based on San Francisco-Oakland consumer price index for housing.

In the light of these facts, the Housing Committee of the City-County Planning Council has recommended the adoption of "a set of housing policies that have as their goal preserving the present economic and social mix of the residents of Marin County. Since no single policy can solve the diverse problems of providing housing for all income levels in Marin County, we urge the adoption of a combination of methods.

"A firm and realistic set of policies is needed to counteract the results of an unrestrained market operating in Marin County and to check our accelerated rise in housing prices in comparison to the rest of the Bay Area."

The Countywide Plan recommends such a set of policies and programs that would:

1. Retain half of the existing low and moderate-priced housing stock that would rise in price under the market, through tax incentives that would induce owners to keep prices and rents down, and through various other methods.

2. Provide low and moderate-priced new units, through subsidized housing programs and other methods.

The net result of these programs would be a price distribution of housing in 1990 that is about the same as in 1970. These policies are described and quantified under Implementation and Next Steps in this section. Recommendations are also made for the number of units by program for each planning area, based on the assumption that each area should have a proportion in each price category as close as possible to the countywide average.

It is essential to be realistic about Marin's housing conditions and prospects when evaluating these recommendations. First a policy of requiring 15 to 20 percent of new developments to be allocated to moderate-income units will have little or no effect on the price distribution of Marin's housing supply, because of strong market pressure. Simply maintaining the present level of economic diversity will require much stronger controls over existing and new housing.

Second, expanding the housing supply will not reduce prices in Marin. Housing floats upward in price here, not downward, as shown on the table of average sales prices. There were dramatic price increases in each community between 1967 and 1971, even compared to the substantial rises during the previous five-year period.

Third, there is no danger of any community being "inundated" by lower cost housing to the extent of forcing the prices of existing units down. Even in communities with low average values compared to the county as a whole, like Fairfax, the prices have gone steadily upward. Still, it is important for the county as a whole to commit itself to maintaining low and moderate-income housing in order to encourage individual communities to do so.

Finally, the kinds of housing action called for in the Countywide Plan will require substantial federal and state subsidies. The private market cannot be expected to reverse housing trends, and the level of public expenditure needed to do so goes beyond the capability of local resources.

It is recognized that the cost and allocation of low, middle and high-income housing may vary within acceptable limits from city to city and that the definition of low, middle and high income will fluctuate over time because of such factors as inflation and inter-group mobility.

Densities and Locational Distribution

The Countywide Plan recommends that higher density housing be located where adequate services and transportation are available, within designated countywide and community activity centers and in other areas specified in the plan where there are opportunities for achieving housing goals. As a general guide, apartment densities of 12 to 20 units or more per net acre and town house-duplex densities of 6 to 12 units per acre are appropriate for these designated areas. In certain developments such as for the elderly or childless higher densities may be desirable.

High-density housing supports public transit efficiently, provides a market for nearby shopping areas, and offers an accessible labor supply for local employers. Therefore it should be located close to these activities. When housing is concentrated, people can support more social

and cultural activities--special interest clubs, theater groups, special shops--than when they live in a dispersed pattern. Moreover, higher densities can reduce costs to the developer and thus make low and moderate-income housing more feasible.

Density bonuses and other incentives should be strictly contingent upon:

1. Providing a maximum amount of low and moderate-income housing.

2. Transferring development rights for open space, as described below under Implementation.

3. Meeting desirable objectives, as specified in Table 2.1 in the Environmental Quality section. (Development Review Checklist)

Housing can be successfully mixed with other uses--shopping, business, and even some industrial--as shown by numerous examples in European cities and in American new towns such as Reston, Virginia. Mixed uses, including apartments over shops and parking lots, should be encouraged in the countywide and community activity centers. They may also be appropriate in business development areas which have the predominant character of office parks.

Group housing of various types would also be suitably located in activity centers, as well as elsewhere in the county. Boarding houses and other shared arrangements enable people to reduce the costs and work of housekeeping to the individual, which is often especially important for the elderly and young unmarried people. Other groups, such as the medically handicapped, need housing arrangements that offer special services and care as well as low costs. In view of Marin's high and rising housing prices, local ordinances should encourage group housing in appropriate locations, rather than discouraging it as is now the case in several jurisdictions.

These density policies speak only to major issues of countywide importance. A wide range of density standards and mixes could occur within various neighborhoods under these policies. The Countywide Plan recommends that each community maintain its own character and identity, and that diversity among communities be encouraged. These differences should be expressed in the density policies of local plans and zoning ordinances. For example, some *communities* may wish to encourage scattered high-density housing in low-density neighborhoods, while others may wish to retain a single density within each neighborhood.

Housing Condition

The Preliminary Countywide Plan contained findings from a Housing Condition Survey done in 1971. It consisted of a simple, exterior-only survey of residential structures in selected areas of the county. From the findings, tentative designations of concentrations of deficient housing were made. Generally, it appeared that the unincorporated communities of Central and West Marin faced more severe housing condition problems than did communities in the City-Centered Corridor.

Data on housing overcrowding and plumbing facilities from the 1970 census for areas covered in the survey have been analyzed. The 1970 census did not include structural condition ratings, such as the sound-deteriorating-dilapidated categories used in the Marin survey. Comparison of findings from the two sources was inconclusive.

Table 3.3

Change in Family Income and Housing Price, 1960-1970

Marin County - Adjusted for Inflation

	INCOME					HOUSING				
	1960		1970			1960		1970		
	# of Families	% of Total	# of Families	% of Total	Percent Change	# of Units	% of Total	# of Units	% of Total	Percent Change
Low	10,703	28.7%	10,302	19.8%	- 8.9%	17,673	41.8%	12,755	19.4%	-22.4%
Medium:										
Moderate	11,105	29.8%	10,133	19.6%	-10.2%	9,287	21.9%	16,898	25.7%	+ 3.8%
Middle	7,061	19.0%	8,561	16.5%	- 2.5%	10,221	24.2%	13,676	20.8%	- 3.4%
High	8,393	22.5%	22,916	44.1%	+21.6%	5,139	12.1%	22,421	34.1%	+22.0%
Total	37,262	100.0%	51,912	100.0%		42,320	100.0%	65,750	100.0%	

Source: U.S. Census of Population and Housing 1960 and 1970

Note: A family is defined as two or more persons living in the same household who are related by blood, marriage, or adoption. Non-family households, such as single persons living alone or two unrelated persons sharing a unit are not included in income data. However, all units, family and non-family, are included in the housing figures. This accounts for the apparent discrepancy between totals of families and housing units.

Table 3.5

Average Price Of Single Family Residence Sales In Marin County

Based on completed sales records for the years 1967 through 1971.
(Multiple listings only, not including units sold by developers. Equals about 50% of all sales.)

	1967		1968		1969		1970		1971		1967-1971 Increase	1964-1968 Increase
	No. Sold	Average Price	No. Sold	Average Price	No. Sold	Average Price	No. Sold	Average Price	No. Sold	Average Price		
BELVEDERE	24	61,060	29	69,640	20	73,630	23	80,350	29	90,310	48%	24%
CORTE MADERA	99	29,030	103	30,445	94	32,320	88	36,635	101	38,135	31%	8%
FAIRFAX	77	23,420	114	24,160	125	25,435	98	28,355	150	30,760	31%	2%
GREENBRAE	48	42,920	55	45,355	38	46,105	49	50,995	45	53,610	25%	13%
KENTFIELD	34	47,130	48	52,850	48	56,890	36	56,280	51	60,370	28%	27%
LARKSPUR	42	31,415	66	31,695	49	35,425	56	36,730	53	45,325	44%	16%
MILL VALLEY	328	30,995	342	33,150	307	36,550	246	36,910	379	40,565	31%	18%
NOVATO	239	27,065	347	29,045	365	29,940	357	31,310	462	36,210	34%	23%
ROSS	16	55,010	24	45,385	8	73,905	17	57,425	33	68,195	24%	21%
SAN ANSELMO	153	27,365	188	30,245	197	31,495	166	32,505	219	33,275	22%	14%
SAN RAFAEL	503	32,150	580	33,705	570	35,445	540	38,000	648	40,320	25%	12%
SAUSALITO	29	47,450	41	45,950	48	49,220	36	61,365	63	52,230	10%	15%
TIBURON	79	42,225	88	45,245	63	55,070	76	55,240	110	62,475	48%	13%
MISCELLANEOUS	36	21,325	54	21,445	46	24,725	41	30,235	52	33,040	55%	18%
COUNTY AVERAGE	1,707	31,915	2,079	33,575	1,978	35,405	1,829	37,845	2,395	41,180	29%	16%

Note: Not adjusted according to housing cost inflation rate, average 3.6% for San Francisco-Oakland 1960-1970. By comparison, county prices over this five-year period rose at an annual average rate of 5.8%.

Source: Marin County Board of Realtors

There is not adequate evidence now to recommend large-scale programs to redevelop or rehabilitate residential areas in the City-Centered Corridor, although city surveys may reveal poor conditions in need of treatment within local areas. Also, some residential areas in Marin's rural villages appear to need cooperative efforts by local homeowners to improve housing quality without significantly increasing the cost to occupants.

The Marin County Planning Commission and the Board of Supervisors have adopted additional technical recommendations for incentives to provide low and moderate-income housing, for subsidies, and for intermingling of housing types. These recommendations, contained in Appendix I to this section, are incorporated as part of the countywide housing policies.

B. COUNTYWIDE ECONOMIC DEVELOPMENT POLICIES

Employment Growth Rate

The Countywide Plan recommends 93,000 as a realistic target for total jobs in 1990, based on the Marin Economic Development Study and the Balanced Transportation Study. Table 3.6 indicates employment projections by category prepared by the consultant for the Economic Development Study. These projections are based on a smaller job total (90,700 derived from a smaller population base previously used), but the proportions are still applicable.

The economic study cited Marin's disadvantages in attracting business growth: Its lack of rail transportation, deep-water harbors*, a central location with respect to regional markets, and plentiful and cheap land and labor. The study also noted that the Countywide Plan's policies of discouraging rail rapid transit and a commercial airport in the county are a constraint on the goal of increasing jobs.

It is recommended that the county intervene aggressively in the market to promote non-population-serving employment that will lead to a better economic balance for Marin, in the same way the county intervenes to slow down the rate of residential growth--through the countywide review functions of the City-County Planning Council and through development reviews and zoning policies by local jurisdictions. In addition, direct action to promote the county's business growth will be required by the CCPC Economic Committee and by the private sector.

The population, environmental quality, transportation, and land use policies of the plan are constraints on the attainment of its economic goals. Efforts to attract suitable businesses must be all the more forceful because of their difficulty. It is also recognized that a more thorough analysis of the economic costs and impacts of the plan will be needed, as part of the next phase of plan-related studies.

Types of Businesses

The following types of businesses are found by the Economic Development Study to represent Marin's best potential and should be encouraged:

* This would appear to be a constraint only for ocean-going bulk carriers.

TABLE 3.6

1990 PLAN EMPLOYMENT TARGETS

SECTOR	1970 EMPLOYMENT	1990 EMPLOYMENT	PERCENT INCREASE	ASSUMPTIONS
Agriculture and Extractive	1,200	1,200	0%	No growth, but no loss.
Construction	2,600	3,500	35%	Population-serving employment[a] only.
Manufacturing	3,300	6,000	55%	Strong Countywide Plan effort in North Marin; additional office-type employment.
Transportation, Communication, Utilities	2,400	3,300	37%	Population-serving employment only.
Wholesale and Retail Trade	11,400	23,500	106%	New regional shopping center; major commitment to retail sales "capture."
Finance, Insurance, Real Estate	2,000	4,000	100%	Continuation of 1965-70 trend, with both major and minor office moves.
Services and Other[b]	19,100	29,000	52%	Growth slightly faster than population, plus 1,000 new tourist enterprise jobs.
Government	12,700	19,000	50%	Growth slightly faster than population.
TOTAL	54,700	89,500	64%	
MILITARY	3,000	1,200		
	57,700	90,700	57%	

a) This employment mainly serves the local needs of the residents, e.g., cleaners, local contractors, realtors, etc.

b) Includes self-employed domestic servants, etc.

Source: Baxter, McDonald and Company, July 1972, revised November, 1973.

Administrative Offices, subordinate to corporate or regional offices, a basic activity which generates other employment. These include distribution, advertising, market research product development, inventory control, sales, and customer service firms. An example is the new Fireman's Fund data processing operation near Terra Linda. If Marin is to compete for these firms, large tracts of undeveloped land near existing freeways and improved transportation will be necessary.

General Offices, smaller business firms such as commodity brokers, import-exporters, and insurance agents. Some are already moving from San Francisco to Marin, and others are being formed locally. These firms do best in locations in or near shopping centers and business districts, with ample parking and easy access, rather than in large tracts planned exclusively for offices. Ground floor locations are preferred, but second floors in shopping centers and small multi-story structures are also suitable.

"Dependencies", or independent operations of large firms, such as mail order facilities. These activities require a skilled, stable labor force, but transportation access is relatively unimportant.

This study found that the county's growth in light manufacturing will probably be limited to occasional moves, often dictated by such non-economic factors as the owner's place of residence. A possible exception is the area along Highway 37 in Novato, where there is potential for light industry and warehousing. Any development along Highway 37 should be consistent with the scenic features of that area.

Tourism or visitor enterprise probably offers less potential for Marin than previously anticipated, the Economic Development Study found. Resort/convention hotels could suffer from the competition of nearby San Francisco, and there is no clear evidence of widespread economic benefits from motels. Campgrounds and commercial second homes, rented to different families for weekends and vacations throughout the year, offer greater potential. Policies for locations for these activities are recommended in the following section on the Coastal Recreation Corridor.

Many artists and craftsmen of all ages and backgrounds live in Marin. Although Marin residents create and purchase many works of art and hand-made goods, the study found that there is little economic potential for the county in these activities. Nevertheless, they are a valuable part of Marin's cultural and social character, and studios and work space should be encouraged for artists and craftsmen throughout the county, through zoning policies.

Marin's retail stores are well patronized, as shown by high sales per square foot. However, Marin is losing sales to other counties in the "comparison goods" category--those for which consumers are likely to look in more than one store, such as clothing and furniture. With the proposed development of a new regional shopping center, Marin's potential to attract comparison shoppers will improve. The economic study found that the retail market can be expected to operate effectively to improve Marin's economy, without public intervention.

The labor force in Marin is a vital factor in attaining the county's economic potential. The office activities that are likely to grow here will depend particularly on the increasing number of well-trained women entering the work force. It is in the county's interest to encourage child care centers near employment areas, to enable more women to take on full or part-time jobs.

A survey of unemployment in Marin revealed that racial minorities, women, young people under 22, senior citizens, and veterans are relatively untapped sources of workers here. The county's overall unemployment rate in 1970 was 4.6 percent.

It is recommended that first priority go toward creating jobs for present Marin residents. However, it is recognized that new or expanded businesses will employ workers who live outside Marin, at least initially. Therefore, transit service for in-commuters should be improved.

Locational Patterns

The plan designates three kinds of areas where commercial and business activities should be concentrated: countywide activity centers, community activity centers, and business development areas. The economic vitality of these areas must not be threatened by allowing other competing centers to drain them of their market and employment potential.

Countywide activity centers are concentrations of employment and services used by people from throughout the county and beyond. They are characterized by high development densities, multiple uses, and excellent accessibility by public transportation. High and medium-density housing should be encouraged here. Each center differs in character and function.

1. Downtown Novato, a future regional-level shopping center. The City of Novato has adopted a policy of concentrating commercial and office development here, rather than permitting additional centers elsewhere in the community.

2. Civic Center-Northgate, the new "downtown Marin", incorporating the county offices and courts, shopping center, and office-industrial park.

3. Downtown San Rafael, an older business district. Its potential specialty is for "incubating" businesses and public and commercial services which cannot afford the higher rents being charged in the new Northgate and Corte Madera centers, but which serve the entire county.

4. Corte Madera-Larkspur, incorporating the proposed new regional shopping center, proposed ferry terminal, and shopping west of the freeway, and also connecting with San Quentin.

Community activity centers are also concentrations of multiple uses, but serving local communities and with somewhat less transportation accessibility than the countywide centers. These areas are also very suitable for high and medium-density housing. They include downtown Fairfax, the Hub, downtown Larkspur, downtown Corte Madera, downtown Mill Valley, the Strawberry Shopping Center, downtown Sausalito, and downtown Tiburon.

Business development areas are where industrial and commercial growth should be concentrated. These vary in character, although the plan does not recommend separating different types of businesses from each other. There is probably more value in encouraging a diversity of activities in each area than in encouraging segregation by type. In fact, residential use may be appropriate and desirable in some business areas. However, it is recognized that certain kinds of activities, such as professional offices, will benefit by clustering together and providing mutual support for each other and for related services. Nor does the plan recommend that all businesses locate within the designated centers and development areas. There are some types of businesses that probably function best at dispersed locations, especially craftsmen and artists who must keep costs to a minimum.

1. North Novato, along Route 101. Potential for aircraft services related to Gnoss Field, recreational facilities including possibly a marina.

2. South Novato area along Route 37 and along Route 101 bypass. Potential for light industry and warehousing. Hamilton Air Force Base, when military use is discontinued, should be considered for light industry or recreation and use of existing housing for people of low and moderate incomes. More specific criteria should be developed for use of Hamilton in anticipation of its eventual conversion to civilian use.

3. Silveira Ranch-St. Vincent's area, a strategically located undeveloped tract with potential for a mixture of industry, offices, recreation, and housing.

4. "Miracle Mile", between San Rafael and San Anselmo, an older strip commercial area containing a variety of businesses and services requiring lower densities than in business districts.

5. Southeast San Rafael, along Francisco Boulevard, auto sales and warehousing prevail. There may be some industrial and recreational potential on vacant sites in the San Quentin Peninsula.

6. Corte Madera, along Route 101, contains a few industrial plants. Some room available for expansion through in-filling.

7. North Sausalito Bayfront, formerly a ship-building area, may have potential for general offices for Marin residents now commuting to San Francisco.

The Economic Development Study found that even a small (5 percent) reduction in commuting would greatly improve peak hour traffic conditions and add $2 million annually in Marin retail sales. Sites along Route 101 and Route 37 have the greatest potential for attracting present commuters to Marin work places, although it will be difficult

to attract significant numbers of very high-income commuters.

Changes in the commuting pattern should therefore be strongly supported for their economic and transportation benefits, and also because they will help stabilize Marin's transition to a one class society.

C. COUNTYWIDE COMMUNITY FACILITIES POLICIES

All types of public facilities--schools, transit, water and sewer lines and treatment plants--should be planned and built in ways that will support Countywide Plan policies for growth rates and locations of development.

Most agencies responsible for these facilities now do their planning on the basis of market projections of population growth. The Countywide Plan now calls for lower growth rates, and the assumptions used by water, sanitary, service, and school districts should be adjusted accordingly.

The City-County Planning Council has been expanding its membership to include representatives of various districts, on a non-voting basis. This effort should be continued.

The various special districts should relate their activities to the Countywide Plan, rather than establishing land use policy independently. The CCPC, representing all government jurisdictions in Marin, should continue to exercise its responsibility for establishing countywide planning policy, and expand its authority for plan implementation. (See Part 5, Implementation.)

Special districts should not expand their efforts in determining how to serve projects unless they have the tentative approval of appropriate planning agencies.

11. Plans for Planning Areas

The following community development recommendations are presented for each of the six planning areas into which the city-centered Corridor is divided, and for the Inland Rural and Coastal Recreation Corridors.

A. NOVATO AREA

Novato, with its relatively large supply of flat, developable land, is a rapidly growing portion of the City-Centered Corridor. It also provides a substantial amount of housing in the low and medium price categories, although prices have been rising dramatically. Town houses have prevailed in recent new construction. Some pending developments would conflict with Countywied Plan open space proposals; if built, presently approved housing units would exceed by far the total projected for 1970 to 1990 for the Novato area.

The Novato area contains some of Marin's major employers--at Hamilton Air Force Base and in industries along Route 101. The U.S. Department of Defense has announced plans to cut back operations at Hamilton by the end of 1973. The City of Novato has adopted a policy of concentrating commercial development in its downtown area, designated as a countywide activity center. New commercial recreation facilities are planned for eastern Novato, including marinas and a tennis club. The Renaissance Pleasure Faire now has a temporary location south of Route 37, and plans to locate permanently north of Novato along Route 101.

The new Indian Valley campus of the College of Marin is in southwest Novato. The city, the county, and the college have recommended a maximum enrollment of 5,000, but the state's policy is to plan for 10,000 students at each campus. A strong recommendation for limiting enrollment will be presented to the state.

Novato has now adopted a revised general plan, dealing with community development issues at a detailed scale. It is generally consistent with the Countywide Plan proposals for Novato.

Major countywide issues in the Novato area are:

1. Controlling the present rapid growth, and preventing development from encroaching on open space.

2. Maintaining the present supply and distribution of low and moderate income housing.

3. Supporting the development of downtown Novato as a countywide activity center.

4. Planning for the future of Hamilton Air Force Base, and for the social and economic impact it will have on the community.

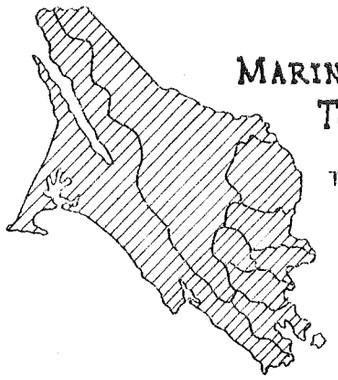
5. Encouraging tourism and suitable business development in eastern Novato.

6. Retaining the area north of Novato to the Sonoma County line as open space.

7. Protecting the flood plain of Novato Creek and Petaluma River and their tributaries.

MARIN COUNTY TOTAL

TABLE 3.7

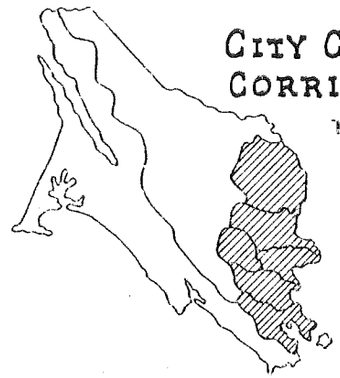


LAND			
	ACREAGE, total		333,380
	7.7 % developed 1970		25,750
	22.5 % open space to be secured 1970-90		75,040
	6.7 % developable but vacant in 1990 (Plan)		22,425

		1970		1990 MARKET		1990 PLAN	
	LAND USE						
	Open Space	86,030	25.8%	99,940	30.0%	161,070	48.3%
	Vacant or Agricultural	221,600	66.5%	193,210	58.0%	138,000	41.4%
	Public and Institutional	1,470	0.4%	1,470	0.4%	1,470	0.4%
	Residential	22,800	6.8%	35,720	10.7%	30,210	9.1%
	Commercial and Industrial	1,480	0.4%	3,040	0.9%	2,630	0.8%
RESIDENTS	PEOPLE	209,574		365,300		300,000	
	% increase 1970-90	-		74.3		43.1	
	DWELLING UNITS	68,700		129,600		106,100	
	% increase 1970-90	-		88.6		54.4	
	RESIDENTIAL DENSITY (a)	3.0		3.6		3.5	
JOBS	BASIC	15,910		22,700		25,700	
	POPULATION SERVING	38,720		79,000		63,800	
	TOTAL CIVILIAN	54,630		101,700		89,500	
HOUSING	1970 OCCUPIED UNITS	LOW (b)		MEDIUM (c)		HIGH (d)	
	owner 41,980	3,100	7.4%	19,440	46.3%	19,440	46.3%
	renter 26,775	10,925	40.8%	12,450	46.5%	3,440	12.7%
	55.5 % change 1960-70	- 15.1		- 1.3		16.4	
1990 PLAN	EXISTING UNITS RETAINED (e)	3,640		4,620		-	
	NEW UNITS REQUIRED (e)	10,077		11,935		13,088	
	% of total new units 1970-90						
1970 CENSUS	FAMILY INCOME	20%		36%		44%	
	AGE: 32.2 % UNDER 18	60.4 % 18-64		7.4 % OVER 65			
	RACE: 95.9 % WHITE	4.1 % NON-WHITE (INCL. 2.4 % BLACK)					

CITY CENTERED CORRIDOR

TABLE 3.8



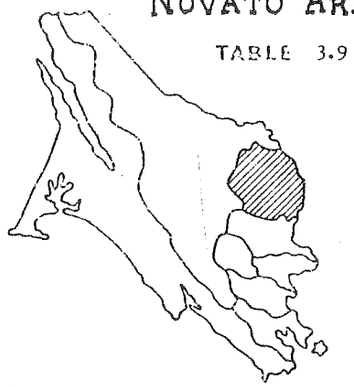
LAND			
	ACREAGE, total		79,140
	30.0 % developed 1970		23,730
	39.0 % open space to be secured 1970-90		30,840
	16.5 % developable but vacant in 1990 (Plan)		13,065

		1970		1990 MARKET		1990 PLAN	
	LAND USE						
	Open Space	1,980	2.5%	1,980	2.5%	32,820	41.5%
	Vacant or Agricultural	53,430	67.5%	42,860	54.2%	15,870	20.1%
	Public and Institutional	1,470	1.9%	1,470	1.9%	1,470	1.9%
	Residential	20,840	26.3%	30,000	37.9%	26,450	33.4%
	Commercial and Industrial	1,420	1.8%	2,830	3.6%	2,530	3.2%
RESIDENTS	PEOPLE	200,600		332,500		283,800	
	% increase 1970-90	-		65.8		41.5	
	DWELLING UNITS	65,700		118,400		100,800	
	% increase 1970-90	-		80.2		53.4	
	RESIDENTIAL DENSITY (a)	3.2		3.9		3.8	
JOBS	BASIC	14,940		21,240		24,240	
	POPULATION SERVING	37,330		77,050		62,050	
	TOTAL CIVILIAN	52,270		98,290		86,290	
HOUSING	1970 OCCUPIED UNITS	LOW (b)		MEDIUM (c)		HIGH (d)	
	owner 40,240	2,615	6.5%	18,631	46.3%	18,993	47.2%
	renter 25,520	10,235	40.1%	11,917	46.7%	3,368	13.2%
	56.9 % change 1960-70	- 14.4		- 4.0		16.5	
1990 PLAN	EXISTING UNITS RETAINED	3,640		4,620		-	
	NEW UNITS REQUIRED	10,077		11,935		13,088	
	% of total new units 1970-90	28.7		34.0		37.3	
1970 CENSUS	FAMILY INCOME	18.7%		35.9%		45.4%	
	AGE: 32.3 % UNDER 18	60.4 % 18-64		7.3 % OVER 65			
	RACE: 95.8 % WHITE	4.2 % NON-WHITE (INCL. 2.5 % BLACK)					

(a) Dwelling units per gross acre (b) Income under $8,000, Rent under $150/month, Home purchase under $20,000
(c) Income $8,000 - 15,000, Rent $150 - 250/month, Home purchase $20,000 - 35,000
(d) Income over $15,000, Rent over $250/month, Home purchase over $35,000 (e) Same numbers as for City-Centered Corridor

NOVATO AREA

TABLE 3.9



LAND							
ACREAGE, total		28,515					
16.0	% developed 1970	4,560					
46.9	% open space to be secured 1970-90	13,370					
28.4	% developable but vacant in 1990 (Plan)	8,090					
	• LAND USE	1970		1990 MARKET		1990 PLAN	
	Open Space	230	0.8%	230	0.8%	13,600	47.7%
	Vacant or Agricultural	23,725	83.2%	21,045	73.8%	8,090	28.3%
	Public and Institutional	470	1.6%	470	1.6%	470	1.6%
	Residential	3,920	13.7%	6,140	21.5%	5,810	20.4%
	Commercial and Industrial	170	0.6%	630	2.2%	545	1.9%
RESIDENTS	• PEOPLE	39,200		74,400		68,600	
	% increase 1970-90	-		89.7		74.9	
	• DWELLING UNITS	10,630		22,700		20,700	
	% increase 1970-90	-		113.5		94.7	
	• RESIDENTIAL DENSITY [a]	2.7		3.7		3.6	
JOBS	BASIC	3,000		3,520		4,360	
	POPULATION SERVING	5,380		15,460		11,660	
	TOTAL CIVILIAN	8,380		18,980		16,020	
HOUSING	• 1970 OCCUPIED UNITS	LOW [b]		MEDIUM [c]		HIGH [d]	
	owner 6,740	519	7.7%	4,260	63.2%	1,961	29.1%
	renter 3,890	1,642	42.2%	2,046	52.6%	202	5.2%
	95.0 % change 1960-70	- 19.1		- 1.6		20.7	
1990 PLAN	• EXISTING UNITS RETAINED	617		439		-	
	• NEW UNITS REQUIRED	2,732		3,682		6,414	
	% of total new units 1970-90	27.1		36.6		36.3	
1970 CENSUS	• FAMILY INCOME	22.7		43.2		34.1	
	• AGE: 40.6 % UNDER 18	55.7	% 18-64	3.7	% OVER 65		
	• RACE: 93.2 % WHITE	6.8 % NON-WHITE (INCL.		2.8 % BLACK)			

For footnotes see page 3-10.

Recommendations for the Novato Area

Housing: Unless development is controlled, Novato's growth rate threatens to exceed 10,000 units over the 20-year period. The city plans to impose effective controls to insure conformity to the plan's objectives, through development reviews and permit issuances. Previously approved proposals which have lain dormant for many years should be re-evaluated and, if appropriate, rescinded. The preservation of Mount Burdell is especially critical to Novato and this area has been named as one of the six important areas initially designated by the Regional Parks and Open Space District.

growth mngmt
revalue dormant plans
preserve Mt B.

The city recognizes the open space designated in the Countywide Plan in its revised general plan. Additional areas under development pressure should be considered for acquisition by the countywide open space agency. In areas only partially covering designated open space, construction should be clustered in the developable portion of the area. Residential development in the Novato Bay Plan should be restricted, through flood plain zoning, pending findings from the current study of soil stability and hazards there.

cluster dev.
restrict Bay Plan

The Countywide Plan recommends that programs be instituted to retain about 10 percent of the existing housing in low and medium price categories, and that new developments be required to include such units, in order to maintain a 1990 price distribution approximating the countywide distribution in 1990. Novato residents have expressed concern about becoming inundated with lower-price housing, but implementation of housing policy throughout the county should allay these local concerns.

10% und. units

Apartment densities, 12 to 20 units per net acre, would be suitable within the downtown Novato countywide activity center. Clustered town house densities (6 to 12 units per net acre) are appropriate at other residential locations near Route 101 or served by transit lines.

12-20 du/ac in downtown
Cluster 6-12 du/ac in 101 corridor

Economic Development: Local and county programs should encourage business development at Hamilton Industrial Park and tourist enterprises in eastern Novato generally, expecially in relation to a possible future ferry terminal. The types of activities that would be desirable here would depend on high environmental quality, and development controls should be carefully related to soil stability and other environmental factors. The South Novato business development area should have priority for expansion over the North Novato area near Gnoss Field. The County Airport is planned to continue as a limited, general use facility.

Business at HAFB
tourist in E. Nov.

S. Nov. business over

The downtown Novato countywide activity center should be strengthened and supported by prohibiting any but local retail facilities in other parts of the area. Office uses should also be concentrated downtown, rather than elsewhere in the Novato area.

strengthen downtown

B. LAS GALLINAS VALLEY

Las Gallinas Valley grew at a very rapid rate between 1960 and 1970, and it is projected to increase at well over the county average during the next two decades. Lucas Valley and Santa Venetia are unincorporated communities, and Terra Linda is in the City of San Rafael*. Housing costs are rising, but more than half the units are still in the medium price category. Some pending residential proposals would partially encroach on recommended open space.

"Downtown Marin", the Civic Center-Northgate countywide activity center, is a major employer, and is expected to provide significant increases in jobs by 1990. The Northgate Industrial area has increasingly taken on the character of an office park, rather than a manufacturing center. The Commerce Clearing House development on Quail Hill, a research and publishing firm, will include housing in a later stage. The new Firemen's Fund operation near Terra Linda is an example of the kind of administrative office activity for which the county has considerable potential.

The revised San Rafael General Plan now being prepared covers both the Las Gallinas Valley and San Rafael Basin planning areas.

Major countywide issues confronting the area are:

1. The rate of growth, and preservation of the supply and distribution of low and moderate-income units.

2. Preserving open space along ridges, the bay shore, and creeks.

3. Linking together the various parts of the Civic Center-Northgate countywide activity center, which are too distant from each other too function as a real downtown.

LAS GALLINAS VALLEY

TABLE 3.10

LAND		
ACREAGE, total		13,665
23.3	% developed 1970	3,190
52.5	% open space to be secured 1970-90	7,170
15.5	% developable but vacant in 1990 (Plan)	2,115

		1970		1990 MARKET		1990 PLAN	
• LAND USE							
	Open Space	40	0.3%	40	0.3%	7,210	52.8%
	Vacant or Agricultural	10,435	76.4%	7,945	58.1%	2,115	15.5%
	Public and Institutional	310	2.3%	310	2.3%	310	2.3%
	Residential	2,690	19.7%	4,900	35.9%	3,610	26.4%
	Commercial and Industrial	190	1.4%	470	3.4%	420	3.1%
RESIDENTS •	PEOPLE	25,800		56,100		39,700	
	% increase 1970-90	-		117.4		53.9	
•	DWELLING UNITS	7,030		17,400		12,100	
	% increase 1970-90	-		117.4		72.9	
•	RESIDENTIAL DENSITY (a)	2.6		3.6		3.4	
JOBS	BASIC	1,460		2,930		3,770	
	POPULATION SERVING	6,130		15,000		11,660	
	TOTAL CIVILIAN	7,590		17,930		15,430	
HOUSING •	1970 OCCUPIED UNITS	LOW (b)		MEDIUM (c)		HIGH (d)	
	owner 5,170	83	1.6%	2,610	50.5%	2,476	47.9%
	renter 1,860	359	19.3%	1,067	57.4%	433	23.3%
	94.0 % change 1960-70	-5.9		-14.2		20.1	
1990 PLAN •	EXISTING UNITS RETAINED	145		219		-	
•	NEW UNITS REQUIRED	1,511		1,836		1,723	
	% of total new units 1970-90	29.8		36.2		34.0	
1970 CENSUS •	FAMILY INCOME	12.4%		34.2%		53.4%	
•	AGE: 42.1 % UNDER 18	53.2 % 18-64		4.7 % OVER 65			
•	RACE: 97.1 % WHITE	2.9 % NON-WHITE (INCL.		1.3 % BLACK)			

For footnotes see page 3-10.

Recommendation for Las Gallinas Valley

Housing: High-density housing, with 12 to 20 units per acre, should be encouraged on suitable sites within the Civic Center-Northgate countywide activity center, in return for developers providing low and moderate-income units and transferring development rights for open space. Housing would be desirable within the shopping center--an especially good location for low income and elderly persons.

Plan implementation indicates an overall rate of growth for the area of about 250 units per year, which will require cooperation by San Rafael, the County of Marin, and the proposed countywide review agency.

Other housing opportunity areas at designated accessible locations would be suitable for medium density, 6 to 12 units per acre. A reasonable amount of rental housing in appropriate locations should be designed for families with two or more bedrooms per unit. In any proposals partially impinging upon proposed open space, such as those on the San Pedro Peninsula, housing should be clustered in the developable sections and the open space permanently preserved.

Economic Development: A shuttle bus at 10 to 15 minute intervals should connect the Civic Center, shopping center, Northgate industrial area, and the Las Gallinas Creek ferry terminal. Making the shopping center easily accessible from these employment areas should help Northgate meet the competition from the proposed Corte Madera regional shopping center. The land north of the Civic Center to Freitas Parkway should not be permitted to develop into a commercial strip. Business and professional offices should be encouraged at the 101-Freitas interchange, which should be redesigned to improve access and safety.

The Northgate industrial area should continue to grow as a fairly intensive office-type concentration, suitable to its highly accessible location, interconnected with commercial and government services.

The Silveira Ranch-St. Vincent's area has potential for a planned development with a mixture of office, industrial and residential uses. The 1971 Preliminary Countywide Plan proposed this area as a countywide activity center, but subsequent evaluation indicates such a designation would detract from the Novato and Civic Center-Northgate centers.

SAN RAFAEL PLANNING AREA

TABLE 3.11

LAND

ACREAGE, total	7,585
48.3 % developed 1970	3,660
23.1 % open space to be secured 1970-90	1,750
13.8 % developable but vacant in 1990 (Plan)	1,045

		1970		1990 MARKET		1990 PLAN	
	• LAND USE						
	Open Space	275	3.6%	275	3.6%	2,025	26.7%
	Vacant or Agricultural	3,630	47.8%	2,405	31.7%	1,045	13.8%
	Public and Institutional	20	0.3%	20	0.3%	20	0.3%
	Residential	3,300	43.5%	4,310	56.8%	3,925	51.7%
	Commercial and Industrial	360	4.7%	575	7.6%	570	7.5%
RESIDENTS	• PEOPLE	31,600		45,600		41,000	
	% Increase 1970-90	-		44.3		29.7	
	• DWELLING UNITS	11,740		18,400		16,500	
	% Increase 1970-90	-		56.7		40.5	
	• RESIDENTIAL DENSITY [a]	3.6		4.3		4.2	
JOBS	BASIC	5,980		8,860		9,000	
	POPULATION SERVING	10,150		17,010		14,920	
	TOTAL CIVILIAN	16,140		25,870		23,920	
HOUSING	• 1970 OCCUPIED UNITS	LOW [b]		MEDIUM [c]		HIGH [d]	
	owner 6,100	378	6.2%	2,385	39.1%	3,337	54.7%
	renter 5,640	3,119	55.3%	2,293	40.3%	248	4.4%
	60.3 % change 1960-70	-14.4		-2.8		17.2	
1990 PLAN	• EXISTING UNITS RETAINED	1,270		814		-	
	• NEW UNITS REQUIRED	1,269		1,595		1,896	
	% of total new units 1970-90	26.7		33.5		39.8	
1970 CENSUS	• FAMILY INCOME	19.1%		37.2%		43.7%	
	• AGE: 27.4 % UNDER 18	63.0 % 18-64		9.6 % OVER 65			
	• RACE: 97.8 % WHITE	2.2 % NON-WHITE (INCL.		1.0 % BLACK)			

For footnotes see page 3-10.

SAN RAFAEL BASIN

San Rafael is the largest city in Marin and continues to grow in population at a higher than countywide rate. However, it has relatively less developable land available than the rest of the City-Centered Corridor, and therefore its growth rate is expected to slow down.

Much of San Rafael's population increase in the next two decades will probably be in-filling of scattered vacant parcels and replacement of older buildings in and near downtown. A major concern here is that this area contains a large share of the county's relatively low-rent units, which are likely to be replaced by new construction. Development pressures also threaten the open space on San Pedro Peninsula.

The San Rafael central business district functioned as "downtown Marin" until the new Civic Center and Northgate Shopping Center shifted this function to the north. The business development area to the south contains mainly automobile sales and service areas and small manufacturing establishments. It can be expected to continue to have the "heaviest" industrial character of the county's business areas.

Major countywide issues in San Rafael are:

1. Retaining the present amount and distribution of low and moderate-income housing units.

2. Preserving open space on ridges and the bay shore, including space serving high-density residential areas.

3. Maintaining a supply of relatively inexpensive commercial and industrial space to help new businesses get started.

4. Maintaining the vitality of downtown San Rafael, especially in view of competition from Northgate and the proposed new Corte Madera center.

5. Improving the appearance of the industrial area along Route 101.

Recommendations for San Rafael Basin

Housing: Apartment densities (12 to 20 units per acre) should be encouraged in the downtown San Rafael countywide activity center, in return for public benefits of low and moderate-income housing and open space. Here it is especially important to carry out the principle of replacing the kind of low and moderate-income housing units removed by new development. Relocation services to present residents should be coupled with a vigorous program to retain the supply of low and moderate-income housing, by the city working with the Marin County Housing Authority and through other programs, as explained under "Implementation and Next Steps", below.

The area should grow at a rate of no more than about 250 housing units per year. San Rafael has declared a temporary moratorium on all construction within open space designated by the Countywide Plan, which the city has adopted as its interim open space element. The recommended open space along the Bay shore south of the canal is essential. It adjoins the county's most densely developed residential area, which now contains inadequate public open space.

Economic Development: Downtown San Rafael is designated as a countywide activity center and should be connected and served by the Northgate shuttle service. It has potential for specializing in "incubating" businesses and services with low profit margins.

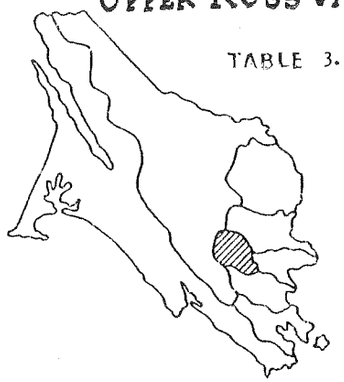
The appearance of the San Rafael industrial area along both sides of Route 101 should be greatly improved, since it is seen by a large share of the people coming to or passing through Marin. Landscaping between the road and the structures should be added. The design of new buildings, redesign of existing ones, and design and placement of signs should be carefully controlled.

The area along the bay north of the Richmond Bridge may have potential for commercial recreation, if public open space is acquired to enhance the area's environmental quality.

The "Miracle Mile" business development area between San Rafael and San Anselmo can be expected to continue to function as an auto-oriented, fairly low density commercial strip. This pattern should not be allowed to spread to other streets.

UPPER ROSS VALLEY

TABLE 3.12



LAND							
ACREAGE, total		9,440					
33.2% developed 1970		3,130					
30.8% open space to be secured 1970-90		2,910					
5.8% developable but vacant in 1990 (Plan)		550					
	• LAND USE	1970		1990 MARKET		1990 PLAN	
	Open Space	140	1.5%	140	1.5%	3,050	32.3%
* Includes 550 ac. developable & 2380 ac. undevelopable (over 40% slope)	Vacant or Agricultural	6,170	65.4%	5,590	59.2%	2,930 *	31.0%
	Public and Institutional	55	5.8%	55	5.8%	55	5.8%
	Residential	2,970	31.5%	3,530	37.4%	3,285	34.8%
	Commercial and Industrial	105	1.1%	125	1.3%	120	1.3%
RESIDENTS	• PEOPLE	26,900		33,700		32,200	
	% increase 1970-90	-		25.3		19.7	
	• DWELLING UNITS	9,380		12,400		11,900	
	% increase 1970-90	-		31.9		26.6	
	• RESIDENTIAL DENSITY [a]	3.2		3.5		3.6	
JOBS	BASIC	980		1,200		1,200	
	POPULATION SERVING	2,750		4,120		3,860	
	TOTAL CIVILIAN	3,730		5,320		5,060	
HOUSING	• 1970 OCCUPIED UNITS	LOW [b]		MEDIUM [c]		HIGH [d]	
	owner 6,120	832	13.6%	3,250	53.1%	2,038	33.3%
	renter 3,260	1,796	55.1%	1,297	39.8%	166	5.1%
	27.0 % change 1960-70	- 13.1		11.0		2.1	
1990 PLAN	• EXISTING UNITS RETAINED	302		0		-	
	• NEW UNITS REQUIRED	700		736		1,584	
	% of total new units 1970-90	23.2		24.4		52.4	
1970 CENSUS	• FAMILY INCOME	22.3%		37.4%		40.3%	
	• AGE: 30.8 % UNDER 18	59.2 % 18-64		10.0 % OVER 65			
	• RACE: 98.5 % WHITE	1.5 % NON-WHITE (INCL.		0.8 % BLACK)			

For footnotes see page 3-10.

UPPER ROSS VALLEY

The Upper Ross Valley--including the cities of Fairfax, San Anselmo and Ross--has been growing at a slower rate than other parts of the City-Centered Corridor. It is expected to continue its relatively leisurely pace during the next two decades, except that density increases are anticipated in areas with particularly good public transit service. Some of the designated open space in the area is already owned by the Marin Municipal Water District.

Fairfax and San Anselmo contain a substantial share of the county's low and medium-price housing units, which could be jeopardized by replacement or cost increases unless corrective steps are taken.

The Hub in San Anselmo and downtown Fairfax meet primarily local shopping and service needs. Only modest employment increases are projected here and in the planning area generally.

Major community development issues for the Upper Ross Valley are:

1. Retaining the present supply and distribution of low and moderate-income housing units.
2. Planning for density increases at selected suitable locations, through in-filling and provision of second units, on single family lots.
3. Supporting community downtown areas and preventing commercial sprawl.

Recommendations for Upper Ross Valley

Housing: The plan contemplates that the annual housing growth rate should not exceed 100 to 150 units. These units should be provided by in-filling existing areas, rather than by permitting low-density sprawl. Increases in density should be permitted in the Fairfax and Hub community activity centers, in return for provision of open space and units for low and moderate-income families.

New development is likely to replace existing low and moderate-income units, especially in and near downtown areas. Relocation services should be provided for present residents, and the supply of units they can afford should be expanded throughout the area. An especially valuable source of such housing are second units on single-family lots.

Economic Development: Retail, commercial, and office uses should be concentrated in the Fairfax and Hub community activity centers, to the greatest extent possible. No new shopping centers or strip commercial developments should be permitted. Local artists and craftsmen should also be encouraged to locate studios and shops in these centers.

LOWER ROSS VALLEY

TABLE 3.13

LAND	• LAND USE	1970		1990 MARKET		1990 PLAN	
ACREAGE, total		6,970					
51.8 % developed 1970		3,610					
25.8 % open space to be secured 1970-90		1,800					
5.0 % developable but vacant in 1990 (Plan)		350					
	Open Space	75	1.1%	75	1.1%	1,875	26.9%
	Vacant or Agricultural	3,285	47.1%	2,115	30.3%	775 *	11.1%
	Public and Institutional	445	6.4%	445	6.4%	445	6.4%
	Residential	2,890	41.5%	3,870	55.5%	3,410	48.9%
	Commercial and Industrial	275	3.9%	465	6.7%	465	6.7%
RESIDENTS	• PEOPLE	32,000		48,300		41,800	
	% increase 1970-90	-		50.9		30.6	
	• DWELLING UNITS	10,020		17,800		15,600	
	% increase 1970-90	-		77.6		55.7	
	• RESIDENTIAL DENSITY (a)	3.5		4.6		4.6	
JOBS	BASIC	1,990		2,400		3,200	
	POPULATION SERVING	7,340		15,440		12,380	
	TOTAL CIVILIAN	9,330		17,840		15,580	
HOUSING	• 1970 OCCUPIED UNITS	LOW (b)		MEDIUM (c)		HIGH (d)	
	— owner 6,380	255	4.0%	2,303	36.1%	3,872	59.9%
	— renter 3,640	1,110	30.5%	1,933	53.1%	597	16.4%
	64.0 % change 1960-70	- 13.9		- 8.2		22.1	
1990 PLAN	• EXISTING UNITS RETAINED	444		989		-	
	• NEW UNITS REQUIRED	1,668		1,948		1,964	
	% of total new units 1970-90	29.9		34.9		35.2	
1970 CENSUS	• FAMILY INCOME	14.3		32.1		53.6	
	• AGE: 26.4 % UNDER 18	65.2 % 18-64		8.4 % OVER 65			
	• RACE: ** 99.1 % WHITE	0.9 % NON-WHITE (INCL.		0.2 % BLACK)			

* Includes 350 ac. developable & 425 ac. undevelopable (over 40% slope)

**Excludes San Quentin prison

For footnotes see page 3-10.

LOWER ROSS VALLEY

Lower Ross Valley includes the cities of Larkspur and Corte Madera and the unincorporated community of Kentfield. The area has been growing rapidly, particularly because of new apartments in Larkspur, but the plan anticipates that the area's rate of increase will be somewhat less than the countywide average over the next two decades, as developable land is used up and open space is preserved.

The area still contains a substantial amount of the county's medium-price homes and rental units. However, prices continue to rise, and most of the new housing stock has been small, high-priced apartments unsuitable to any but high-income, childless occupants. Some pending residential projects would impinge upon open space designated in the Countywide Plan.

The proposed Corte Madera shopping center and the new Larkspur ferry terminal will significantly affect the area's economic future. There is also some industry along Route 101, which is expected to expand. The College of Marin and Marin General Hospital and its related professional offices are also important employers in the area. Total jobs in the area are expected to increase by more than 6,000 between 1970 and 1990.

Countywide issues in Lower Ross Valley include:

1. Rate of growth and preservation of open space.
2. Changing the trend toward expensive, non-family new housing units and expanding the supply of housing available to low and moderate-income families.
3. Tying together the new shopping center and ferry terminal and relating them to nearby areas and to the county as a whole.
4. Improving the appearance of the industrial area along Route 101.

X X X X

Recommendations for Lower Ross Valley

Housing: The annual growth rate in the area should not exceed 250 to 300 housing units, which will require the cooperation of Larkspur, Corte Madera, and the county, and the proposed county-wide review agency of the City-County Planning Council. About 55 percent of these new units should be in the low and medium price categories, and programs should be undertaken to retain about 15 percent of the existing low and medium price units in their existing categories.

High-density housing should be allowed in the Corte Madera-Larkspur countywide activity center (especially near the ferry terminal) and in Kentfield near the College of Marin, in return for provision of open space and low and moderate-income housing. Medium densities should be permited in the Larkspur-Corte Madera downtown areas and near the hospital.

Economic Development: The proposed Corte Madera shopping center should be linked physically, visually, and by an internal transportation system (including walkways and bicycle paths) to the Larkspur ferry terminal, the shopping complex west of the freeway, and nearby residential and industrial areas. This countywide activity center should also connect with the San Quentin prison site, which may be re-used as a park or residential area, and to the proposed open space along the bay.

The appearance of the existing Corte Madera industrial area should be improved through landscaping and building improvements, to enhance the view from 101 and the approach to the new shopping center.

Community retail, commercial, and office development should be concentrated in the Larkspur and Corte Madera downtowns and near the College of Marin.

RICHARDSON BAY COMMUNITIES

TABLE 3.14

LAND							
	ACREAGE, total	12,965					
	42.9 % developed 1970	5,560					
	29.6 % open space to be secured 1970-90	3,840					
	7.1 % developable but vacant in 1990 (Plan)	915					
	• LAND USE	1970		1990 MARKET		1990 PLAN	
	Open Space	1,220	9.4%	1,220	9.4%	5,060	39.0%
	Vacant or Agricultural	6,185	47.7%	3,760	29.0%	915	7.1%
	Public and Institutional	170	1.3%	170	1.3%	170	1.3%
	Residential	5,070	39.1%	7,250	55.9%	6,410	49.4%
	Commercial and Industrial	320	2.5%	565	4.4%	410	3.2%
RESIDENTS	• PEOPLE	45,100		74,400		60,500	
	% increase 1970-90	-		65.0		34.1	
	• DWELLING UNITS	16,960		29,700		24,000	
	% increase 1970-90	-		75.1		41.5	
	• RESIDENTIAL DENSITY (a)	3.3		4.1		3.7	
JOBS	BASIC	1,530		2,330		2,700	
	POPULATION SERVING	5,570		10,010		7,580	
	TOTAL CIVILIAN	7,100		12,340		10,280	
HOUSING	• 1970 OCCUPIED UNITS	LOW (b)		MEDIUM (c)		HIGH (d)	
	owner 9,730	506	5.2%	3,756	38.6%	5,468	56.2%
	renter 7,230	2,118	29.3%	3,376	46.7%	1,735	24.0%
	41.0 % change 1960-70	- 19.1		- 8.2		27.3	
1990 PLAN	• EXISTING UNITS RETAINED	862		2,159		-	
	• NEW UNITS REQUIRED	2,111		2,443		2,485	
	% of total new units 1970-90	30.0		34.7		35.3	
1970 CENSUS	• FAMILY INCOME	18.7%		30.3%		51.0%	
	• AGE: 27.9 % UNDER 18	64.3 % 18-64		7.8 % OVER 65			
	• RACE: 94.6 % WHITE	5.4 % NON-WHITE (INCL.		4.0 % BLACK)			

For footnotes see page

RICHARDSON BAY COMMUNITIES

The population, densities, and housing prices in most parts of the Richardson Bay Communities area have been rising rapidly in recent years. Increasingly, the area is taking on the character of a northern extension of San Francisco, with heavy influxes of small apartments, single and wealthy residents, and tourists. A start contrast to the rest of the area is Marin City, the county's only black ghetto, where nearly two-thirds of the units are public housing.

Tourism is a major economic activity in the area, but Sausalito has adopted policies opposing the attraction of more visitors, and Tiburon has recommended limitations. Firms have been moving out of the Sausalito industrial area, formerly a shipbuilding complex. Downtown Mill Valley and the Strawberry shopping center provide community-level services.

Major countywide issues confronting the area are:

1. Modifying current trends toward high-cost, small apartments, and the rate of growth.
2. Expanding the supply of housing for low and moderate-income families.
3. Tying in Marin City with adjacent communities.
4. Preserving open space threatened by encroaching development.
5. Planning for desirable economic activities other than tourism.

Recommendations for Richardson Bay Communities

Housing: About 40 percent of new units should be in the low and medium price categories. Voluntary controls over rents and prices of existing units in these categories will be especially critical here, if the present upward spiral is to be modified. Overall, the area should grow at a rate of not more than about 350 units per year.

The recently completed Marin City Master Plan recommends methods of increasing the racial and economic heterogeneity of the community, up-grading its environment and improving access to adjacent areas.

Economic Development: The present bay front industrial area in Sausalito should be planned to convert into a business and professional office center. A significant number of Marin residents who now commute to San Francisco have expressed interest in relocating their offices to Marin, and Sausalito would provide a very desirable, accessible location.

Local retail, commercial, and office uses should be concentrated in the Mill Valley, Tiburon, and Sausalito downtowns, the Strawberry shopping center, and in Marin City. Expansion of tourist-related enterprises should not be encouraged in the area, and visitor access on weekends should be limited to transportation modes other than the automobile, to the greatest extent possible

G. INLAND RURAL CORRIDOR (See Table 3.15)

Farms, ranches, publicly owned land, and scattered villages characterize this corridor. The total amount of housing is small, but it includes a proportion of low and moderate-income units that is considerably higher than the countywide average. Many of these units are also in poor physical condition.

The area has not yet been directly affected by the pressures that have caused rapid growth in the City-centered Corridor. However, Nicasio and the San Geronimo Valley could feel this impact soon, since they are the most accessible parts of the corridor.

Economic activities in the corridor consist mostly of agriculture and a few tourist enterprises such as the San Geronimo Golf Course.

Major countywide issues confronting the corridor are:

1. Prefenting rapid growth and urbanization that would destroy the present rural character of the area.

2. Improving the quality of existing residential areas, without substantially increasing costs to low and moderate-income residents.

3. Supporting continues agriculture.

RECOMMENDATIONS FOR THE INLAND RURAL CORRIDOR:

The section on Village Development Policies contains general guidelines for housing and economic expansion in the village areas designated in the Countywide Plan, for the inland Rural and Coastal Recreation Corridors. More detailed policies will be prepared in area plans, in conjunction with local residents.

H. COASTAL RECREATION CORRIDOR (See Table 3.16)

Much of the Coastal Recreation Corridor is already publicly owned in Point Reyes National Seashore, and there will be extendsive additional federal acquaitions in the Golden Gate National Recreation Area. However, there will continue to be privately owned agricultural, village, and tourist areas.

Like the Inland Rural Corridor, this area is characterized by a small, predominatly rural population and a lagre share of low and moderate-income and relatively poor quality housing units. Area residents, in reviewing the 1971 Preliminary Countywide Plan, have expressed strong desires to prevent rapid growth and preserve the existing natural environment.

Major issues in the corridor are:

1. Preventing rapid or disruptive growth.

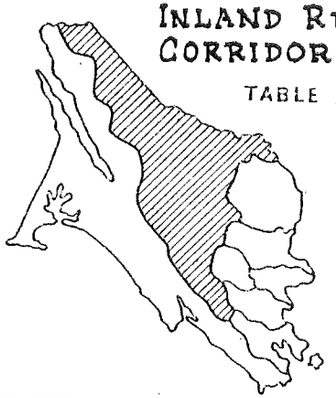
2. Improving housing quality without substantially increasing costs to present low and moderate-income residents.

3. Providing for properly designed and located tourist facilities, related to major recreational attractions.

4. Supporting continued agriculture.

INLAND RURAL CORRIDOR

TABLE 3.15



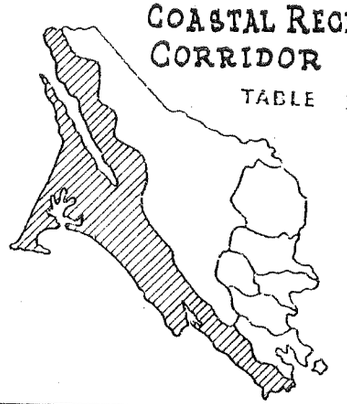
LAND		
ACREAGE, total		130,280
0.8 % developed 1970		1,000
12.1 % open space to be secured 1970-90		15,800
2.1 % developable but vacant in 1990 (Plan)		2,700

		1970		1990 MARKET		1990 PLAN	
	• LAND USE						
	Open Space	23,490	18.0%	23,490	18.0%	39,290	30.2%
	Vacant or Agricultural	105,790	81.2%	103,310	79.3%	89,090	68.4%
	Public and Institutional	0		0		0	
	Residential	990	0.8%	3,380	2.6%	1,860	1.4%
	Commercial and Industrial	10	0.007%	100	0.08%	40	0.03%
RESIDENTS	• PEOPLE	3,950		17,800		9,300	
	% increase 1970-90	-		350.6		127.8	
	• DWELLING UNITS	1,260		5,900		3,000	
	% increase 1970-90	-		368.3		138.1	
	• RESIDENTIAL DENSITY (a)	1.3		1.7		1.6	
JOBS	BASIC	250		250		250	
	POPULATION SERVING	320		420		380	
	TOTAL CIVILIAN	570		670		630	
HOUSING	• 1970 OCCUPIED UNITS			LOW (b)		MEDIUM (c)	
	owner 840	277	33.0%	413	49.2%	150	17.8%
	renter 420	233	55.4%	177	42.2%	10	2.4%
	31.1 % change 1960-70	-33.9		24.4		9.5	
1990 PLAN	• EXISTING UNITS RETAINED	-		-		-	
	• NEW UNITS REQUIRED	-		-		-	
	% of total new units 1970-90	-		-		-	
1970 CENSUS	• FAMILY INCOME	30.5%		44.1%		25.4%	
	• AGE: 32.2 % UNDER 18	59.4 % 18-64		8.4 % OVER 65			
	• RACE: 97.4 % WHITE	2.6 % NON-WHITE (INCL. 2.4 % BLACK)					

For footnotes see page 3-10.

COASTAL RECREATION CORRIDOR

TABLE 3.16



LAND		
ACREAGE, total		123,960
0.8 % developed 1970		1,020
22.9 % open space to be secured 1970-90		28,400
5.4 % developable but vacant in 1990 (Plan)		6,660

		1970		1990 MARKET		1990 PLAN	
	• LAND USE						
	Open Space	60,560	48.9%	74,470	60.1%	88,960	71.8%
	Vacant or Agricultural	62,380	50.3%	47,040	37.9%	33,640	27.1%
	Public and Institutional	0		0		0	
	Residential	970	0.8%	2,340	1.9%	1,900	1.5%
	Commercial and Industrial	50	0.04%	110	0.08%	60	0.04%
RESIDENTS	• PEOPLE	5,050		12,400		9,500	
	% increase 1970-90	-		145.5		88.1	
	• DWELLING UNITS	1,740		4,300		3,300	
	% increase 1970-90	-		147.1		89.7	
	• RESIDENTIAL DENSITY (a)	1.8		1.8		1.7	
JOBS	BASIC	730		1,200		1,200	
	POPULATION SERVING	1,070		1,580		1,390	
	TOTAL CIVILIAN	1,800		2,780		2,590	
HOUSING	• 1970 OCCUPIED UNITS			LOW (b)		MEDIUM (c)	
	owner 900	285	31.7%	363	40.3%	252	28.0%
	renter 840	465	55.4%	355	42.2%	20	2.4%
	31.1 % change 1960-70	-33.9		24.4		9.5	
1990 PLAN	• EXISTING UNITS RETAINED	-		-		-	
	• NEW UNITS REQUIRED	-		-		-	
	% of total new units 1970-90	-		-		-	
1970 CENSUS	• FAMILY INCOME	45.2		37.4		17.4	
	• AGE: 30.4 % UNDER 18	59.4 % 18-64		10.2 % OVER 65			
	• RACE: 96.3 % WHITE	3.7 % NON-WHITE (INCL. 1.4 % BLACK)					

I. Village Development Policies

The Planning Department intends to prepare a series of plans for each village and its surrounding area, in close cooperation with local residents, rather than preparing a revised version of the overall West Marin Plan. Work on these plans is now underway.

The Countywide Plan defines all concentrations of settlement in the two western corridors as villages. Almost all of the remainder of the two western corridors are proposed in the plan for agriculture, recreation or public open space. Exceptions are the areas outside villages to be designated for tourism and quasi-institutional uses such as Synanon. These areas will be the subject of special site studies, and included in studies of nearby villages' "areas of interest" as part of village plans.

1. BOUNDARIES MUST BE SET AND CLARIFIED FOR EACH VILLAGE

Three kinds of boundaries affect villages:

A. Boundaries of existing developed areas. In some cases, in-filling within these areas is the only expansion recommended.

B. Boundaries within which villages should be allowed to expand in the future. Criteria in setting these boundaries are described below.

C. Boundaries of each village's "area of interest", outside the area of expansion but close enough that any development or use has significant impacts on the village. These boundaries will be set during the preparation of village plans.

Each village has its own unique character, but all share the qualities of being small, separate, and relatively self-contained. The quality of self-containedness is evident in the first type of boundary around existing developed areas. It is expressed physically (most villages have a radius of less than a mile so that it is possible to walk from one end to the other); socially (almost all village residents know each other); and economically (a higher proportion of residents work at home or nearby than in communities in the eastern corridor. This is shown by 1970 census data: Only about 23 percent of the workers in rural Marin census tracts commute out of the county, compared with 48 percent countywide).

In setting expansion area boundaries, the following criteria were used, with variations in each village according to local conditions as shown on Table 3.17. Only rural *or low-density* development should be permitted outside these boundaries throughout the Inland Rural and Coastal Recreation Corridors, except for areas to be designated for tourism.

A. Boundaries of existing and proposed public open space (Golden Gate National Recreation Area, Point Reyes National Seashore).

B. Boundaries used in studies by the Planning Department and local planning groups.

C. Areas under agricultural zoning.

D. Service area boundaries of utility districts.

E. Watershed boundaries.

F. Natural barriers: terrain, water, cliffs, open space separating developed areas.

G. Man-made barriers: roads, dikes.

H. Adequate land to accommodate 1990 population recommended in Countywide Plan and to allow flexibility and choice.

I. Existing subdivisions.

J. Flood plains and areas subject to seismic hazard.

TABLE 3.17

CRITERIA USED IN SETTING VILLAGE EXPANSION AREA BOUNDARIES

	A. Public Open Space	B. Planning Studies	C. Agricultural Zoning	D. Utility Service Areas	E. Watersheds	F. Natural Barriers	G. Man-made Barriers	H. Land Needed	I. Subdivisions	J. Flood Plains, Seismic
Dillon Beach			X	X		X		X	X	X
Tomales			X				X	X		X
Marshall			X			X				X
Inverness	X	X			X	X		X	X	X
Inverness Park	X	X			X	X		X	X	X
Pt. Reyes Stn.		X	X	X		X	X	X	X	X
* Olema	X									X
Bolinas		X	X	X		X		X	X	X
* Stinson Beach	X								X	X
* Muir Beach	X									
Nicasio		X	X		X	X		X	X	
Lagunitas	X			X	X	X		X	X	X
Forest Knolls	X			X	X	X		X	X	X
San Geronimo				X	X	X		X	X	X
Woodacre				X	X	X		X	X	X

* The expansion areas for Muir Beach and Stinson Beach and Olema are based on the assumption that the currently proposed boundaries for the Golden Gate National Recreation Area will finally be adopted and acquired by the federal government.

Conservation zones designated by the Countywide Plan are included within most of the villages and their expansion areas. These include areas within 1,000 yards of the ocean and bay shores (similar to the Coastal Zone created by passage of Proposition 20) and within 300 feet of each side of streams. The Countywide Plan recommends special controls over any development in these environmentally sensitive areas. However, since portions of conservation zones are already developed, they were not automatically excluded from village or expansion area boundaries. It is assumed that the stringent regulations of the Countywide Plan would apply to all conservation zones, both inside and outside villages. Refinement of the conservation zones to reflect local conditions should be done as part of village plan preparation.

2. LARGE DEVELOPMENT THAT WOULD RAPIDLY OR DRASTICALLY CHANGE THE CHARACTER OF THE VILLAGE SHOULD BE DISCOURAGED, BUT SOCIAL AND ECONOMIC DIVERSITY SHOULD BE ENCOURAGED.

Large scale development occurring over a short period of time that would drastically change the appearance of a village, or would create a need for expensive new urban services should be avoided.

Most low and moderate income housing stock will have to come from existing supply, and therefore methods to prevent units from rising in price should be employed. As shown on Table 3.18 income levels in western and central Marin are now relatively low.

Innovations in architectural and living arrangements should be encouraged to the greatest possible extent.

X X X X

TABLE 3.18

FAMILY INCOME IN MARIN COUNTY AREAS--1970 Census

	Median Income
Marin County	$13,935
Novato	12,014
San Rafael	14,064
Bolinas-Stinson Beach	10,647
Inverness-Olema Valley	7,909
Pt. Reyes Station-Northwest Marin	8,106
San Geronimo Valley	11,810

Table 3.19 presents growth guidelines for village areas. It is based on village expansion boundaries delineated according to criteria described under point 1. Except where otherwise noted in the Appendix, to the table, the Recommended Additional Units figure assumes that 20 percent of the land available in the expansion area (outside the developed area) will develop at the recommended density over the 20-year period. This percentage of available land to be developed between 1970 and 1990 is the same as recommended for the City-Centered Corridor in the Countywide Plan.

The Recommended Additional Units number is thus derived from three variables: acres within the expansion area boundaries, density of development, and timing of development. If any of these factors change, the resulting increase will of course differ.

TABLE 3.19

MARIN VILLAGE AREAS: ACREAGE AND DWELLING UNITS, 1970-1990

(See Appendix for explanation)

	Acres		1970				1970-1990 Recommended Increase			
COASTAL RECREATION CORRIDOR	Total[4] Village Area	Expansion Area	Dwelling[1] Units	Density	Population[2]	1960-70%[3] Increase in DU's Village Areas	Dwelling[1] Units	Density	Estimated Population	% Increase in DU's
Dillon Beach	367	305	137	2.2	250	19%	200	2.2	576	146%
Tomales	246	217	68	2.3	200		100	2.3	288	147%
Marshall	52	0	60	1.2	170	68%	20	1.6	58	33%
Inverness	850	1,419	559	2.3	423	30%	370	1.1	1,077	66%
Inverness Park	812				325					
Point Reyes Station	683	571	134	1.2	390	5%	225	0.5 & 2.0	648	168%
Olema	107	89	27	1.5	50	26%	20	1.0	58	74%
Bolinas	390	126	527	2.0	597	37%	120	2.1	298	23%
Stinson Beach	380	184	499	2.5	792	36%	120	1.9	298	24%
Muir Beach	157	124	61	1.8	58	141%	25	1.0	66	41%
INLAND RURAL CORRIDOR										
Nicasio Valley	---	---	(100)	Rural	297	17%	(50)	Rural	148	50%
Lagunitas										
Forest Knolls	826	511	564	1.8	1,293	49%	140	1.0	395	25%
San Geronimo	131	66	125	1.9	364		20	1.0	56	16%
Woodacre	497	350	472	3.2	1,295		90	1.0	254	19%

Total 1970 occupied dwelling units: Coastal Recreation Corridor, 1,740; Inland Rural Corridor, 1,255

1) Includes total units occupied and unoccupied.

2) 1970 population is relatively low in villages with a large proportion of unoccupied seasonal units (Dillon Beach, Inverness, Inverness Park, Bolinas, Stinson Beach, Muir Beach). 1990 population figures assume all units occupied.

3) Comparison of Population Estimating Sub-Areas for 1960 (Marin County Planning Department, 1963) with Traffic Zones for 1970 (Balanced Transportation Program, 1969). Occupied units only.

4) Includes 1970 area as well as 1970-90 expansion area.

APPENDIX TO TABLE 3.19: Village Development Policies

Explanation of Factors Used in Determining Recommended Additional Units

Dillon Beach

New development could be at presert density (2.2 units/ acre), since sewer facilities will have been provided for Oceana Marin. Recommended Additional Units figure assumes that 30 percent, rather than 20 percent, of the expansion area will develop between 1970 and 1990 because of recreational potential.

Tomales

Sewer system improvements are already planned, so new development could be at present density of 2.3 units/acre.

Marshall

No expansion area recommended. New units would be in-filling of existing developed area. Marshall figures do not include Synanon, which has an estimated population increase of 100 between 1970 and 1990.

Inverness, Inverness Park

Density of additional units in expansion area is recommended to be 1 unit/acre, instead of the existing 2.2/acre. This is because the area is not sewered and it is hilly. In addition, the need to protect the water supply from contamination will make development difficult. Recommended Additional Units also include development at 2.3 units/acre of one-eighth of existing developed acreage through in-filling.

Point Reyes Station

Growth in expansion area west of Highway 1 is assumed to be at a density of 2 units/acre (instead of the existing 1.2) because of sewer facilities already planned. Density in the area east of Highway 1 would be 1 unit/2 acres to prevent a strip form of development. The Coast Guard housing now under construction should not be included in the area's 1970-1990 additional units since it is a one-of-a-kind development not likely to produce pressures for more growth.

Bolinas, Stinson Beach

Recommended Additional Units include 20 percent of expansion area plus development at 2 units/acre through in-filling on one-eighth of existing developed acreage. Limited-scale sewage treatment facilities make possible continued development at average of more than 1 unit/acre density.

Muir Beach

Expansion outside Golden Gate National Recreation Area only.

Nicasio Valley

Nicasio is not a village, but an historic square containing only a church, eight houses, and a commercial building. The remaining population is scattered at rural densities throughout the Nicasio Valley. Because of this firmly established development pattern and because of the historic characher of the square, it is recommended that no concentrated core be developed. Therefore, no expansion area boundaries are designated. Recommended Additional Units would be at rural densities on existing lots throughout the entire Nacasio Valley. These units include one-fifth of the 168 existing subdivided, unimproved lots, plus subdivision and development of one-fifth of the 103 vacant agricultural parcels.

Lagunitas, Forest Knolls, San Geranimo, Woodacre

Density of new development was set at 1 unit/acre. This would enable the San Geronimo Valley to continue relying on septic tanks rather than installing sewers. Additional units include in-filling on one-eighth of existing developed acreage. If the large area east of Woodacre which is now under agricultural preserve contract were to develop, the total number of additional units between 1970 and 1990 would increase by at least 50.

These recommended figures are intended to be used as a general guide for planning and development reviews. More specific targets will be prepared in conjunction with village area plans.

Following are general characteristics and policies for each village, also to be used as planning guides for more detailed plans.

Coastal Recreation Corridor

Dillon Beach is so remote that there is little prospect of its attracting many year-round residents who commute to San Francisco to work, though there may be some commuters to Sonoma County. Some additional second-home development may be feasible here, together with year-round retirement homes. Present major features are second homes, beach business, sport fishing, and the Pacific Marine Station.

Tomales, was a major settlement in the mid-nineteenth century but is now a small center of commercial uses and schools. It probably has little potential for second-home and recreation development, since it is removed from the water. Some residential growth and provision of additional local commercial services through in-filling would be appropriate. The Association of Bay Area Governments Preliminary Regional Coastline Plan designates Tomales as a center for limited growth.

Marshall, a narrow strip on the east shore of Tomales Bay, is unable to expand without further polluting the Bay or encroaching on grazing lands. It should retain its present fishing village character. Only very limited growth through in-filling is recommended. Other small clusters of development along Tomales Bay (Nick's Cove, Blake's Landing, Cypress Grove, Reynolds, Marconi, Millerton Point) should not be allowed to grow into villages or to merge.

Inverness and Inverness Park are a well-defined pocket bounded by Point Reyes National Seashore and Tomales Bay. They are characterized by a mix of primary and second homes, with limited commercial, recreational and fishing activities. They should continue to serve a residential function, including some second homes, in addition to local commercial services and fishing. Further development should be confined to existing lots.

Synanon, a residential-agricultural complex operated by a special-purpose institution, is not a village in the usual sense. Nevertheless, the development of Synanon should be related to these village policies, and representatives of the organization should participate in areawide and local planning efforts.

Point Reyes Station, a commercial and service center, is designated as a center for limited growth in the ABAG Preliminary Coastline Plan. It should retain its present character, rather than developing with major recreational facilities and second homes. Diversity in structure types and lot sizes should be encouraged in new development. Some small-scale facilities for tourists such as hotels and restaurants designed to harmonize with existing structures, should be permitted. (See point 7.)

Olema reflects more past history than present activity. The area immediately around the crossroads should be preserved as an historic site, in conjunction with the adjoining Golden Gate National Recreation Area. It is under pressure for tourist-commercial development; only those commercial uses that are in keeping with Olema's historic character should be permitted. Expansion of primary residences and small-scale commercial services should be carefully reviewed.

Bolinas is more diverse than the other villages, with second homes, new residents on the mesa, and agricultural areas. Determining the types and locations of new development that should be permitted will require much more extensive analysis, working with local residents. If the RCA transmitters on the northern part of Bolinas Mesa are phased out this area would have potential for a tourist camp related to the Palomarin entrance to Point Reyes National Seashore.

Stinson Beach is primarily a mix of primary and second homes with some tourist commercial activities. There is a need for some additional commercial services here, for both visitors and residents.

Muir Beach, in an environmentally fragile coastline setting, is surrounded by the Golden Gate National Recreation Area lands and will be unable to expand. Commercial facilities should be kept to a minimum within the existing community.

Inland Rural Corridor

Nicasio Valley should have carefully regulated expansion following the trend of existing development. Its main functions should be primary homes, limited local services, and some agricultural tourist activities such as dude ranches. Primary or secondary homes on 10 to 20 acre sites, sometimes known as "ranchettes" would be suitable uses in the Nicasio expansion area, but not in the Coastal Recreation Corridor or outside expansion areas. (See Appendix.)

Lagunitas, Forest Knolls, San Geronimo and Woodacre are covered by the adopted San Geronimo Valley Plan, which must be revised in accordance with the Countywide Plan. The present San Geronimo Valley Plan calls for an ultimate 5,000 dwelling units, compared with a Countywide Plan total of about 2,400 for the entire Inland Rural Corridor by 1990. Expansion of these villages should be carefully regulated, but it is recognized that their residents will include a higher proportion of commuters than in the villages of the Coastal Recreation Corridor. Other functions should continue to be local commercial services and tourism (golf course, dude ranches). Buffer zones should be secured to separate these four villages and prevent them from merging into a continuous strip.

The timing of development within village expansion areas should also be determined in preparing village plans in order to prevent rapid and disruptive change and to minimize utility costs. This could be done by including time stages in the plan, and adopting "incremental zoning" accordingly. Areas could be held back from development until the proper time by public "rental" of land for temporary open space use, possibly using funds obtained from assessed value increments elsewhere in the village (as in city redevelopment projects). Or, land to be held open could be placed under an open space contract covering the appropriate period of time.

3. EXPANSION OR ADDITION OF PUBLIC UTILITIES SHOULD BE COORDINATED WITH GROWTH RATES AS PROJECTED IN THE PLAN

Development requires adequate water lines, sewers, schools and other public facilities. The timing, size and location of service extensions should conform to policies of the Countywide Plan and village plans. Treatment facilities and utility expansions should be based on the projected growth rates. Greatly oversized infrastructures would be a burden to existing residences and could stimulate undesirable growth pressures.

Residences in most of the two western corridors are now on septic tanks, which require large lots and thus preclude massive development at urban densities. Bolinas and Tomales, which now have obsolete sewer systems causing water pollution, are under cease and desist orders from the Regional Water Quality Control Board. Both communities plan limited-scale improvements to prevent pollution without adding pressures for growth.

When it is necessary to convert from septic tanks to sewers or to improve a sewer system, small, self-contained systems such as community sewer farms or package treatment plants should be selected rather than large-scale systems.

The Marin Municipal Water District provides water service to the San Geronimo Valley communities and the North Marin County Water District serves communities along and south of Tomales Bay. Small local water companies serve the remaining communities. Both districts are now ex-officio members of the City-County Planning Council. Full involvement of these agencies in the countywide planning process should be strongly encouraged and facilitated. These agencies should study means of providing small-scale, limited capacity water facilities, similar to the small package sewage treatment plants now being developed.

State law now requires that all public agencies annually submit proposed capital improvements to the local jurisdiction, for review for their conformity to the adopted local plan. (Section 65401, Government Code). Now that the Board of Supervisors has adopted the Countywide Plan, such reviews will become mandatory for all special districts serving unincorporated communities.

4. DIVERSITY IN LOT SIZE AND ARCHITECTURE SHOULD BE ENCOURAGED

A number of West Marin residents have advocated varied lot sizes, rather than uniformity, within village areas. This is desirable from the standpoint of individual diversity and aesthetics but it raises the question of equity: Owners of large parcels would be taxed unfairly if they should not choose to subdivide. Open space contracts (enforceable restrictions) or transfer or public purchase of development rights of large parcels could be used to solve this problem. Concurrently, revised zoning techniques could set lots at their existing size, or allow flexibility, rather than blanketing a large area with uniform requirements.

Architectural styles in most villages have generally been diverse and innovative. Continued diversity in the future would be better served by avoiding aesthetic controls, rather than imposing design review restrictions on single-family homes, which could stifle creativity.

5. SOME TYPES OF AGRICULTURE AND LIVESTOCK ARE TO BE PERMITTED IN SOME OF THE VILLAGES

The raising of crops is now a permitted use in all zoning districts. The keeping of livestock is more restricted, usually requiring a use permit or variance. The Planning Department's policy is generally to grant requests for keeping small numbers of livestock (horses, cattle, poultry) in residential districts, unless there are complaints from neighbors or there is a serious nuisance problem. In all cases, there must be adequate provision for sanitary disposal of wastes.

Small-scale agricultural activity is thus usually possible in residential areas under existing zoning, for land owners who wish to pursue it. To encourage more village residents to do so, agricultural or open space contracts might be used. Rezoning to encourage agriculture or keeping of farm animals should be adopted where needed to carry out the intent of village plans.

6. HISTORIC STRUCTURES SHOULD BE PRESERVED, AND THE LONG-ESTABLISHED CHARACTER OF VILLAGE CENTERS SHOULD BE ENHANCED

The overall physical character of present villages should be protected from damage or rapid change. Of particular importance are historic buildings or areas that meet one or more of the following criteria:

a. Age.
b. A fine example of a particular style.
c. A work of a notable architect or builder.
d. The site of an historic event.
e. A building associated with a famous person.
f. Industries or activities that are part of the history of the area.

Here Today, the 1962 survey of Bay Area architectural landmarks by the San Francisco Junior League, lists 28 historic structures in the Coastal Recreation and Inland Rural Corridors.

Historic features in each village area should be identified in the preparation of local plans. Preservation could then be encouraged through historic zoning, which would allow the continuation or rehabilitation of an existing use, but not its expansion or replacement. This would designate historic

features as conforming, so that owners would not be encumbered in selling their property, but removal of an important feature would not be permitted without a rezoning.

All major natural features, such as rock outcrops and bodies of water, will be preserved through the environmental impact review process.

7. NO LARGE TOURIST FACILITIES SHOULD BE ALLOWED IN THE VILLAGES, BUT SOME SMALL TOURIST-ORIENTED BUSINESSES MAY BE PERMITTED

Within villages and expansion areas, small-scale needs to serve visitors to major public recreation areas and tourist developments such as campgrounds, hotels, shops and restaurants should be permitted, if they are consistent with local plans.

Tourist facilities should be of such design, location and scale that they do not adversely affect the natural setting and features which attract visitors in the first place; trailer parks should be carefully designed and well-landscaped. Facilities which encourage auto use and require large parking areas, such as drive-in restaurants, should not be permitted. Uses that can be served by public transit, such as hotels, should be favored over uses requiring auto access, such as motels.

The timing of commercial development should be controlled in the same manner as residential development, to prevent rapid or drastic change in the character of the village. A strip form of development, either contiguous or widely spotted along a road, should not be permitted.

Recommendations for tourist areas to be designated outside villages but within a village's "area of interest" will also be prepared as part of the plan for that village.

Implementation Summary

Methods of implementing the village development policies are described under each point above. Table 3.20 summarizes these implementation methods.

TABLE 3.20

IMPLEMENTATION METHODS FOR VILLAGE DEVELOPMENT POLICIES

	Specific Plan Adoption	Revised Zoning	Incremental Zoning	Historic Zoning	Use Permits & Variances	Open Space Acquisition	Open Space Contracts	Agricultural Contracts	Development Rights Transfers	Planning Commission Reviews	Local Housing Cooperatives	Inter-Agency Coordination	Capital Improvements Reviews	New Small-Scale Utility Techniques	Environmental Impact Reviews
1. Set boundaries	X	X				X				X					X
2. Discourage large developments	X	X	X			X	X			X	X				X
3. Match services to planned growth rates *Coordinate as projected in plan*												X	X	X	
4. Encourage diversity in lot sizes and architecture		X				X			X						
5. Permit agriculture in villages		X			X		X	X							
6. Preserve historic structures	X			X											
7. Permit only small tourist services in villages	X	X								X					X

III. Implementation and Next Steps

HOUSING

Reconciling the Growth Rate with Plan Objectives

The City-County Planning Council, through its proposed countywide review agency and working with the city and county governments, will be the main instrumentality for monitoring the rate of growth. As explained in the section on implementation, CCPC should take on additional review responsibilities: setting standards and criteria for applying plan principles to project reviews, reviewing proposals of countywide importance, monitoring trends and setting planning targets accordingly. These review agency functions should be advisory only during the first period of operation.

The 1970-1990 planned dwelling unit increase for the total county would represent an average annual growth rate of about 2.8 percent, compared with 4.6 percent for the 1960-1970 decade.* Growth has been allocated among planning areas on the basis of developable land available and housing market forces. (See tables for each planning area.)

*1970-1990 increase of 37,575 units, divided by 20, equals about 1,900, approximately 2.8 percent of 1970 number of dwellings, 68,755.

In its annual monitoring, the countywide review agency should evaluate how much housing has been built in each subarea, what price levels this housing has had, and what income and population trends are affecting the area. To the extent allowed by law, appropriate controls should be imposed to achieve plan objectives.

Price Level Distribution

Achieving the plan goal of maintaining social and economic diversity will require action on two levels: providing for an adequate share of new units at low and moderate-income prices, and modifying the present upward spiral of rents and prices of existing units.

To maintain the present housing price distribution of the total county in 1990 (about 20 percent low, 45 percent medium, 35 percent high) indicates that of all new construction during the 20 years, 40 percent would have to be in the low-price category and 40 percent in the medium-price category. This assumes that the 1960-1970 rent and selling price increase rate would continue to operate, pressing the price of existing housing higher.

Most of these new units would have to be publicly subsidized, in order to bring them within the range of low and moderate-income families. It is estimated that the total cost of subsidizing the new units could reach about $137 million by 1990. This money would come mainly from federal mortgage subsidies, such as under Section 236 of the National Housing Act, to the extent that such funds are available.

The Countywide Plan recommends a mix of programs to slow down the increase in prices and rents of existing housing, in addition to including low and moderate-income units in new developments. Table 3.21 shows the recommended number of units in the low-price and middle-price categories to be included in each program over the 20-year period, for the City-Centered Corridor and for each planning area. Units have been allocated to planning areas on the assumption that each should have a price distribution as close as possible to the countywide distribution. (See Table 3.21).

By using a range of programs rather than relying on new construction alone to maintain Marin's housing price structure, the share of new units needed to be subsidized would be significantly reduced. Emphasizing existing units is a feasible approach to implementing Marin's housing policy.

Table 3.21 HOUSING PROGRAMS NEEDED TO MAINTAIN THE 1970 PRICE DISTRIBUTION IN 1990

This list is limited to existing federal and existing state housing programs and new housing programs which could be implemented by the County without major legislative change. The numbers on this page are intended to give possible acceptable figures. Greater numbers in any program should be accepted because it is likely that lower numbers will be achieved in other programs. All numbers are for both owner and renter occupied dwelling units for the 20 year period 1970-1990. Note: a) Federal programs temporarily suspended.

EXISTING HOUSING Programs to retain half of the existing low and medium priced units that would rise in price under the market (no./year for whole county)	City Centered Corridor		Novato Area		Las Gallinas Valley		San Rafael Basin		Upper Ross Valley		Lower Ross Valley		Richardson Bay Communities	
	Low Price	Med Price	Low Price	Med Price	Low Price	Med Price	Low Price	Med Price	Low Price	Med Price	Low Price	Med Price	Low Price	Med Price
Leased housing and similar programs (40/yr.)	800	0	136	0	32	0	279	0	66	0	98	0	153	0
Elderly tax relief (80/yr.)	800	800	136	76	32	38	279	141	66	0	97	171	189	374
Existing 2nd units, with price guaranteed (37/yr.)	450	300	76	28	18	14	157	53	38	0	55	64	107	140
Voluntary agreement to hold price or rent down in return for tax relief (100/yr.)	1,000	1,000	159	95	40	47	349	176	83	0	122	214	237	457
Rehabilitation without tax increase (72/yr.)	400	1,050	68	100	16	50	140	185	33	0	49	225	95	491
Neighborhood preservation areas (40/yr.)	190	600	32	57	7	28	66	105	16	0	23	129	45	280
Other innovative programs (47/yr.) (deficit)	0	870	0	83	0	42	0	153	0	0	0	186	0	407
TOTAL EXISTING HOUSING (413/yr.)	3,640	4,620	617	439	145	219	1,270	814	302	0	444	989	862	2,159
NEW HOUSING Programs to provide low and medium priced new housing units														
Public housing for families (75/yr.)	1,500	0	417	0	228	0	180	0	111	0	247	0	316	0
Public housing for elderly (75/yr.)	1,500	0	417	0	228	0	180	0	111	0	247	0	317	0
HUD subsidy programs for families (236 etc.) with non-profit sponsors (90/yr.)[a]	360	1,440	100	444	55	205	43	191	27	95	59	222	76	283
HUD subsidy programs for elderly (236 etc.) with non-profit sponsors (60/yr.)[a]	240	960	67	296	36	136	29	127	18	63	40	148	50	190
Non-profit sponsor and/or developer without federal money but with local incentives such as density bonuses (60/yr.)	200	1,000	56	308	30	142	24	133	15	66	33	154	42	197
Planning Commission: new units from development fund created by taxing new construction (100/yr.)	200	1,800	36	535	30	255	24	239	15	119	33	277	42	355
Mobile homes/houseboats (25/yr.)	100	400	28	123	15	57	12	53	8	26	76	62	21	75
2nd units with price limits (75/yr.)	600	900	167	277	91	129	72	119	45	59	99	139	125	173
Group housing: college, retirement, cooperative, Synanon, etc. (85/yr.)	600	1,100	167	339	91	156	72	146	45	73	99	170	126	217
Other innovative programs (455/yr.) deficit	4,777	4,335	1,257	1,301	707	757	633	685	305	235	795	777	998	946
TOTAL NEW HOUSING (1,100/yr.)	10,077	11,935	2,732	3,682	1,511	1,836	1,269	1,595	700	736	1,668	1,748	2,111	2,443
TOTAL NEW AND EXISTING HOUSING PROGRAMS (1,513/yr.)	13,717	16,555	3,349	4,121	1,656	2,055	2,539	2,510	1,002	736	2,112	2,937	2,973	4,602

Most Marin residents would gain more than they would lose by county-wide programs to keep rents and prices down. Obviously, tenants would benefit if they were not confronted by constantly rising rents. But homeowners as well would stand to benefit, most obviously because of tax stabilization. In addition, under the present circumstances of rising house values, an owner may make an apparent profit when he sells his house for more than he paid for it, but this profit melts away when he seeks another home for himself in the inflationary housing market. In fact, the only persons who really gain from the current upward price and rent spiral are real estate speculators, rather than people who actually own homes here.

Actions that should be taken immediately to expand the supply of low and moderate-income housing include:

1. Adoption of necessary ordinances by the cities and the county to implement the recommended programs for maintaining existing low and medium-priced housing. In particular, provisions should be adopted to allow tax reductions for owners who agree to maintain prices and rents within the range of low and moderate-income families.

2. Adoption of ordinances by the county and the cities requiring a minimum share of low and moderate-income units in all new developments; provision of density incentives at appropriate locations.

3. Formation of a countywide land bank for low and moderate-income housing.

4. Expansion of the public housing supply, by new construction, leased housing (Section 23), and turnkey (private development). Cities should contract with the Marin County Housing Authority to construct public housing within incorporated areas; new projects are now limited to unincorporated areas. It will be necessary for Marin voters to approve a referendum authorizing new public housing units for the authority to proceed with construction anywhere in the county.

5. Use of federal aids for low and moderate-income housing construction, by community organizations, non-profit sponsors, and private developers. The Federal Housing Administration insures and pays most of the interest on loans for housing for low and moderate-income families under Section 235 (housing for purchase) and Section 236 (rental or cooperative housing) of the National Housing Act, in addition to other programs. These programs have been temporarily suspended.

6. Use of federal aids for rehabilitation, by community organizations, non-profit sponsors, and private developers. Section 235 and 236 loans can also be used for improving existing housing, which should be particularly valuable to residents of rural Marin villages where there are concentrations of deficient units.

7. Modification of design standards in developments providing low and moderate-income housing, with careful controls, to lower costs to the developer.

8. Permitting second units on lots in single-family areas, with local registration and controls to prevent overcrowding and other adverse impacts.

Densities and Locational Distribution

State law now requires that zoning conform to adopted plans, and specifies the addition of measures to carry out open space elements. City and county zoning ordinances, as they are modified in accordance with the Countywide Plan, will be the chief method of achieving policies for housing densities and distribution.

Designation of "housing opportunity areas" is not intended to show precise location but rather to indicate that the purposes of the plan call for this type of development in the general vicinity.

Zoning, cannot be confiscatory and must leave the property owner with a reasonable residual land use. The extent of the limitations imposed by zoning must be justifiable in the interests of the public health, safety and welfare.

An important possibility to consider for implementation of the County-wide Plan, is that development rights can remain attached to property committed for open space, although it may be required that these rights be exercised in another location.

Owners of property desirable for open space could be encouraged to sell their development rights to the owner of property in a portion of the City-Centered Corridor designated for higher-density housing (countywide and community activity centers, housing opportunity areas). Or, the owner of open space property could dedicate all or part of his development rights to a government jurisdiction, in return for an open space contract and reduced tax assessment.

In all cases, the density increase within designated areas should be consistent with Countywide Plan goals, including those for low and moderate-income housing, for providing open space, and for project design.

This combination of private transactions plus government distribution could prevent windfall profits to landowners having land in areas designated by the plan for density increases. At the same time, open space public benefits would be gained without full purchase of land by government, thus lowering open space acquisition costs and making more funds available for housing subsidies and other social needs.

The principle of transferring development rights has already been established in the present practice of encouraging developers to cluster units on a given large piece of property, rather than distributing them evenly. The difference here is that units could be transferred over more than one piece of property, and among more than one owner.

ECONOMIC DEVELOPMENT

The Economic Committee of the City-County Planning Council should be redefined as the body most directly responsible for implementing the economic policies of the Countywide Plan. The committee's functions should include:

1. Monitoring Planning Department staff work in setting a climate that will encourage economic development as proposed in the plan.

2. Providing information to potential employers or developers who wish a valid assessment of the county's economic climate.

3. Reporting annually to CCPC on how the economic goals of the Countywide Plan are faring, both in absolute terms and in comparison with success in implementing other plan goals.

4. Working with city officials, private organizations, and other community leaders to stimulate direct "selling of the county" to desirable business developers.

City and county governments should also undertake the following implementing actions:

1. Rezone as necessary areas designated in the Countywide Plan as countywide activity centers, community activity centers, and business development areas.

2. Require an "office expansion plan" for proposed regional shopping centers, which offer potential for location of general offices.

3. Encourage innovative development and financing methods, such as use of the state Redevelopment Act and special assessment bonds, for industrial sites.

4. Provide adequate public transportation for workers who commute into Marin County.

5. Adopt a system of countywide revenue sharing, similar to that now in operation in the Minneapolis-St. Paul area.

6. Revise zoning and development review provisions to encourage the development of second homes which can also be rented to the public at suitable locations in West Marin.

7. Investigate the possibility of using second units in West Marin as overnight lodging facilities, with appropriate controls.

NEXT STEPS

A full-scale study of the economic costs and benefits of all Countywide Plan proposals is now underway. It will include analysis of the impacts associated with the private sector, public agencies, and public services.

Additional economic studies should include preparation of a financing plan and tax structure that will be needed to carry out plan proposals, including recommended new forms of taxation as well as revenue sources that already exist. Findings of these studies will be incorporated in the forthcoming Action Plan.

The Community Development element of the Countywide Plan will be broadened to include a range of subjects affecting the county's living and working areas. These subjects include utilities, schools, health facilities, and social services. The Planning Department does not now have an adequate information base to make sound recommendations on these subjects. As soon as time and resources permit, the staff will expand its contacts with the appropriate agencies, obtain needed data, and formulate recommendations for these and other relevant subjects. Findings and proposals should be reported as they become available, and incorporated into later revisions of the Countywide Plan.

APPENDIX 1

TECHNICAL RECOMMENDATIONS ON HOUSING POLICY*

Recommendations on modifications to the county housing policy by the Technical Advisory Housing Committee of the Planning Commission have been approved by the Planning Commission and the Board of Supervisors. These are recommendations for incentives for the provision of housing for low, middle and moderate-income households, on housing subsidies, and on intermingling.

The purpose of the Technical Advisory Housing Committee was to advise the Marin County Planning Commission on certain aspects of Marin County housing policy. In particular, the committee was to identify problems connected with the requirement that the County has been making for all new developments to include a percentage of low and moderate income housing. People were asked to join the committee who are active in the fields of development, architecture, law, financing, non-profit sponsorship, and planning. The committee met between April 13, 1972 and September 14, 1972, and developed this series of recommendations.

The implementation of these policies would ease some of the problems with the current policy while still providing for including low, moderate, and middle-income housing in new developments.

Objective of the Housing Policy

The adopted housing element is a statement of the County's policy on housing. The housing element is required by state and legislation to be an element of the general plan. Many state and federal grants are dependent upon having a housing element.

The officially adopted Marin County Housing Policy states that the goal of the County is "to encourage continuation of social and economic diversity in Marin County communities through a variety of housing types and to expand the supply of decent housing for low and moderate-income families." The first action program for implementing the housing element is to "include low and moderate-income housing in new residential developments where feasible, and where there is control over sales and rents through existing federal and local agencies."

*Report by Technical Housing Subcommittee of the Marin County Planning Commission, Oct. 1972. (See list of members on page 3-38)

Problems in Implementation

The Planning Commission has become familiar with several problems while implementing the policy of requiring a proportion of low and moderate-income units in all new developments. Some of the problems are:

- The uncertainty of the legal authority for continuing to make such a requirement until the passage of state enabling legislation to allow the County to write an ordinance with this requirement.
- The difficulty in using federal housing subsidies in Marin County is due to the limited amount of subsidy available, the problems of meeting the cost guidelines, and the slow processing procedures.
- The capability of the private market to produce moderate and middle-priced housing without subsidies. Low income housing cannot be produced by the market and must be subsidized.
- The need to enforce agreed-upon sales and rental price at the time of first and later sales.

Policy Recommendations

Proposed Solutions

A. Local Incentives for Moderate and Middle-Priced Housing Without Federal Subsidies.

The Committee recommends that local incentives be provided in exchange for non-federally subsidized moderate and middle-priced units as well as for federally subsidized units.

These incentives can take the form of density bonuses, of modification of certain development standards, of density rights transfer, or of county housing subsidies.

Several procedures need to be developed to insure that the public interest is served by such government aids. Procedures are needed to insure that the units are sold or rented for the promised price and to insure that only households below a certain income qualify for the unit. Also an effort should be made to create a technique for limiting the raise in the resale price of a house so that another moderate or middle-income family can afford to purchase it when it is sold. For instance, the resale monitoring could be handled by a non-profit corporation which would be given 80 to 120 days to screen and qualify the moderate-income buyer or renter.

Mechanisms are needed to insure that the units be rented or sold at the promised lower price and be maintained at a lower price after initial occupancy. A mechanism is also needed to insure that the lower priced units are actually occupied by low income people.

Any procedure that is developed should utilize existing mechanisms if possible and minimize the amount of bureaucratic procedure. The committee was opposed to creating new agencies or departments if available. One method for limiting price would be to include a price restriction in the title. The developer would be required to file a deed covenant which includes the initial sales price of the dwelling unit and limits any future rise in price to a housing price index. Prospective owners would be notified that this land was given a density bonus and in return a certain number of units will be sold to persons below a certain income at a price below full market price. The title companies would report this deed restriction to prospective owners when they do a title search.

Another possible procedure is to give the first option to buy to a low income person. The unit would be available for a price limited by an escalation clause. The real estate fee would be limited.

Another procedure is to write a long-term lease on the lower priced unit that requires the price to be tied to a housing index.

No mechanism exists to insure that a lower income family purchases or rents the dwelling unit with a lower price. One suggestion is that the financing institution be paid for limiting sales to eligible families. Or the leased housing office of the housing authority could certify families as eligible. Or if a new agency is created to administer this program that agency could assume responsibility for certifying eligibility.

The following tables show the suggested price ranges for a dwelling unit to be considered a moderate or middle-priced unit. A moderate or middle-priced unit would be eligible for a density bonus. The dollars are 1972 dollars. The division between southern and northern Marin is the Civic Center.

DEFINITION OF PRICE RANGES OF RENTED UNITS

NORTHERN MARIN

(January 1973 dollars)

Price Category	Bonus	# of Bedrooms 0	1	2	3	4
High	No Bonus	Over $190	Over $210	Over $230	Over $250	Over $270
Middle	Small Bonus	$190-140	$210-160	$230-180	$250-210	$270-210
Moderate	Larger Bonus	Under $140	Under $160	Under $180	Under $230	Under $230
Low (Subsidized)	Maximum Bonus					

SOUTHERN MARIN

(January 1973 dollars)

Price Category	Bonus	# of Bedrooms 0	1	2	3	4
High	No Bonus	Over $225	Over $250	Over $280	Over $300	Over $325
Middle	Small Bonus	$225-170	$250-195	$280-220	$300-240	$325-265
Moderate	Larger Bonus	Under $170	Under $195	Under $220	Under $240	Under $265
Low (Subsidized)	Maximum Bonus					

DEFINITION OF PRICE RANGES OF
HOUSES, TOWNHOUSES & CONDOMINIUM APARTMENTS

NORTHERN MARIN

(January 1973 dollars)

Price Category	Bonus	# of Bedrooms 1	2	3	4
High	No Bonus	Over $30,500	Over $32,000	Over $33,500	Over $35,000
Middle	Small Bonus	$30,500-24,500	$32,000-26,000	$33,500-27,500	$35,000-29,000
Moderate	Larger Bonus	Under $24,500	Under $26,000	Under $27,500	Under $29,000
Low (Subsidized)	Maximum Bonus				

SOUTHERN MARIN

(January 1973 dollars)

Price Category	Bonus	# of Bedrooms 1	2	3	4
High	No Bonus	$33,500	$36,000	$40,000	$42,000
Middle	Small Bonus	$33,500-30,000	$36,000-30,000	$40,000-32,000	$42,000-34,000
Moderate	Larger Bonus	$30,000	$30,000	$32,000	$34,000
Low (Subsidized)	Maximum Bonus				

The proposal for a density rights transfer is worth pursuing. It was the judgment of the committee that the housing element has to be tied to open space planning. This proposal should encompass both before being seriously pursued.

The development rights transfer proposal starts with each area of the county being zoned for a base density. This density is translated into the right to develop a specific number of units. As owner of a parcel who seeks to develop more units must purchase development rights from land designated as open space or agricultural. The owner of the open space or agricultural land is compensated for the denial of the right to develop by purchase of their development rights.

The committee expressed concern that communities would be unwilling to allow higher densities in exchange for open space elsewhere. Maybe a ratio should be established of development rights purchased from within that valley or drainage basis to development rights purchased elsewhere. It would also be good to establish a required ratio between development rights purchased from open space and in urbanized areas. This ratio would enable a double set of prices reflecting the real development potential. The specific ratio would be a way of determining priorities between the acquisition of open space in the urbanized areas and in rural areas. The development rights allowed to be sold for transfer to elsewhere might be limited to areas subject to development pressure, such as Nicasio Valley.

A certain percent of the units created by transfer of development rights could be required to be for low and moderate income housing. The county could purchase open space in high priority areas. The development rights thus acquired could be given to development whic h seeks to construct more than the minimum number of low and moderate income housing units. The county could be authorized to create development rights which could be given to developers of low and moderate income housing.

A.1 Density Bonuses

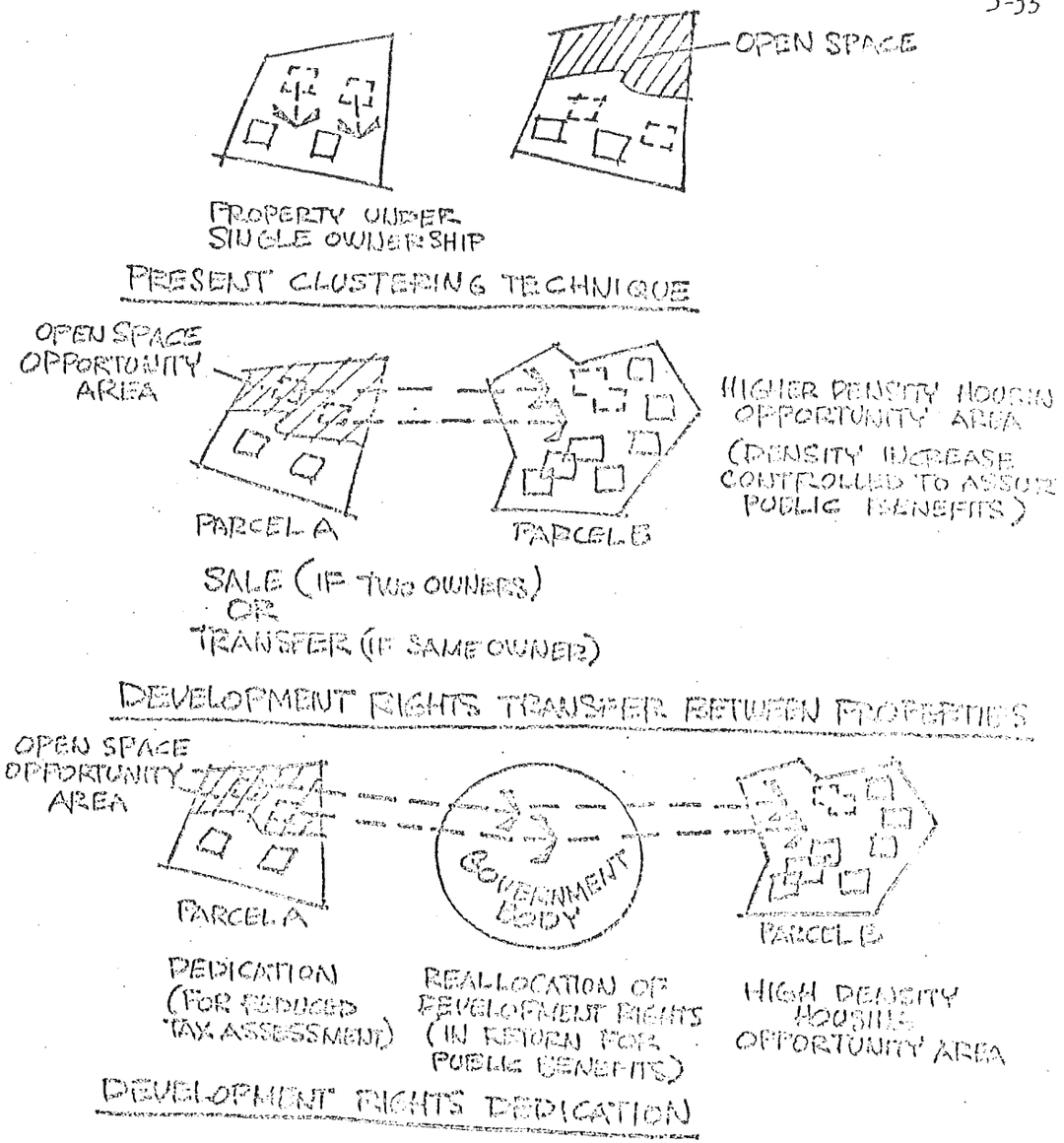
The committee recommends an incentive method of density bonuses for producing low and moderate-income housing instead of a mandatory requirement for a certain percent of low and moderate-income dwelling units in all developments. A greater density bonus would be earned by building government subsidized units, a smaller bonus for moderate priced units, and an even smaller bonus for middle priced units.

The density bonus should not exceed 20 percent, and should not allow plan population projections to be exceeded.

A reason for recommending a voluntary system is that it would appeal to the developer's own self-interest. It is also believed that the land pricing mechanism works better under an incentive system. Another reason is that clear state authority is lacking to write a county ordinance that makes this a requirement. There are also many practical difficulties in timing a requirement for lower priced housing to federally subsidized housing programs.

The reason for this recommendation is that federal funding is inadequate in both quantity, cost limitations and timing. Private construction with local incentives are an additional means to obtain an income mix in new developments.

The following formula for calculating density bonuses is recommended. The density bonuses for the provision of low, moderate, and middle priced housing should be an option, not a mandatory requirement.



DENSITY BONUS FORMULA

# of Lower Priced Units 20% LMIH	Bonus 20% Bonus
2 low (subsidized)	2 additional conventional
2 lower middle priced	1 additional conventional
2 moderate priced	1/2 additional conventional

	Price of Units	1 # Units Under Current Zoning	2 # Lower Priced Units	3 # Bonus Units at Market Price	4 (1+3) Total # Market Price	5 (1+2+3) Total # Units
A	High	100			100	100
B	Middle	100	20	5	105	125
C	Moderate	100	20	10	110	130
D	Low (Subsidized)	100	20	20	120	140

The density bonus should be directly tied to the number of lower priced units built at each phase. The developer does not receive permission to go ahead on the next phase until he builds the lower priced units in the previous phase. The units granted as a density bonus should be itemized to the particular phase receiving the bonus. In developments that have only one time phase then the full number of low and moderate income housing should be applied in the first phase.

It is acknowledged on the part of all participants that applying for federal subsidized housing funds is a gamble. One possible method for insuring some kind of contribution on the part of the developers is for the land on which the subsidized units will be built to be deeded to the Ecumenical Association for Housing or the County. Then if there are delays in the project, at least there is a parcel of land which will be used in the public interest at some time.

The Committee agreed that there always is some minimum density necessary for a developer to achieve moderate priced housing, that this minimum varies according to circumstances, but that 7 units per acre, even with a bonus, is generally minimum.

It is recommended that the rezoning of the county following the new general plan provide specific densities and not a range of densities. If a system of density bonuses for low and moderate-income housing is adopted, each parcel should have a specific maximum density, and another maximum density, with and without the bonus.

A.2 Modification of Development Standards

The committee recommends a modification of some development standards, a reduction of utility fees, and an assumption by the county of certain off-site development costs. These modifications would enhance the possibility of creating low, moderate, or middle income housing, and in many cases increase design flexibility and traffic safety, and decrease environmental damage.

Modifications should be made only the contract, condition, or other means, and if enforceable limitations are concurrently imposed to secure the desired moderate or middle-income benefits.

These standards should be modified:

a. Street Pavement Widths

There are many instances where residential streets, voth public and private, could be narrower than currently required. The variables that need to be considered in each particular case are: Topography, length of street, number of dwelling units served, manner of serving them, future extension, provision for parking bays, intensity of pedestrian and bicycle traffic.

b. Right of Way Widths

Where no future street widening is contemplated, a right-of-way should be no sider than necessary to put in street pavement, curb, and sidewalks, provided the minimum width requirement necessary for gas tax funds is satisfied.

If a utility needs a width greater than that permitted within the street right-of-way, the utility can request a utility easement outside the right-of-way, and this policy should be encouraged.

c. Street Improvements

The necessity for sidewalks on both sides of a street is affected by: density of dwelling units fronting on a street, likelihood of children using sidewalks as a play-space and/or as a route to school, and amount of traffic on the street. It should be possible to develop some standards of density and intensity of use below which sidewalks would be required on only one side.

The need for curbs depends on the number of dwellings fronting on and using the street as an access. Often a curb on one side is all that is necessary. Curb standards should relate to runoff as well as to parking needs--streets can sometimes be better designed with runoff in the middle.

More flexibility on road improvements is needed to allow designing for a particular desired character. In some instances a park-like or rural quality of roads--even a gravel surface--may be permissible.

d. Underground Electrical Utilities

In most circumstances undergrounding should be required. The possibility of surface wiring which still avoids the visual effect of poles, etc., might be worth investigating.

The present cost is such, however, that the committee recommends that all or a portion of it be borne by the county as an indirect form of subsidy where low, moderate, or middle-income housing is being provided.

e. Driveway Standards

Driveways should not always have to conform to street standards when in the right-of-way.

More flexibility as to the number of dwellings served from one driveway is needed. The present limits of three to a driveway should be eliminated, and criteria relating driveway standards to number served and permitting a judgment as to workability of a particular design should be developed instead.

f. Guest Parking

Extra parking should be provided in the street, and the street should not be widened simply to ensure availability of two driving lanes for every conceivable--thonly only occasional--circumstance, such as the proverbial big cocktail party. Enforcement of a ten foot clearance should suffice for safety.

g. Street Lights

These should be limited generally to intersections on streets with high traffic counts.

h. Cut and Fill

A reduction of the 1-1/2 to 1, and 2 to 1 ratios should be considered, where, as a result, damage to plant growth could be minimized, and more of the natural environment protected, and where soil type permits.

It might be appropriate to adopt a policy that would accept a higher maintenance cost in order to achieve more environmental protection.

The desire of the county to minimize maintenance over a 50-year period should not always prevail over the desire to preserve hillsides.

i. Water and Sewer

Water and sewer are large items in the development cost. There seems to be considerable lack of uniformity in requirements of the various districts. The committee suggests the county investigate the desirability of establishing an agency to regulate these districts and to lower the fees to developers.

A.3 County Housing Subsidy

The committee recommends that the County reimburse developers of lower-priced housing for some development costs. Some of the development costs that could be locally subsidized are underground utilities, offsite improvements, sewer connection fees, water connection fees and exemption from the bedroom tax. The county shall not reimburse developers for offsite improvement costs. The committee also supported the idea that the county itself should enter into the funding of low and moderate-income housing, on the theory that action begins at home. However there was insufficient time to formulate a precise recommendation. Members of the committee felt that local talent could continue to be tapped for more creative solutions.

B. State and Federal Subsidies

B.1 The Creation of an Effective State Housing Program

An effective state housing program is needed which includes planning and financing for lower-priced housing. A state housing program should supplement the long-term financing available from federal programs.

B.2 Procurement of Federal Funding

The committee recommends that the county should lobby for: Adequate federal subsidies and streamlined processing procedures, yearly commitments, more appropriate HUD guidelines and procedures. The reason for these recommendations is to improve Marin's ability to utilize federal housing subsidies (or change the federal housing programs so that they can be utilized better in Marin).

Marin County should work with ABAG and HUD to be designated as an annual arrangements county. Local subdivision approvals could be coordinated better with federal housing programs if it was known how many units would be available for Marin County each fiscal year. Marin County would also like to control the allocation of units within the county.

HUD requirements and programs should be modified to permit a mingling of small numbers of subsidized units with conventionally financed units. Modification of processing procedure is also needed to encourage developers for a separate project of under 100 to apply for a subsidy.

HUD should be requested to reexamine cost and income guidelines under federal programs so that they can be modified for high cost areas such as Marin, and to justify existing HUD differentials presently applied within Marin County.

The committee resolved that "someone in county government should be designated to follow through on obtaining federal funding for housing subsidies." Also "the county should designate a representative to assist developers and non-profit sponsors in expediting processing and in securing federal subsidies."

C. Intermingling

The Committee recommends that the Planning Commission review all projects to ascertain that the maximum effort has been made to intermingle the units within each development. Intermingling units within a development provides for a dispersed pattern and avoids easy identification and isolation of the residents living in different priced houses and apartments.

The Committee agreed that all efforts to intermingle should be made within the feasibility limits of the terrain and economics. It is recommended that the Planning Commission review projects to ascertain that the maximum effort has been made to intermingle the units within each individual development. The rationale for the amount of intermingling proposed should be explained to the Planning Commission.

TECHNICAL ADVISORY COMMITTEE

Margaret Azevedo) Housing
Rebecca Watkin) Subcommittee
William Lynch) Planning Commission
Kent Frost, Civil Engineer representing Alan-Marin, Mill Valley
Charles Miltner, Planner & Builder, Plantech, Mill Valley
Roger Strawick, Self-employed Builder (Novato Committee)
Norman Gilroy, Architect, Gilroy Associates, Mill Valley
Gene Wedell, Architect, Wedell Group, Sausalito
Martin Mackey, Executive for EAH, San Rafael
Jean Lovejoy, Former President, EAH, Mill Valley
Ralph Higbee, Mortgage Investor, Weyerhauser Mortgage Co., San Rafael
Albert Bianchi, Attorney for Bagley, Bianchi & Sheeks, San Rafael
Douglas Maloney, County Counsel
Harriet Schaffran, Housing Consultant to Marin County Housing Authority, E.M. Schaffran & Co., San Francisco
Mark Williams, Planner, City of Novato
Mark Westfall, Planner, City of Novato
Ruth Friedlander, Planner, County of Marin
Julie Reuter, Planning Consultant, Berkeley
Alex Soriz, Housing Production, HUD, San Francisco

APPENDIX 2

POPULATION PROJECTIONS IN COUNTYWIDE PLAN: BACKGROUND INFORMATION
MARIN COUNTY DEVELOPMENT
Past and Projected
Based on Summing from 317 Traffic Zones
and rounded to the nearest hundred

POPULATION

Planning Area	1960	1970	1980 Countywide Plan	1980 Market "D"	1990 Countywide Plan	1990 Market "D"
Novato Area	21,700	39,200	55,200	58,000	68,600	74,400
Las Gallinas Valley	14,700	25,800	33,200	41,200	39,700	56,100
San Rafael Basin	21,600	31,600	37,700	40,200	41,000	45,600
Upper Ross Valley	22,800	26,900	29,600	31,600	32,200	33,700
Lower Ross Valley	23,500	32,000	37,100	40,700	41,800	48,300
Richardson Bay Communities	34,300	45,100	54,200	63,700	60,500	74,400
City Centered Corridor	138,600	200,600	247,000	275,400	283,800	332,500
Inland and Coastal Corridors	8,200	9,000	13,000	21,000	16,200	32,800
COUNTYWIDE TOTALS	146,800	209,600	260,000	296,400	300,000	365,300

DWELLING UNITS

Novato Area	5,500	10,600	15,900	16,900	20,700	22,700
Las Gallinas Valley	3,600	7,000	9,500	11,900	12,100	17,400
San Rafael Basin	7,300	11,700	14,600	15,600	16,500	18,400
Upper Ross Valley	7,400	9,400	10,900	11,200	11,900	12,400
Lower Ross Valley	6,100	10,000	13,400	14,600	15,600	17,800
Richardson Bay Communities	12,000	17,000	21,600	24,500	24,000	29,700
City Centered Corridor	41,900	65,700	85,900	94,700	100,800	118,400
Inland and Coastal Corridors	2,300	3,000	4,400	7,100	5,300	11,200
COUNTYWIDE TOTALS	44,200	68,700	90,300	101,800	106,100	129,600

TABLE 2

COUNTYWIDE PLAN DEVELOPMENT RATES

People, Jobs and Houses

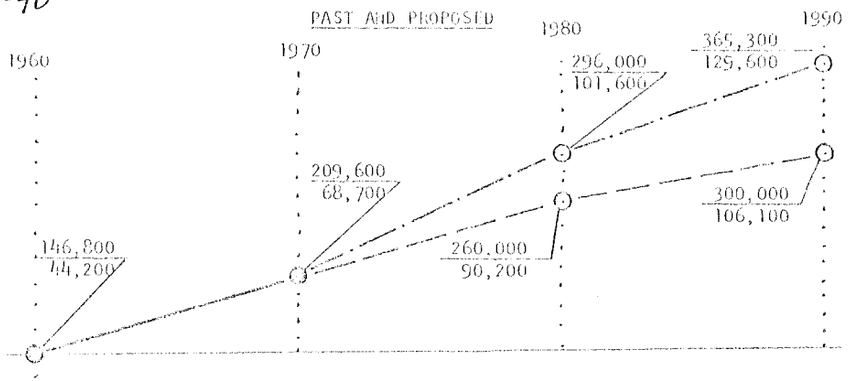
	Historical Data 1960	60-70	1970	Projections 70-80	80-90	1980	1990
PEOPLE	146,820		209,574			260,000	300,000
Increase		62,754		50,426	40,000		
% Increase		43%		24%	15.4%		
Average Annual Rate		3.6%		2.3%	1.4%		
JOBS	36,100		57,730			78,000	93,000
Increase		21,600		20,300	15,000		
% Increase		60%		35.2%	19.2%		
Average Annual Rate		4.8%		3.1%	1.8%		
JOBS/POPULATION	.25		.28			.30	.31
HOUSES (Occupied)	44,209		68,715			90,200	106,100
Increase		24,545		21,400	15,900		
% Increase		56%		31%	18%		
Average Annual Rate		4.6%		2.7%	1.7%		
POPULATION/HOUSEHOLD	3.12		2.94			2.84	2.80
		2.56		2.36	2.31		

Average Annual Number of New Households
1960 - 1970 (2,456)
1970 - 1980 (2,140)
1980 - 1990 (1,590)

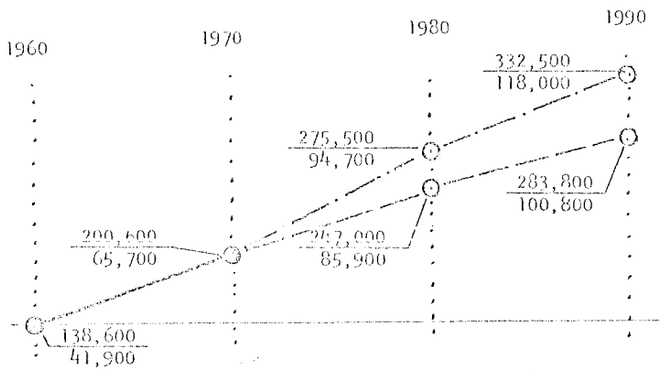
Average Annual New Jobs
1960 - 1970 (2,160)
1970 - 1980 (2,030)
1980 - 1990 (1,500)

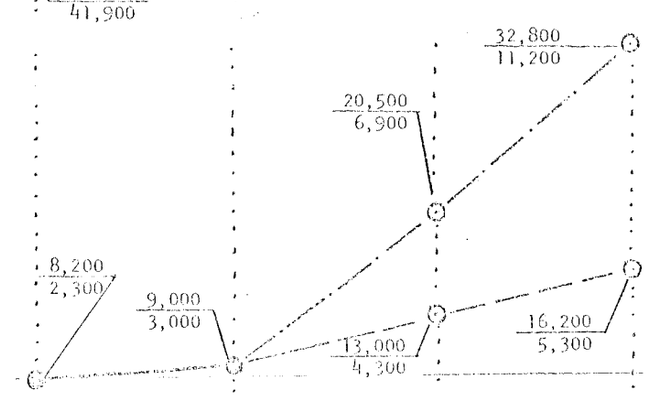
MARIN COUNTY DEVELOPMENT

PAST AND PROPOSED



Countywide Totals

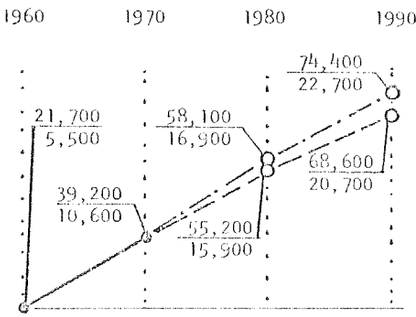




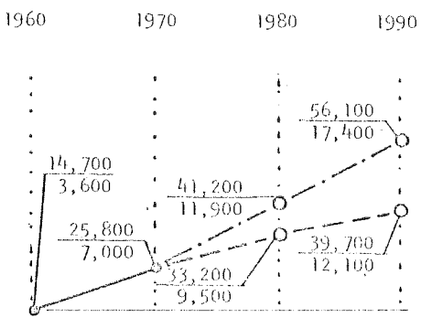
MARIN COUNTY DEVELOPMENT

Past and Projected / City Centered Corridor

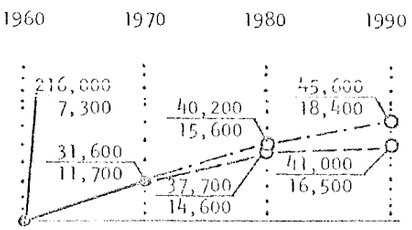
NOVATO AREA



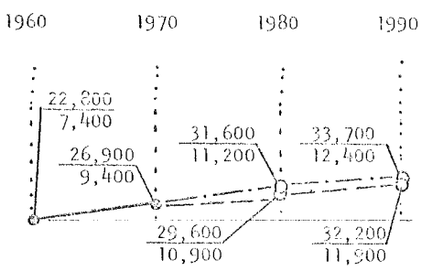
LAS GALLINAS VALLEY



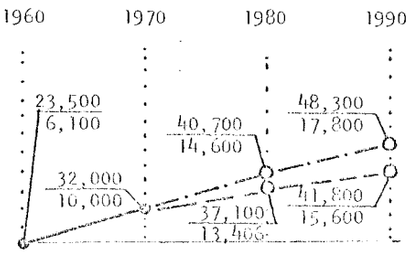
SAN RAFAEL BASIN



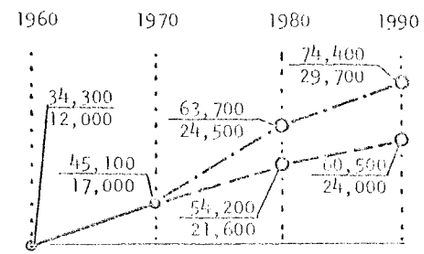
UPPER ROSS VALLEY



LOWER ROSS VALLEY



RICHARDSON BAY COMMUNITIES



Actual Growth = O ——

Market Projections = O —·—·—

Countywide Plan = O — — —

000/000 = Population / Dwelling Units

APPROVED BY CCPC JANUARY 11, 1973

Source
CCPC Exec. Comm.

Population and Rate of Growth

CCPC Executive Committee recommends:

The revised population numbers for the Countywide Plan are:

1980 - 260,000 ± 2% (5,000) = 255,000 -265,000
1990 - 300,000 ± 5% (15,000) = 285,000 -315,000

The following tables and graphs illustrate the relationship of these revised numbers to each of the planning areas and the region and show relationship to job targets and annual growth rate curves.

TABLE 1

Marin Related to Region

Source of Regional Statistic - ABAG and State Dept. of Finance

	Region	Marin
1950	2,681,322	85,619
1960	3,638,939	146,820
1970	4,632,732	209,574
1980	5,484,228	260,000
1990	6,495,090	300,000

Average Annual Percent Increase

	Region		Marin	
1950-1960	3.1%	50-70 = 2.8%	5.5%	= 4.57%
1960-1970	2.4%		3.6%	
1970-1980	1.7%	70-90 = 1.7%	2.3%	= 1.8%
1980-1990	1.7%		1.4%	

NOTE:

Alternate 1990 Populations for Comparison

365,300 (Market) is 2.8% increase 70-90
330,000 (Economic Committee) is 2.3% increase 70-90
286,000 (Plan as published) is 1.6% increase 70-90

CLARIFICATION

1990 POPULATION PROJECTION FOR MARIN COUNTYWIDE PLAN

The Marin Countywide Plan recommends that the county's population not exceed 300,000 by 1990, an increase of no more than about 90,000 people and about 37,000 dwelling units, plus or minus 5 percent from 1970. This projection is based on:

- What the market is likely to produce
- Anticipated changes in family size
- Controls needed to preserve open space recommended in the plan

Studies Used to Arrive at Projection

Step 1.
Unadjusted Market Projection: 389,000

This figure, derived from the Bay Area Simulation Study model, assumes that there would be an uncontrolled real estate market, with no constraints imposed by local plans. This projection, used for the Preliminary Countywide Plan, was done before results of the 1970 Census were available. It therefore used an unrealistically high average family size, while the 1970 Census indicates a strong and continuing decrease. The Unadjusted Market Projection assumes no freeway access to West Marin; if the Route 17 and 37 freeways were built, the county's total 1990 population would be 417,000.

Step 2.
Adjusted Market Projection: 365,300

This projection was made after publication of the Preliminary Countywide Plan. It adjusted the previous market projection, first, according to the smaller family size reported in the 1970 Census. About the same number of dwelling units are projected, but they would contain fewer people than previously anticipated.

Second, the first projection was modified according to a "bias adjustment", to compensate for the BASS model's tendency to allocate too many housing units to areas that were undeveloped in 1970. In effect, this adjustment moved units from rural West Marin and the fringe areas of East Marin to locations near city centers.

A third adjustment to original BASS model forecasts was made to compensate for the model's tendency to project the density of new development the same as the density of existing development. This "density adjustment" concentrated more development in the most accessible and buildable areas of the City Centered Corridor.

Step 3.
Countywide Plan Projection: 300,000

The market projection in Step 2 further refined to account for the open space proposals of the plan. The staff quantified and analyzed in detail the open space allocations and dwelling unit projections for the 317

traffic zones into which the county is divided. As a result, the projected population for the City-Centered Corridor would be 15 percent less than under the Adjusted Market Projection, and the population of the two western corridors would be 51 percent less.

The original plan as published had a population of 286,000 and was modified based upon change in the development rates from 1970 to 1973 exceeding the plan's recommended rate. When new approvals from 1970 to 1973 were taken into account, a 1990 population of about 300,000 was derived as a more realistic result of plan implementation.

Preliminary Plan Forecast

A rough forecast of 330,000 persons by 1990 was used in the Preliminary Countywide Plan. This figure was based on the arbitrary assumption that Marin could accommodate the same population increase over the next two decades as it did over the last two decades (about 120,000).

Since the Preliminary Plan was published, 1970 Census figures have become available, and the Planning Department staff has analyzed the open space and housing allocations in detail, and arrived at the more refined Countywide Plan projections. (Using adjusted family size and holding dwelling units constant, the 330,000 population figure would be only 311,000 by 1990.)

Therefore, the original crude estimate should no longer be used as representing plan policy. This is especially true in view of the fact that a significant public response to the Preliminary Plan was that it should emphasize rates of growth and capacity to accommodate it, rather than "target" population numbers. There was no expressed public support for the 330,000 forecast as such, but there was strong approval of the more important ideas of limiting and controlling growth.

In Conclusion

The 300,000 Countywide Plan projection is based on detailed analysis of relevant available data, from Bay Area Simulation Study projections, the 1970 Census, and staff studies of open space and dwelling unit allocations.

The Plan Projection reflects prevailing expressions of public policy, obtained in reviews of the Preliminary Plan, for limiting and controlling growth and preserving open space.

The Plan Projection does allocate people from open space to central cities, through the "bias and density adjustment" done on the market model.

The Plan Projection represents a reasonable share of the Bay Area's population. Marin now has about 4.4 percent of the region's people. It would continue to have about 4.4 percent of the area's 6,500,000 population in 1990 projected by the California Department of Finance.

The Plan Projection is in line with other projections. The "low" forecast for 1990 Marin being used by the Association of Bay Area Governments is 285,000, based on Department of Finance projections. The "high" ABAG projection, comparable with the Adjusted Market Projection, is 365,000.

1990 MARIN COUNTY POPULATION PROJECTIONS

1. Unadjusted Market Projection

	City-Centered Corridor	Inland Rural & Coastal Recreation Corridors	Total
Population (Civilian)	316,133	68,012 (17.7%)	384,145
Dwelling Units	106,173	22,434 (17.4%)	128,607
Family Size	2.98	3.03-	2.99
Military Population			4,644
Total Population			388,789 (389,000)

2. Adjusted Market Projection

	City-Centered Corridor	Inland Rural & Coastal Recreation Corridors	Total
Population (Civilian)	327,874	32,762	360,636
Dwelling Units	117,413	11,397	128,810
Family Size	2.79	2.87	2.80
Military Population			4,644
Total Population			365,280 (365,300)

3. Countywide Plan Projection

	City-Centered Corridor	Inland Rural & Coastal Recreation Corridors	Total
Population (Civilian)	279,175	15,964 (5.8%)	295,783
Dwelling Units	99,915	5,532 (5.5%)	105,447
Family Size	2.79	2.87	2.80
Military Population			4,644
Total Population			299,783 (300,000)

Association of Bay Area Governments

ALTERNATE MARIN COUNTY POPULATION FORECASTS

(000's)

	1970[1]	1975	1980	1990	2000
Base Line[2]	206.8	229.8	261.9	335.9	403.3
		1970-75	1975-80	1980-90	1990-2000
Increase		23.0	32.0	74.0	67.4
(Natural Increase)		9.0	13.7	33.7	39.1
(Migration)		14.0	18.3	40.3	28.3
High[3]	1970	1975	1980	1990	2000
	206.8	230.8	272.2	365.2	455.3
		1970-75	1975-80	1980-90	1990-2000
Increase		24.0	41.4	93.0	90.1
(Natural Increase)		10.0	16.4	43.8	44.2
(Migration)		14.0	25.0	49.2	45.9
Low[4]	1970	1975	1980	1990	2000
	206.8	222.0	242.3	285.0	321.8
		1970-75	1975-80	1980-90	1990-2000
Increase		15.2	20.3	42.7	36.8
(Natural Increase)		19.1	11.8	25.7	19.8
(Migration)		6.1	8.5	17.0	17.0

1) 1970 Census, July estimate by State Department of Finance.
2) State Department of Finance - Based on Census Bureau Series D Fertility (2.45 births per woman during a lifetime) and 150,000 state net migration.
3) State Department of Finance - Based on Census Bureau Series C Fertility (2.11 births per woman during a lifetime) and 300,000 state net migration.
4) State Department of Finance - Based on Census Bureau Series E Fertility (2.78 births per woman during a lifetime) and zero state net migration.

EVOLUTION OF POPULATION FORECASTS DEVELOPMENT

Step	Description	Data 1970	BASS V-A 1990	BASS V-B 1990	CWP 1990
1*	Civilian Estimate Only				
	Population	205,000			
	Dwellings	66,842			
	Family Size	3.07			
2*	Raw BASS V Total				
	Population	209,334	390,421	417,130	
	Dwellings	68,187	127,173	135,873	
	Family Size	3.07	3.07	3.07	
3*	Marin Staff - Hand Adjusted - Civilian Only				
	Population	204,500	382,600	410,800	
	Dwellings	67,182	127,800	136,800	
	Family Size	3.04	2.99	3.00	
4*	City Adjustments Total				
	Population		385,000		
	Dwellings		128,607		
	Family Size		2.99		
5*	Bias Adjustment Plus New Family Size				
	Population		358,144		
	Dwellings		128,940		
	Family Size		2.78		
	+ Group Quarters 90 = + 4,810		362,954		
6*	Density Adjustments				
	Population		365,280		
	Dwellings		128,810		
	Family Size		2.80		
7*	New Family Size Minus Open Space - CWP originally published				
	Population (Total)	209,574			285,716
	Dwellings	68,755			101,374
	Family Size	2.94			2.82
8*	Countryside Plan Revised				
	Population				299,783
	Dwelling Units				105,447
	Family Size				2.80

X X X X X

Part 4. Transportation

These pages contain background material which is not part of the adopted plan:

R-right side only	L-left side only
4-3R	4-9
4-4L	4-12R
4-5	4-13R
4-7	4-14

Part 4. TRANSPORTATION

I. Introduction

The Countywide Plan recommends transportation improvements that will maintain a high level of mobility with a minimum of adverse environmental impact, in a pattern that will reinforce community development goals. The price of these improvements will be high, requiring a strong commitment by the people of Marin. However, studies of the Balanced Transportation Program show that the consequences of not providing coordinated transportation facilities make the costs appear reasonable and the need emphatic.

The Balanced Transportation Program was established by the Marin County Board of Supervisors in 1968, to coordinate transportation and land use planning in Marin.

Previously, transportation planning had been undertaken by separate local, regional, and state agencies, each with its own special interest, and with little consideration for planning by other agencies. Moreover, transportation planning was mostly a matter of reacting to development once it had occurred or appeared inevitable, rather than using transportation positively to induce desired development patterns.

Strong public objections to proposed transportation facilities for Marin County in the mid-1960's initiated a thorough re-evaluation of both transportation and community development planning methods. The Route 17 freeway in the Ross Valley, a second Golden Gate Bridge, and a second deck on the existing span had been recommended to meet the demand that would have been created by development under locally adopted land use plans.

Phase I of the Balanced Transportation Study, completed in 1970, analyzed what these local plans would mean in travel demand. The results: the ultimate planned population of about 800,000 would require massive road building--for example, expansion of Route 101 to three times its width by the year 2020. Realization of the impending unmanageable level of change in Marin led to work on the Countywide Plan, with the Balanced Transportation Program as a basic and integral part.

Phase II of the program tested alternative transportation systems for their potential in attaining the goals of the Countywide Plan. The transit and highway systems that best meet this criterion are recommended here. Costs of three of these alternatives were analyzed. (See section on Cost Estimates.)

Phase III of the program, now underway, will design an intra-county transit system, recommend a capital improvement program, propose policies for recreational transportation, and complete a noise element in accordance with state law.

I. COUNTYWIDE POLICIES

The transportation plan supports the other elements of the Countywide Plan. These policies will advance the plan's goals of limited and diversified growth, greater economic self-sufficiency, and environmental quality. In turn, achievement of the recommended policies for other elements of the plan will be necessary if the proposed transportation system is going to work. Figure 4.2 shows how the transportation and other policies of the Countywide Plan, working together, would produce a lower number of commuters to San Francisco than would occur under current trends and a higher use of transit than now.

1. Community Development - A policy of controlled growth should be implemented by all the cities and the county. Providing a balanced transportation system will be almost impossible unless the pattern of development and the rate of growth is brought under public regulation, particularly since the number of vehicles and the amount of travel is expected to continue to grow even faster than population.

2. *Level of Mobility - The level of mobility should be maintained at or near the level found in 1972. This means that where auto congestion exists today it would continue in the future. Some areas of the county have indicated they are willing to accept even higher levels of auto congestion than now exist. In these areas mobility will be sacrificed in order to avoid either community or environmental disruption.*

3. Emphasis on Transit - Needed mobility will be provided by greatly expanding the bus transit system, with some expansion of the highway system. No new freeways should be built. Additional lanes on 101 should be reserved for exclusive bus use until a parallel separate bus right-of-way has been constructed. The freeway should not be expanded beyond eight auto lanes. A study by the Bay Area Air Pollution Control District* has found that an auto-oriented rather than bus-oriented, transportation system would seriously impair Marin's air quality by 1990. The decision on a transit deck on the Golden Gate Bridge should not be made until all planned improvements (eight lanes on 101, a separate busway along 101, a separate bus lane on the existing bridge, and the ferry system) have been completed and evaluated.

4. Relation to Countywide Plan - The capacity of all transportation systems will be scaled to the travel needs of the adopted Countywide Plan. The 1990 population allowed under the plan (300,000) would produce commuter travel volumes in the City-Centered Corridor that would require no more than an exclusive right-of-way bus transit route and an eight-lane freeway. (A one-way demand of 12,000 people per hour.)

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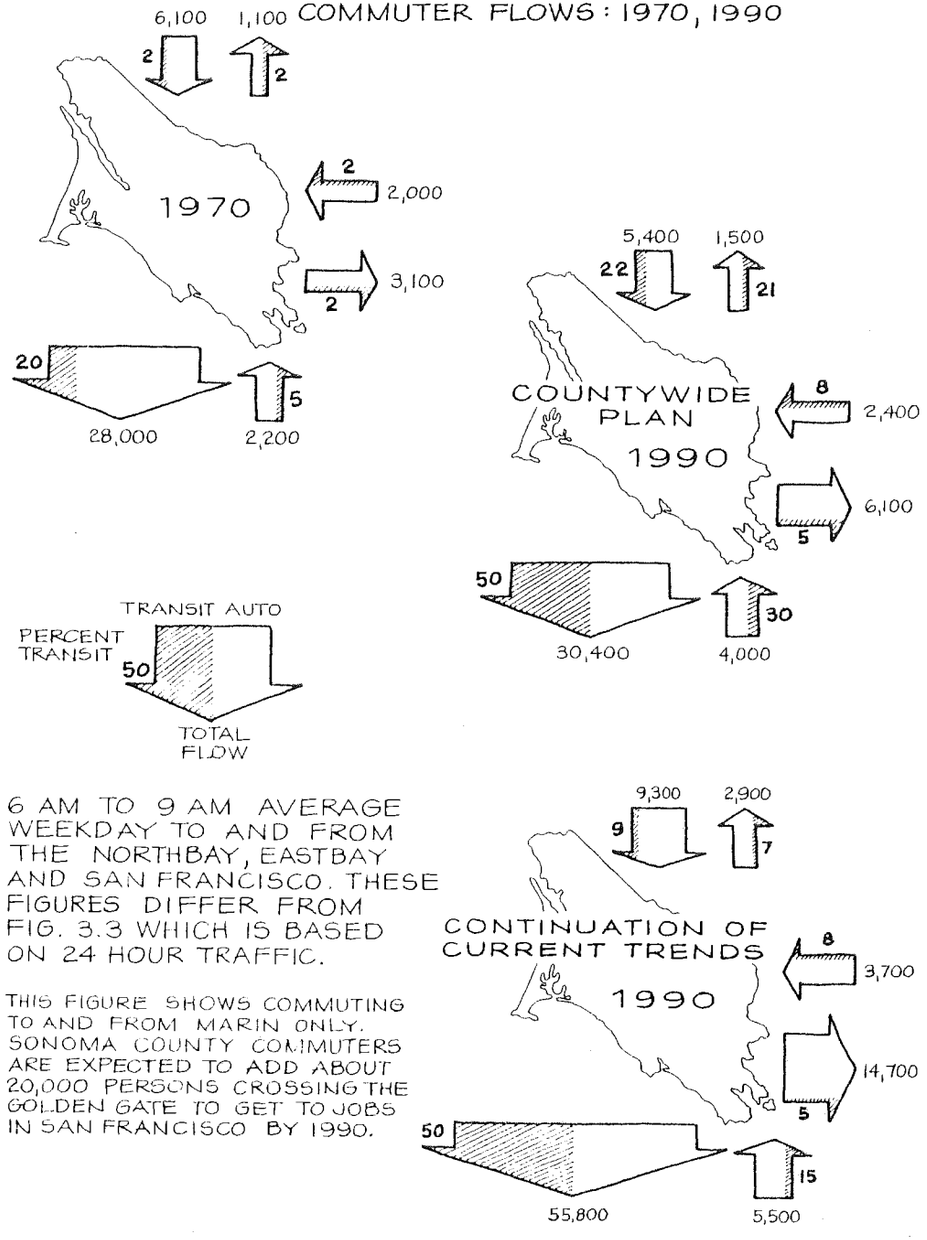
*A Study to Assess the Impact of Growth Upon the Air Quality of Southeastern Marin County, Bay Area Air Pollution Control District, June 1972.

FIGURE 4.2

COMMUTER FLOWS: 1970, 1990



6 AM TO 9 AM AVERAGE WEEKDAY TO AND FROM THE NORTHBAY, EASTBAY AND SAN FRANCISCO. THESE FIGURES DIFFER FROM FIG. 3.3 WHICH IS BASED ON 24 HOUR TRAFFIC.

THIS FIGURE SHOWS COMMUTING TO AND FROM MARIN ONLY. SONOMA COUNTY COMMUTERS ARE EXPECTED TO ADD ABOUT 20,000 PERSONS CROSSING THE GOLDEN GATE TO GET TO JOBS IN SAN FRANCISCO BY 1990.

Until the Recreation Travel Study is completed and its recommendations evaluated, all new transportation facilities will be restricted to areas deemed desirable for urban development. There will be no capacity added to automobile routes to rural undeveloped areas, but improvements for safety will be encouraged. Transit should be encouraged for recreational travel, in a system producing minimum environmental damage. Automobiles will not be further emphasized as the primary means of access to coastal recreation areas.

5. Keeping the Options Open - The county will retain flexibility in its transportation planning. Innovative transit systems, not yet far enough along for evaluation, may be possible by 1990. These systems would require funding which might not be available if the county commits itself to huge, one-time capital investments.

6. Coordination of Systems - All transportation facilities providing interrelated service will be integrated with each other and with adjoining land use. Transit, highway, and ferry facilities serving workday traffic will be planned together. Facilities serving recreational travel will be planned in relation to each other and to other systems, but recreational transportation serving West Marin will not be designed to encourage commuting, since this would cause unwanted residential growth.

7. *Intra-County Transit - The local public transit system must be expanded to serve the local travel needs of Marin, particularly those needs related to stimulating Marin's local economy and job market. This system will have as a goal to serve eventually the majority of Marin households and businesses with buses on five to ten minute headways in the peak hours. The system will be designed to retain the present level of mobility wherever possible, with a shift from cars to buses. Emphasis will be on serving areas where automobile congestion is projected to grow worse or where high patronage is forecast, such as countywide activity centers, employment areas, and downtowns. Pilot programs should take place in selected areas to provide a realistic test of the full potential of bus transit.*

8. Scenic Highways - All arterial highways leading to West Marin and designated in this transportation element are considered scenic highways for county planning purposes. They should remain slow speed two-lane roads of rural character, and they should receive special treatment with landscaping and viewpoints. Zoning and scenic easements will be related to these routes, so that views are protected. No state designation of scenic highways will be sought, since it would encourage unnecessary auto use by visitors to West Marin.

9. Airports - No major new regional airport should be built in Marin to serve North Bay residents in the foreseeable future. No commercial aviation use of Hamilton Field should be allowed. The feasibility of transit service from Marin to San Francisco International Airport should be studied.

10. Other Transportation Facilities - More detailed recommendations will be prepared for airports, recreational transportation, and paths and trails, based on further studies and on the goals of the Countywide Plan.

11. Implementing Balanced Transportation - The County will aggressively pursue the implementation of the recommended transportation systems in a series of manageable, fundable, and logical program steps. Active seeking of federal grants and vigorous legislative programs will be needed to fund expansion of the transit and highway systems.

12. Expansion of Highway Systems

Highway 101 - Emphasize the need to reserve new lanes for exclusive bus use and carpools until a parallel separate bus way has been constructed. Then limit any further expansion of the freeway to eight auto lanes.

Local Routes - Add two new local roads by 1990 as follows:

1. The San Rafael Waterfront Parkway from Point San Quentin to South San Pedro Road with a connection to Bellam Boulevard. This route should not block the waterfront.

2. Smith Ranch Road upgraded and extended from the proposed ferry terminal on Las Gallinas Creek to Route 101.

Each of these routes passes through some urban open space areas shown in the Countywide Plan. Neither will be built until this open space is permanently secured. Planning for these routes should include transit, bicycle, and pedestrian facilities.

Reevaluate the need for four lanes on the proposed San Rafael Waterfront Parkway. Change the recommendation on highway expansion to delete new lanes from Upper Ross Valley, and reevaluate other widenings in the light of the recreation travel study, noise element, air pollution, and safety elements which are yet to be completed. Any recommended decrease in highway expansion is to be accompanied by a description of increased congestion and typical delay the added congestion is projected to cause.

II. PLANS FOR TRANSPORTATION SYSTEMS

A. TRANSIT

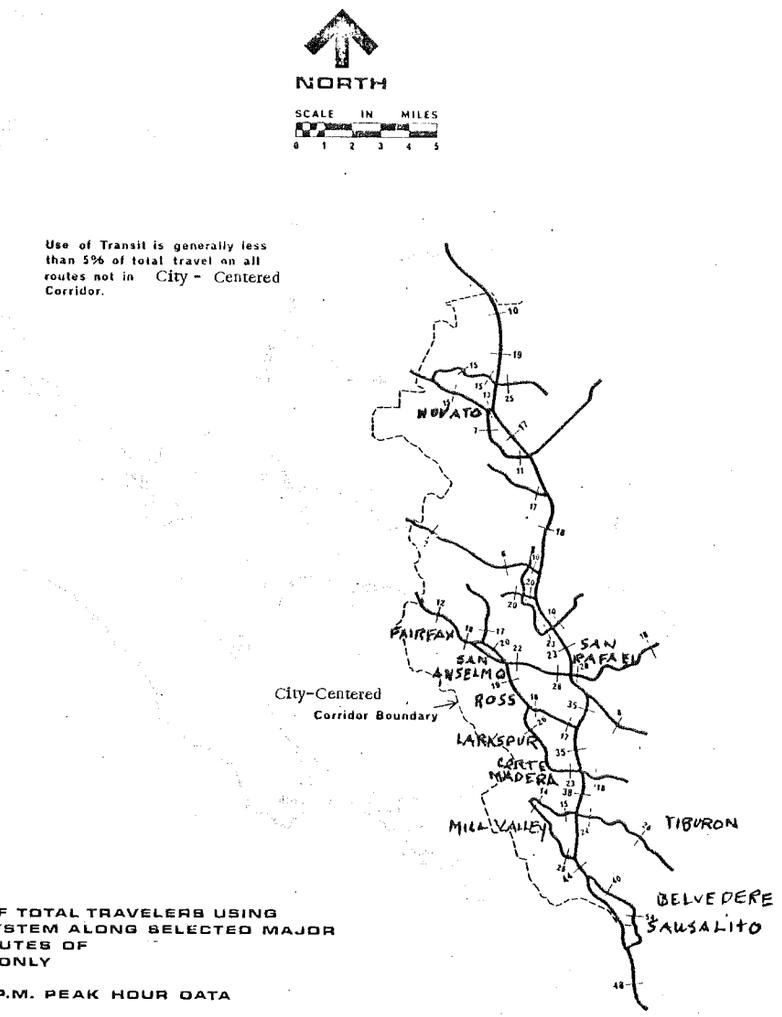
The 1971 Preliminary Countywide Plan recommended:

- Establish the present bus system as soon as possible.
- Ultimately provide a separate right-of-way transit system in the Route 101 corridor.
- Provide ferry service to San Francisco from Sausalito, Tiburon, Larkspur, and Las Gallinas Creek.

Citizens expressed general support for these proposals, but there was also a prevailing view that the preliminary plan gave inadequate emphasis to transit, compared to automobiles. The City-County Planning Council made the following addition to the text of the preliminary plan: "Marin County's transportation system should encourage the use of public transit, reduce reliance on the private automobile, and greatly improve intra-county public transit."

The following transit proposals are designed to meet these criteria and to promote the other policies of the Countywide Plan. Costs shown on Tables 4.1 and 4.2, assume a system of approximately 350 intra-county buses by 1990, which is probably significantly higher than the number that would result from plan policies as adopted by the Board of Supervisors.

Figure 4.3



USE OF TRANSIT
BALANCED TRANSPORTATION PLAN

Recommendations for Transit

Trans-Bay Bus System, the first major component. Similar to that designed by Kaiser Engineers for the Golden Gate Corridor Study, the system will be implemented in separate but coordinated steps between now and 1990. Each step will add new equipment or build new exclusive busways until the total system of approximately 300 buses and 22 miles of north-south busway is completed.

The initial stages of the Trans-Bay Bus System are now being operated by the Golden Gate Bridge District. Exclusive lanes on the Route 101 freeway are needed for these buses immediately. As the freeway is widened, the new lanes should be reserved for bus use, to be terminated only when the parallel exclusive bus right-of-way is complete. The ultimate location of the separate bus right-of-way should be as far from Route 101 as Marin's topography will allow, to serve the widest possible band along the corridor.

Trans-Bay Ferry System. Existing service to Sausalito and Tiburon will be supplemented in stages with new service--initially to Larkspur and possibly in the future to Las Gallinas Creek or Novato. The potential of ferries for recreational travel will be analyzed in Phase III of the Balanced Transportation Program.

Intra-Marin Bus Service, designed to provide most residents of East Marin with a level of mobility comparable to 1973 when coupled to the recommended highway system. Vehicles entering residential neighborhoods should be 20-passenger "mini-buses". These smaller vehicles are more attractive to passengers, less disruptive to residential neighborhoods, capable of deeper penetration into areas of steep topography and narrow streets, and better suited to the anticipated volume of ridership than larger buses.

Emphasis should be on short-range transit projects which would add about 20 buses per year to serve high patronage areas such as countywide activity centers, employment areas and downtowns. Bus service should be reassessed on a continuing basis. No service should be provided to low-density areas or to residential areas where there is major citizen opposition.

Many sections of major east-west arterial highways will have special lanes for the Intra-Marin Bus Service. In some cases, road widening will be necessary, since exclusive bus lanes are impractical on existing two-lane roads. Some of the new four-lane arterial roads will operate with two lanes for autos and one for buses only in the peak direction, with only one lane for autos and buses serving the opposing traffic flow.

Table 4.1

Transportation Systems Capital Costs Required By 1990

(MILLIONS OF 1990 DOLLARS)

SYSTEM COMPONENTS	1990 ALTERNATES		
	CURRENT TRENDS	BALANCED TRANSPORTATION, NO LAND USE CONTROLS	COUNTYWIDE PLAN
Highway	$404	$362	$228
Transit			
Trans-bay			
Bus*	$211	$211	$211
Ferry	44	44	44
Intra-Marin Bus	0	42**	42**
Transit Subtotal	$225	$297	$297
Total	$659	$659	$525

*Costs for Marin portions of busway only. Golden Gate crossing and San Francisco busways would add $589 million to total.

**Assumes approximately 350 intra-county buses by 1990. This total is probably significantly higher than the number that would result from plan policies as adopted by the Board of Supervisors.

Table 4.2

Annual Transportation System Operating Costs In 1990

(MILLIONS OF 1990 DOLLARS)

COMPONENT	1990 ALTERNATES		
	CURRENT TRENDS	BALANCED TRANSPORTATION, NO LAND USE CONTROLS	COUNTYWIDE PLAN
Highway			
Public Maintenance	$ 12	$ 11	$ 10
Private Operating*	680	651	528
Highway Subtotal	$692	$662	$538
Transit			
Trans-bay			
Bus	$ 49	$ 49	$ 49
Ferry	15	15	15
Intra-Marin Bus	11	35**	35 **
Transit Subtotal	$ 75	$ 99	$ 99
Total	$767	$761	$637

*Based on projected mileage costs for automobiles. (10¢ per mile in 1972, adjusted for increase in driving and annual 5% inflation.)

**Assumes approximately 350 intra-county buses by 1990. This total is probably significantly higher than the number that would result from plan policies as adopted by the Board of Supervisors.

Supporting Transit Through Development Patterns. The recommended transit system will operate best if the county's over-all development pattern is more concentrated, rather than widely dispersed. The more homes and offices within walking distance of transit service, the higher the proportion of travelers who can use transit rather than autos. If development is allowed to sprawl, people who live and work in these hard-to-reach areas will be virtually forced to use their cars.

The transit system would not require great increases in residential densities for adequate support. However, higher densities at selected locations--accessible and properly spaced nodes of development--would help to achieve improved levels of transit service. Density increases should be allowed only at locations where transit service exists or can be easily provided, and where other criteria of the Countywide Plan are met.

Each development should be reviewed as to how it will relate to existing or planned transit service. If there is no service within walking distance (1/4 mile) and the density is higher than single-family, an agreement for extension of service with the Marin County Transit District should be required before the development is approved. This would be similar to agreements now required from water and sewer districts. The design of any new development should include facilities for transit--loading zones, shelters, and paths to housing. Separate bus, auto, and bike ways might be appropriate for some developments.

The availability of parking, or lack of it, is a critical factor in inducing people to take transit, rather than driving. One reason for the success of the trans-bay commuter service in Marin is the lack of reasonably priced parking in downtown San Francisco.

Employment centers in Marin--industrial parks, the Marin County Civic Center, and other government buildings--are excellent places to begin implementing a policy of limiting parking for employees. Home-to-work trips can be easily accommodated by transit because they are concentrated in a relatively short time period and require practically no package-handling. However, parking should not be reduced until a good intra-county bus service is available.

Serving shopping areas by transit is more difficult than serving employment centers, because of the large numbers of packages to be handled. The prospect of hauling home a week's supply of groceries is certainly enough to cause a shopper to drive, rather than take a bus. It may be possible to offer a publicly subsidized package service to transit riders, to aid people who cannot drive, in addition to discouraging auto use.

Railroads. The Northwestern Pacific Railroad's freight operations are the only rail service still functioning in Marin. The NWP recently abandoned its right-of-way from Sausalito to Greenbrae, and has expressed its intention to seek Interstate Commerce Commission approval of abandoning other portions of its service south of the Ignacio junction.

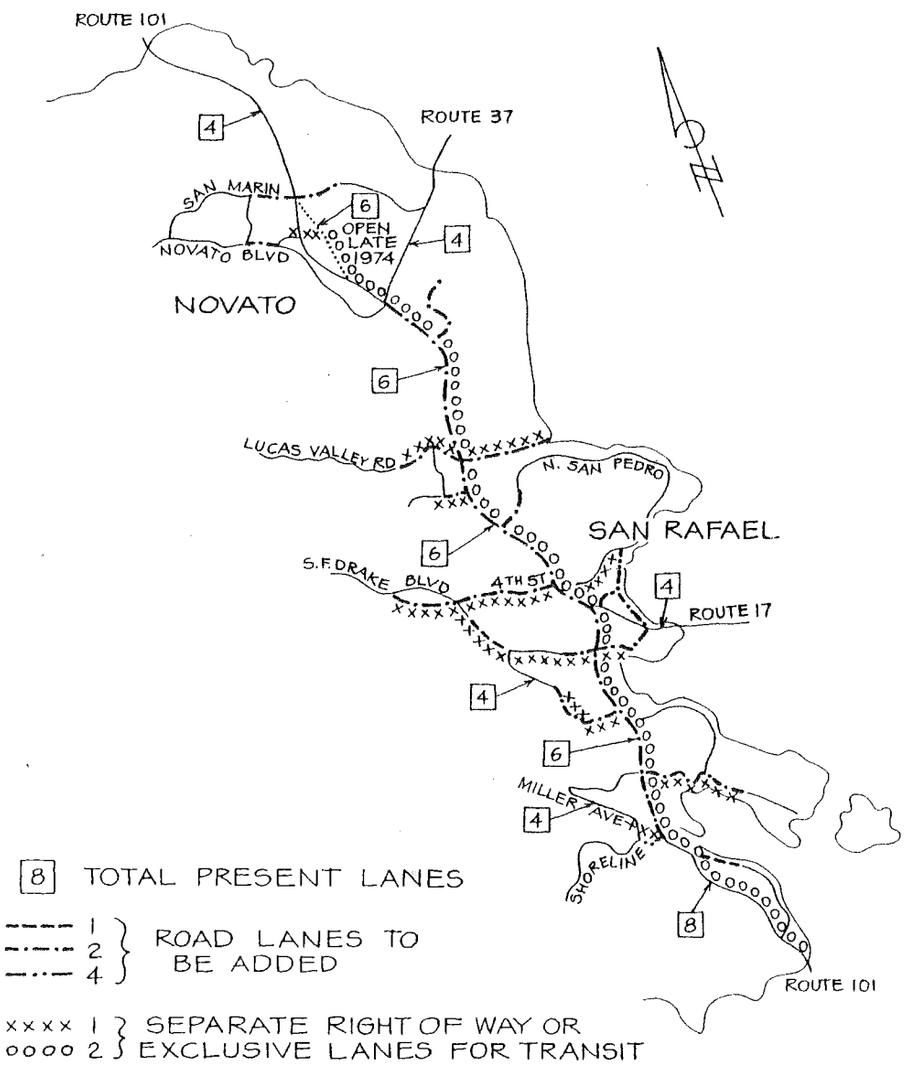
The Marin County Transit District's policy is to acquire the abandoned NWP right-of-way for future transit use, in conjunction with the cities through which the line passes. The City-County Planning Council has endorsed this effort by the Transit District, and recommended interim public uses of the right-of-way, such as for bicycle paths, rather than allowing it to revert to private or discontinuous ownership.

The county should encourage the railroad and the Interstate Commerce Commission to continue existing freight operations, unless it can be demonstrated that they are no longer needed by the Marin industries currently served. If additional parts of the right-of-way are abandoned, they should be publicly secured for eventual transit use. Use of this alignment for express bus lanes or other transit operation would represent a great savings to the county in comparison with what it would cost to acquire an entirely new right-of-way.

Possible rail service for visitor excursions to East and West Marin will be analyzed as part of the recreation travel study in Phase III of the Balanced Transportation Program. This service might connect with ferry terminals, to create a rail and water excursion loop extending through the county and connecting with San Francisco and the East Bay.

FIGURE 4.4

1990 HIGHWAY SYSTEM
NUMBER OF LANES TO BE ADDED BETWEEN 1970 AND 1990



B. HIGHWAYS

Marin's traffic congestion problem can be partially explained by a few statistics. Marin's population has increased by nearly two and a half times between 1950 and 1972. During this time, auto registration grew by more than three and a half times, until today Marin averages almost two private vehicles for every household. Arterial highway capacity increased from 508 lane miles in 1950 to 645 in 1972, a growth of only about one-fourth.

Since 1968 there has been very little expansion of the highway system. Projects now under construction include the by-pass of Route 101 around downtown Novato and the widening to eight lanes of the Richardson Bay Bridge and the portion of 101 south to the Golden Gate Bridge.

The 1971 preliminary plan text recommended the following limited highway improvements:

1. Limit highway expansions to the City Centered Corridor except for the Point Reyes National Parkway.

2. Widen Route 101 to eight lanes to Route 37, and to six lanes north to the county line. Integrate transit facilities within the right-of-way.

3. Build inter-valley connectors connecting Terra Linda-Sleepy Hollow and Lucas Valley Road-White Hill. Build the Bay Front Parkway in San Rafael.

4. Treat routes to coastal recreation attractions as scenic highways.

Public reaction to these proposals indicates that the anti-freeway sentiment of 1968 continues today. There was a general response that road improvements were over-emphasized, in comparison to transit. The national parkway and inter-valley connectors were singled out for strong opposition, although they were supported by a minority.

In 1972 the Bay Area Air Pollution Control District conducted a special study of the impact of growth to 1990 upon the air quality of southeastern Marin, under the unconstrained market. Major findings were that Marin's current air quality is good, but its topography, climate, and wind patterns create a high danger of heavy air pollution in the future under current trends. Unless Marin controls its rate of growth and chooses a transit-oriented transportation system for the future, rather than relying on automobiles, air quality is likely to be intolerably poor by 1990. (See Figs. 4.5 and 4.6)

Although the Countywide Plan does emphasize the maximum use of transit, tests conducted in Phase II of the Balanced Transportation Program indicate that some highway expansion is necessary to accommodate the recommended bus system, and to maintain the current level of mobility.

Recommendations for Highways

The total capacity of the freeways and major arterials will be expanded by 12 percent by 1990, with an addition of 91 lane miles, many to be used exclusively by transit.

All widenings will be reevaluated in the light of the recreational travel study, noise, safety and air pollution elements which are yet to be completed. Any recommended decrease in highway expansion will be accompanied by a description of the increased congestion and delay anticipated as a result of the reduction.

Freeways. No new routes will be built. Route 101 will be widened where necessary to provide eight lanes between the Golden Gate Bridge and Route 37, six lanes to Gnoss Field, and four lanes to the Sonoma County line. An exclusive bus lane will begin operating immediately on the freeway until a parallel transit way is constructed in stages. Then, Marin will have the option of continuing exclusive transit lanes or converting to a full eight lanes for autos. Expansion of 101 will be limited to eight auto lanes.

Arterial Highways. These new routes are proposed:

1. The San Rafael Waterfront Parkway from Point San Quentin to South San Pedro Road with a connection to Bellam Boulevard. Reevaluate the need for four lanes on this route.

2. Smith Ranch Road upgraded and extended from the proposed ferry terminal on Las Gallinas Creek to Route 101.

Each of these routes passes through some urban open space areas shown in the Countywide Plan. Neither will be built until this open space is permanently secured.

All major arterials in east Marin should be widened to at least four lanes by 1990, for needed highway capacity and exclusive bus lanes, except that no new lanes should be added in the Upper Ross Valley. Some sections of six-lane arterials will be needed, primarily as short connections from major traffic generators, such as between the Northgate and Bon Air shopping centers and Route 101.

The following arterial highway improvements, proposed or adopted by various groups or jurisdictions, are not recommended by the Countywide Plan:

Route 17 as a freeway west of Route 101 to Point Reyes Station

Route 37 as a freeway west of Route 101 to Point Reyes Station

Arterial connection to Route 101 at Rodeo Avenue in Sausalito

William Avenue Extension in Corte Madera and Larkspur

San Francisco Avenue Extension to a ridge top road or across the ridge to Terra Linda from San Anselmo

Freitas Parkway connection to ridge top road or across the ridge to Butterfield Road from Terra Linda

Butterfield Road connections to Terra Linda or Lucas Valley

Ignacio Boulevard Extension beyond Indian Valley Colleges Campus

Rowland Boulevard between Route 101 and Olive Avenue

Connector from Lucas Valley Road to Sir Francis Drake Blvd. at White Hill

Golden Gate Crossing. The capacity of the Golden Gate Bridge has been and will continue to be an important factor in controlling Marin's development. If bridge capacity is expanded indefinitely, it would be nearly impossible for Marin to achieve its goals of limited population growth with more residents working in the county, because the current trend toward more commuting to the city would not be limited.

Therefore no second deck should be added to the Golden Gate Bridge for automobiles, and no other bridge should be built connecting Marin with either San Francisco or the East Bay. The people-moving capacity of the existing bridge should be increased at a controlled rate by providing an exclusive bus lane on the six-lane deck in the peak direction of traffic flow. A reserved lane for buses and car pools should be established immediately as a first step. As the bus fleet grows, car pools could be excluded from this lane.

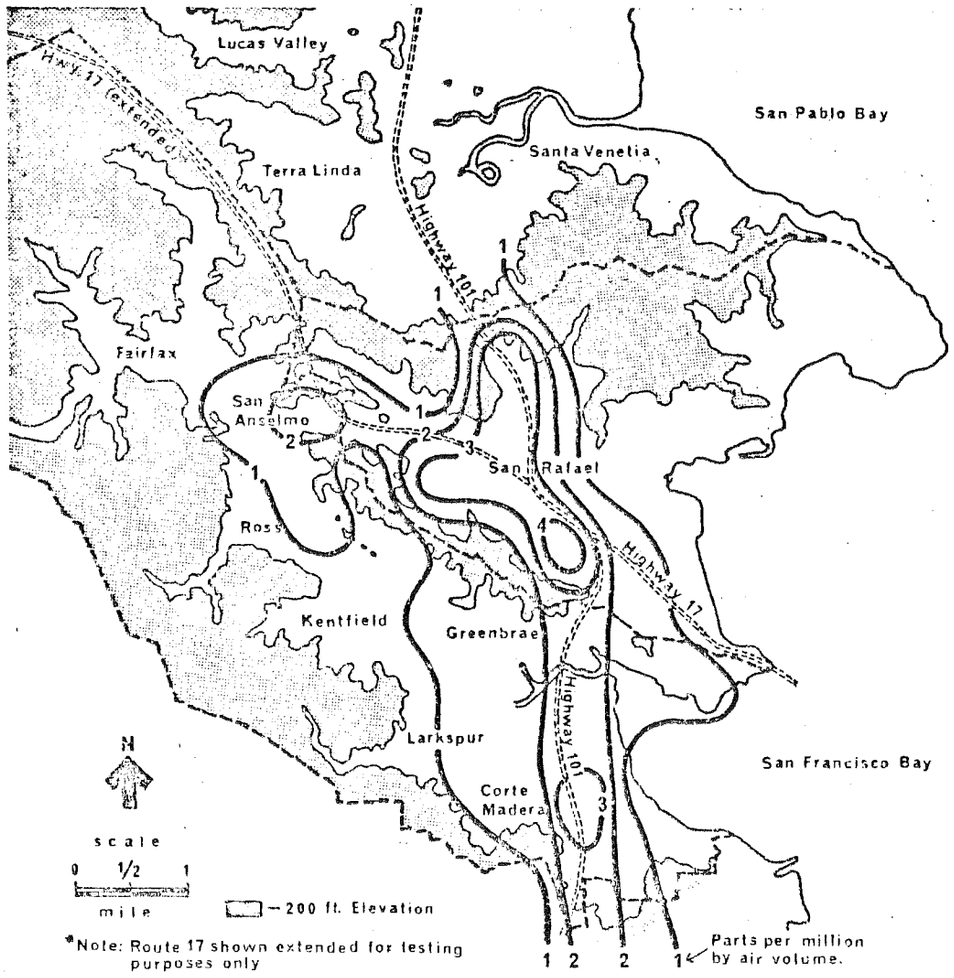
The decision on a second transit deck on the bridge should be deferred until there can be an evaluation of the impact of all proposed transportation improvements--a widened 101, separate busway along 101, bus lane on the existing bridge, and the total ferry system. If congestion is then found intolerable the next step in increasing corridor capacity would be the new transit deck sometime after 1990.

Maintaining the present capacity of the Golden Gate Bridge is appropriate for Marin's weekend traffic as well. Just as San Francisco's streets can tolerate no more autos downtown on weekdays, Marin cannot accomodate an increasing flow of cars to recreational sites on weekends based on present highway use patterns. Solutions must be found to the problem of providing access to public recreation areas, other than expanding the capacity of the bridge and highways to accomodate private automobiles.*

*See section on Recreation Transportation.

Figure 4.5

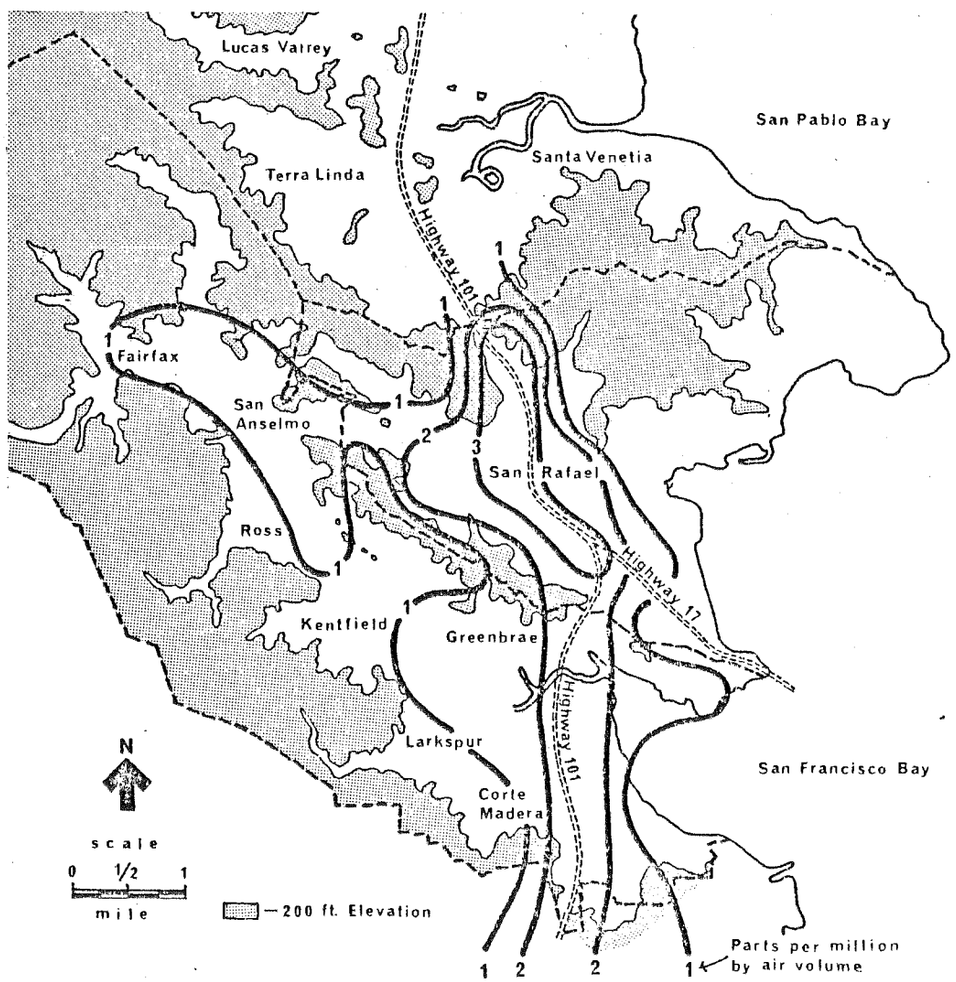
1990 Distribution Of Carbon Monoxide Concentration Due To Extensive Auto Use



SOURCE: "Air Quality & Growth in Marin County" Figure 15 by Bay Area Air Pollution Control District, June 1972

Figure 4.6

1990 Distribution Of Carbon Monoxide Concentration Due To Extensive Bus Transit



SOURCE: "Air Quality & Growth in Marin County" Figure 16 by Bay Area Air Pollution Control District, June 1972

Making the Freeway Work. If Route 101 is to be Marin's only freeway, it is important that it operate as efficiently as possible, without adding great chunks of new pavement.

A new idea is ramp metering, which means controlling the flow of vehicles entering the freeway with traffic signals. Providing a smooth movement at entrance ramps improves the flow of traffic throughout the length of the freeway.

Upgrading Marin's substandard interchanges would also improve the efficiency of Route 101. The Division of Highways should consider combining interchanges that are too close, such as Shoreline Highway-Seminary Drive-Tiburon Wye and Tamalpais Drive-Lucky Drive-Sir Francis Drake Boulevard. The Lincoln Avenue interchange in San Rafael is substandard, and should be closed or moved. This would be possible if a frontage road connection were made from Lincoln to Los Ranchitos, which would also make it possible to close the substandard Los Ranchitos and Merrydale connections.

New interchanges should be provided only where access is needed in order to achieve Countywide Plan goals. For example, north of Gnoss Field in Novato the plan calls for retention of open space with no development. Route 101 through this area, now an expressway, should be improved as a limited access freeway for safety reasons. However, no interchanges should be provided in this four-mile stretch, in order to help prevent development in the open space. The transit system parallel to Route 101, when built, will also provide no access to the open space area. A local road system could be developed, to serve agricultural and recreational activities.

Another example is Rodeo Avenue, which extends into Wolfback Ridge, designated by the plan as open space. This interchange should not be improved, since its present low level of access is in keeping with the plan's goals.

Scenic Highways. State law now requires that general plans include "A scenic highway element for the development, establishment, and protection of scenic highways pursuant to the provisions of Article 2.5 (commencing with Section 260) of Chapter 2 of Division of the Streets and Highways Code."

When a route has been designated by the state as a scenic highway, it is so indicated on state maps and highway signs, and the state provides special help in planning to enhance aesthetic qualities of the route when improvements are made.

State criteria used for designating scenic highways are:

1. The scenic corridor through which the highway passes should have consistent scenic, historic, or aesthetic value during all seasons.

2. Consideration should be given those highways or routes which are:

   a. State or jurisdictional entry routes.

   b. Predominately utilized for recreation or vacation travel.

   c. Utilized for one-day sightseeing or study trips.

   d. A part of an integrated, or semi-integrated, scenic route system that traverses varied scenic corridors for longer trips, and/or

   e. Through areas of extraordinary scenic value.

   f. Typical or demonstrative of varied scenic factors available within the jurisdiction.

3. If possible, all principal landscape and topographical type areas should be represented in the system.

4. Routes of historic significance which connect places of interest should be considered even though the route is of marginal scenic value.

Any route leading through the county to the coast would qualify as a scenic highway under these criteria. However, seeking state designation of any of these routes would be inconsistent with the Countywide Plan policy that automobiles will not be further emphasized as the primary means of access to coastal recreation areas. Showing routes to West Marin as scenic highways on state maps and signs would inevitably encourage visitors to drive, either to reach the coast or as a recreational experience in itself. There would be no counterbalancing advantage to the county in state designation, since the Countywide Plan recommends no widening of any routes to West Marin. Thus, there would be no opportunity to use state aid in planning landscaping and improvements.

Therefore, the county will not seek state designation of any routes as scenic highways. All routes to the coast shown as arterials in the Countywide Plan are considered scenic highways for county planning purposes. Special landscaping

and planting should be provided, to enhance appearance and screen unattractive roadside development. Scenic easements should be acquired to preserve views, and zoning regulations should be designed to enhance the view from the road. Roadside turnouts should be provided at important vistas. The county and most cities already have legislation prohibiting billboards.

Special effort should be made to enhance the appearance of the County from Highway 101 and 17. This would involve paying particular attention to the design and location of development and the preservation of natural features along the highways.

C. AIRPORTS (NOTE: Rest of this page not part of adopted text.)

Marin County now contains four airport facilities of significant size:

1. Hamilton Air Force Base, now used exclusively for military purposes. The possibility of limited joint use by civilian aircraft is being discussed.

2. Gnoss Field, owned by the county, serving general aviation (private planes). It has a 3,300-foot lighted runway without instrument approach facilities. About 135 aircraft are based here now. The field could accommodate 350 to 400 planes if aircraft parking space were expanded.

3. Smith Ranch Airport, privately owned, with a 2,200-foot runway. About 30 aircraft are based here.

4. The Marin County Heliport near Sausalito, where San Francisco-Oakland Helicopter Airlines provides service to the San Francisco and Oakland international airports.

Most Marin residents use the San Francisco and Oakland airports more frequently than these local facilities. In the current study of airport requirements sponsored by the Association of Bay Area Governments, it is estimated that by 1985 Marin will generate 4.62 million passengers, of whom 35 percent will be traveling to the Los Angeles Basin.

The preliminary plan recommended:

- Study a heliport or short-take-off-and-landing facilities for the Northgate-Civic Center area.

- Regarding joint military-civilian use of Hamilton Air Force Base, study the impacts of noise, traffic, other environmental effects, and economic benefits.

Novato residents and others strongly objected to adding civilian flights at Hamilton, although some organizations expressed support. The Board of Supervisors has since adopted a policy opposing commercial use of Hamilton.

Recommendations for Airports

New Airports. In the foreseeable future, no major new regional airports should be built in Marin to serve North Bay residents. The Regional Airport Systems Study, recently completed by the Association of Bay Area Governments concluded that existing facilities, with some expansions, can accommodate needs to 1985. Provision of a Marin or North Bay airport, the study concluded, is therefore a completely local issue which should be based on residents' desires for convenience, balanced by the environmental impacts an airport will cause.

A future decision to develop a new airport in Marin, if any, should be based on three factors:

1. Need. It is strongly recommended that the State Business and Transportation Agency immediately study the potential for greatly improved high-speed land transportation linking Sacramento, San Francisco, Los Angeles, and San Diego. This kind of new service could dramatically reduce the demand for air travel to and from the Los Angeles basin, the single most important destination from the Bay Area.

2. Economic Impact. Airports do create some jobs, directly and by the stimulation of nearby industrial parks. But of what type, and where, has not yet been made clear. Also, jobs created by an airport need to be compared with jobs that could be provided by alternate use of a given site, such as an industrial park.

3. Environmental Impact. Data collected in the ABAG study indicate that noise and air pollution are relatively minor problems in airport expansion, when compared to existing military use. However, a number of citizens have complained that even the present noise level at Hamilton is far from acceptable. The noise and air pollution that would occur should be compared with the levels produced by alternate transportation forms, such as high-speed ground transportation to Los Angeles, that could eliminate the need for another airport.

Hamilton Air Force Base. Now that Hamilton will be used much less intensively for military purposes, its use should be completely re-evaluated, including consideration of the possibility of industrial development.

A proposal to use Hamilton Field for 20 commercial flights a day has been made. The Planning Department staff has determined that this level of operation would probably be acceptable in terms of noise, ground traffic, air pollution, and land use impact. However, 20 flights a day represents use by only 800,000 passengers annually, and the ABAG Regional Airport Systems Study forecasts a demand of 2.5 million at Hamilton by 1985, if Hamilton is used. This is a conservative estimate, since it includes only flights within California, and includes only passengers from Marin, Sonoma, and Napa counties, while some would probably come from Contra Costa and San Francisco as well. Moreover, the study found that use of Hamilton is not necessary for the region, although substantial demand would be generated if it were once placed in operation.

Once a precendent is set by allowing joint use, it would be extremely difficult to prevent expansion of operations to meet the ultimate demand. Therefore, it is strongly recommended that no commercial aviation use be permitted at Hamilton Field. The City of Novato, as well as the County of Marin, should be closely involved in planning for the future of Hamilton.

Heliports and STOL Facilities. The preliminary plan recommended a heliport in the Civic Center area. However, the noise level of helicopters or short-take-off-and-landing aircraft is excessive. No additional facilities for these vehicles should be provided in Marin County until they have been redesigned to reduce noise to an acceptable level. However, it will be necessary to use helicopters for emergency evacuation of injured persons. The Marin Office of Emregency Services should designate landing sites for helicopter ambulances.

Other Facilities. Recommendations for changes to Gnoss Field should be based on findings of a study on the capacity and requirements of that airport, planned by the Marin County Ariport Commission. Expansion of the Smith Ranch Airport is not recommended, because of interference with the extensive development occurring nearby. Plans for general aviation facilities should consider the possibility that Hamilton Field may become available to private planes, as well as commercial aircraft.

D. RECREATIONAL TRANSPORTATION

Recreational traffic in Marin is becoming a greater problem than commuter traffic. While commuter transit service is good, persons who visit the county for recreation have almost no choice other than their own automobiles. The result is heavy weekend congestion on highways and in neighborhoods, especially in southern Marin.

The estimated five million day visitors to Marin in 1970 were concentrated on weekends. Three and a half million of them visited public parks and recreation areas, mostly in West Marin. This number will rise as Point Reyes National Seashore is completed and the Golden Gate National Recreation Area is established. (See Fig. 4.7)
(Insert Fig. 4.7)
Only limited transportation facilities exist to handle this massive and growing traffic flow. Route 1 and Sir Francis Drake Boulevard are already jammed on weekends, and non-commute bus service is infrequent.

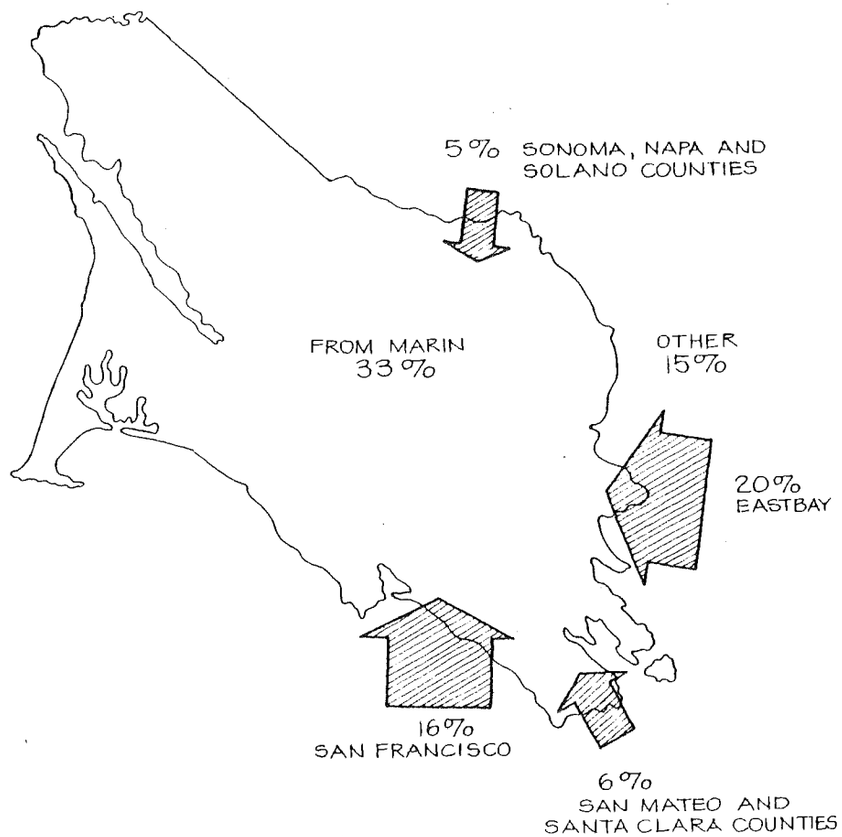
The 1971 preliminary plan recommended a national parkway connecting the Golden Gate Bridge with Point Reyes National Seashore, to accommodate recreational travel. It would be an "elongated park," serving both cars and buses, and its access would be strictly limited so that it would not encourage development.

There was strong public objection to this proposal. Many citizens felt that no new roads should be built anywhere in the county, and especially not in the fragile environment of West Marin. Some groups, however, supported it as a means of reducing congestion in East Marin. It was generally agreed that more consideration should be given to a wide range of possible ways to solve the recreational travel problem. Recently, proposals for re-establishing rail service to West Marin, for recreational purposes only, have been presented and widely discussed.

There was also considerable controversy about whether the parks and open areas of West Marin should be seen primarily as facilities that should be accessible to the public, or as natural resources that should be preserved in their original condition.

FIGURE 4.7

WHERE MARIN'S VISITORS COME FROM ON SUMMER WEEKENDS



TOTAL OF 5 MILLION ANNUAL VISITORS TO MARIN COUNTY IN 1970

SOURCE : MARIN COUNTY PLANNING DEPT., RECREATION SURVEY, JULY-SEPT. 1972

Recommendations for Recreational Transportation

The City-County Planning Council, in its revisions to the preliminary plan, stated that "Transit usage for recreational travel is a necessity for environmental conservation in areas of heavy visitation; adequate bus and ferry service should be operational as soon as possible. A comprehensive study of recreation travel should be undertaken as a coordinated project among the various agencies concerned with recreation and access to West Marin. The study should include many transportation options and their environmental impact, and should be structured to offer solutions compatible with the Countywide Plan."

The CCPC also stated that "Automobiles should not be further emphasized as the primary means of access to coastal recreation areas."

Phase III of the Balanced Transportation Program, now underway, includes a study of recreational travel needs and possibilities, leading to recommendations for the best approach for Marin.
Among the options to be considered are:

1. Rail service to West Marin, along various alignments. (Including a coastal route serving both the Golden Gate National Recreation Area and Point Reyes and a route through central Marin serving Point Reyes only.) Possible connections with ferry service.

2. Expanded bus service to recreation areas, using existing roads, possibly accompanied by strict parking restrictions on weekends at major destination points and along access roads.

3. Ferry service to Bolinas, Point Reyes, and other possible destinations.

4. Bicycle, hiking, and riding trails, connecting with other transportation terminals.

5. A national parkway, from the Golden Gate Bridge to Point Reyes National Seashore.

6. New sophisticated techniques for rerouting traffic on weekends to west Marin.

While people must have access to public recreation areas, this does not mean the right to access by private automobile. Unless other ways of accommodating recreational travel are found, values of the places attracting visitors will be destroyed. For example, in Yosemite Valley the National Park Service has found it necessary to restrict auto access and to provide free public transportation. Since Marin County is in a major urban region, there will be an even greater need for alternative transportation facilities to reach parks here.

Recreational travel facilities must themselves provide a recreational experience, if they are to attract people away from their cars. Pleasure driving is a major reason for recreational travel in Marin, in addition to visiting a specific destination. Reduction of the weekend volume of auto traffic will require either restrictions on parking and excess or another form of transportation more enjoyable than driving, and will require the cooperation of the National Park Service in adjusting its own policies for Point Reys for the Golden Gate National Recreation Area.

Terminal locations for recreational transportation are also important. If the system only picks up passengers within Marin County, traffic on the Golden Gate Bridge and Route 101 would continue to be excessive, since more than two-thirds of weekend vissitors come from San Francisco. Also, large amounts of land would have to be provided for parking, unless feeder lines were used, in which case many potential passengers might be lost because of the need to transfer. Main terminal and pick-up locations would probably best be located in areas where most visitors originate, in San Francisco and the East Bay, with secondary pick-up points in Marin, at Ferry terminals for example. Both terminals and routes should be planned to minimize congestion within East Marin, as well as West Marin, communities.

The recreational transportation system should be designed and scheduled so that it does not encourage commuting, in order to deter residential development in West Marin, in keeping with the Countywide Plan.

E. PATHS AND TRAILS

Bicycle, hiking, and riding trails extend throughout most areas of Marin, urban as well as rural. In recent years, bicycling has become an important means of transportation to work and school, rather than just a sport.

The Board of Supervisors adopted a bicycle path plan for Marin County in 1970, and the county Parks and Recreation Department and several cities have been carrying out this plan in stages. The preliminary countywide plan recommended a bicycle path system funded by all local jurisdictions.

Recommendations for Paths and Trails

Countywide Bicycle Route System. The bicycle path plan should continue to be implemented by the cities and the county. First priority should go to providing a link between Marinwood and Novato, which would complete the north-south path system along the Route 101 corridor. A major addition to the 1970 plan is the proposed new 22-mile east-west route, connecting the Civic Center with Point Reys National Seashore, using Marin Municipal Water District easements for part of the alignment.

The County Department of Public Works, rather than the Parks and Recreation Department, should be responsible for development and maintenance of bike paths--thus underscoring their transportation function.

Bike routes should be built separately from highway pavements wherever possible. Railroad alignments make excellent bike paths because of their gradual slope and separation from the noise and dangers of automobiles. The Tiburon bike trail is an excellent example. Other trails such as fire roads or park roads are also very appropriate because of their separation from auto traffic.

Routes in Cities. Cities should sign and improve bike routes that can be used safely for transportation, as well as recreation. In some cities, bike paths have been designated on hilly, circuitous routes. These are avoided by the masses of regular bike riders (such as high school students) in favor of main roads, with their heavy volumes of automobile traffic.

Home to Work Travel. Paths should be provided to encourage the use of bicycles for going to work. To the extent that more people are able to find jobs in the county, the use of bicycles for the journey to work will become more feasible. Lockers should be provided at major employment centers and transit stops.

Recreational Travel. Paths should also be developed to encourage people to use bicycles, rather than autos, to reach recreational destinations in Marin. Lockers and rest areas should be provided at selected locations along the bicycle path system. Hostels for hikers and bicycle riders should be developed in areas designated for visitor enterprises in West Marin.

Private Developments. Developers will be encouraged to provide bicycle paths and hiking trails connecting with nearby transit stops, open space, and community centers.

Other Facilities. The system of riding and hiking trails should be extended and improved throughout rural and urban areas, by the cities and the county. These routes should be treated mainly as recreational facilities, and they should not be available for use by motorized vehicles by the public. Off-the-road vehicles (dune buggies, dirt bikes) should be permitted to operate only in designated areas.

III. Implementation and Next Steps

COST ESTIMATES

Cost estimates for three different transit and highway system alternatives were prepared in the Balanced Transportation Program. Based on estimated 1990 populations, these are the alternatives shown in Tables 4.1 and 4.2:

1. Continuation of Current Trends. Marin's population would reach 365,300 by 1990, and the highway system would expand on demand. No new freeways would be built because of community opposition. Good trans-bay commuter service would be provided, but intra-county transit would remain minimal.

2. Balanced Transportation Without Land use Controls. A good intra-county, as well as trans-bay, transit system would be provided. However, without improved land use controls the population would still rise to 365,300 by 1990. Highways would have to expand accordingly, although there would be no freeways to West Marin.

3. Countywide Plan. Population growth would be controlled, increasing only to 300,000 by 1990. Both intra-county and trans-bay transit service would be greatly improved. Highway expansion would take place only in accord with this relatively low level of need.

The 1990 dollars shown are based on 1972 costs plus an inflation factor (5 percent compounded annually for 18 years).

As noted on Tables 4.1 and 4.2, these figures assume approximately 350 intra-county buses by 1990. This total is probably significantly higher than the number that would result from Countywide Plan policies as adopted by the Board of Supervisors.

Both capital and operating costs would be significantly lower under the Countywide Plan than under the other two alternatives. However, existing sources of funds would still not be enough to meet the cost requirements of the recommended transportation improvements. There would be deficit of over $100 million for capital costs and of nearly $40 million annually for operation expenses.

Marin County will aggressively seek additional federal and state funds to help make up these capital and operation deficiencies.

Local jurisdictions will also be called upon to support the transportation proposals of the Countywide Plan. Two possible sources of funds would be the gasoline tax and the property tax. Raising the gas tax from the present 55 percent to 90 percent in 1990 (a level comparable with other industrialized countries) would produce much of the needed operating subsidy. The balance could be provided by an addition to the property tax of $1.92 per $100 assessed valuation in 1972 dollars; this would be comparable to the rate now paid by San Franciscans to subsidize the Municipat Railway and the Bay Area Rapid Transit District.

Even though these costs are high, they are substantially less than the costs of not carrying out the balanced transportation recommendations of the Countywide Plan, as shown on alternatives 1 and 2, Tables 4.1 and 4.2.

The estimated cost of the first stage of the bicycle path system, now under way by the Parks and Recreation Department, is $150,000, of which $75,000 has been allocated in the county budget. The estimated cost of the new east-west route through central Marin is $300,000 to $400,000, including easement purchase and construction. This would be jointly financed by the County of Marin and the Marin Municipat Water District, possibly with other external sources of funding. The estimated cost of the total countywide bicycle path system is $2.9 million.

Cost estimates for recreational transportation facilities will be prepared in Phase III of the Balanced Transportation Program. Costs of airport facilities would depend upon the actions to be taken, pending the completion of current studies and policy decisions.

IMMEDIATE ACTIONS

Several immediate steps can be taken to implement these transportation recommendations.

1. The California Division of Highways should install bus lanes on Route 101 and start ramp metering at interchanges.

2. The Golden Gate Bridge, Highway, and Transportation District should immediately establish a special bus lane on the existing deck and expanded ferry service. The district should continue its plan for a separate right-of-way trans-bay transit system in the Route 101 corridor north of the bridge.

3. The Marin County Transit District should secure revenues from the sales tax on gasoline, effective July 1, 1972. Funds from this source--newly available for transit purposes--should be used for intra-Marin transit.

4. The County of Marin will begin work on county and state legislation needed to provide funds for transit facility construction and operation--including consideration of additions to local gasoline and property taxes.

5. Cities should develop their own capital improvement programs for transportation improvements recommended by the Countywide Plan, in conjunction with the county and the Marin County Transit District. A multi-jurisdictional funding procedure, similar to the road program of the Urban Thoroughfare System, may be needed.

6. The county and the cities should continue implementing the countywide bicycle path system. Responsibility for the

county's portions should be transferred from the Department of Parks and Recreation to the Department of Public Works. Funds for path and trails should be included in park and open space programs.

7. The existing Northwestern pacific Railway right-of-way, as it is abandoned in sections, should be asecred for public use, eventually for transit and temporarily for bike pats or bus shuttles. It should not be permitted to revert to private development or automobile use.

Phase III of the Balanced Transportation Program, now under way, will produce the design for an intra-county transit system and a capital improvements program for all transportation modes. The Marin County Transit District should then seek Urban Mass Transit Adnimistration grants through the Metropolitan Transportation Commission. Phase III will also include analysis and recommendations on recreational travel facilities.

State law requires general plans to include "A noise element in quantitative, numerical terms, showing contours of present and projected noise levels associated with all existing and proposed major transportation elements." These include but are not limited to highways and freeways, rapid transit systems, and ground transportation facilities associated with airports. This work is now being done as part of Phase III of the Balanced Transportation Program; findings will be reported as soon as they are available.

Conditions and trends affecting all modes of transportation will be continuously monitored, and policies will be modified periodically, as part of the inter-governmental planning process established by the City-County Planning Council.

X X X X X

Part 5. Implementation

CONTENTS

These pages contain background material which is not part of the adopted plan:

5-9R
5-10

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Part 5. IMPLEMENTATION

I. Introduction: Requirements for Actions, Costs, Organization

Implementation--bridging the gap between what the plan recommends and what actually happens--is the real substance of the planning process. But implementation methods, the kinds of actions to be taken and how they will be paid for, are by far the most controversial and difficult aspects of a plan.

State law now requires plans to be implemented, through zoning and other regulatory measures. Plans can no longer be presented as "flexible guidelines", to be followed or ignored according to the expediency of the moment. Now the law specifies that an adopted plan represents official public policy which must shape development approvals and other government actions. Public agencies must also now specify a much wider range of environmental standards to be met by developers, beyond the conventional criteria of zoning and subdivision ordinances.

Each section of the Countywide Plan--Environmental Quality, Community Development, Transportation--recommends implementation methods for that particular element. These recommendations are summarized on the accompanying table. Estimates of direct public costs are included, where appropriate. These include federal, state, and regional, as well as county, expenditures. They do not include either indirect public costs (such as the need for more public facilities) or indirect public benefits (such as less congestion, a more beautiful environment).

Implementation measures fall into three major categories: Development Controls, Direct Public Action, and Citizen Participation.

Table 5.1

Summary Of Countywide Plan Policies, Required Actions, Costs

Element/Subject Policy	Actions Required*	Agencies Involved	Total Estimated Direct Public Costs 1972 to 1990 in 1990 Dollars
ENVIRONMENTAL QUALITY			
Open Space			
1. Secure open space in City-Centered Corridor.	Adopt open space zoning; transfer development rights; purchase easements; accept donations; obtain federal and state grants; acquisition by cities and local communities.	New countywide open space agency; city, county, state park-recreation departments; U.S. Department of Housing and Urban Development; city and county legislative bodies; City-County Planning Council.	$63-115 million depending on how much land is secured by regulation instead of acquisition. Administrative costs.**
2. Stabilize agriculture in Inland Rural and Coastal Recreation Corridors.	Adopt agricultural zoning; adjust tax assessments. *Explore other means of stabilizing agriculture.*	Board of Supervisors, County Assessor, City-County Planning Council, *Agric. Advisory Board.*	Administrative costs.** Transfer of tax burden.
3. Acquire open space and park land in Coastal Recreation Corridor (and some in Inland Rural Corridor).	Complete Pt. Reyes; acquire GGNRA (Federal); expand Taylor Park (State); acquire Nicasio regional park (County).	U.S. Department of Interior; State Parks and Recreation Department; County open space agency and Parks and Recreation Department.	GGNRA: $10.4 million (Federal).
Conservation			
4. Control public and private actions in accordance with environmental quality principles.	Expand functions of Environmental Protection Committee; establish similar mechanisms for cities.	Environmental Protection Committee; cities; State Dept. of Resource Management; Federal Environmental Protection Agency; City-County Planning Council.	Administrative costs.**
5. Exert special development controls in conservation zones.	Same as 4.	Same as 4.	Administrative costs.**

* Some actions may require new State legislation.

** Administrative costs of $1 million covers recurring management or enforcement functions for Items 1, 2, 4, 5.

Table 5.1 (Continued)

Element/Subject Policy	Actions Required	Agencies Involved	Total Estimated Direct Public Costs 1972 to 1990 in 1990 Dollars
The Built Environment			
6. Relate design of the man-made environment to the natural environment.	Establish standards and guidelines (CCPC); Adopt Development Review Checklist with incentive system (cities and county).	Environmental Protection Committee; city aud county planning commissions and legislative bodies; CCPC.	None
7. Use the principles of accessibility, coucentration, variety of use, and amenity in designing activity centers.	Establish standards and guidelines (CCPC). Adopt specific standards with incentive system (cities and county).	Same as 6.	None
Safety			
8. Locate and design all facilities to minimize human and property damage from earthquakes, other geologic hazards, floods, noise, and accidents.	Prepare and adopt seismic, safety, and noise elements and related ordinances.(city and county).	City and county planning commissions and legislative bodies; Environmental Protection Committee; CCPC.	Normal administrative costs.***
Recreation			
9. Federal and state governments should continue to finance and operate large facilities, mainly in Coastal Recreation Corridor and Inland Rural Corridor.	Complete Pt. Reyes; acquire GGNRA; expand Taylor Park.	U. S. Department of Interior; State Parks and Recreation Department.	See 3.
10. County agencies should operate facilities for people beyond immediate local areas.	Secure open space in City-Centered Corridor; other regional parks and facilities.	Countywide open space district; County Parks and Recreation Department; Marin Municipal Water District, *North Marin Water Dist.*	See 1.
11. Cities and recreation districts should finance and operate local facilities.	Acquire and develop land for small parks, playgrounds, other local facilities.	City Parks and Recreation Departments; recreation districts.	(Local budgets and capital improvement programs.)

***Normal administrative costs mean the work could be handled by existing agencies with their present workforce.

Table 5.1 (Continued)

Element/Subject Policy	Actions Required	Agencies Involved	Total Estimated Direct Public Costs 1972 to 1990 in 1990 Dollars
12. Develop private recreational facilities at suitable locations in West Marin and elsewhere in the county.	Establish guidelines and criteria (CCPC). Adopt specific standards with incentive system (cities and county).	Environmental Protection Committee; city and county planning commissions and legislative bodies; CCPC.	None
COMMUNITY DEVELOPMENT			
Housing			
13. Coordinate services with growth rate projection of Countywide Plan.	Establish Countywide Review Agency (adjunct of CCPC), with advisory power to review and comment on development proposals in accord with Countywide Plan policies. Establish specific annual targets.	Countywide Review Agency; city and county planning commissions and legislative bodies; CCPC.	Normal administrative costs.***
14. Prevent increases in rents and prices of existing housing units to meet the housing goals of the plan.	Establish standards and guidelines (CCPC); lower taxes for owners agreeing to keep rents and prices down.	City and county legislative bodies; CCPC.	Normal administrative costs.***
15. Provide the amount of low to middle income housing called for in the plan.	Establish standards and guidelines (CCPC); adopt ordinances requiring minimum percentage of low and moderate income housing; review of developments by Countywide Review Agency; assistance to existing housing agencies; establish land bank.	City and county planning agencies and legislative bodies; Countywide Review Agency; CCPC; Marin County Housing Authority; U.S. Dept. of Housing and Urban Development; non-profit groups.	$505 million
16. Encourage higher densities in specified housing opportunity areas contingent upon development rights transfer in open space, and upon provision of low and moderate income units.	Establish standards and guidelines (CCPC); adopt specific standards and related ordinances (cities and county).	City and county planning agencies and legislative bodies; Countywide Review Agency; CCPC.	Normal administrative costs.***

Table 5.1 (Continued)

Element/Subject Policy	Actions Required	Agencies Involved	Total Estimated Direct Public Costs 1972 to 1990 in 1990 Dollars
Economic Development			
17. Attract businesses that will produce social, economic, environmental, and revenue benefits.	Expand functions of CCPC Economic Committee, in conjunction with the private sector; establish land bank; establish standards and criteria for use by Countywide Review Agency.	CCPC Economic Committee; city and county planning commissions and legislative bodies; Chamber of Commerce; other private groups; Countywide Review Agency.	Normal administrative costs. ***
18. Concentrate businesses in business development areas and activity centers.	Establish standards and criteria for use by Countywide Review Agency; establish revenue sharing by cities and the county; use land bank.	Countywide Review Agency; CCPC Economic Development Committee; city and county planning commissions and legislative bodies; Chamber of Commerce; other private groups.	None
19. Encourage tourism at appropriate locations.	Same as 17.	Same as 17.	Normal administrative costs. ***
20. Support agriculture, commercial fishing, and other rural economic activities. Conduct ongoing studies of the economic validity of agriculture in Marin County, the merits of density transfer, compensable zoning, land banking, and inclusion of Marin in a nine-county open space agency.	Adopt agricultural zoning; adjust tax assessments; explore other means of stabilizing agriculture.	County Planning Commissions and Board of Supervisors, County Assessor; Environmental Protection Committee; CCPC; Agricultural Advisory Board.	Normal administrative costs; transfer of tax burden. ***
Community Facilities			
21. Provide an urban level of services in developed and developable sections of the City-Centered Corridor; provide rural services elsewhere in the county. *and the appropriate level of services in village areas;*	Include school, water and sanitation districts on CCPC; relate activities of all districts to Countywide Plan policies.	School, water, sanitation districts; CCPC; Countywide Review Agency.	None

Table 5.1 (Concluded)

Element/Subject Policy	Actions Required	Agencies Involved	Total Estimated Direct Public Costs 1972 to 1990 in 1990 Dollars
TRANSPORTATION			
22. Develop the transbay bus and ferry system.	Obtain federal and state funds for right-of-way and terminal improvements, vehicles, operating costs; expand county revenue sources.	Golden Gate Bridge District, Marin Transit District, Metropolitan Transit Commission, U.S. Dept. of Transportation; city and county planning commissions and legislative bodies; CCPC	$297 million (capital) * $537 million (operating)*
23. Develop Intra-Marin Bus Service.	Same as 22.	Same as 22.	
24. Build no new freeways; improve and widen 101, with preference for transit; build needed new arterial highways, contingent upon permanently securing open space.	Obtain federal and state funds for right-of-way and interchange improvements.	State Division of Highways, County Dept. of Public Works, U.S. Dept. of Transportation, city and county planning commissions and legislative bodies; CCPC.	$228 million (Capital); $107 million (Operating) plus $5 billion necessary private automobile operating costs 1972-1990.
25. Defer decision on transit deck on Golden Gate Bridge until other improvements have been completed and evaluated.	Obtain firm commitments from federal and state agencies.	Same as 24.	None
26. Build no major new airports in Marin; allow no commercial aviation use of Hamilton Air Force Base.	Obtain firm commitments from government agencies.	U.S. Dept. of Defense, Federal Aviation Commission, County Airport Land Use Commission, highway agencies, county and Novato Planning Commissions and legislative bodies; CCPC.	None
27. Study recreational travel needs and possibilities.	Conduct Phase III of Balanced Transportation Program.	CCPC; U.S. Dept. of Interior; state, county and city parks and recreation depts.; local citizens' groups; transit and highway agencies.	Depends on action taken.
28. Develop countywide bicycle path system.	Obtain and improve additional needed rights-of-way.	County Public Works and Parks and Recreation Depts.; cities; CCPC.	$10.1 million

*Assumes approximately 350 intra-county buses by 1990. This total is probably significantly higher than the number that would result from plan policies as adopted by the Board of Supervisors.

The functions of the City-County Planning Council should be expanded so that it can take on responsibility for Countywide Plan implementation. It is clear that new organizational methods of coordination and review are essential if the goals of the Countywide Plan are to be achieved. Relying upon the twelve jurisdictions acting independently will not do the job.

The City-County Planning Council already exists as an area planning body, by joint agreement of the eleven cities and the county. Expanding this existing body would be preferable to instituting a new layer of government. CCPC now has the following powers:

1. To prepare a countywide general plan.

2. To study regional or state agency plans.

3. To study at its own discretion matters referred to it by any responsible governmental agency.

In order for CCPC to become responsible for plan implementation, its member jurisdictions should empower it to conduct the following additional functions:

4. To set specific standards and criteria for applying the Countywide Plan's principles to development reviews and public programs.

5. To review and act on public and private proposals of countywide or area-wide importance, through a Countywide Review Agency.

6. To monitor conditions and trends periodically, and to set planning targets for the whole county and for subareas accordingly. These targets should include housing units (by type and income level), employment growth, and open space acquisition for a five-year period.

7. To prepare short-range Action Plans at regular intervals recommending ways in which these targets can be achieved, through public programs and development reviews.

8. To expand activities of CCPC citizens' committees on Environmental Quality, Housing, Economic Development, and Transportation.

Expansion of the functions of CCPC would be possible under provisions of the State Area Planning Law, under which CCPC was organized, according to the opinion of County Counsel. The twelve member jurisdictions would retain local autonomy, but subject to the review and recommendations of CCPC, and would continue to act as permit-issuing authorities. They would delegate some of their policy-making to CCPC as well as some of the responsibility for carrying out this policy.

To implement the plan, CCPC must be able to act as well as react. Its positive functions, of monitoring growth trends, setting targets, and preparing Action Plans, are equal in importance to the function of reviewing development applications. It will be necessary for CCPC to have its own independent staff in order to take on these additional functions, rather than continuing to use only the County Planning Department staff.

II. Development Controls

CCPC should delegate the responsibility of reviewing and *commenting* on public and private proposals of countywide or areawide importance to a Countywide Review Agency. The agency's membership should consist of one elected CCPC voting member of each city and the county. In order to recognize the vast differences in population among the member jurisdictions, a weighted vote should be considered for the Review Agency.

The purpose of the Review Agency shall be to prevent the destruction or serious impairment of the goals and objectives of the Countywide Plan by actions of the county or any of the cities within the county.

The authority of the Review Agency shall be limited to the minimum necessary to accomplish the purpose of the agency. Specifically the authority shall be limited to:

1. Determine if public and private proposals of countywide or areawide importance, as defined below, are in substantial conformance with the goals and objectives of the Countywide Plan.

2. Recommend for denial or approval with conditions any such proposals if substantial conformance with the goals and objectives of the Countywide Plan is not found.

The following public or private proposals shall be declared to be of county-wide or areawide importance and shall come under the purview of the Review Agency:

1. All residential developments of over 100 dwelling units or zoning map changes leading to such developments in the City-Centered Corridor.

2. Residential developments of over 50 dwelling units in the Inland Rural and Coastal Recreation Corridors or if located within 500 feet of a city line or if access to the development is primarily over streets in an adjoining jurisdiction, or zoning map changes leading to such developments.

3. All non-residential developments or zoning map changes of over 15 acres.

4. Non-residential developments or zoning map changes of over 5 acres if located within 500 feet of a city line or if access to the development is primarily over streets in an adjoining jurisdiction.

5. Non-residential developments or zoning map changes of over 2 acres, if located within 500 feet of any interchange of Highway 101, Highway 37, or Highway 17.

6. All open space acquisitions by the countywide open space agency.

7. All public transit, ferry, highway, airport, recreational travel, and other major transportation proposals.

The following list describes proposals which shall not come under the jurisdiction of the Review Agency. This list is intended to further clarify the Review Agency's jurisdiction by giving typical examples.

1. All residential and non-residential development proposals and zoning changes which are not specifically listed as coming under the purview of the Review Agency.

2. Variances and adjustments.

3. Land divisions.

4. Building permits and sign permits.

5. Design review permits.

Review Agency procedures should be designed to require the least delay for applications and to avoid complicated and confusing referrals and schedules.

1. The individual jurisdiction shall refer any subject proposal to the Review Agency within three working days of the application, including complete plans and written material.

2. The Review Agency shall make its recommendation, after holding at least one public hearing, within 20 working days after receipt of the referral.

3. Staff reports may be submitted to the Review Agency by city staffs, but reports must be submitted by the County Planning Department. These reports shall be limited to countywide or areawide issues concerning the application.

4. The individual jurisdiction may process the application during the review period of the agency, but final action shall be delayed until after final action of the Review Agency.

Plan implementation through development regulations is now mandatory, not optional, under state law. All cities and counties in California must adopt general plans and they must contain the nine mandatory elements. (See Summary for location of each element in the Countywide Plan.) All zoning ordinances must be consistent with the land use designations shown on the adopted general plan map. The law provides that any resident or property owner within the city or county may bring an action in Superior Court to force compliance with these requirements.

Cities and counties now must have an open space element of their general plans. Both the Marin County Board of Supervisors and the City of San Rafael have adopted the preliminary open space plan in the environmental quality report, "Can the Last Place Last?", as an interim measure. The law specifies that "no building permit may be issued, no subdivision map approved...unless the proposed construction, subdivision or (zoning) ordinance is consistent with the local open space plan". All jurisdictions must also "make a finding that any project they intend to carry out, which may have a significant effect on the environment, is in accord with the conservation element of the general plan". (Sec. 21151, Public Resources Code, amended by Chap. 1433, Stats. 1970)

Subdivisions must be consistent with applicable general and specific plans, and they must not be likely to cause substantial environmental damage or serious public health problems, in order to be approved by a local jurisdiction.

The county should zone areas adjacent to cities in accordance with each city's policies for the types and densities of development over the next five years, based on the city's capacity to provide urban services.

III. Direct Public Action

It is essential to take direct public actions that will further the goals of the Countywide Plan, in addition to responding to development proposals. It is recommended that Marin County initiate a process of preparing short-range Action Plans, a major means of plan implementation. Prepared at regular intervals, the Action Plan would serve several functions:

1. Assessing current conditions and trends, and analyzing their impacts upon the attainment of plan goals.

2. Presenting findings from recent studies, and evaluating their significance.

3. Tying in recommendations of local area plans, prepared in relation to the Countywide Plan, to action programs.

4. Analyzing the effectiveness of current programs in attaining the goals of the Countywide Plan and local area plans.

5. Presenting and evaluating alternative program approaches for meeting unmet needs.

6. Recommending targets for attainment over the subsequent five-year period, for all relevant government bodies.

7. Analyzing costs and benefits of recommendations.

The suggested contents of the Action Plan are presented on the accompanying chart. It would provide an implementing link between the Countywide Plan and the budgets, capital improvement programs, and review activities of the various county, local, district, and other public agencies affecting Marin.

The Action Plan would make it possible to adjust specific targets, for example, for the annual growth rate of housing units and employees in each planning area, in accordance with changing conditions, while still moving toward the basic goals of the Countywide Plan.

Public action programs will be aided and expanded by anticipated changes in the revenue structure for local governments. Current federal proposals for revenue sharing would increase financial aid to cities, and allow much more discretion by the local government on how this money will be spent. However, current revenue sharing proposals would provide relatively limited assistance to counties.

Establishing a revenue-sharing program within the county, similar to that adopted by governments in the Minneapolis-St. Paul metropolitan area*, would also produce benefits. Under this system, a portion of the property taxes collected by each jurisdiction would be pooled and redistributed on a per capita basis. Thus, all areas of the county would benefit by increased tax revenues in any one area. This should aid in making rational countywide land use decisions, since cities would no longer find it as necessary to compete with each other for lucrative developments such as shopping centers.

Further studies to be directed by the Economic Development Committee of the City-County Planning Council will analyze possible future tax revenue changes and their potential impact on Marin.

IV. Citizen Participation

Public hearings on the Countywide Plan have been held by the City-County Planning Council, the planning commissions and councils of the cities, and the county Planning Commission and Board of Supervisors. Expressions of public support, criticism, and recommendations for changes in the plan have been presented at these hearings, and some revisions in the plan have been made accordingly.

Broadly based citizen groups shall be encouraged and assisted in the formulation of specific plans and the review of developments relating to these plans. Such plans should be consistent with the Countywide Plan, but provide more detail on local goals, policies and land use. Appropriate jurisdictions should consider these specific plans for adoption and inclusion in their general plans.

Citizen participation must continue in order to support implementation. The presence of citizens and the expression of their views is essential at every meeting of a city or county planning commission or legislative body where a proposal affecting the Countywide Plan is being considered. Citizen involvement in the activities of the proposed countywide review agency of CCPC will also be required.

Local plans for cities and unincorporated communities must also be revised in accordance with the adopted Countywide Plan. Citizen guidance and review of these plans, and review of subsequent implementing actions, will be needed. The recommended Action Plan, detailing steps to be taken to implement the Countywide Plan and local plans, will be presented for citizen review.

The four existing committees of the City-County Planning Council should be reconstituted as citizen action groups. The CCPC, in its interim approval of the Preliminary Countywide Plan, adopted the statement that "The CCPC committees on Housing, Transportation, Environmental Quality, and Economic Development should expand their membership to become citizen task forces with representation from throughout the county. These committees could represent the countywide interest at public meetings in the cities and the county, thus helping to assure implementation of the plan".

The Countywide Plan is a political instrument more than it is a presentation of aesthetic goals and technical information. As such, it offers a means by which the people of Marin can express their wishes and work with government bodies to assure that they are carried out. The plan assumes that the people of Marin can shape their destiny, but it will require perseverance and constant viligance to do so.

*See Minnesota's Fiscal Disparities Bill, American Society of Planning Officials, February 1972.

Table 5.2 MARIN COUNTY ACTION PLAN: SUGGESTED CONTENTS

1. Environmental Quality

For each environmental corridor (City-Centered, Inland Rural, Coastal, Recreation):

A. Open Space

1. Analysis of present programs' effectiveness in attaining Countywide Plan recommendations.
2. Alternative programs.
3. Recommended targets for next five years: city and county budgets, capital improvement programs, review agencies; private activities.
4. Costs and benefits of these recommendations.

B. Conservation

1. Analysis of present programs' effectiveness in attaining Countywide Plan recommendations.
2. Alternative programs.
3. Recommended targets for next five years: city and county budgets, capital improvement programs, review agencies; private activities.
4. Costs and benefits of these recommendations.

C. The Built Environment

1. Analysis of present conditions and trends' effectiveness in attaining Countywide Plan recommendations.
2. Alternative programs.
3. Recommended approaches and directions for next five years: city and county review agencies, private developers.
4. Costs and benefits of these recommendations.

D. Safety

1. Findings from seismic safety, noise, safety element studies.
2. Analysis of present conditions and trends' effectiveness in attaining recommendations from Countywide Plan and subsequent studies.
3. Alternative programs.
4. Recommended targets for next five years: federal, state, county, local budgets, capital improvement programs, review agencies.
5. Costs and benefits of these recommendations.

E. Recreation

1. Analysis of present programs' effectiveness in attaining Countywide Plan recommendations.

2. Alternative programs.

3. Recommended targets for next five years: federal, state, county, local budgets, capital improvement programs, review agencies; private activities.

4. Costs and benefits of these recommendations.

2. Community Development

For each planning area (Novato Area, Las Gallinas Valley, San Rafael Basin, Upper Ross Valley, Lower Ross Valley, Richardson Bay Communities, Inland Rural Corridor, Coastal Recreation Corridor):

A. Housing

1. Analysis of present programs' effectiveness in attaining Countywide Plan recommendations.

2. Alternative programs.

3. Recommend targets for next five years: federal, state, county, local budgets, capital improvement programs, review agencies; private activities.

4. Costs and benefits of these recommendations.

B. Economic Development

1. Findings from further economic studies.

2. Analysis of present programs' effectiveness in attaining recommendations from Countywide Plan and subsequent studies.

3. Alternative programs.

4. Recommended targets for next five years: federal, state, county, local budgets, capital improvement programs, review agencies; private activities.

5. Costs and benefits of these recommendations.

C. Community Facilities

1. Findings from further studies of utilities, schools, health facilities, social services.

2. Analysis of present programs' effectiveness in attaining recommendations of Countywide Plan and from subsequent studies.

3. Alternative programs.

4. Recommended targets for next five years: district, county, local budgets, capital improvement programs, review agencies; private activities.

5. Costs and benefits of these recommendations.

3. Transportation

For each transportation system (Transit, Highways, Airports, Recreational Transportation, Paths and Trails):

A. Summary of Countywide Plan recommendations.

B. Findings from additional studies (e.g. Recreational Transportation).

C. Analysis of present programs' effectiveness in attaining recommendations from Countywide Plan and subsequent studies.

D. Alternative programs.

E. Recommended targets for next five years: federal, state, regional, county, local budgets, capital improvement programs, review agencies; private activities.

F. Costs and benefits of these recommendations.

ESTIMATED PUBLIC COSTS TO ACCOMPLISH THE COUNTYWIDE PLAN*

	Units	1972 Public Subsidy Per Year Per Unit	Total Costs 1972 to 1990 and Source of Funds in 1990 Dollars[a] Federal	State	County	New Sources Required
Retain 28% of present low to moderate housing supply						
Leased housing	800	$156	$ 2.0 mil.			
Tax relief for elderly	1,600	208		$ 8.9 mil.		
Tax relief for voluntary price limit	2,000	100			$3.1 mil.	
No tax increase for rehabilitation programs without public cost	1,450	300			6.8 mil.	
Deficit of medium income housing units not fundable with current programs	870	240				$ 3.3 mil.
Allow second units in existing areas; neighborhood preservation; sales tax on value increment at a time of sale	1,540	0	(no public subsidy)			
	8,260					
Provide new low and medium priced housing						
Public housing for families & elderly	3,000	213	111.4 mil[c]			10 mil.[c]
Subsidized rental units (HUD 236)	3,000	950	141.8 mil[d]			
Group housing (elderly, college)	1,700	0	24.8 mil[e]			
Mobile homes and increase density bonus through private market supply	5,200	0	(no public subsidy)			
Deficit of low income housing units not fundable with current programs	4,777	213				$193.3 mil.[c]
Medium priced housing assumed to be built without government assistance	4,335	0	(no public subsidy)			
	22,012		$280 mil.	$8.9 mil.	$9.9 mil.	$206.6 mil.
Total	30,272		$505.4 million			

a) Assumes 4% annual inflation, except 7% for land and construction. Costs are spread uniformly over 18 years, except tax relief for elderly, an on-going program.
b) The amount of taxes not collected under this program.
c) Includes construction cost of $23,250 per unit. Since only $3,500 per unit is allowed for land under current federal programs, an extra $1,500 per unit for land is included under "new sources required" to meet Marin's high land cost.
d) Includes construction cost of $20,420 per unit.
e) Includes $9,500 per unit construction cost.
f) Covers operating cost not met by the occupants.

	1972-1990[b] Average Annual Per Capita Costs in 1990 Dollars	Total[a] 1972-1990 Costs	FUNDING SOURCES: Federal - State Grants & Subsidies	Federal - State Sales & Gas Taxes	Marin County Property Taxes	Other	New Sources Required
Transportation							
Transit							
capital	$ 64	$297 mil.	$198 mil.	$ 39 mil.		$ 60 mil.[c]	-
operating	115	537 mil.	-	13 mil.	$ 9 mil.[e]	340 mil.[d]	$175 mil.
Highway							
capital	49	228 mil.	-	131 mil.	-	-	97 mil.
operating	23	107 mil.	-	87 mil.	-	-	20 mil.
Countywide bicycle path system	2	10 mil.[i]	4 mil.	3 mil.	-	1 mil.	2 mil.
Open Space							
Acquisition	$16-27	73-125 mil.	37-83 mil	-	20 mil.[f]	-	1-53 mil.[h]
Administration	0.21	1 mil.	-	-	1 mil.	-	-
Housing							
Construction	89	414 mil.	224 mil.	-	-	-	190 mil.
Operating	19	91 mil.	66 mil.	-	9 mil.	-	16 mil.
County Review Agency							
Operating	0.86	4 mil.	-	-	4 mil.	-	-
Total	$378-389	$1.76-1.81 billion	$529-575 million	$273 mil.	$43 mil.[g]	$401 mil.	$501-553 million

a) Assumes 4% annual inflation except 7% for land and construction. Costs are spread uniformly over 18 years. Costs are in 1990 dollars.
b) Total costs divided by 18 years and again divided by 259,500 population (the average between 219,000 in 1972 and 300,000).
c) Golden Gate Bridge revenue bonds to build Marin's section of Trans-Bay System.
d) Transit system operating revenue.
e) Based on a present annual county tax rate of 5¢ per $100 of assessed value and assumes 350 intra-county buses by 1990, actual number will probably be less.
f) Based on new county regional open space district tax rate of 10¢ per $100 of assessed value.
g) Equivalent to a present annual county tax of 21¢ per $100 of assessed value. This includes the 10¢ rate from the open space district.
h) Depending on whether federal/state contributions equal 30% or 60% of the minimum $73-million program or maximum $125 million. Difference between minimum and maximum depends on how much land can be secured by regulation instead of acquisition. Same amount of land in both cases. See Appendix P for details.
i) This estimate is only approximate since a detailed bicycle path plan is not yet completed. Estimate based on an arbitrary 2% of transit and highway capital costs.

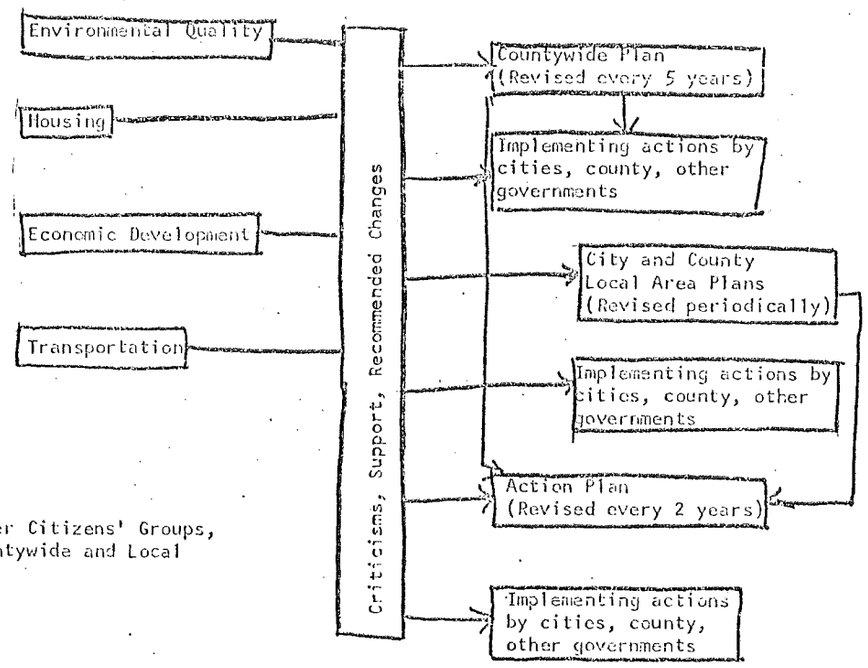
The average annual per capita costs of $378-389 shown above include all funding sources. The Marin County property tax represents $9.46 of this total, while "new sources required" represents $107-118.

* Figures originally published in 12 page newspaper tabloid "A User's Guide to the Marin Countywide Plan", September 1972. These tables based on the December 1972 and January 1974 revisions.

Fig. 5.2

CITIZEN PARTICIPATION

CCPC Citizens' Committees:



FINAL

Environmental Impact Report on the Marin Countywide Plan

April 1973

Introduction

The Guidelines for Implementation of the California Environmental Quality Act of 1970 (Office of the Secretary of Resources, February 1973) defines "the adoption of local general plans or elements thereof" as a project for which an Environmental Impact Report must be prepared if it is found to have a significant effect on the environment.

This report, in addition to meeting state requirements, is intended to establish principles for subsequent EIR's: Brevity, incorporation of information by reference whenever possible, and inclusion of information on social and economic impacts.

It is also anticipated that local plans conforming to the Countywide Plan may be exempted from the requirement to prepare an EIR. The Guidelines state "A responsible agency may employ a single EIR to describe more than one project, if such projects are essentially the same in terms of environmental impact". Thus it would be necessary for a jurisdiction to find conformity with the Countywide Plan when reviewing local plans, rather than to prepare another complete EIR. However, EIR's should be prepared for specific projects based on the Countywide Plan as they are undertaken. These reports should be much more specific than this statement, since the Countywide Plan itself is a general guide.

Summary of Major Environmental Issues

Development of Marin County to the year 1990 according to the policies of the Countywide Plan would produce fewer adverse environmental impacts than development under the two most likely alternatives tested which are: (1) Current trends, a continuation of present market conditions without the additional constraints imposed by the Countywide Plan, and (2) the composite of existing adopted local plans. Nevertheless, the plan contains unavoidable policy conflicts which it seeks to mitigate. Limiting growth and limiting land available for development by substantial open space areas could tend to press housing prices upward, making the social goals of the plan more difficult to attain. Limiting growth also tends to lessen prospects for some jobs and economic development. Conversely, any amount of growth, even when limited as called for in the plan, has cumulative adverse environmental impacts. The plan recommends policies and programs including mitigating measures designed to attain a balance among desirable but partially conflicting goals.

I. DESCRIPTION OF PROJECT

A. Location and Boundaries

(See map of ABAG plan, Summary map of Countywide Plan.) The Countywide Plan is intended to detail the broad policies of the Association of Bay Area Governments' 1990 Regional Plan and to deal comprehensively with incorporated as well as unincorporated Marin County.

B. Statement of Objectives

The Countywide Plan as approved by the Marin County Planning Commission has three interrelated goals:

1. Discourage rapid or disruptive population growth but encourage social and economic diversity within communities and in the county as a whole.

2. Achieve greater economic balance for Marin, by increasing the number of jobs and the supply of housing for people who will hold them.

3. Achieve high quality in the natural and built environments, through a balanced system of transportation, land use, and open space.

C. Background

The Marin Countywide Plan is being considered by the Board of Supervisors, under provisions of state law which require each county to prepare and adopt a comprehensive, long-term general plan for its physical development. Background studies for the plan began in 1968, when an analysis of local adopted plans clearly showed the need for a countywide approach to planning.

The cities and the county then established, through joint powers agreements, the City-County Planning Council of Marin, for the primary purpose of preparing a Countywide Plan. The 1970 ABAG Regional Plan was used as a framework for the plan. A preliminary version of the plan was released in 1971 for review and was approved with revisions in February 1972 by CCPC as the working interim guide for the staff to prepare the final plan.[2] The Board of Supervisors adopted the open space element of the plan in 1972 as an interim measure pending final adoption of the Countywide Plan. The Marin County Planning Commission has approved and recommended to the Board for adoption the goals, countywide policies, and implementation recommendations of the Countywide Plan.

The Countywide Plan presents guidelines for the preparation of more detailed plans and programs by all jurisdictions, the cities as well as the county. Adoption of the Countywide Plan by the Board of Supervisors will have legally binding effects on the development of all unincorporated areas of the county. More specific local community plans conforming to the Countywide Plan will be prepared for adoption, and state law requires that zoning be consistent with adopted plans by July 1, 1973. Specific program-related action plans will also be developed.

II. DESCRIPTION OF ENVIRONMENTAL SETTING

Social: Marin's 1970 population was 209,574. Median family income was $13,935; 20 percent of Marin's families had low incomes (less than $8,000), 20 percent moderate-income ($8,000-$11,500), 17 percent middle-income ($11,500-$15,000), and 44 percent high-income (over $15,000). About 96 percent of the 1970 population was white. Rising housing costs are leading to an accelerated exclusion of low and moderate-income families from the community.[3]

Economic: The number of jobs in Marin is increasing at a faster rate than the population. Still, about half of the county's employed residents commute out. About one-fourth of Marin's jobs are held by people who live outside the county, many of whom cannot afford housing here.[4]

Environmental: Marin County, covering 333,350 acres, can generally be divided into three zones, based on major natural features: The western zone along the coast, characterized by large public land holdings, the central zone where agriculture predominates, and the eastern zone where all 11 cities exist and where urbanization has occurred. The Countywide Plan recognizes these zones in the designation of three environmental corridors, Coastal Recreation, Inland Rural, and City-Centered.

A-1

A-2

Development in eastern Marin continues to threaten the ridges and hillsides that give form and beauty to communities. Air and water pollution are increasing, and air pollution may exceed tolerable limits by 1990 unless Marin controls its rate of growth and switches from auto to transit emphasis in its transportation system, according to a study by the Bay Area Air Pollution Control District.[5]

III. ENVIRONMENTAL IMPACT

A. The Environmental Impact of the Proposed Action

Social: The plan recommends controlling the rate of growth so that the county's total population reaches no more than about 300,000 by 1990, plus or minus five percent. The Balanced Transportation Study indicates that the population would reach about 364,000 by that year if the current market operated without the plan's constraints. The plan also seeks to insure an adequate supply of low and moderate-income housing so that the county's income and housing cost distribution in 1990 is about the same as in 1970. If current trends continue, more than half the county's housing units would be in the high-price category by 1990. Densities under the plan would be increased at certain accessible locations in the City-Centered Corridor and decreased in other locations.[6]

The chief social impact of the plan would be to retain the county's present income diversity in 1990.

Economic: The plan recommends measures to increase the number of jobs in Marin from 57,700 in 1970 to 93,000 in 1990, so that the county becomes more economically balanced, less reliant on the commute to San Francisco, and less reliant on the residential property tax. Emphasis will be on attracting businesses that provide jobs for people now commuting out and for groups of Marin residents now underemployed, such as women and youth. Businesses would be concentrated in designated countywide and community activity centers and in business development areas, accessible to transit.[7]

The plan's economic impact would be to increase the proportion of Marin resident workers who are employed in the county.

Environmental: The plan seeks a compact form of development, centering on existing communities and developing outward in an orderly way, rather than a sprawling, leapfrogging development pattern. Urbanization would be confined to the eastern corridor, and the inland and coastal corridors would remain mostly rural and open. Permanently secured public open space would increase from 87,500 acres in 1970 to about 136,230 in 1990. All developments would be reviewed for their environmental impacts and design standards. The transportation system would shift to a much heavier emphasis on transit, rather than autos. The development of water and sewer facilities would be based on the plan's growth rate.

The plan's impacts on air quality, vegetation, geology, and visual conditions have been generally assessed and found to be significantly less adverse than impacts from current trends. Further studies on the conservation, noise, safety, and seismic general plan elements will include impact analysis.[8]

Timing: Development under the plan would be staged, so that the rate of change in community character would be gradual and the capacity of land and facilities to accept growth would not be exceeded. This will be very difficult to accomplish, since it will require that all jurisdictions adopt a cooperative, countywide approach to planning and development review, rather than continue the present competitive approach. The plan covers the 20-year period 1970 to 1990. Action plans will cover shorter range periods, and a monitoring and review process would continually update the plan.[9]

B. Any Adverse Environmental Effects Which Cannot be Avoided if the Proposal is Implemented

Social: The plan's proposals to limit growth and restrict the land available for development would accelerate rising housing prices. The plan's housing policies, for higher densities at selected locations and for a price mix, can be expected to generate neighborhood opposition.

Economic: Population growth limitations would tend to lessen prospects for population-serving jobs, though not for basic employment. The plan's transportation policies, such as the policy against commercial use of Hamilton Field, and its high environmental standards could discourage certain types of economic development. Public costs and benefits of the plan, discussed generally in the plan text, will be the subject of an additional consultant study.

Environmental: Any amount of development has a certain detrimental effect on water and air quality and on plant and animal life. A limited growth policy as proposed in the plan would significantly reduce adverse impacts compared to current trends, but would not be without impacts as would a "no growth" policy. The city-centered form of development would increase densities at specified locations, and this could result in increased congestion and pollution in some areas of western Marin, and could result in construction on sites which contain environmental problems.

C. Mitigation Measures Proposed to Minimize the Impact

The plan presents a balanced set of policies which seek to attain a measure of all three partially conflicting goals. Deliberate efforts to achieve the goals, rather than reliance on current trends will be required to achieve all three types of policies, social, economic, and environmental.

The plan's housing policies seek to redress the trend toward rising prices; under an effective growth control system proponents of development would be induced to compete for approvals by including public benefits such as socially needed housing. The plan calls for aggressive economic action to attract those businesses that can operate best in Marin's social and environmental setting. Strict environmental impact and design standards will be used in reviewing all development proposals.

The chief problem in mitigating the adverse impacts of the plan's policies will be to devise effective means of implementing the plan iteself. If the plan is not carried out, the continuation of existing trends would produce significantly more undesirable results in high housing prices, greater reliance on auto-only movements, economic imbalance, and impairment of environmental quality.

D. Alternatives to the Proposed Action

Table 1, under Summary of Major Environmental Issues, describes impacts between the Countywide Plan and the two most likely alternative forms of development, the composite of local plans that were adopted in 1970 and the operation of current trends.

A one-to-one comparison of the composite numbers is not valid, since these figures are for the ultimate holding capacity of the county rather than to 1990 only. Moreover, many of the plans that were current in 1970 are now being revised by the cities and the county. Nevertheless, the gross differences between the Countywide Plan and the composite are significant for general comparative purposes. The adopted plans provide for land in public ownership, compared with the Countywide Plan. They provide for no system of staging development, for no public transportation, and for no solution to housing problems.

By 1990 the current trends, compared with the Countywide Plan, would result in a significantly higher population, larger proportion of high-income families, and lower share of Marin residents employed in the county. More land would be developed at locations that would require costly urban service extensions, and less land would be secured for public benefit. Private auto usage would be much more extensive.

The Balanced Transportation Study showed that under the composite of 1970 plans there would be a need for 12 to 18 lanes on Route 101 and a second Golden Gate crossing. Under current trends, the southern end of Route 101 would have to be a 10 to 12-lane freeway by 1990, and main arterials in the Ross Valley would have to become eight-lane roadways.

The Countywide Plan alternative is the most effective of the three considered in attaining the goals of controlled and diversified population, a balanced economy, and environmental quality.

Obviously there are an infinite number of other alternatives that could also have been analyzed. However, by accepting the ABAG-recommended city-centered growth pattern as a foundation for the Countywide Plan, all of the alternatives studied by ABAG and rejected were not considered as possible alternatives.

E. The Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

and

F. Any Irreversible Environmental Changes Which Would be Involved in the Proposed Action Should it be Implemented

A cardinal principle of the plan is to keep options open by controlling the growth rate so that irretrievable damage is not done in the interests of short-term gain. If all demands for development are allowed to proceed now, options for the future would be closed. The plan calls for periodic review so that alternatives can be re-examined and policies changed. If necessary or deemed appropriate, the growth rate can be increased in the future.

Growth rates would be based on the capacities of public facilities, land capability, and resource conservation. Future service demands could be rationally programmed without oberburdening fiscal and technical resources. Techniques for measuring the impact of development on environmental resources are now being perfected. By controlling the growth rate instead of allowing rapid development now, it will be possible to apply these techniques as knowledge becomes available.

G. The Growth-Inducing Impact of the Proposed Action

A goal of the plan is to control growth. However, several key policies would stimulate growth by making it more possible and desirable to live here. Examples are the provision of low and moderate-income housing, the increase in the number of jobs, and the maintenance of high environmental quality.

The plan, as discussed previously, contains numerous policies that are partially in conflict, even though they are generally regarded as desirable.

The balanced approach recommended by the plan will require new, effective implementation methods, in particular the proposed countywide review agency and growth control mechanisms. Current trends are leading in the opposite direction from the goals of the plan, toward uncontrolled growth, exclusion of lower-income families from Marin, an unbalanced economy, and environmental deterioration. Establishment of the controls recommended by the plan could make it possible to change these trends by requiring that developments contribute to the complete range of social, economic, and environmental policies.[10]

IV. ORGANIZATIONS AND PERSONS CONSULTED

The outline for this report was reviewed by the Executive Committee and the Environmental Quality Committee of the City-County Planning Council. The complete draft should be reviewed by CCPC, the cities, and County Planning Commission, and all interested citizen groups as well as by the Board of Supervisors.

After hearings by the Board on this draft, a final draft will be prepared which will incorporate a summary of testimony at the hearings and a response to comments.

A list of background reports and technical studies conducted for preparation of the Countywide Plan and incorporated in the plan, a log of public presentations and hearings on the plan, and an estimate of projected public costs with and without the plan will be available by the time of the first public hearing to be held by the Board of Supervisors.

TABLE 1

SUMMARY OF COMPARATIVE MAJOR IMPACTS IN MARIN COUNTY: COUNTYWIDE PLAN, CURRENT TRENDS, COMPOSITE OF ADOPTED PLANS[1]

		Countywide Plan	Current Trends	Composite of Adopted Plans (1970)
SOCIAL	1. Growth rate (1970 pop. 209,574)	Controlled rate: 1990 pop. 300,000	No direct control: 1990 pop. 364,000	No control over rate: Ultimate pop. 768,000
	2. Housing for low and moderate-income families. (1970 mix: 36% high, 44% middle, 20% low)	Would retain 1970 mix in 1990	Rising housing prices, 1990 mix: 53% high, 40% middle, 7% low	No information
	3. Residential densities	Increased at selected accessible sites only; open land retained; sprawl reduced	Extensive increases accompanied by low-density sprawl	Controlled increases accompanied by low-density sprawl
ECONOMIC	4. Jobs (54% Marin resident/workers employed here in 1970)	Improved economic balance: 68% Marin resident/workers employed here in 1990	Continued economic imbalance: 52% Marin resident/workers employed here in 1990	No information
	5. Business locations	Concentrate in activity centers, development areas, serving entire county	Development in sprawl and strip patterns, not concentrated	Development in each community, unrelated to countywide needs
	6. Business types	Businesses to employ Marin residents, especially underemployed groups. Encouragement of agriculture, nonpolluting industries.	Heavy reliance on in-commuting; decline of agriculture; limited business growth	Emphasis on nonpolluting businesses; no information on job types, decline of agriculture
ENVIRONMENTAL	7. Water quality	Strict development controls near all waterways, including streams	Controls over ocean and bay shores only	No special standards for development near waterways
	8. Air quality (transportation: 1,005,680 vehicle trips/day in 1969)	Less pollution through more transit, less reliance on cars (1,527,200 vehicle trips/day in 1990)	More pollution because of inadequate public transportation (1,839,490 vehicle trips/day in 1990)	Increasing pollution; inadequate plans for public transportation (4,102,500 vehicle trips/day under ultimate development
	9. Geologic and soil conditions	Stricter development controls to minimize geologic hazards	Some development controls to minimize geologic hazards	Limited development controls (e.g. slope policy) in relation to geology
	10. Plant and animal life	Species preserved through open space program, EIR	No direct means of preservation	Some preservation through limited open space programs
	11. Noise conditions	Noise element to be prepared		
	12. Visual conditions (67,500 acres in publicly secured open space, 1970)	Extensive open space to preserve community appearance provide recreation (136,230 acres in 1990)	Only presently scheduled major public parks would be added to open space (101,410 acres in 1990)	Limited proposals for public open space (99,000 acres under ultimate development)

X X X X X

REFERENCES

1. Part 1, Summary, Marin Countywide Plan, 1973, Figures 1.2, 1.3, 1.4, Table 1.1; An Evaluation of Local Plans, Balanced Transportation Program Phase I, Tables 1 and 2; Technical Data and Procedures, Balanced Transportation Program Phase II Technical Report, 1972, Tables 21 and 70; A Transportation Plan for Marin, Balanced Transportation Program Phase II, 1972; Air Quality and Growth in Marin County, Bay Area Air Pollution Control District, 1972; "Growth Limitations for Marin County", CP 216 winter quarter 1973 project, Department of City and Regional Planning, University of California at Berkeley.

2. "Background of the Plan", in Part 1, Summary, Marin Countywide Plan, 1973.

3. Part 3, Community Development, Marin Countywide Plan, 1973; Don't Leave It to Elsewhere, Marin County Planning Department, 1970.

4. Part 3, Community Development, Marin Countywide Plan, 1973; A Critique of the Economic Goals of the Countywide Plan, Economic Development Committee of the City-County Planning Council, 1972.

5. Part 2, Environmental Quality, and Part 4, Transportation, Marin Countywide Plan, 1973; Can the Last Place Last, Marin County Planning Department, 1971; A Transportation Plan for Marin, Balanced Transportation Program Phase II, 1972; Air Quality and Growth in Marin County, Bay Area Air Pollution Control District, 1972.

6. Part 3, Community Development, Marin Countywide Plan, 1973; Don't Leave It to Elsewhere, Marin County Planning Department, 1970.

7. Part 3, Community Development, Marin Countywide Plan, 1973; A Critique of the Economic Goals of the Countywide Plan, Economic Development Committee of the City-County Planning Council, 1972.

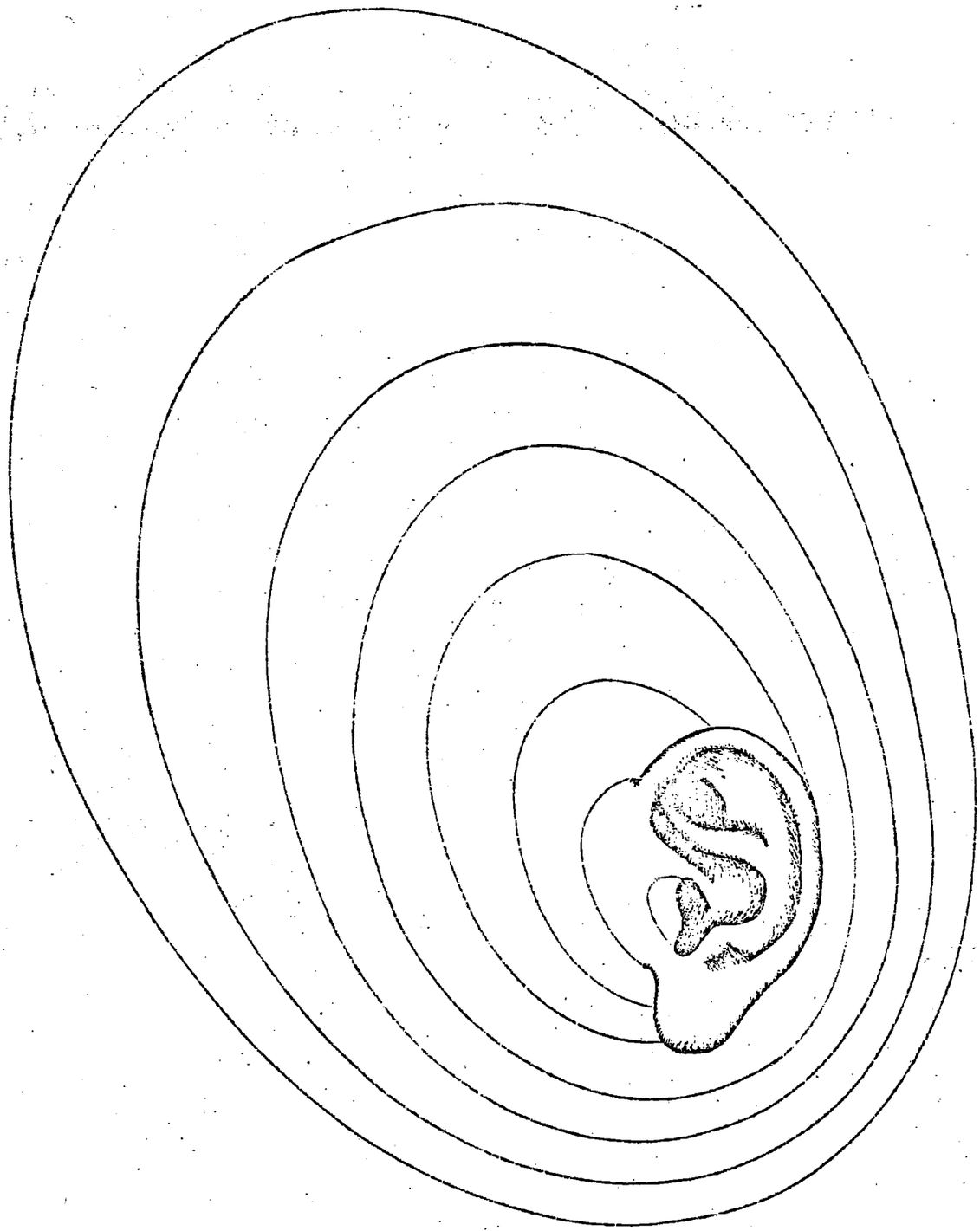
8. Part 1, Summary, Part 2, Environmental Quality, and Part 4, Transportation, Marin Countywide Plan, 1973; Can the Last Place Last, Marin County Planning Department, 1971; A Transportation Plan for Marin, Balanced Transportation Program Phase II, 1972; Air Quality and Growth in Marin County, Bay Area Air Pollution Control District, 1972; Geology and Slope Stability in Marin County, Salem J. Rice and Rudolph G. Strand, California Division of Mines and Geology, 1971.

9. Part 5, Implementation, Marin Countywide Plan, 1973.

10. Part 5, Implementation, Marin Countywide Plan, 1973.

LAST PAGE

NOISE ELEMENT



APPROVED BY THE PLANNING COMMISSION SEPTEMBER 22, 1975

APPROVED BY BOARD OF SUPERVISORS OCTOBER 14, 1975

MARIN COUNTYWIDE PLAN

The Noise Element was jointly prepared by the Marin County Planning Department and Department of Public Works.

While the opinions, findings, and recommendations are those of the authors, the firm of Bolt, Beranek and Newman was engaged as consultants under a joint city/County program; and their technical report and field measurements are the basis for the recommended methodology and proposed standards.

Staff participating in the preparation of this draft and the writing of the environmental impact supplement are:

Bob Armstrong, Transportation Planner, Public Works Department
Chuck Ditlefsen, Transportation Planner, Public Works Department
Bob Harrison, Asst. General Manager, Marin County Transit District
Sol Silver, Chief Advance Planning, Marin County Planning Department
Kathy Sennello, Manuscript and Report Typing
Lillian Cavagnolo, Manuscript and Report Typing
George Johnson and Larry Smith, Report Cover, Graphics, and Preparation of Figures

The Noise Element was approved by the Planning Commission on September 22, 1975 and recommended for adoption by the Board of Supervisors on October 14, 1975.

PREFACE

This element constitutes an amendment to the appropriate sections of the Countywide Plan, particularly the transportation (part 4) and the environmental quality (part 2) sections of the Plan. The land use and noise abatement ordinance recommendations of this element apply only to unincorporated areas; however, they are also recommended to all cities in Marin for consideration as part of each jurisdiction's general plan.

SUMMARY

By most urban standards, Marin County is a haven of quiet. Over 90% of Marin's land is in open space, recreational, agricultural, or vacant status, where noise generated by man's activities is rarely an irritant.

There is little disturbance from industrial, commercial, or other stationary source noises. Even rail, truck, and aircraft noises are minor. With the elimination of active military units at Hamilton Air Force Base, residential areas are now affected, if at all, primarily by highway noise.

Over 90% of Marin's residents are concentrated in a series of connected communities occupying about 7% of the land mass. In this area, our main streets are the 101 freeway and other heavily auto travelled noise corridors.

Recent State and Federal requirements for protecting the public from noise will require very costly noise insulation and other noise abatement strategies if we continue to encourage intensive development in noise corridors. In many cases this may still prove to be the best choice available to us, but the required noise insulation costs will be reflected in higher housing costs. Where we have the opportunity through planning strategies to mitigate excessive noise impacts by avoiding high density traffic flows in neighborhood settings, or by careful review of new noise sensitive developments in areas already severely impacted by noise, it is the recommendation of this element that we do so.

MATRIX OF GOALS, POLICIES, AND IMPLEMENTATION STEPS*

	POLICIES											
GOALS	1	2	3	4	5	6	7	8	9	10	11	12
A. Alert public to noise issues and assign mitigating costs equitably.	a	f	d	e	-	d	f	e	f	-	f	e
B. Protect areas from excessive noise through land use regulation.	b	c	c	b	-	d	f	f	-	d	-	-
C. Minimize excessive transportation noise levels.	f	c	f	e	f	b	a	d	a	f	f	f
IMPLEMENTATION STRATEGIES	Assess noise levels.	Mitigate noise impacts using planning and technology.	Amend & enact ordinances (zoning, abatement, etc.).	Develop technical capabilities.	Consider noise in vehicle purchase.	Coordinate efforts with cities.	Cooperate with State, regional, and Federal agencies.	Recommend legislation.	Monitor other agencies' efforts.	Encourage standardization.	Endorse Federal research.	Educate Public.
a. Cooperate with CALTRANS.												
b. Same effort on local streets.												
c. Review new development for noise impacts.												
d. Consider noise abatement ordinance.												
e. Assist property owners in noise insulation.												
f. Monitor and evaluate program.												

* See Page 6 for goals and policies; Page 11 for implementation.

The resident who is exposed to ever increasing noise should not be required to pay the full costs of recovering a degree of quiet, particularly where increased noise is due to public action. Ideally, the costs for insuring quiet should be borne by those generating the noise.

Where mandated State and Federal noise standards are being adhered to locally, monetary contributions by State and Federal agencies should be requested to meet increased costs, caused by following such standards.

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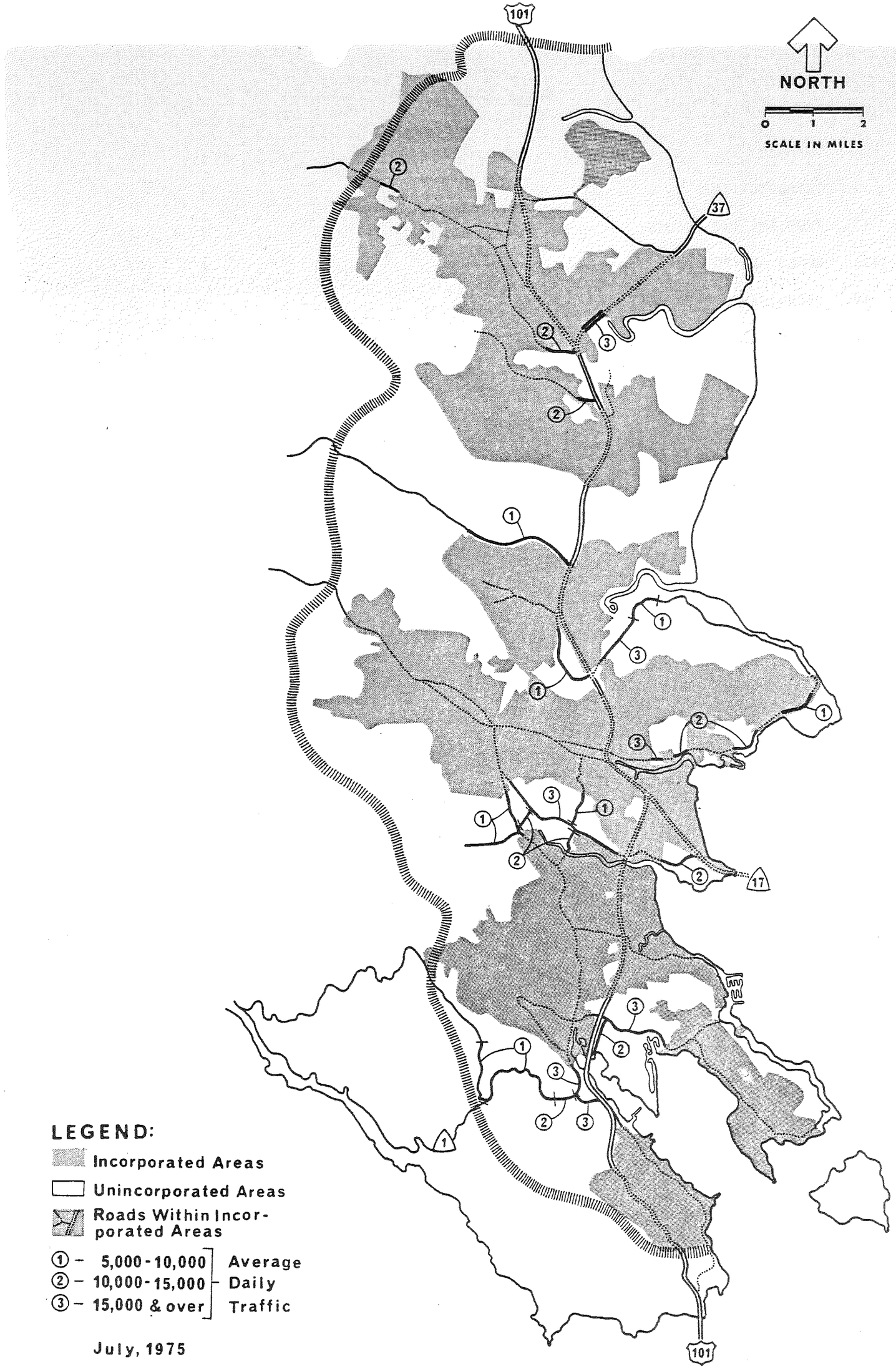
* Copies of Appendix A-2 and Appendix B are on file at the Marin County Planning Department, Civic Center, San Rafael.



N O I S E E L E M E N T

POTENTIAL NOISE CORRIDORS-EASTERN MARIN COUNTY

I. INTRODUCTION

This element of the Marin Countywide Plan deals with the quantification and control of noise generated by transportation facilities in our environment. The California Government Code, Section 65302 (g), requires that the County prepare:

> "A noise element in quantitative, numerical terms, showing contours of present and projected noise levels associated with all existing and proposed major transportation elements. These include, but are not limited to the following:
>
> (1) Highways and freeways.
> (2) Ground rapid transit systems.
> (3) Ground facilities associated with all airports operating under a permit from the State Department of Aeronautics.
>
> These noise contours may be expressed in any standard acoustical scale which includes both the magnitude of noise and frequency of its occurrence. The recommended scale is sound level A,* as measured with a-weighting network of a standard sound level meter, with corrections added for the time duration per event and the total number of events per 24-hour period.
>
> Noise contours shall be shown in minimum increments of five decibels and shall be continued down to 65 dB(A). For regions involving hospitals, rest homes, long-term medical or mental care, or outdoor recreation areas, the contours shall be continued down to 45 dB(A)..."

Instead of a plot of noise contours on a map, a list of local collector, arterial, and highway segments in the Eastern Corridor of the County has been prepared with various levels of noise listed by distances from these streets. This listing procedure is presented in Appendix A and is preferred to a noise contour map because it provides in tabular form a relationship between existing and projected ADT on major roads and the corresponding distances from the center of the roads at varying dbA noise levels. Major advantages of this method include:

1. Ease of plotting precise dbA contours at any scale map without trying to measure distances and convert these from a small map.
2. Ease of updating and modifying noise levels based on new data.

As an approximate method to interpret for noise levels not shown on the list, it can be assumed that noise will decrease 5 dB(A) for every doubling of the distance from the roadway. Conversely, noise will increase by approximately 5 dB(A) when the distance from the roadway is halved. This is particularly applicable where topography is gentle. (For a full explanation, the reader is referred to the Technical Report of Bolt, Beranek and Newman). In addition to this listing, CALTRANS has furnished the County with a map showing L10* contours for Highway 101.

* NOTE: See glossary for acoustic terminology.

II. PROBLEMS AND ISSUES ASSOCIATED WITH NOISE

Sound refers to anything that is or may be perceived by the ear. Noise is any unpleasant and/or annoying sound.

The sound from a unique source decreases with increasing distance. The amount of sound reaching a receiver is dependent upon barriers between the source and the receiver, atmospheric conditions, and the quantity and volume of the sound emitting sources.

The typical community noise environment is comprised of a background noise level and higher noise levels. These higher noise levels are often transportation oriented. Noise from other than transportation sources which could pose problems include: Power tools, air conditioning, sound amplifying equipment, animals, musical instruments, industrial machinery, garden equipment, off the road vehicles, etc

Background noise levels are lower at night. Consequently, the problems generated by higher noise levels from individual sources are more pronounced during nighttime hours, a time when most people desire quiet.

The noise level of our society has increased at a rate of one decibel a year over the past 25 years.[1] The increase has been due in part to the introduction of larger and noisier transportation vehicles and the increase in the number of vehicles. Additionally, the increasing demand of our expanding population for better, more conveneient transportation facilities, coupled by inadequate noise control measures or land use controls, has moved the sources of noise closer to the people. The Occupational Safety and Health Act (OSHA) contains standards for regulating excess industrial noise for worker protection.

A. The Transportation Noise Problem

Excessive noise from vehicles and aircraft constantly intrude upon our daily lives without any compensation from those responsible for the generation of the undesirable noises. Our society tolerates noise because it is widely believed that the expenditure for quieting engines and tires in their design and construction is less effective than would be the same expenditure for buffering their noise after they have been built.

The County supports State and Federal regulation of vehicle noise. Some communities require more stringent standards appropriate to local sensitivity; however, these standards are often more stringent than regulations can effect. In Marin County it has been found that automobiles are the principal noise source, and therefore, the controlling element in community noise levels.

The increase of traffic noise in Marin County has been caused by increased use of automobiles, roads which permit faster speeds, and elevated freeways. The latter affects the distribution of noise, since heavily used freeways produce a wider impact area.

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1) Senator Mark O. Hatfield, "The Now Sound - Noise" Catalyst, Vol. 1, No. 3 (Fall, 1970), p. 25

Generally, vehicular noise does not follow the 24 hour traffic fluctuations. The overall level of noise when measured on a daily basis, lessens during the evening and night-time hours and rises with morning traffic, but remains fairly constant between and during the commute periods.

Annoyance from traffic noises is caused mainly by variations in the magnitude of sound. From points close to a roadway, bursts of noise are heard from individual vehicles as they pass. Records of voluntary complaints against community noises show a predominance of response from people affected by these on and off traffic sounds. This is not meant to pardon the roar of heavy continuous traffic.

B. Effects of Extreme Noise

The effects of severe noise are many and can be placed in four main categories:

*Physiological - physical effect

*Psychological - emotional effect

*Sociological - group effect

*Economical - cost effect

1. Physiological

Exposure to sufficient levels of noise for long periods of time can produce temporary or permanent loss of hearing. In general, sound levels must exceed 80 dB(A) for sustained periods before hearing loss occurs. The greater or longer the exposure, the greater the potential for hearing loss.[2] Other physical effects of noise may be rapid heart beat, blood vessel constriction, dilation of the pupils, paling of the skin, headaches, muscle tension, nausea, insomnia, and fatigue. If the noise is of sufficient level, the stomach, esophagus, and intestines may be seized by spasms.[3]

2. Psychological

Noise can interfere with sleep. Excessive exposure to noise may also cause symptoms of anxiety, anger, vertigo, hallucinations, and in extreme cases, has even been blamed for homicidal and suicidal tendencies.[4,5] It has not been scientifically proven, however, that noise is the primary cause of these symptoms.

3. Sociological

There are two alternative means of handling noise intrusions -- reduce the problem by shielding, escaping, or removing the noise source; or, adapt to the noise environment. Adaptions to noise intrusions may adversely affect group interrelationships. The intrusion of noise can affect every facet of human existence, from one's family life to one's occupational, educational, and religious activities. The possible adverse effects of an individual's reactions to noise -- physical and emotional maladies -- may be compounded in the group situation. More importantly, though, noise may threaten the ability to communicate and to comprehend. For example, children who live or attend school near sources of excessive noise can be handicapped, not only in their learning process, but also in their socialization process.[6]

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2) Central Institute for the Deaf, Effects of Noise on People, Washington: Environmental Protection Agency, (December 31, 1971), p. 18.

3) Ibid., p. 129.

4) Ibid., p. 130.

5) Noise Control Act of 1971 and Amendments--Hearings before the Sub-Committee on the Environment of the Committee of Commerce, Washington: U. S. Government Printing Office, (1971) p. 79.

6) Central Institute for the Deaf, op. cit., p. 55.

4. Economic

The costs of living with severe noise as well as the costs of measures to reduce the impacts of severe noise intrusion are appreciable and include medical care, loss of efficiency and production, reduction of property value, litigation, abatement measures, and increased vacancies. For example, in order to achieve acceptable interior noise levels in an area experiencing a high frequency and magnitude of aircraft noise, it cost $12,550 to $14,450 in 1969 for a 1,530 square foot stucco house.[7] It would cost approximately 500 million dollars to achieve the noise levels proposed by the Federal Aviation Administration for the present commercial aircraft fleet.[8] An eight-foot wall or earth berm adjacent to a freeway costs approximately $700,000 per mile.

In addition, the costs of increased litigation, sound insulation, acquisition of land and construction for noise mitigation of transportation facilities and vehicles contribute to higher prices for goods and services as well as higher taxation to cover these costs.

C. Land Use/Transportation Interrelationship

Traditionally land use and transportation planning have not adequately considered noise impacts. Consequently, developed areas adjacent to major transportation facilities have become impacted by noise. Once a noise problem has been allowed to develop, there are three alternative remedies available: 1) Reduce the noise at the source; 2) Reduce noise by controlling the path of transmission; 3) Reduce the noise impact on the receiver. Source reduction lies outside the immediate control of local planning bodies. The other two potential remedies entail, in some cases, massive disruption of existing land use patterns once the noise problem has become aggravated.

The tolerance of land use activities to noise from vehicles is described in Figure 1 on page 5A. For each land use type, increasing noise levels can be expected to cause interference, annoyance, or hearing damage. The community response is assessed in Figure 2 of page 5B and is correlated with the recommended steps to avoid or abate the noise. This chart permits the evaluation of alternative noise standards more or less stringent than those recommended in this element.

D. Relationship to Airport Vicinity Noise

There is a possible overlap of noise effects in the vicinity of airports due to the combined effects of highway and freeway noise, airport ground facilities noise, and aircraft operational noise. This will require special evaluation of noise sensitive development proposals in the airport vicinity. State standards currently provide for no residential development in areas above the 65 CNEL[9] level due to aircraft noise.

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7) Wyle Laboratories, Home Soundproofing Pilot Project for the Los Angeles Department of Airports, El Segundo: Wyle Laboratories, (March, 1970), p. 19.

8) Noise Pollution, Senate Hearings on S1016, S3342, and HR11021, Washington: U. S. Government Printing Office, (1972), p. 523.

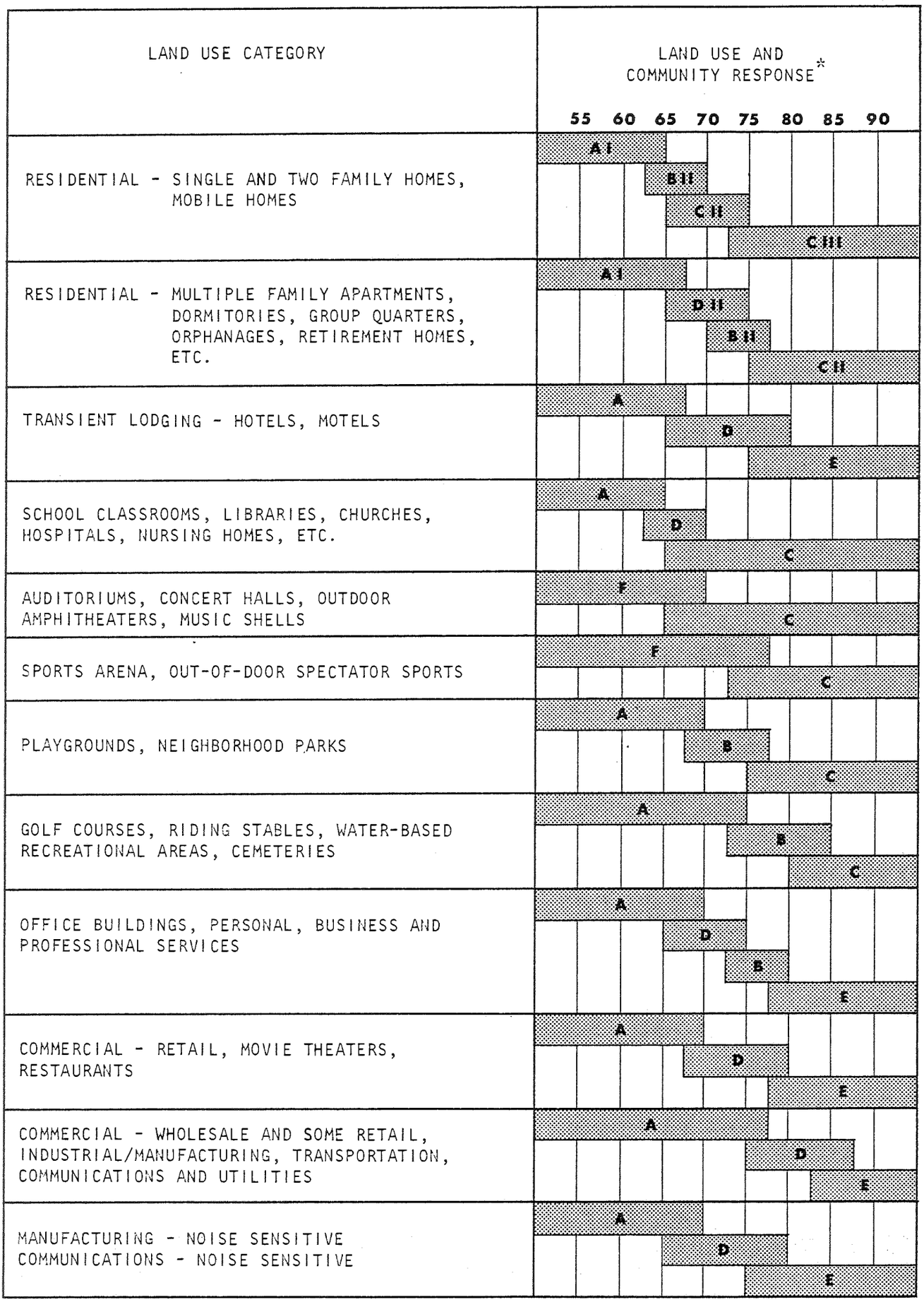
9) See glossary for definition of acoustical terminology.

Ground facilities noise includes engine testing and engine "runups" of planes preparing to take off. These specific interval activities will produce peaks of noise substantially higher than highway generated noise which is more constant and of longer duration. ALUC (The Airport Land Use Commission) is responsible for preparing a plan around airports and for reviewing development proposals consistent with such an adopted plan.

The information in this noise element can be used by the ALUC in forming its recommendations regarding noise standards in the ALUC plan. The State and Federal governments have preempted control of operational vehicle noise including aircraft.

FIGURE 1

LAND USE COMPATIBILITY CHART FOR COMMUNITY NOISE



* FOR INTERPRETATION, SEE FIGURE 2.

FIGURE 2

NOISE COMPATIBILITY INTERPRETATIONS FOR USE WITH FIGURE 1

GENERAL LAND USE RECOMMENDATIONS

A.	Satisfactory, with no special noise insulation requirements for new construction.
B.	New construction or development should generally be avoided except as possible infill of already developed areas. In such cases, a detailed analysis of noise reduction requirements should be made, and needed noise insulations features should be included in the building design.
C.	New construction or development should not be undertaken.
D.	New construction or development should not be undertaken unless a detailed analysis of noise reduction requirements is made, and needed noise insulation features included in the design.
E.	New development should generally be discouraged. Conventional construction will generally be inadequate, and special noise insulation features must be included. A detailed analysis of noise reduction requirements should be made and needed noise insulation features included in the construction or development.
F.	A detailed analysis of the noise environment, considering noise from all urban and transportation sources should be made, and needed noise insulation features and/or special requirements for the sound reinforcement systems should be included in the basic design.

COMMUNITY RESPONSE PREDICTIONS

I.	Some noise complaints may occur, and noise may, occasionally, interfere with some activities.
II.	In developed areas, individuals may complain, perhaps vigorously, and group action is possible.
III.	In developed areas, repeated vigorous complaints and concerted group action might be expected.

Land use recommendations are based upon experience and judgmental factors without regard to specific variations in construction (such as air conditioning and building insulation) or in other physical conditions (such as the terrain and the atmosphere). These features and others involving social, economic, and political conditions must be considered in recommending individual use and density construction combinations in specific locations.

Community response predictions are generalizations based upon experience resulting from the evolutionary development of various national and international noise exposure units, in particular, the Composite Noise Rating (CNR). For specific locations, considerations must also be given to the background noise levels and the social, economic, and political conditions that exist.

Source: Bolt, Beranek & Newman, A Background Report on Transportation Noise, Sept. 1974.

III. GENERAL GOALS AND POLICIES

It shall be the objective of Marin County to concern itself with noise regulations and abatement strategies only where noise is now a significant problem or where proposed activities could create a measurable noise problem.

To this end, the decisions and activities of County government shall be guided by the following goals:

A. Alert the public regarding the potential impact of excessive transportation noises as well as stationary source noises, and attempt to assign the cost of mitigating noise to those who produce the noise.

B. Establish compatible land use categories with respect to noise tolerance adjacent to transportation facilities and endeavor to protect areas that are presently quiet from future noise impacts.

C. Minimize excessive noise levels of existing and future transportation facilities so that noise does not jeopardize public health and welfare.

The following policies can provide direction for achieving these goals, if public and private resources are allocated to specific measurable implementation programs.

It shall be the policy of the County of Marin to:

1. Assess the noise levels associated with all present and future major transportation systems in the County.
2. Mitigate excessive noise impacts from transportation noise through judicious use of technology, planning, and regulatory measures.
3. Amend and enact zoning, building, subdivision, noise, and land use ordinances which will establish acceptable noise standards and employ effective techniques of noise abatement.
4. Develop the technical expertise within County Government to identify technological opportunities, conduct studies, assess effectiveness of programs, set standards, and recommend additional mitigation techniques, programs, or alternatives.
5. Consider noise criteria in the purchase of vehicles, trucks, refuse and maintenance equipment, tires, and aircraft for use by County.
6. Join with the various cities in a coordinated approach to the problem of noise and provide leadership and technical expertise when requested by the other jurisdictions.
7. Cooperate with Federal, State, and regional agencies in implementing noise abatement programs in this County as mandated by Federal and State laws and to seek funds from the appropriate levels of government to underwrite the costs of these programs.
8. Recommend legislation to the State and Federal Government that will provide for the equitable distribution of the costs of such programs.
9. Monitor the programs and policies of the responsible Special Districts, Regional, State, and Federal agencies to insure that they effectively exercise their mandate to control the sources of transportation noise for new, proposed, or existing transportation facilities, vehicles, or aircraft as these activities affect noise levels in Marin County.
10. Encourage the Federal Government to standardize and simplify the measurement methods used in assessing noise impact.
11. Endorse continued Federal and State research into the noise problem.
12. Endeavor to educate the public concerning the effects of noise.

A recommended short ...ge action program to begin im... ...menting these policies is contained in part V.

IV. TECHNICAL PROCEDURES

A. Recommended Noise Levels Compatible With Residential Areas

A considerable amount of evidence has been compiled by the U.S. Environmental Protection Agency which correlates constant noise levels with speech interference, sleep disturbance, and hearing loss. These have been established after extensive before and after tests of people exposed to different noise situations.[10]

The level identified for the protection of speech communication is 45 dB(A) within the home. Allowing for a typical 15 dB(A) reduction in sound level between outdoors and indoors, this level becomes an outdoor day-night sound level of 60 dB(A) for residential areas. For outdoor voice communication, the outdoor day-night level of 60 dB(A) allows normal conversation at distances up to 2 meters with 95% sentence intelligibility.

Although speech interference has been identified as the primary interference of noise with human activities, and as one of the primary reasons for adverse community reactions to noise and long term annoyance, a margin of safety of 5 dB(A) has been applied to the maximum outdoor level to give adequate weight to other potential adverse effects.

Therefore, the outdoor day-night sound level recommended as desirable for residential areas is a day-night (Ldn)[11] sound level of 55 dB(A). The associated interior sound level within a typical home is 40 dB(A) for daytime periods and 32 dB(A) for nighttime periods.

This latter value is consistent with the limited available sleep criteria. Additionally, these resulting indoor levels are consistent with the background levels inside the home which have been recommended by acoustical consultants as "acceptable" for many years.

The effects associated with an outdoor day-night sound level of 55 dB(A) are:

1. Satisfactory outdoor average sentence intelligibility may be expected for normal voice conversations over distances of up to 3.5 meters;
2. Depending on attitude and other non-acoustical factors, the average expected community reaction is "none" although 1% may complain and 17% indicate "highly annoyed" when responding to social survey questions; and
3. Noise is the least important factor governing attitude towards the area.

Identification of a level which is 5 dB(A) higher than 55 dB(A) would significantly increase the severity of the average community reaction, as well as the expected percentage of complaints and annoyance. Identification of a level 5 dB(A) lower than 55 dB(A) would reduce the indoor levels resulting from outdoor noise well below the normal background indoors. It would decrease

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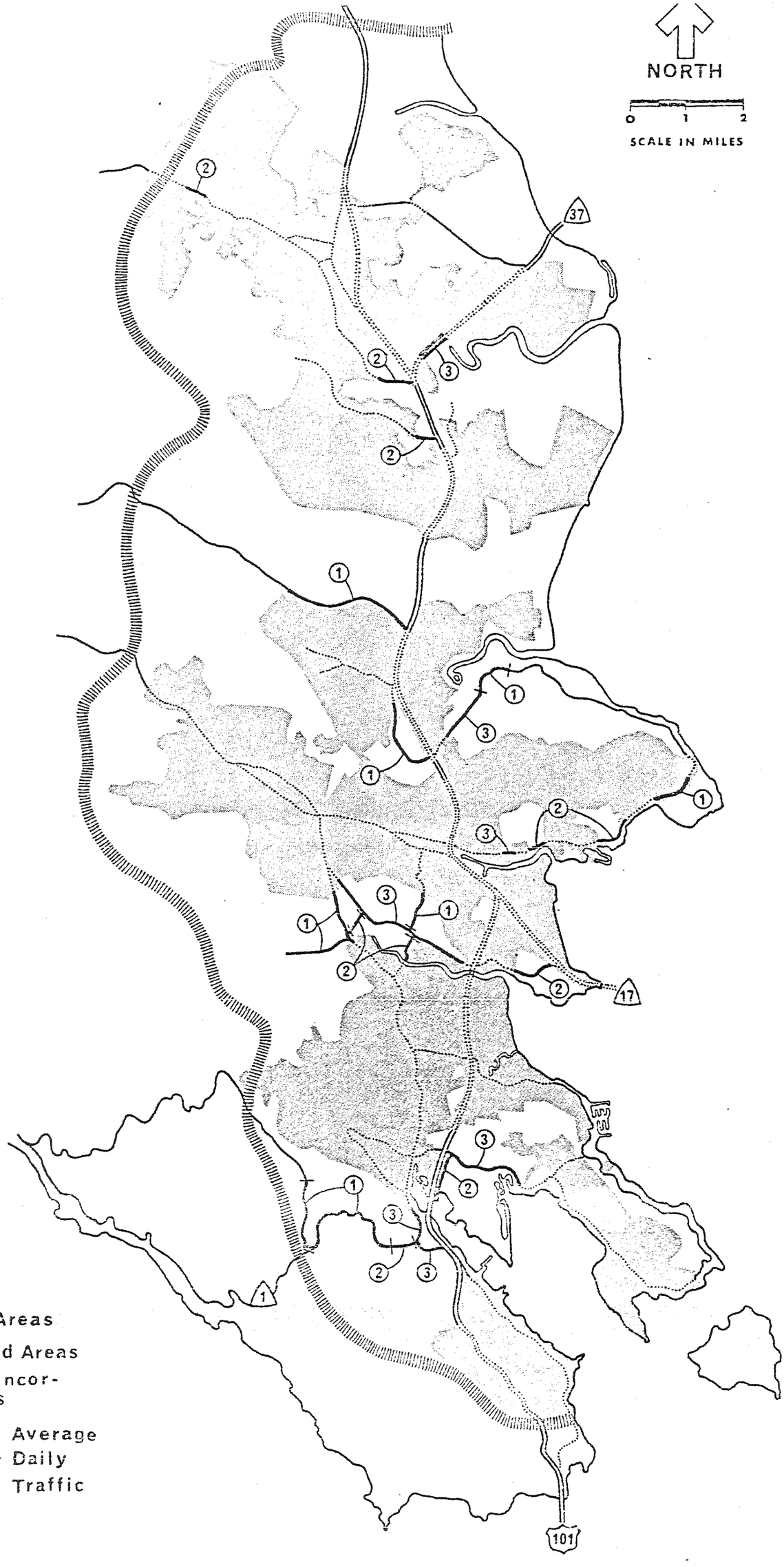
10) Environmental Protection Agency, Information on Levels of Environmental Noise Requisite to Protect Health and Welfare with An Adequate Margin of Safety, 3/19/74. pp. 25.

11) See glossary for definition of acoustical terms.



N O I S E E L E M E N T

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speech privacy c loors to marginal distance. L le change in annoyance would be made since at levels below the identified level, individual attitude and life style, as well as local conditions, are more important factors in controlling the resulting magnitude of the intruding noise.

In conclusion, a L_{dn} level of 55 dB(A) is the outdoor noise level in residential areas most compatible with the protection of public health and welfare and is the most compatible with adequate speech communication indoors and outdoors. With respect to complaints and long term annoyance, this level is clearly a maximum satisfying the large majority of the population. However, specific local situations, attitudes, and conditions may make lower levels desirable for some locations. A noise environment not annoying some percentage of the population cannot be identified atthe present time by specifying noise level alone.[12)]

Figure 3 on page 8a is based on a more detailed description of standards for land uses, both indoor and outdoor, which appeared in Bolt, Beranek & Newman's "A Background Report on Transportation Noise". (See Appendix B).

B. Criteria for Evaluating New Developments in Noise Corridors (See map, pg. 7a). Streets and highways having or projected to have daily traffic volumes (ADT) greater than 5,000 ADT are considered potential noise corridors. An estimate of distances from the centerline of traffic noises produced at 55, 60, 65, and 70 decibels (dBA) has been prepared and is contained in Appendix A. The method for estimating these is contained in the Consultant's report, A Background Report on Noise, Bolt, Beranek and Newman, September, 1974. (See Appendix B).

Recommended standards will apply to new residential uses. For industrial, commercial, and other uses that are more tolerant to noise than residential use, an increase of 5 decibels in the standards shall be considered. For uses which are extremely sensitive to noise interference (hospitals, outdoor assembly areas, wildlife sanctuaries, religious retreats, etc.), the proposed sites for such uses should be reviewed using the residential noise standards until such time as a more appropriate standard can be determined.

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12) Ibid., pp. D-56 - D-59.

FIGURE 3

PROPOSED NOISE STANDARDS

(SUMMARY OF NOISE LEVELS IDENTIFIED AS REQUISITE TO PROTECT PUBLIC HEALTH AND WELFARE WITH AN ADEQUATE MARGIN OF SAFETY)

EFFECT	LEVEL	AREA
Hearing Loss[2)]	$L_{eq}(8) \leqslant 75$ dB 1) $L_{eq}(24) \leqslant 70$ dB 3)	All areas
Outdoor activity interference and annoyance	$L_{dn} \leqslant 55$ dB	Outdoors in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use.
	$L_{eq}(24) \leqslant 55$ dB	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	$L_{dn} \leqslant 45$ dB	Indoor residential areas.
	$L_{eq}(24) \leqslant 45$ dB	Other indoor areas with human activities such as schools, etc.

Source: Bolt, Beranek & Newman, A Background Report on Transportation Noise, Sept., 1974.

Notes for Figure 3:

1) Detailed discussions of the terms L_{dn} and L_{eq} appear in the EPA "Levels" document. Briefly, $L_{eq}(24)$ represents the sound energy averaged over a 24-hour period while L_{dn} represents the L_{eq} with a 10 dB nighttime weighting. $L_{eq}(8)$ represents the sound energy for the loudest eight hours over a 24-hour period. (See glossary)

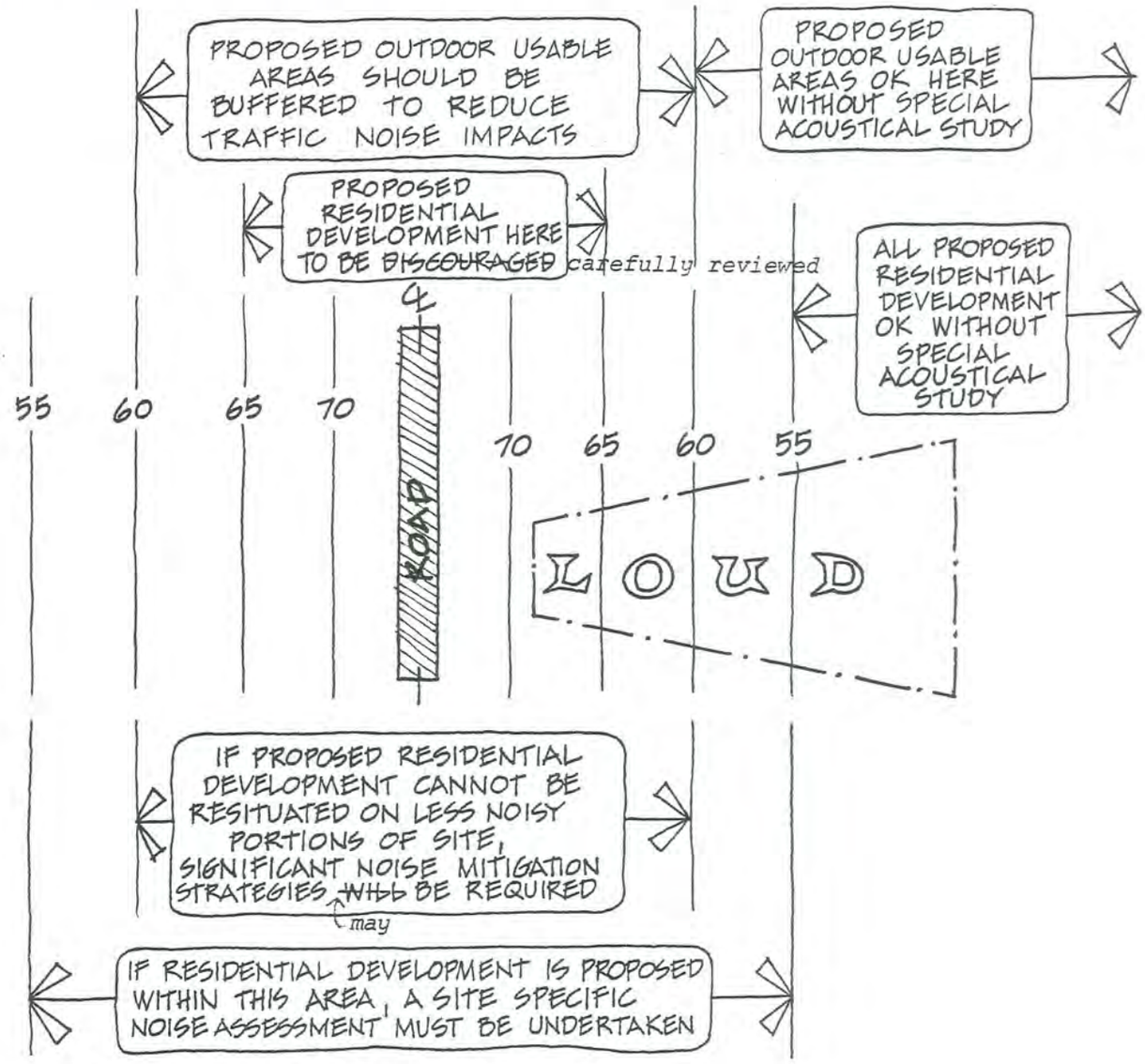
2) The hearing loss level identified here represents annual averages of the daily level over a period of forty years. (These are energy averages, not to be confused with arithmetic averages.)

3) Relationship of an $L_{eq}(24)$ of 70 dB to higher exposure levels.

The Environmental Protection Agency has determined that for purposes of hearing conservation alone, a level which is protective of that segment of the population at or below the 96th percentile will protect virtually the entire population. This level has been calculated to be an L_{eq} of 70 dB over a 24 hour day.

FIGURE 4

SAMPLE APPLICATION OF NOISE CONTOUR DATA TO REVIEW RESIDENTIAL DEVELOPMENT PROPOSALS



KEY

L = *Lot configuration or building placement should inhibit or reduce the effect of noise.* ~~LIMIT OR DISCOURAGE RESIDENTIAL USAGE~~

O = ONLY AFTER STUDY & ANALYSIS WILL RESIDENTIAL OR OUTDOOR USES BE PERMITTED

U = USABLE FOR OUTSIDE AREAS WITH NO STUDY REQUIRED, STUDY REQUIRED FOR RESIDENTIAL

D = DEVELOPMENT PERMITTED WITH NO STUDY REQUIRED

60 Ldh VALUE NOISE CONTOUR (distance from road ℄ based on ADT Volume on road)

ROAD MUST HAVE 5000 ADT OR GREATER (Developments proposed adjacent to roads with less than 5000 ADT are not subject to this criteria)

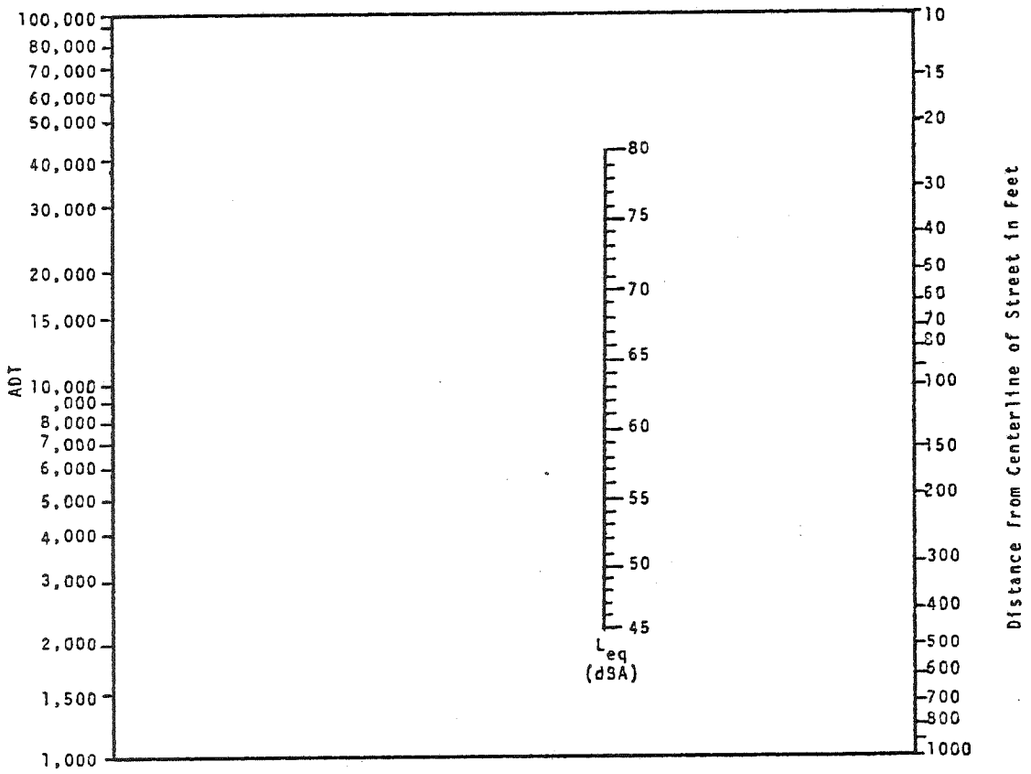
ILLUSTRATIVE VACANT PARCEL PROPOSED FOR RESIDENTIAL DEVELOPMENT

FIGURE 5

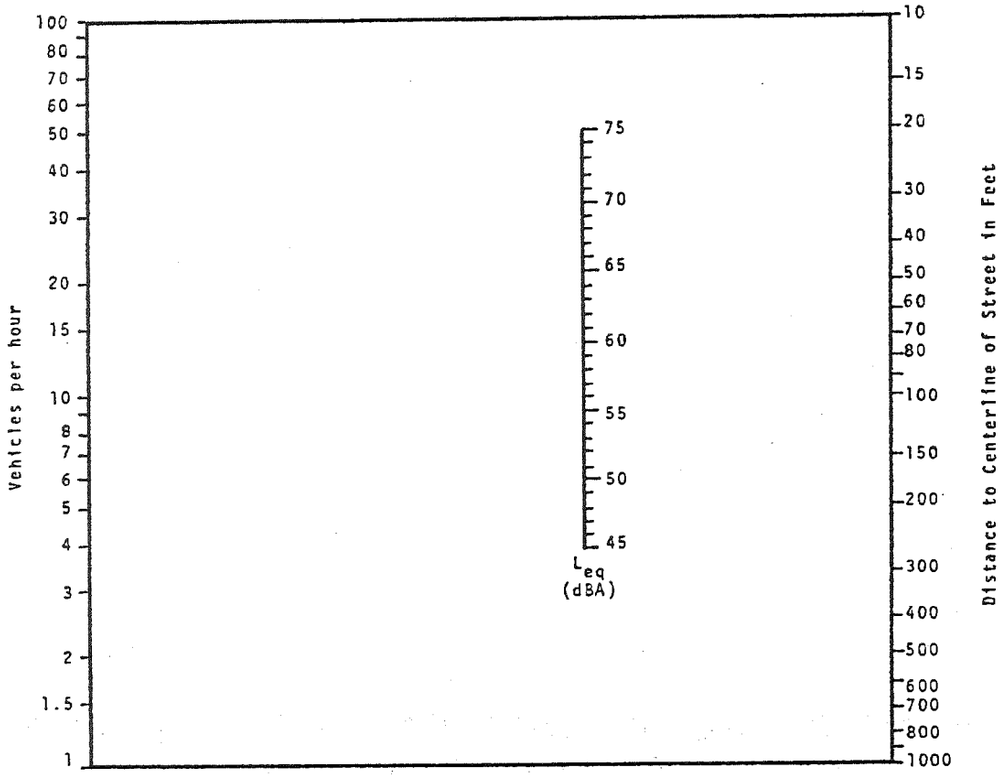
NOMOGRAPH FOR DETERMINING THE EQUIVALENT NOISE LEVEL DUE TO STREET TRAFFIC.

See Appendix A for list of streets and ADT.
See Appendix B for procedures for using nomographs.

NOMOGRAPH #1 - EXCLUDING GOLDEN GATE TRANSIT VEHICLES



NOMOGRAPH #2 - FOR GOLDEN GATE TRANSIT VEHICLES ONLY



These criteria will not apply to existing development or to proposals having received approval prior to the adoption of the noise element. See Figure 4 on page 8b for an illustration of the review criteria. The suggested procedures for noise review for new development proposals are as follows:

1. Submitted residential development proposals would be reviewed for their locations with respect to noise corridors--whether all or any portion of the residential units are to be within the area projected to be a potential noise corridor.

2. Only if the project proposes residential development to be located within the 55 dB(A) noise corridor, will the sponsor be required to engage an acoustical consultant to prepare a site specific noise evaluation to consider noise impact from traffic. This evaluation would consider topography, natural shielding, and other local conditions specific to the site so that a more accurate assessment of potential noise problems and possible mitigation measures can be made.

3. The Review Agency will endeavor to insure that proposed usable outdoors activity areas (communal or private) not be exposed to noise levels from traffic over 60 dB(A) without attempts to mitigate the noise impact. If the project proposes outdoor use areas in locations where potential noise levels would be greater than 60 dB(A), then reasonable mitigation measures may be required, such as: project redesign, construction techniques, or other strategies, where costs of the mitigation are not an unwarranted imposition. See Paragraph D for examples of strategies.

4. In intensive noise zones (areas subject to 65 dB(A) or greater), the placement of buildings or lot configuration which inhibits or reduces the effect of noise may be required. The County should consider initiating rezonings of such parcels as it determines are presently improperly zoned with respect to excessive noise impacts if this noise element is adopted. (Refer to Figures 1 and 2 for alternative land uses).

   The County will work with responsible transportation agencies in an effort to mitigate the harmful effects of noise on affected properties to the extent that funding and resources permit.

These standards would be used as guidelines for both environmental impact review and design review procedures as provided in Chapter 22.82 Design Review in the County Zoning Code. An additional statement of Purpose, 22.82.010 (a), (4) would state: "To protect the public health and convenience and to preserve and restore the quality of quietness in neighborhood areas."

In addition, the County and all jurisdictions should consider the desirability of adopting a consistent and comprehensive noise abatement ordinance. Only after adoption of the noise element will consideration be given to preparation of a noise ordinance.

C. Coordination and Research Among Jurisdictions

Research about the effects of noise on people is now going on at the Federal level. This knowledge can help improve the public's ability to avoid and abate noise. Legislative requirements for the design and use of noisy products (presently exempt from local controls) offers the potential of reducing noise at its source--the most effective approach. These research programs need to be followed to determine their effects on noise in the environment and their usefulness for enforcing community standards.

There are numerous Federal noise research programs which are in progress or have been completed. Some of them are included in the following list:[13]

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13) Environmental Protection Agency, comp., Summary of Noise Programs in the Federal Government, op. cit., (See programs under NASA, DOT, USDA, HEW).

- o Improvement of noise measurement techniques, data reduction, and analysis (Department of Transportation) (DOT)
- o Jet engine noise and its abatement (DOT)
- o Development of noise-monitoring systems for airport environs (DOT)
- o Jet exhause noise (National Aeronautics and Space Administration) (NASA)
- o V/STOL noise characteristics (DOT)
- o Development of supplemental engine equipment or devices to suppress noise (NASA)
- o Tire acoustics (DOT)
- o Internal combustion engine noise (emphasis on the diesel) (DOT)
- o Attenuation of noise by vegetation (United States Department of Agriculture) (USDA)
- o Effects of noise on humans and wildlife (Health, Education and Welfare and USDA)
- o Acoustical performance of buildings (Housing and Urban Development)

The requirements of the Federal Environmental Protection Act and the California Environmental Quality Act for reporting on noise in the vicinity of new developments provide a practical data source for monitoring the noise environment in Marin. Standardizing the measurement and reporting format guidelines would be a help in comparing individual projects and working toward a consistent noise data source useful by many jurisdictions.

Transportation operating entities (Golden Gate Bridge, Highway and Transportation District, California Department of Transportation, Northwestern Pacific Railroad, and Greyhound, Inc.) are responsible for measuring noise from their equipment. The collection and interpretation of these data will be helpful to planning agencies in order to assess the contribution these operators make to the noise environment.

D. Specific Noise Abatement Strategies

Effective noise abatement measures are unique for each situation. Using the guidelines described below, probable reduction of noise can be approximated.[14]

1. Reduction of noise by increasing distance from traffic routes. Generally the doubling of distance will reduce traffic noise approximately 5 dB(A). This assumes a clear sight-path between the roadway and the point of measurement. This effect is due to the spreading of sound energy, thus reducing the intensity of sound at greater distances.
2. Effects of Plantings. Heavy, dense growth of vegetation (generally heavy planting 100 ft. deep between the source and the receiver) will reduce traffic noise by approximately 5 dB(A). No clear sightpath should exist, and heavy underbrush may be required to provide attenuation of sound beneath tree branches. Planting should not interfere with safe intersection sightlines and may be an inappropriate strategy in some environmentally sensitive areas due to conflicts of potential fire hazard, need for visibility, inability of soil to retain vegetation, etc.
3. The effect of Barriers. These include walls, hills, earth berms, or other devices which lie between the source and receiver. The effectiveness of these depends upon several local factors, such as the height of the barrier relative to the sight-line of the sound, distances of the barrier from the source and receiver, reflections of sound which diminish the effectiveness of barriers and combinations of any of these.

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14) Bolt, Beranek, & Newman, Fundamentals and Abatement of Highway Traffic Noise, Federal Highway Administration, June, 1973. pp. 1-19.

4. The effects Building mass and shape. No e of thumb is available to estimate this effect. Reduction will depend upon whether the buildings front 100% of the street, less than 100% fronting, distance between the source and receiver, other buildings between the source and receiver, and height of the buildings.

5. Outdoor to indoor noise reduction. The effects of building construction on noise varies between materials used, distance, weather conditions, and temperature. For schools with large wall areas facing the traffic and large open windows, the effect could be as low as 6-8 dB(A). Residential buildings of wood frame construction will abate noise by as much as 10 dB(A) with the windows open to 15 dB(A) with windows closed. See Appendix D for Title 25, CAC requirements for noise insulation.

6. Effects of rain, wind, and temperature. These should not be regarded as effective abatement measures since their occurrence and, therefore, their effects are highly unpredictable. Caution should be taken with sound measurements as these variables are to some degree always present. Documentation of noise readings should note the climatic conditions existing during the readings.

V. RECOMMENDED IMPLEMENTATION STEPS

A. Cooperate with State

The County and its cities should participate actively with the State Department of Transportation (CALTRANS) to ensure that existing and new highways (when and if constructed) incorporate noise control measures particularly where adjoining land uses are noise sensitive. CALTRANS policy is to reduce traffic noise on new freeways and to reduce excessive traffic noise on existing freeways. According to CALTRANS, the extent of these measures will be contingent on local governments regulating development near freeways. CALTRANS' three listed priorities in order are: For the expeditious construction of noise attenuation features where required to protect noise sensitive development adjacent to existing freeways 1) which existed or were under construction prior to route adoption, 2) which existed after route adoption but before freeway construction, and 3) development taking place after freeway construction.

While there was very little development subject to priority 1 (along 101, route adoption was as early as 1915 in some sections), maps furnished by the State identify many residential developments located in noisy settings for which CALTRANS priorities 2 or 3 apply.

B. Local Roads

Major County and city roads (both existing and proposed) should be evaluated with the objective of avoiding high density traffic flows through residential areas. Where appropriate, consider installing locally funded attenuating features where noise is now excessive and disruptive to existing residential neighborhoods and to hospitals, schools, libraries, and other noise sensitive activities. A portion of the roads capital improvement program could be considered for this purpose after a priority evaluation with other needs.

C. Development Review

Carefully review new residential and other noise sensitive development without acoustical protection in high noise level areas. Revise design review and environmental impact review procedures to take identified noise locations into consideration more adequately at the earliest review opportunity, rather than approving development at the planning stage and then discovering at the building permit stage that costly insulation is required. Revise the zoning ordinance and where appropriate, initiate rezonings in extremely noisy areas to protect the public's right to quiet for health and welfare.

D. Noise Ordinance

After an acceptable ordinance is drafted, initiate public hearings by the Planning Commission and the Board of Supervisors to consider replacing County Code Section 6.70 for single event, stationary source, and other noises occurring on private as well as public property so that the County's noise reduction effort is not limited to vehicle generated noises exclusively. The ordinance can best be administered by the Environmental Health Inspection Division that now evaluates industrial noises under OSHA guidelines.

E. Noise Insulation

Assist property owners of existing units who wish to meet the noise insulation requirements of CAC Title 25 for new units (See Appendix D) by providing technical resource assistance, inspection, and certification of compliance after noise attenuation devices are installed. This program can best be administered by the Building Inspection Department with assistance from Environmental Health inspectors. A reasonable fee to cover the cost of this program should be assigned based on actual case cost experience.

F. Monitoring Program

Annually monitor and evaluate the costs and effectiveness of the specific noise abatement strategies carried out and submit recommendations for future work needed based on new information and research. Consider modifying the recommended standards if cost of compliance is high and cannot be equitably distributed to those causing the noise impacts.

V.. ENVIRONMENTAL IMPACT SUPPLEM.

This report is in conformance with the adopted EIR guidelines of Marin County 3/18/75 and the California Environmental Quality Act of 1970, and the Administrative Requirements of the Secretary, Resources Agency of California, dated December 17, 1973 as amended January 7, 1975 which state in part:

CEQA guidelines (Section 15148)

> The requirements for an EIR on a local general plan or element thereof, will be satisfied by the general plan or element document, and no separate EIR will be required if:
>
> a. The general plan addresses all the points required to be in an EIR by Article 9 of these guidelines and
>
> b. The document contains a special section or cover sheet identifying where the general plan document addresses each of the points required.

It should be emphasized that the Noise Element is being proposed as part of the environmental quality element of the Adopted Countywide Plan. Thus the impacts identified are generalized in nature and emphasize long range and cumulative effects possible from implementing the element over time. There are no identified direct short range environmental consequences of adopting goals and policies of such a general plan element.

The CEQA guidelines (Section 15147(b)) also provide that

> "An EIR on projects such as the adoption or amendment of...a local general plan should focus on the secondary effects that can be expected to follow from the adoption, but the EIR need not be as detailed as an EIR on the specific construction projects that might follow."

Since several requirements of the State EIR guidelines are already satisfied in the plan document, in order to avoid unnecessary duplication, an environmental impact supplement is hereby combined with the Noise Element to make a single report which satisfies the requirements of State Law. Where the plan element does not adequately address all the points required to be in an EIR by Article 9, it is the intention of this supplement to address these points.

SUMMARY - Cover sheet in accord with Section 15148(2). Identification, by page number, of where each item required by Article 9 is located.

Item #	Item	Page # Plan Element	Page #, Impact Supplement
15141	Description of Project	1-12	15
15142	Description of Environmental Setting	i	15
15143a)	Environmental Impact of Proposed Action	i	16
b)	Any Adverse Environmental Effects Which Cannot be Avoided if the Proposal is Implemented.	4	18
c)	Mitigation Measures Proposed to Minimize Impact.	ii	17,18
d)	Alternatives to the Proposed Action	i	18
e)	Relationship Between Local Short Term Uses of Man's Environment and the Maintenance and Enhancement of Long Term Products	4	20
f)	Any Irreversible Environmental Changes Which Would Be Involved in the Proposed Action Should it be Implemented	i	20
g)	Growth Inducing Impact of the Proposed Action	8	20
h)	Energy Conservation Measures	10	21
15144	Identity of Persons Preparing Document	Inside Front Cover	-

INTRODUCTION

The Noise Element identifies the problems and issues of transportation noise in Marin County and proposes that certain goals be established, policies initiated, and programs implemented to bring the problem under control. This Environmental Impact Supplement attempts to analyze the effects of the policies and program recommendations on the environment in this County.

This supplement was prepared in accordance with State and County guidelines to be an information document and a full disclosure of environmental effects. The report does not imply that the Noise Element is entirely beneficial, detrimental, or of no significance.

Additional information and identification of impacts may be provided by the individual reports of the other jurisdictions within this County which are also required to prepare a similar report. It is the intent of this supplement to consider the impact of this element on all jurisdictions located within this County.

I. Description of Project

A. Location

The Noise Element of the Marin Countywide Plan encompasses the entire area of Marin County. See part II, description of environmental setting for tables showing the areas of the County that will be affected by this plan element.

B. Description of the Element

The noise element of the Marin Countywide Plan deals with the quantification and control of noise generated by transportation facilities in our environment. The plan proposes goals, policies, and recommended action programs to control the impact of transportation noise to an acceptable level. See page 6 of the plan element for goals and policies and page 11 for recommended action program to implement the policies.

II. Description of Environmental Setting

By most urban standards, Marin County is a haven of quiet. Over 90% of Marin's land is in open space, recreational, agricultural, or vacant status, where noise generated by man's activities is rarely an irritant.

There is little disturbance from industrial, commercial, or other stationary source noises. Even rail, truck, and aircraft noises are minor. With the elimination of active military units at Hamilton Air Force Base, residential areas are now affected, if at all, primarily by highway noise.

However, over 90% of Marin's residents are concentrated in a series of connected communities occupying about 7% of the land mass. In this area, our main streets are the 101 freeway and other heavily auto travelled noise corridors.

The following two tables from the Marin Countywide Plan illustrate the County as a whole and the City Centered Corridor where potential noise corridors exist. In the City Centered Corridor, the land use and implementation recommendations, if adopted by the County, apply only to unincorporated lands.

LAND

ACREAGE, total		333,380
7.7	% developed 1970	25,750
22.5	% open space to be secured 1970-90	75,040
6.7	% developable but vacant in 1990 (Plan)	22,425

MARIN COUNTY TOTAL

TABLE 3.7

LAND USE	1970		1990 MARKET		1990 PLAN	
Open Space	86,030	25.8%	99,940	30.0%	161,070	48.3%
Vacant or Agricultural	221,600	66.5%	193,210	58.0%	138,000	41.4%
Public and Institutional	1,470	0.4%	1,470	0.4%	1,470	0.4%
Residential	22,800	6.8%	35,720	10.7%	30,210	9.1%
Commercial and Industrial	1,480	0.4%	3,040	0.9%	2,630	0.8%

LAND

ACREAGE, total		79,140
30.0	% developed 1970	23,730
39.0	% open space to be secured 1970-90	30,840
16.5	% developable but vacant in 1990 (Plan)	13,065

CITY CENTERED CORRIDOR

TABLE 3.8

LAND USE	1970		1990 MARKET		1990 PLAN	
Open Space	1,980	2.5%	1,980	2.5%	32,820	41.5%
Vacant or Agricultural	53,430	67.5%	42,860	54.2%	15,870	20.1%
Public and Institutional	1,470	1.9%	1,470	1.9%	1,470	1.9%
Residential	20,840	26.3%	30,000	37.9%	26,450	33.4%
Commercial and Industrial	1,420	1.8%	2,830	3.6%	2,530	3.2%

III. SECONDARY IMPACTS OF THE NOISE ELEMENT

A. Because noise is an environmental problem, programs to reduce the impact of noise will have beneficial environmental effects, not negative ones.

There are economic impacts which should be considered because programs to effectively reduce the impact of noise could create equally serious economic effects.

One of the goals of the noise element is to attempt to assign the costs of mitigating noise to those who produce the noise.

1. Should a noise abatement ordinance be adopted that might require additional enforcement staff, the increased cost could be partly offset by collecting special permit fees for noisy activities and events, levying fines for noise violations, and ordering corrective work to be paid for by those generating the noise at the source.

2. In the case of planning, zoning and design review of new development proposals, if conditions are imposed to mitigate noise caused by the project, the costs would probably be passed on to the future occupants of the project. If conditions are imposed to mitigate noise impacts due to public off site noise sources, such as traffic volumes on adjacent streets, cost sharing programs using State or Federal revenue reimbursements to local governments based on gas tax, motor vehicle registration fees, and other vehicle related revenues could partly pay for the cost of imposing conditions on an applicant, if funds are available for such purposes.

3. The cost of purchasing quieter equipment by local government would be a general public benefit, and this expense would be paid by local taxes raised.

4. The costs of public improvements including road shielding barriers and future roadway routings due to noise from high volume traffic flow should be paid by State and Federal programs because no local area specific assignment of cost can be equitably determined.

B. The Environmental Impacts of the Noise Element

The policies and programs of the Noise Element are aimed at reducing transportation noise to an acceptable level that does not jeopardize the health and welfare of the citizens of this County. In addition to the secondary impacts described in IIIA, some direct physical impacts could result from implementing the noise element. These are:

1. Landform

Impact: There may be a need for some slight alterations in landform as a result of the policies and programs of this element. This will be due to the limited construction of earth berms or a combination of earth berms and walls for certain transportation facilities in urbanized areas or where adjacent land use dictates a need for such noise attenuation devices. In rural and most suburban areas where adequate buffer zones can be provided, these devices will not be needed.

Technical, environmental, and economic consideration will need to be adequately evaluated on individual projects prior to the implementation of such facilities.

Mitigating Measures: Landscaping installed on earth berms and aesthetically treated walls could enhance some road sections.

2. Natural Resources

Discussion: Noise from transportation sources intrudes into every facet of our daily existence; however, some of the County's most important natural resources are the quiet areas where only the sounds of nature can be heard. Approximately 90% of the County is vacant, recreational, agricultural, or other open space. Much of this area provides a place where a reasonable measure of solitude can be enjoyed. There is no significant impact projected to take place upon areas outside the urban corridor by implementing the goals or policies of the noise element. If the noise element is successfully implemented, it will insure that knowledge about potential noise impacts upon presently quiet areas will be considered at the earliest point in the decision making process.

3. Social

Impact: Noise may threaten the ability to communicate and to comprehend. For example, children who either live near or who are required to be near, due to school location, sources of excessive noise can be handicapped, not only in their learning process, but also in the process by which they become responsible adults, their socialization process.

Although much of the noise problems can be alleviated through changes in the building code, subdivision, noise, and zoning ordinances, there may, in the future, be some displacement of people around freeways, (the greatest noise problem areas) if this is the only effective way found to solve a serious noise problem.

Mitigating Measures: Generally, if families have to be displaced, they may benefit from improved mental and physical health. These families would receive compensation for their properties and relocation assistance to aid them in the relocation process. There is no proposal as part of the noise element to relocate or displace any families, and this strategy is considered unlikely based on present noise conditions.

4. Urban Development

Impact: The establishment of noise standards in building, subdivision, and zoning ordinances, as recommended in this element, could tend to have a restrictive effect on future urban development in presently noisy areas, particularly of noise sensitive activities. This could increase the pressure to develop areas which are now relatively quiet because of the lower costs of insuring against noise in already quiet zones.

Mitigating Measures: As noise abatement technology progresses and new quieter vehicles replace the older noisier models, compliance with these standards can be accomplished more readily; and if staged over a period of years, will lessen this impact while at the same time achieve a gradual improvement in the quality of life in the urban areas through the reduction of noise. Improved noise conditions could enhance existing areas of

urban development thus encouraging stabilization or upgrading of neighborhoods.

5. Safety

Impact: With regard to safety, there could be some problems if transportation vehicles become significantly quieter as a result of Federal standards. Vehicles that are unusually quiet could result in some accidents, since people, particularly the very young and the old, would not hear them as readily.

Mitigating Measures: There are no measurable impacts, but should vehicles become so quiet they pose a safety hazard, more effective visual and information systems to alert the public may be necessary.

C. Adverse Environmental Impacts Which Cannot be Avoided if the Proposal is Implemented.

1. Possible minor alterations of existing landforms due to construction of landscaped earth berms or walls at various locations where technically feasible.

2. Possible but unlikely future displacement of residents around severe noise areas to create buffer zones.

3. Possible additional costs to enforce the noise control programs and install sound insulation in buildings.

4. Possible minor safety concern because quieter transportation vehicles will not be heard as readily as noisier vehicles.

5. Possible future route selections which may not be as direct if they avoid noise sensitive residential areas.

D. Alternatives to the Proposed Action

The recommended policies of the Noise Element are aimed at reducing transportation noise to an acceptable level that does not jeopardize the health and welfare of the citizens of this County.

In addition to the recommended policies, the following alternatives were considered:

Alternative 1 - Minimum Program

An alternate to the recommended policies is maintenance of the present noise levels associated with the entire spectrum of present and future transportation modes. The implications of this policy with respect to physical factors is that the effect will be practically nil. It has not been fully determined as to whether maintaining the present transportation noise levels would be hazardous. However, indications are that continued exposure to increasing noise levels could potentially have a damaging effect on the physical and mental well-being of the populace. This policy was not selected because it lacked a positive effect on reducing transportation noise.

Alternative 2 - Maximum Program

This alternate would seek to eliminate transportation noise within Marin County to the degree that residents will always experience a condition of quiet. The implications of this policy are significant and far-reaching, since the following measures might be required to achieve this level of noise reduction.

A noise reduction of this magnitude might require the depressing of some major surface transportation facilities. Since major surface transportation facilities also serve as conveyors of surface runoff, such obstructions could cause flooding problems.

The prohibition of trucks on noisy highways would tend to increase the concentrations of air pollutants as trucks would, in some cases, be required to travel longer routes, thus increasing the total vehicle miles travelled.

The scenic and esthetic qualities of the environment could be increased by landscaped buffer zones and additional landscaping between the source and the receiver. Extensive use of walls, earth berms, and depressed facilities for noise abatement could cause visual pollution even if adequately landscaped.

A substantial number of families could be displaced by the construction of depressed highways, earth berms, and buffer zones around noisy transportation facilities. As a result, housing for low- and middle-income groups might be more difficult to obtain. Displacement of residents could result in the breakup of neighborhoods.

The revenue necessary to support such extensive noise-abatement programs, higher costs of transportation equipment, the possible decrease in tax base (due to forcing some existing development out, and the acquisition of additional land area for buffer zones), could result in an imbalance of revenues and expenditures and cause an increase in the tax rate.

The reduction of noise by the substantial amount implied for this alternate would definitely have a beneficial effect on the physical and mental well-being of the populace.

Increased staff might be required to police and enforce the noise ordinance. Walls, berms, vehicle speed reductions, and designation of diversion truck routes could result in loss of access, traffic delays, and an inadequate transportation system which could impede the maneuverability of fire, police, and emergency vehicles.

This alternate was not selected because of the potential high cost and disruptive effects that could result to the area's economy, mobility, and overall environment if such a program were initiated.

Alternative 3 - No Project

State law required that a noise element be included in all general plans for all jurisdictions. As outlined in the description of the element, its express purpose is to serve as a tool for planners, administrators, and legislators to use in abating unwanted noise. It establishes programs to follow and recommends goals and coordinated actions which are designed to bring noise under control in this County.

If a noise element is not adopted, the County would not be in compliance with State law; and noise abatement programs presently proposed by other levels of government may be jeopardized.

For these reasons, this alternative was rejected.

Alternative 4 - Reduce Recommended Standards

Omit the 5 dbA margin of safety in the desirable outdoor noise levels for residential settings changing the recommended standard to 60 dbA from the proposed 55 dbA. The effect of this change would be to ease the requirements and possibly the costs for compliance in some areas. By eliminating the 5 db margin of safety, there may be more complaints of noise; however, it is difficult to estimate to what extent this may occur.

This alternative is possible, should the costs of carrying out the noise element appear high and no equitable distribution of these costs to those creating the noise at the source is possible. This alternative should be reconsidered after evaluating the experience of about one year at the recommended standard and hardships or cost inequities demonstrate that such a modification is appropriate.

E. The Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

This element will improve the noise environment in the County. The short-term implications of the element will be a relatively small amount of disturbance to landforms, and commitment of energy and materials. The long-term result should be better health and improvement of the quality of life for all residents.

Expenditure of funds to initiate a noise control program will be deferred, and higher short-term costs for certain goods and services when viewed in the context that these expenditures are from a limited source, involve trade-offs between other desired programs, and are probably not recoverable by those who pay for these higher costs.

F. Any Irreversible Environmental Changes Which Would Be Involved in the Proposed Action Should It Be Implemented

Irreversible environmental changes which may be involved in implementing this element are as follows:

1. Minor modification of landforms.

2. Use of natural resources and energy to construct noise attenuation devices.

3. Possible displacement of residents in high noise areas adjacent to certain transportation facilities in order to provide adequate buffer zones would result in disruption of the social processes of these communities.

4. Possible reduction in high density auto activity in sensitive to noise areas.

G. The Growth-Inducing Impact of the Proposed Action

There is no direct growth inducing impact involved in implementing the Noise Element.

H. Energy Conservat . Measures

1. Insulation applied to dwelling units to reduce sound transmission may also provide thermal insulation, and some thermal insulation applications may reduce noise transmission. Where the application of one form of insulation is required, it would be possible to conserve energy by insuring that such an insulation application serve dual needs.

2. If windows must be closed in dwellings due to noise interference, air conditioning or mechanical ventilation may become necessary. Efforts to insure a noise reduced environment will enable more use of natural ventilation and particularly with the moderate Marin County climate will have decided energy conservation features.

3. The commitment of energy to implement this element would be highest in terms of building berms or walls at presently noisy roads; rerouting future heavy traffic away from residential settings would also result in a high commitment of energy.

VII. GLOSSARY

A-WEIGHTED NETWORK, dB(A):
The sound pressures heard by the human ear vary over a wide range. To make this range easier to study, sound pressures are converted into units called decibels (dB). The range then goes from 0, the threshold of hearing, to beyond 140 dB, at the threshold of pain.

Because the human ear does not react to sound at low frequencies in the same way as sounds at high frequencies, the quality of the sound must also be evaluated. An "A-weighting" network is provided in sound level meters to simulate the human ear. A-weighting sound levels are expressed in units of dB(A).

ACOUSTICS:
The science of sound, including the generation, transmission, and effects of sound waves, both audible and inaudible.

BACKGROUND NOISE:
The total of all noise in a system or situation, independent of the presence of the desired signal. In acoustical measurements, strictly speaking, the term "background noise" means electrical noise in the measurement system.

COMMUNITY NOISE EQUIVALENT LEVEL, (CNEL):
CNEL is a scale which takes into account all the A-Weighted acoustic energy received at a point, from all noise events causing noise levels above some prescribed value. Weighting factors are included which place greater importance upon noise events occurring during the evening hours (7:00 P.M. to 10:00 P.M.) and even greater importance upon noise events at night (10:00 P.M. to 7:00 A.M.).

COMPOSITE NOISE RATING, (CNR):
CNR is a scale which takes into account the totality of all aircraft operations at an airport in quantifying the total aircraft noise environment. It was the earliest method for evaluating compatible land use around airports and is still in wide use by the Department of Defense in predicting noise environments around military airfields. Basically, to calculate a CNR value, one begins with a measure of the maximum noise magnitude from each aircraft flyby and adds weighting factors which sum the cumulative effect of all flights. The scale used to describe individual noise events is perceived noise level (in PN dB); the term accounting the number of flights is $10 \log_{10} N$ (Where N is the number of flight operations), and each night operation counts as much as 16.7 daytime operations. Very approximately, the noise exposure level at a point expressed in the CNR scale will be numerically 35-37 dB higher than if expressed in the CNEL scale.

DAY-NIGHT AVERAGE-SOUND LEVEL:
The L_{dn} is a scale equivalent to the CNEL with the exception that the evening period is deleted, and all occurrences during 7:00 P.M. and 10:00 P.M. are included in the daytime period.

DECIBEL:
The decibel (dB) is a measure, on a logarithmic scale, of the magnitude of a particular quantity (such as sound pressure, sound power, intensity), with respect to a standard reference value (0.0002 microbar for sound pressure and 10^{-12} watt for sound power).

LOUDNESS:
1) A listener's perception of the intensity of a strongly audible sound or noise;
2) The factor n by which a constant-intensity sound or noise exceeds in the judgment of a listener the loudness of a 1000 H_z tone heard at a sound pressure of 40 dB above threshold;
3) The judgment of intensity of a sound by a human being. Loudness depends primarily upon the sound pressure of the stimulus. Over much of the loudness range it takes about a threefold increase in sound pressure (approximately 10 dB) to produce a doubling of loudness. The unit is the sone.

NOISE:
The term "noise" is generally defined as "unwanted sound". Certain amounts and kinds of urban noise are inevitable and even desirable; many residents feel that the daily sounds of activities around them are an integral part of the community. But many urban sounds are objectionable, and too much is physically damaging. Noise--defined as injurious urban sounds because it interferes with speech and hearing or is intense enough to damage hearing, should be the intended objects of regulation.

STATISTICAL A-WEIGHTED NOISE LEVEL:
This scheme represents the A-weighted noise level, dBA, which is exceeded a percentage of the time over the duration of the sample noise measurement. Thus, L_{99}, L_{90}, L_{50}, L_{10}, L_1, denote the value of the noise level exceeded 99, 90, 50, 10, and 1 percent of the time.

VIII. ANNOTATED NOISE BIBLIOGRAPHY

1. Noise Control Act of 1972, Public Law 92-574, 92 Congress, HR 11021, October 27, 1972.

   This act regulates the design, manufacture and distribution of products which emit noise. Also included is noise from aircraft and interstate railroad, truck and bus operations. It forbids local and state regulation of products and noise producing sources included in the federal law. Guidelines required by this law have been prepared by the Environmental Protection Agency. (See bibliographic list Nos. 2 & 3.)

   The federal standards for motor vehicles are: For speeds over 35 m.p.h. vehicular noise may not exceed 90 (A) when measured 50 feet from the center line of moving traffic. For speeds under 35 m.p.h. the maximum is 86 (A) at 50 feet. A noise test while the vehicle is stationary shall not exceed 88 (A) measured at 50 feet. The law bans "pocket retreads" and institutes a muffler inspection. Standards for moving aircraft and airports (mainly testing and maintenance of jets on the ground) are under review by the Federal Aviation Administration. Publication of these standards are expected by the end of 1974. Military aircraft are exempt from federal noise standards and are precluded from control by states or local governments.

2. U.S. Environmental Protection Agency, Public Health and Welfare Criteria for Noise, (July 27, 1973) 550/9-73-002.

   This is the first of a two part requirement by Congress to "publish descriptive data on the effect of noise which might be expected from various levels and exposure situations" (PL 92-574-92). This is a technical document dealing with the affects of noise on people. The properties of noise and its attenuation is described in the second document (biblio. No. 3).

   This document is available from the Superintendent of Documents, U.S. Printing Office, Stock No. 5500-00103, Catalogue No. EP 1.2N 69/23/973 $1.95

3. U.S. Environmental Protection Agency, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, (March, 1974) 550/9-74-004.

   This is the second part of the noise studies mandated by Congress. While the terms "criteria" or "standards" are scrupulously avoided, it is a very

useful guide to the assessment of noise damage and ways to abate noise. The mandate is to publish "information as to the levels of noise requisite to protect the public health and welfare with an adequate margin of safety." It includes an extensive bibliography of publications on the effects of noise on people, the character of noise and studies of abatement methods. A glossary of terms for common useage is given.

Findings: Measurements of annoyance levels vary widely depending upon duration, frequency, range and magniturde of noise. Noise levels are identified to protect against a) speech interference b) activity interference, c) community reaction and d) long-term damage to hearing.

For relaxed outdoor conversation, at 4 meters distance between speakers, 100% intelligibility of speech is possible at 33 dB(A) and 99% intelligibility is possible at 43 dB(A). For raised voice conversation outdoors, 95% intelligibility is possible at 60 dB(A). Relaxed conversation outdoors is masked at 20 meters with a 20 dB(A) background noise. Normal conversation (slightly above relaxed) is masked when background noise is 54 dB(A) and speakers are 4 meters apart. Raised voice conversation is masked by 65 dB(A) when speakers are 2 meters apart. A maximum distance for speech privacy is 2 meters.

Hearing damage is caused by noise at 4,000 HZ sound frequency measured in cycles per second. Changes in levels of noise less than 5 dB(A) are not significant and cannot usually be detected. Hearing deterioration by people increases their tolerance to noise.

For relaxed conversation in a living room or bedroom, 100% intelligibility of speech is possible at 45 dB(A). Residential indoors under 45 dB(A) will permit speech communication, and when the source is outdoors, 54 dB(A) permits normal speech communication at 4 meters. (This means approximately 40 dB(A) level indoors with windows partly open for ventilation.) Night time levels of 32 dB(A) (accounting for normal decrease in noise levels at night) will protect against sleep interference. A magnitude of 70 dB(A) will protect against damage to hearing. Commercial areas (excluding hotels, motels which are in residential) are identified as 70 dB(A) to protect against hearing loss. Transportation facilities noise maximums to protect against loss is also 70 dB(A).

Hospital areas identified at 45 dB(A) indoor and 55 dB(A) outdoors which will also adequately protect the indoor levels with windows closed. Educational areas are identified as requiring 45 dB(A) to permit speech communication. Outdoor levels of 55 dB(A) will permit teaching outdoors.

Indoor speech interference (masking) begins at levels of 45 dB(A). Distance is not important unless the space is large or accoustically designed. Outdoor speech masking begins to occur for relaxed conversation levels when speakers are one meter apart and the background noise is above 45 dB(A). A raised voice conversation is necessary with 95% intelligibility when speakers are one meter apart in a noise environment of 72 dB(A). At two meters distance, 95% intelligibility is possible with a raised voice in a 66 dB(A) noise environment. These tolerances protect speech privacy. Sleep is the activity acknowleged as most frequently interferred with by traffic noise.

Also, this document presents noise measurement principles for various applications: Eight hour, twenty-four hour, single event, high frequency (HZ), day-night, etc. This document is available from the Superintendent of Documents, U.S. Print Office, Stock No. 5500-00120, Catalogue No. EP 1.2N 69/26 $2.10

4. California Environmental Quality Act of 1970 (CEQA)

This law (Public Resources Code Section 21000, et. seq.) requires guidelines to be prepared by the Resources Agency of California for the preparation of Environmental Impact Reports. (Biblio. No. 5)

5. Guidelines for Implementation of The California Environmental Quality Act of 1970 (as amended), Office of The Secretary for Resources, December, 1973

The estimation of noise on proposed projects from other sources and the production of noise by projects are required in the preparation of an Environmental Impact Report.

6. Guidelines for Local General Plans, Office of Intergovernmental Relations, Adopted October 2, 1973

These prescribe the state requirements (Government Code Section 65302) for noise elements in local general plans. The law requires consistency between zoning ordinances and the adopted general plan. This means that zoning

ordinances relate to noise abatement or prohibition must be reflected in the general plan. The noise element must present the existing and projected noise levels associated with: 1) highways and freeways, 2) ground rapid transit systems and, 3) ground facilities associated with all airports operating under a permit from the State Department of Aeronautics.

The noise element must include:

A. A statement of policy regarding noise and noise sources.

B. The desired maximum noise levels by land use categories.

C. Standards and criteria on noise emissions from transportation facilities.

D. Standards and criteria for compatible noise levels for local "fixed point" noise sources.

E. A guide to implementation.

F. An appendix describing methodology of preparation and sources of data.

Local governments must have adopted the Noise Element by September 20, 1974.

7. Bolt, Beranek & Newman, Fundamentals of Abatement of Highway Traffic Noise, U.S. Department of Transportation, Office of Environmental Policy, Federal Highway Administration, June, 1973

Prepared as a textbook for training courses, it includes information on the characteristic and behavior of sound, especially vehicular noise, ways of measuring, preduction of noise and treatments for control. A nomograph is presented and discussed as a quick method of evaluating acoustic barriers. Also included is a review of literature on human response to noise. This latter subject is thoroughly covered in "Public Health and Welfare Criteria for Noise" (2).

8. Gordon, C.G., Galloway, W.J., Kugler, B.A., and Nelson, B.L., Highway Noise -- A Design Guide for Highway Engineers. National Cooperative Highway Research Program Report No. 117 (1971)

The research presents information that will allow engineers and architects to predict noise levels expected from a new highway facility. By comparing these predicted noise levels against recommended noise design criteria, the impact of highway-generated noise on the community can be estimated. The noise evaluation technique is presented by means of a series of examples and in-

cludes a "cookbo manual. The recommended noi design criteria are based on task interference considerations of speech and of sleep. It should be noted that these recommended noise design criteria (noise standards) are tentative and subject to change as additional research is undertaken.

Subsequent research as to the effects of noise on people is reviewed in (3) and presented in detail in (2). Adjustments to this work on specific methods for predicting noise are included in (9). All of these procedures and adjustments reflecting recent research are incorporated into the text of the Survey of Noise and Guidelines for Control in Marin County.

9. Kluger, B.A. and Piersol, A.G., Highway Noise -- A Field Evaluation of Traffic Noise Reduction Measures National Cooperative Highway Research Program Report 144, Highway Research Board (1973)

Amends the method of estimating noise alteration from highway sources by elevation, depression and barriers which was presented by the NCHRP Report #117 in 1971. Conclusions: 1) The Design Guide (Report #117) tends to under-predict noise reduction at locations where noise flow must "bend" over barriers such as walls and buildings, 2) tends to over-predict noise reductions at locations distant from the roadside and, 3) tends, in most cases, to under-predict the noise reduction for truck traffic as opposed to automobile traffic.

10. Marin County Planning Department, Procedures and Guidelines for Environmental Impact Review of Private Development Projects, revised March 18, 1975.

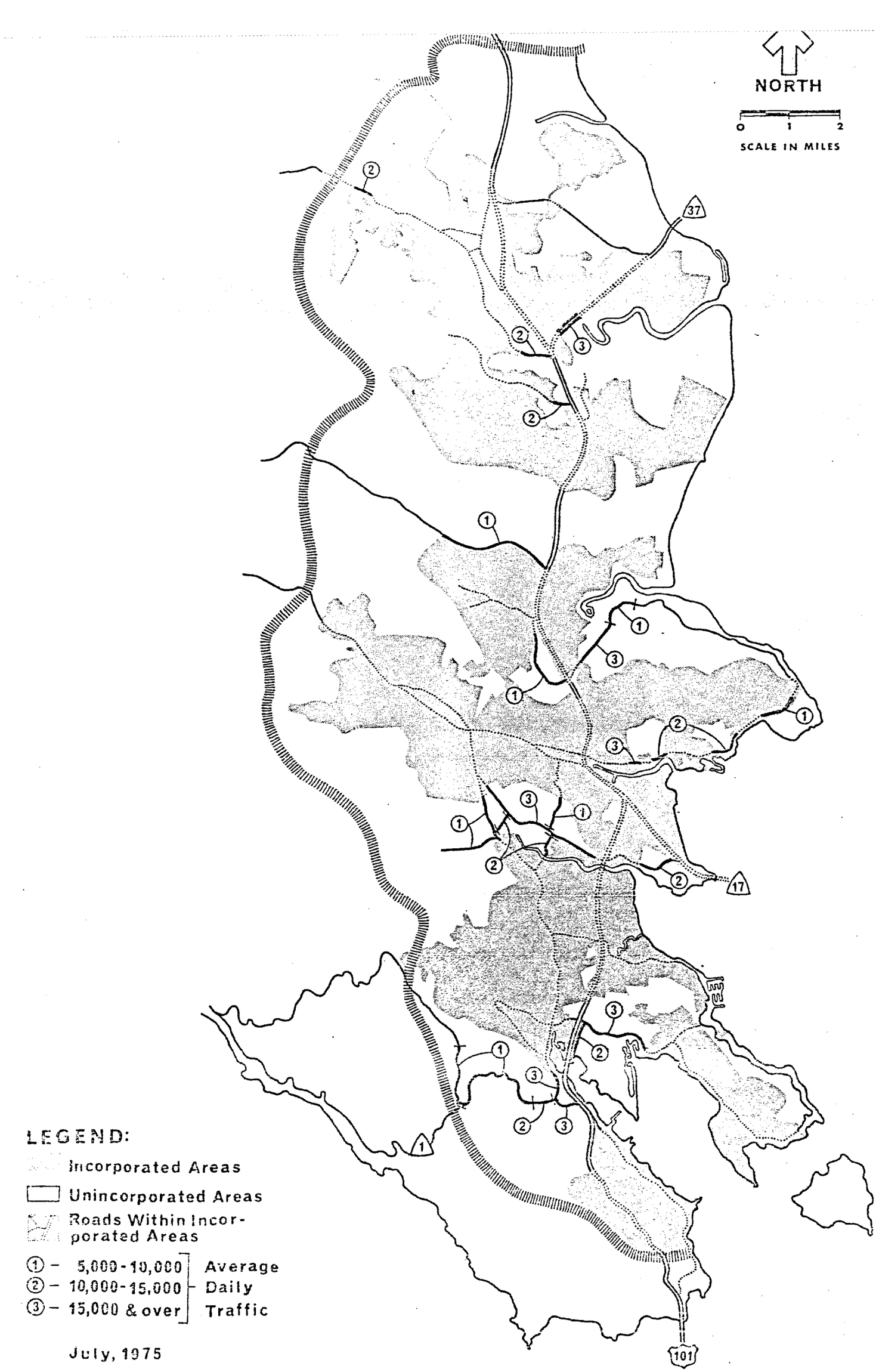
These guidelines present the adopted County policy on enviro mental review procedures. A checklist of environmental review is included.

It is available from the Department of Environmental Services, Marin County Civic Center, San Rafael, California 94903.

APPENDICES

A1. Listing of Noise Levels by Distance For All Major Streets

C. California Administrative Code, Title 25



N O I S E E L E M E N T

POTENTIAL NOISE CORRIDORS-EASTERN MARIN COUNTY

TRAFFIC NOISE INCLUDING BUSES

Link Description			1990 Average Daily Traffic	Distance from Centerline of Roadbed Noise Calculations in L_{dn} = dB(A)						CURRENT (Latest Count as of August, 1974) Average Daily Traffic	Distance from Centerline of Roadbed Noise Calculations in L_{dn} = dB (A)					
	Begin	End		45	55	65	70	75	80		45	55	65	70	75	30
RICHARDSON BAY COMMUNITIES																	
Sausalito Lateral	Highway 101	2nd Street	10,000 - 15,000	2000	500	125	62	31	15	10,538	1440	360	90	45	22	11
Bridgeway Blvd.	2nd Street	Spring Street	15,000 - 20,000	2400	600	150	75	37	18	14,243	2000	500	125	62	31	15
Bridgeway Blvd.	Spring Street	Highway 101	20,000 - 30,000	2800	700	175	88	44	22	23,028	2400	600	150	75	37	18
Tiburon Blvd.	Highway 101	Blackfield Dr.	30,000 - 40,000	3600	900	225	112	56	28	28,486	2800	700	175	88	44	22
Tiburon Blvd.	Blackfield Dr.	Trestle Glen	20,000 - 30,000	2800	700	175	88	44	22	20,463	2400	600	150	75	37	18
Tiburon Blvd.	Trestle Glen	Main Street	15,000 - 20,000	2400	600	150	75	37	18	15,824	2000	500	125	62	31	15
Paradise Drive	Main Street	Mar East	10,000 - 15,000	2000	500	125	62	31	15	4,134	880	220	55	27	14	7
Paradise Drive	Mar East	Mar Centro	5,000 - 10,000	1440	360	90	45	22	11	--						
San Rafael Ave./ Beach	Tiburon Blvd	Tiburon Blvd.	5,000 - 10,000	1440	360	90	45	22	11	2,917	720	180	45	22	11	5
Trestle Glen	Tiburon Blvd	Paradise Drive	5,000 - 10,000	1440	360	90	45	22	11	2,230	560	140	35	18	9	4
East Strawberry Dr.	Tiburon Blvd	Seminary Drive	5,000 - 10,000	1440	360	90	45	22	11	1,785	480	120	30	15	8	4
Seminary Drive	East Strawberry Dr.	Ricardo Road	5,000 - 10,000	1440	360	90	45	22	11	2,100	560	140	35	18	9	4
Belvedere Dr.	Tiburon Blvd	S. Knoll Road	5,000 - 10,000	1440	360	90	45	22	11	1,959	560	140	35	18	9	4
Redwood Hwy/Frontage	Tiburon Blvd	Highway 101	5,000 - 10,000	1440	360	90	45	22	11	11,400	1520	380	95	48	24	12
Shoreline Highway	Highway 101	Tennessee Valley Rd.	40,000 - 50,000	4000	1000	250	125	62	31	24,646	2400	600	150	75	37	18
Shoreline Highway	Tennessee Valley Rd.	Almonte Blvd.	30,000 - 40,000	3600	900	225	112	56	28	19,240	2240	560	140	70	35	17
Shoreline Highway	Almonte Blvd	Poplar	15,000 - 20,000	2400	600	150	75	37	18	14,560	2000	500	125	62	31	15
Shoreline Highway	Poplar	Shasta Way	10,000 - 15,000	2000	500	125	62	31	15	1,278	480	120	25	12	6	3
Shoreline Highway	Shasta Way	Loring Ave.	5,000 - 10,000	1440	360	90	45	22	11	4,950	960	240	60	30	15	7
Shoreline Highway	Loring Ave.	Dias Road	5,000 - 10,000	1440	360	90	45	22	11	7,029	1200	300	75	37	18	9
Edgewood -- Molino -- Miller Avenue			5,000 - 10,000	1440	360	90	45	22	11	3,687	800	200	50	25	12	6
Almonte Blvd.	Shoreline Highway	Miller Avenue	20,000 - 30,000	2800	700	175	88	44	22	24,800	2960	700	175	88	44	22
Dias Road	Shoreline Highway	Sequoia Valley Rd.	5,000 - 10,000	1440	360	90	45	22	11	5,037	960	240	60	30	15	7

** Distance calculations are based upon the upper end of the projected range of traffic.

Appendix A-1: Listing of Noise Levels by Distance For all Local Major Streets

TRAFFIC NOISE INCLUDING BUSES

Link Description			1990 Average Daily Traffic	Distance from Centerline of Roadbed Noise Calculations in L_{dn} = dB(A)						CURRENT (Latest Count as of August/ 1974) Average Daily Traffic	Distance from Centerline of Roadbed Noise Calculations in L_{dn} = dB(A)					
	Begin	End		45	55	65	70	75	80		45	55	65	70	75	80
RICHARDSON BAY COMMUNITIES CONT'D.																
Miller Avenue	Almonte	Camino Alto	20,000 - 30,000	2800	700	175	88	44	22	16,833	2000	500	125	62	31	15
Miller Avenue	Camino Alto	Locust	30,000 - 40,000	3600	900	225	112	56	28	19,397	2240	560	140	70	35	17
Miller Avenue	Locust	Park	20,000 - 30,000	2800	700	175	88	44	22	15,000	2000	500	125	62	31	15
Miller Avenue	Park	Blithedale	15,000 - 20,000	2400	600	150	75	37	18	10,872	1440	360	90	45	22	11
W. Blithedale Ave. (Throckmorton Ave.)	Cascade Dr.	Madrona	5,000 - 10,000	1440	360	90	45	22	11	8,000	1280	320	80	40	20	10
W. Blithedale-- E.Blithedale	Madrona	Camino Alto	10,000 - 15,000	2000	500	125	62	31	15	11,480	1600	400	100	50	25	12
E. Blithedale	Camino Alto	Highway 101	30,000 - 40,000	3600	900	225	112	56	28	24,370	2800	700	175	88	44	22
Camino Alto	Miller Avenue	Blithedale	30,000 - 40,000	3600	900	225	112	56	28	16,932	2000	500	125	62	31	15
Camino Alto	Blithedale	1/2 Mile North	10,000 - 15,000	2000	500	125	62	31	15	3,997	800	200	50	25	12	6
Camino Alto	1 Mi. N. of Blithedale	Magnolia	5,000 - 10,000	1440	360	90	45	22	11	3,997	800	200	50	25	12	6
LOWER ROSS VALLEY																
Paradise Dr.	Highway 101	Harbor Drive	20,000 - 30,000	2800	700	175	88	44	22	12,648	1600	400	100	50	25	12
Paradise Drive	Harbor Drive	Prince Royal Passage	15,000 - 20,000	2400	600	150	75	37	18	2,060	560	140	35	18	9	4
Paradise Drive	Prince Royal Passage	Taylor Road	10,000 - 15,000	2000	500	125	62	31	15	2,080	560	140	35	17	9	4
Paradise Drive	Taylor Road	Trestle Glen	5,000 - 10,000	1440	360	90	45	22	11	2,090	560	140	35	18	9	4
Tamalpais Dr.	Madera Blvd.	Chapman Dr.	20,000 - 30,000	2800	700	175	88	44	22	12,351	1600	400	100	50	25	12
Tamalpais Dr.	Chapman Dr.	Magnolia	15,000 - 20,000	2400	600	150	75	37	18	12,000	1600	400	100	50	25	12
Magnolia Ave.	Tamalpais Dr.	William	15,000 - 20,000	2400	600	150	75	37	18	12,000	1600	400	100	50	25	12
Magnolia Ave.	William	Bon Air Road	20,000 - 30,000	2800	700	175	88	44	22	17,890	2000	500	125	62	31	15
Magnolia Ave.	Bon Air Rd.	SFD via College	15,000 - 20,000	2400	600	150	75	37	18	14,324	1760	440	110	55	27	14
Bon Air Road	Magnolia Ave.	Sir Francis Drake	20,000 - 30,000	2800	700	175	88	44	22	13,284	1600	400	100	50	25	12
Doherty Drive	Magnolia Ave.	Lucky Dr.-Hwy. 101	10,000 - 15,000	2000	500	125	62	31	15	9,858	1440	360	90	45	22	11
Madera Blvd.	Tamal Vista	Lucky Dr.	10,000 - 15,000	2000	500	125	62	31	15	7,963	1280	320	80	40	20	10
Canyon Creek			5,000 - 10,000	1440	360	90	45	22	11	4,000	800	200	50	25	12	6

Link Description			1990 Average Daily Traffic	TRAFFIC NOISE INCLUDING BUSES — Distance from Centerline of Roadbed — Noise Calculations in L_{dn} = dB(A)						CURRENT (Latest Count as of August/ 1974) Average Daily Traffic	Distance from Centerline of Roadbed — Noise Calculations in L_{dn} = dB(A)					
	Begin	End		45	55	65	70	75	80		45	55	65	70	75	80
LOWER ROSS VALLEY CONT'D																	
Sir Francis Drake Blvd.	Highway 101	Highway 17	40,000 - 50,000	4000	1000	250	125	62	31	10,720	1440	360	90	45	22	11
Sir Francis Drake	Highway 101	Eliseo	40,000 - 50,000	4000	1000	250	125	62	31	38,549	3200	800	200	100	50	25
Sir Francis Drake	Eliseo	Bon Air Road	30,000 - 40,000	3600	900	225	112	56	28	31,103	2800	700	175	88	44	22
Sir Francis Drake	Bon Air Road	Bolinas	20,000 - 30,000	2800	700	175	88	44	22	22,923	2400	600	150	75	37	18
Kent at College Ave. to	Poplar & Lagunitas Rd.		10,000 - 15,000	2000	500	125	62	31	15	6,321	1120	280	70	35	17	8
Woodland	College Ave.	Ridgewood Rd.	5,000 - 10,000	1440	360	90	45	22	11	5,900	1040	260	65	32	16	8
Wolfgrade	Sir Francis Drake	Bayview Street	10,000 - 15,000	2000	500	125	62	31	15	9,594	1440	360	90	45	22	11
UPPER ROSS VALLEY																	
Sir Francis Drake	Bolinas	Red Hill Ave.	30,000 - 40,000	3600	900	225	112	56	28	18,376	2000	500	125	62	31	15
Sir Francis Drake	Red Hill Ave.	Valley Road	20,000 - 30,000	2800	700	175	88	44	22	26,540	2800	700	175	88	44	22
Sir Francis Drake	Valley Road	Oak Manor	15,000 - 20,000	2400	600	150	75	37	18	9,217	1440	360	90	45	22	11
Center Boulevard	Red Hill Ave.	Sir Francis Drake	15,000 - 20,000	2400	600	150	75	37	18	14,430	2000	500	125	62	31	15
Bolinas Avenue	Sir Francis Drake	Bolinas County Road	5,000 - 10,000	1440	360	90	45	22	11	7,104	1280	320	80	40	20	10
Butterfield Road	Sir Francis Drake	Woodside Drive	10,000 - 15,000	2000	500	125	62	31	15	8,622	1280	320	80	40	20	10
Butterfield Road	Woodside Drive	Fawn Court	5,000 - 10,000	1440	360	90	45	22	11	2,890	640	160	40	20	10	5
Red Hill Ave. (Miracle Mi.)	Sir Francis Drake	4th Street	40,000 - 50,000	4000	1000	250	125	62	31	31,627	3200	800	200	100	50	25
SAN GERONIMO VALLEY																	
Sir Francis Drake	Oak Manor	San Geronimo Valley Dr.	10,000 - 15,000	2000	500	125	62	31	15	7,740	1200	300	75	37	18	9
Sir Francis Drake	San Geronimo Valley Dr.	S.P. Taylor Park	5,000 - 10,000	1440	360	90	45	22	11	4,900	960	240	60	30	15	7
SAN RAFAEL BASIN																	
Wolfgrade	Bayview Street	2nd Street (San Rafael)	15,000 - 20,000	2400	600	150	75	37	18	6,890	1120	280	70	35	17	8
2nd Street	Miracle Mile	Highway 101	30,000 - 40,000	3600	900	225	112	56	28	19,950	2400	600	150	75	37	18
3rd Street	E Street	Highway 101	30,000 - 40,000	3600	900	225	112	56	28	24,620	2800	700	175	88	44	22
4th Street	Miracle Mile	Highway 101	15,000 - 20,000	2400	600	150	75	37	18	10,251	1600	400	100	50	25	12
5th Street	California Street	Highway 101	5,000 - 10,000	1440	360	90	45	22	11	7,465	1280	320	80	40	20	10
6th Street	H Street	Highway 101	10,000 - 15,000	2000	500	125	62	31	15	10,821	1600	400	100	50	25	12
H Street	6th Street	4th Street	10,000 - 15,000	2000	500	125	62	31	15	7,500	1280	320	80	40	20	10
3rd Street	Highway 101	Embarcadero Way	15,000 - 20,000	2400	600	150	75	37	18	15,716	2000	500	125	62	31	15

TRAFFIC NOISE INCLUDING BUSES

Link Description			1990 Average Daily Traffic	Distance from Centerline of Roadbed Noise Calculations in L_{dn} = dB(A)						CURRENT Average Daily Traffic	Distance from Centerline of Roadbed Noise Calculations in L_{dn} = dB(A)					
	Begin	End		45	55	65	70	75	80		45	55	65	70	75	80
SAN RAFAEL BASIN CONT'D.																
Pt. San Pedro Road	Embarcadero Way	Aqua Vista Dr.	15,000 - 20,000	2400	600	150	75	37	18	15,144	2000	500	125	62	31	15
Pt. San Pedro Road	Aqua Vista Dr.	Riviera Dr.	10,000 - 15,000	2000	500	125	62	31	15	13,169	1760	440	110	55	28	14
Pt. San Pedro Road	Riviera Dr.	McNears Beach	5,000 - 10,000	1440	360	90	45	22	11	5,500	1040	260	65	32	16	8
Lincoln	Highway 101	Duffy Street	15,000 - 20,000	2400	600	150	75	37	18	13,602	1600	400	100	50	25	12
Lindaro	4th Street (proposed)	Jacoby	20,000 - 30,000	2800	700	175	88	44	22	--						
Jacoby to	Bellam to	Highway 101	30,000 - 40,000	3600	900	225	112	56	28	18,443	2000	500	125	62	31	15
Kerner Blvd.	Highway 101	Belvedere	20,000 - 30,000	2800	700	175	88	44	22	--						
Kerner Blvd.	Belvedere (proposed)	San Pedro Rd.	15,000 - 20,000	2400	600	150	75	37	18	--						
Proposed new road	Kerner Blvd.	Pt. San Quentin	10,000 - 15,000	2000	500	125	62	31	15	--						
Proposed new road	Bellam	Francisco & SFD	5,000 - 10,000	1440	360	90	45	22	11	--						
Grand Avenue	5th Ave.	Highway 101	5,000 - 10,000	1440	360	90	45	22	11	5,588	1040	260	65	32	16	8
LAS GALLINAS VALLEY																
N. San Pedro Road	Highway 101	Civic Center Dr.	20,000 - 30,000	2800	700	175	88	44	22	16,000	2000	500	125	62	31	15
N. San Pedro Road	Civic Center Dr.	Meadow Dr.	15,000 - 20,000	2400	600	150	75	37	18	18,740	2000	500	125	62	31	15
N. San Pedro Road	Meadow Drive	Mabry	10,000 - 15,000	2000	500	125	62	31	15	7,436	1200	300	75	37	18	9
N San Pedro Road	Mabry	LaPasada	5,000 - 10,000	1440	360	90	45	22	11	5,521	960	240	60	30	15	7
Civic Center Dr.	San Pedro Rd	Marin Co. Civic Center	15,000 - 20,000	2400	600	150	75	37	18	4,891	960	240	60	30	15	7
Civic Center Dr.	Marin Co. Civic Center	Freitas Parkway (Hwy. 101)	10,000 - 15,000	2000	500	125	62	31	15	5,883	1040	260	65	32	16	8
Frontage Road	Freitas Parkway (Hwy. 101)	Smith Ranch Road	20,000 - 30,000	2800	700	175	88	44	22	7,000	1200	300	75	37	18	9
Merrydale Road	San Pedro Road	Highway 101	15,000 - 20,000	2400	600	150	75	37	18	8,360	1280	320	80	40	20	10
San Pedro Road	Merrydale Rd.	Los Ranchitos Rd.	10,000 - 15,000	2000	500	125	62	31	15	8,650	1280	320	80	40	20	10
Los Ranchitos Rd.	San Pedro Road	Golden Hinde Blvd.	10,000 - 15,000	2000	500	125	62	31	15	7,717	1280	320	80	40	20	10
Los Ranchitos Rd.	Golden Hinde Blvd.	Las Gallinas Ave.	15,000 - 20,000	2400	600	150	75	37	18	5,500	960	240	60	30	15	7
Las Gallinas Ave.	Los Ranchitos	Nova Albion Way	15,000 - 20,000	2400	600	150	75	37	18	5,500	960	240	60	30	15	7
Nova Albion Way	Las Gallinas Ave.	Montecillo Rd.	15,000 - 20,000	2400	600	150	75	37	18	2,800	640	160	40	20	10	5
Nova Albion Way	Montecillo Rd.	Northgate Dr.	5,000 - 10,000	1440	360	90	45	22	11	3,000	720	180	45	22	11	5
Northgate Dr.	Nova Albion	Los Ranchitos	5,000 - 10,000	1440	360	90	45	22	11	5,000	960	240	60	30	15	7

TRAFFIC NOISE INCLUDING BUSES

Link Description	Begin	End	1990 Average Daily Traffic	Distance from Centerline of Roadbed Noise Calculations in L_{dn} = dB(A)						CURRENT Average Daily Traffic	Distance from Centerline of Roadbed Noise Calculations in L_{dn} = dB(A)					
				45	55	65	70	75	80		45	55	65	70	75	80
LAS GALLINAS VALLEY CONT'D.																
Montecillo Road	Nova Albion	Freitas Parkway	10,000 - 15,000	2000	500	125	62	31	15	3,500	800	200	50	25	12	6
Freitas Parkway	Montecillo Rd.	Del Ganado Road	10,000 - 15,000	2000	500	125	62	31	15	4,000	800	200	50	25	12	6
Del Ganado Rd.	Freitas Parkway	Las Ovejas	10,000 - 15,000	2000	500	125	62	31	15	4,500	880	220	55	27	14	7
Las Gallinas	Freitas Parkway	Collindas Road	15,000 - 20,000	2400	600	150	75	37	18	4,669	880	220	55	27	14	7
Las Gallinas	Collindas Road	Lucas Valley Rd.	10,000 - 15,000	2000	500	125	62	31	15	3,910	800	200	50	25	12	6
Lucas Valley Rd.	Highway 101	Miller Creek Rd.	20,000 - 30,000	2800	700	175	88	44	22	8,142	1280	320	80	40	20	10
Lucas Valley Rd.	Miller Creek Rd.	Mt. Shasta Dr.	15,000 - 20,000	2400	600	150	75	37	18	6,632	1120	280	70	35	17	8
Lucas Valley Rd.	Mt. Shasta Dr.	Mt. McKinley Rd.	10,000 - 15,000	2000	500	125	62	31	15	1,780	480	120	30	15	7	3
Lucas Valley Rd.	Mt. McKinley Rd.	1/2 mile West	5,000 - 10,000	1440	360	90	45	22	11	1,120	400	100	25	12	6	3
Mt. Lassen Rd.	Lucas Valley Rd.	Idleberry Rd.	5,000 - 10,000	1440	360	90	45	22	11	900	320	80	20	10	5	2
Idleberry Rd.	Mt. Lassen Rd.	Mt. McKinley Rd.	5,000 - 10,000	1440	360	90	45	22	11	1,220	400	100	25	12	6	3
Miller Creek Rd.	Lucas Valley Rd.	Highway 101	10,000 - 15,000	2000	500	125	62	31	15	4,980	880	220	55	27	14	7
Las Gallinas	Lucas Valley Rd.	Miller Creek Rd.	10,000 - 15,000	2000	500	125	62	31	15	3,563	800	200	50	25	12	6
Smith Ranch Rd.	Highway 101	N.W. Pacific Railway	10,000 - 15,000	2000	500	125	62	31	15	2,000	560	140	35	17	8	4
Smith Ranch Rd. (proposed)	N.W. Pacific Railway	Gallinas Creek	10,000 - 15,000	2000	500	125	62	31	15	--						
NOVATO AREA																
Bel Marin Keys	Highway 101	Hamilton Dr.	15,000 - 20,000	2400	600	150	75	37	18	6,744	1120	280	70	35	17	8
Bel Marin Keys	Hamilton Dr.	Caribe Isle	10,000 - 15,000	2000	500	125	62	31	15	2,854	640	160	40	20	10	5
Bel Marin Keys	Caribe Isle	Bahama Reef	5,000 - 10,000	1440	360	90	45	22	11	1,000	400	100	25	12	6	3
Frontage Road (E. of Hwy. 101)	Bolling Ct. (Hamilton AFB)	Ignacio Blvd.	5,000 - 10,000	1440	360	90	45	22	11	6,837	1120	280	70	35	17	8
Frontage Road (W. of Hwy. 101)	to Alameda Del Prado	to Ignacio Blvd.	5,000 - 10,000	1440	360	90	45	22	11	1,261	400	100	25	12	6	3
Ignacio Blvd.	Highway 101	Palmer Dr.	30,000 - 40,000	3600	900	225	112	56	28	11,890	1600	400	100	50	25	12
Ignacio Blvd.	Palmer Dr.	Country Club Dr.	20,000 - 30,000	2800	700	175	88	44	22	4,500	880	220	55	27	14	7
Ignacio Blvd.	Country Club Dr.	end of Blvd.	15,000 - 20,000	2400	600	150	75	37	18	4,141	880	220	55	27	14	7
Sunset Parkway	Ignacio Blvd.	So. Novato Blvd.	5,000 - 10,000	1440	360	90	45	22	11	3,500	800	200	50	25	12	6

TRAFFIC NOISE INCLUDING BUSES

Link Description			1990 Average Daily Traffic	Distance from Centerline of Roadbed Noise Calculations in L_{dn} = dB(A)						CURRENT Average Daily Traffic	Distance from Centerline of Roadbed Noise Calculations in L_{dn} = dB(A)					
	Begin	End		45	55	65	70	75	80		45	55	65	70	75	80
NOVATO AREA CONT'D.																
So. Novato Blvd.	Highway 101	Novato Blvd.	20,000 - 30,000	2800	700	175	88	44	22	11,530	1600	400	100	50	25	12
Novato Blvd.	So. Novato Blvd.	Bowman Canyon	20,000 - 30,000	2800	700	175	88	44	22	14,720	1760	440	110	55	27	14
Novato Blvd.	Bowman Canyon	Hicks Valley Rd.	15,000 - 20,000	2400	600	150	75	37	18	1,400	480	100	25	12	6	3
Hicks Valley Rd.	Novato Blvd.	1 mile West	10,000 - 15,000	2000	500	125	62	31	15	1,342	400	100	25	12	6	3
Rowland Blvd.	So. Novato Blvd.	Scottsdale Blvd.	15,000 - 20,000	2400	600	150	75	37	18	--						
Scottsdale Blvd.	Highway 101 (proposed)	So. Novato Blvd.	15,000 - 20,000	2400	600	150	75	37	18	--						
Proposed New Freeway	San Marin Drive	Hwy. 101 1-mi. north of South Novato Blvd.	50,000 - over							--						
Old Highway 101	Grant Avenue	Scottsdale Blvd.	30,000 - 40,000	3600	900	225	112	56	28	40,000	3600	900	225	112	56	28
Old Highway 101	Grant Avenue	San Marin Drive	20,000 - 30,000	2800	700	175	88	44	22	30,000	2800	700	175	88	44	22
Olive Avenue	Proposed New Freeway	Atherton Avenue	10,000 - 15,000	2000	500	125	62	31	15	1,200	400	100	25	12	6	3
Atherton Avenue	Highway 101	Armstrong Avenue	40,000 - 50,000	4000	1000	250	125	62	31	2,000	560	140	35	17	8	4
Atherton Avenue	Armstrong Ave.	Bahia Ave.	20,000 - 30,000	2800	700	175	88	44	22	1,850	480	120	30	15	7	3
Atherton Avenue	Bahia Avenue	State Highway 37	15,000 - 20,000	2400	600	150	75	37	18	2,450	640	160	40	20	10	5
Atherton Avenue	State Highway 37	Highway 101	40,000 - 50,000	4000	1000	250	125	62	31	1,300	400	100	25	12	6	3
Grant Ave.	Old Highway 101	Proposed New Freeway	50,000 - over							6,455	1120	280	70	35	17	8
Diablo Avenue	Hill Avenue	Novato Blvd.	10,000 - 15,000	2000	500	125	62	31	15	6,700	1120	280	70	35	17	8
Diablo Avenue	Novato Blvd.	Proposed New Freeway	30,000 - 40,000	3600	900	225	112	56	28	4,622	880	220	55	27	14	7
Reichert Avenue	Lamont Avenue	Grant Avenue	5,000 - 10,000	1440	360	90	45	22	11	2,500	640	160	40	20	10	5
Indian Valley Rd.	Old Ranch Rd.	Diablo Avenue	5,000 - 10,000	1440	360	90	45	22	11	1,262	400	100	25	12	6	3
Bahia Avenue	Atherton Ave.	Topaz Dr.	5,000 - 10,000	1440	360	90	45	22	11	1,500	480	120	30	15	7	3
Grant Avenue	Highway 101	Novato Blvd.	15,000 - 20,000	2400	600	150	75	37	18	12,825	1600	400	100	50	25	12
San Marin Dr.	Highway 101	Novato Blvd.	10,000 - 15,000	2000	500	125	62	31	15	3,661	800	200	50	26	12	6
Simmons Lane	Novato Blvd.	San Marin Dr.	10,000 - 15,000	2000	500	125	62	31	15	3,000	720	180	45	22	11	5
Wilson Avenue	Hatch Rd.	Center Blvd.	5,000 - 10,000	1440	360	90	45	22	11	4,373	960	240	60	30	15	7
Wilson Avenue	Center Blvd.	Novato Blvd.	10,000 - 15,000	2000	500	125	62	31	15	5,000	960	240	60	30	15	7
Mill Rd.	Vineyard	Wilson Avenue	5,000 - 10,000	1440	360	90	45	22	11	1,820	480	120	30	15	7	3

TRAFFIC NOISE INCLUDING BUSES

Link Description			1990 Average Daily Traffic	Distance from Centerline of Roadbed Noise Calculations in L_{dn} = dB(A)						CURRENT Average Daily Traffic	Distance from Centerline of Roadbed Noise Calculations in L_{dn} = dB(A)					
	Begin	End		45	55	65	70	75	80		45	55	65	70	75	80
NOVATO AREA CONT'D																
Vineyard Rd.	Wild Horse Valley Rd.	Wilson Ave.	5,000 - 10,000	1440	360	90	45	22	11	3,049	720	180	45	22	11	5
Sutro Ave.	Vineyard	Center	10,000 - 15,000	2000	500	125	62	31	15	1,323	400	100	25	12	6	3
Sutro Ave	Center	Novato	15,000 - 20,000	2400	600	150	75	37	18	4,091	880	220	55	27	14	7
Center Rd.	Sutro Ave.	Wilson Ave.	5,000 - 10,000	1440	360	90	45	22	11	2,000	560	140	35	17	8	4
Center Rd.	Wilson Ave.	So. Novato Blvd.	10,000 - 15,000	2000	500	125	62	31	15	3,544	800	200	50	25	12	6
Tamalpais Ave.	Center	Grant	5,000 - 10,000	1440	360	90	45	22	11	2,000	560	140	35	17	8	4
7th Street	Grant	Carmel Dr.	5,000 - 10,000	1440	360	90	45	22	11	2,000	560	140	35	17	8	4
7th Street (proposed)	Carmel Dr.	San Marin Dr.	5,000 - 10,000	1440	360	90	45	22	11	--						

Article 4. Noise Insulation Standards

1092. Noise Insulation Standards. Noise insulation standards shall be in accordance with the applicable requirements of California Administrative Code, Title 24, Part 6, Division T25, Chapter 1, Subchapter 1, Article 4, Section T25-1092, which reads as follows:

T25-1092. Noise Insulation Standards. (a) **Purpose.** The purpose of this article is to establish uniform minimum noise insulation performance standards to protect persons within new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings from the effects of excessive noise, including but not limited to hearing loss or impairment and persistent interference with speech and sleep.

(b) Application and Scope. The provisions of this article relating to noise insulation performance standards apply to new hotels, motels, apartment houses and dwellings other than detached single-family dwellings.

These regulations shall apply to all applications for building permits made subsequent to the effective date of these regulations.

These regulations shall be effective 6 months after the adoption by the Commission of Housing and Community Development.

(c) Definitions. The following special definitions shall apply to this article as applicable:

(1) Impact Insulation Class (IIC)—A single number rating for ceiling-floor construction that represents the ability of the construction to isolate impact noise, where measurement procedure is based on ASTM E492-73T and as defined in UBC Standard No. 35-2.

(2) Sound Transmission Class (STC)—A single figure rating for floor-ceiling and interior wall partition construction that represents the ability of the construction to isolate airborne noise, where measurement procedure is based on ASTM E90-70 or ASTM E366-71 and as defined in UBC Standard No. 35-1.

(3) Detached Single-Family Dwelling—Any single family dwelling which is separated from adjacent property lines by 3 feet or more or is separated from adjacent buildings by 6 feet or more.

(d) Sound Transmission Control Between Dwelling Units.

(1) Wall and Floor-Ceiling Assemblies. Wall and floor-ceiling assemblies separating dwelling units or guest rooms from each other and from public space such as interior corridors and service areas shall provide airborne sound insulation for walls, and both airborne and impact sound insulation for floor-ceiling assemblies.

(2) Airborne Sound Insulation. All such separating walls and floor-ceiling assemblies shall provide an airborne sound insulation equal to that required to meet a Sound Transmission Class (STC) of 50 (45 if field tested) as defined in UBC Standard No. 35-1.

Penetrations or openings in construction assemblies for piping, electrical devices, recessed cabinets, bathtubs, soffits, or heating, ventilating or exhaust ducts shall be sealed, lined, insulated or otherwise treated to maintain the required ratings.

Dwelling unit entrance doors from interior corridors together with their perimeter seals shall have a Sound Transmission Class (STC) rating of not less than 30 and such perimeter seals shall be maintained in good operating condition.

(3) Impact Sound Insulation. All separating floor-ceiling assemblies between separate units or guest rooms shall provide impact sound insulation equal to that required to meet an Impact Insulation Class (IIC) of 50 (45 if field tested) as defined in UBC Standard No. 35-2. Floor coverings may be included in the assembly to obtain the required rating, and must be retained as a permanent part of the assembly and may only be replaced by other floor covering that provides the same sound insulation required above.

(4) Tested Assemblies. Field or laboratory tested wall or floor-ceiling designs having an STC or IIC of 50 or more as determined by UBC Standard 35-1, 35-2 or 35-3 may be used without any additional field testing when in the opinion of the Building Officials the laboratory tested design has not been compromised by flanking paths. Tests may be required by the Building Official when evidence of compromised separations is noted.

(5) Field Testing. Field testing, when required, shall be done under the supervision of a person experienced in the field of acoustical testing and engineering, who shall forward test results to the Building Official showing that the minimum sound insulation requirements stated above have been met.

(6) Airborne Sound Insulation Field Tests. When required, airborne sound insulation shall be determined according to the applicable Field Airborne Sound Transmission Loss Test procedures of U.B.C. Standard No. 35-3. All sound transmitted from the source room to the receiving room shall be considered to be transmitted through the test partition.

(7) Impact Sound Insulation Field Test. When required, impact sound insulation shall be determined in accordance with U.B.C. Standard No. 35-2.

Note: Excerpts from the 1973 U.B.C., Appendix Chapter 35, reproduced with permission of International Conference of Building Officials, 5360 S. Workman Mill Road, Whittier, California.

(e) Noise Insulation from Exterior Sources.

(1) Location and Orientation. Consistent with land use standards, residential structures located in noise critical areas, such as proximity to select system of county roads and city streets (as specified in 186.4 of the State of California Streets and Highways Code), railroads, rapid transit lines, airports, or industrial areas shall be designed to prevent the intrusion of exterior noises beyond prescribed levels with all exterior doors and windows in the closed position. Proper design shall include, but shall not be limited to, orientation of the residential structure, set-backs, shielding, and sound insulation of the building itself.

(2) Interior Noise Levels. Interior community noise equivalent levels (CNEL) with windows closed, attributable to exterior sources shall not exceed an annual CNEL of 45 dB in any habitable room.

(3) **Airport Noise Source.** Residential structures to be located within an annual CNEL contour (as defined in Title 4, Subchapter 6, California Administrative Code) of 60 require an acoustical analysis showing that the structure has been designed to limit intruding noise to the prescribed allowable levels. CNEL's shall be as determined by the local jurisdiction in accordance with its local general plan.

(4) **Vehicular and Industrial Noise Sources.** Residential buildings or structures to be located within annual exterior community noise equivalent level contours of 60 dB adjacent to the select system of county roads and city streets (as specified in Section 186.4 of the State of California Streets and Highways Code), freeways, state highways, railroads, rapid-transit lines and industrial noise sources shall require an acoustical analysis showing that the proposed building has been designed to limit intruding noise to the allowable interior noise levels prescribed in Section T25-1092(e)(2).

Exception: Railroads, where there are no nighttime (10:00 p.m. to 7:00 a.m.) railway operations and where daytime (7:00 a.m. to 10:00 p.m.) railway operations do not exceed four (4) per day.

(f) **Compliance.**

(1) Evidence of compliance shall consist of submittal of an acoustical analysis report, prepared under the supervision of a person experienced in the field of acoustical engineering, with the application for building permit. The report shall show topographical relationship of noise sources and dwelling site, identification of noise sources and their characteristics, predicted noise spectra at the exterior of the proposed dwelling structure considering present and future land usage, basis for the prediction (measured or obtained from published data), noise attenuation measures to be applied, and an analysis of the noise insulation effectiveness of the proposed construction showing that the prescribed interior noise level requirements are met. If interior allowable noise levels are met by requiring that windows be unopenable or closed, the design for the structure must also specify the means that will be employed to provide ventilation, and cooling if necessary, to provide a habitable interior environment.

(2) **Field Testing.** Only when inspection indicates that the construction is not in accordance with the approved design, field testing may be required. Interior noise measurements shall be taken under conditions of typical maximum exterior noise levels within legal limits. A test report showing compliance or noncompliance with prescribed interior allowable levels shall be submitted to the Building Official.

Where a complaint as to noncompliance with this article requires a field test to resolve the complaint, the complainant shall post a bond or adequate funds in escrow for the cost of said testing. Such costs shall be chargeable to the complainant when such field tests show that compliance with these regulations is in fact present. If such tests show noncompliance, then such testing costs shall be borne by the owner or builder.

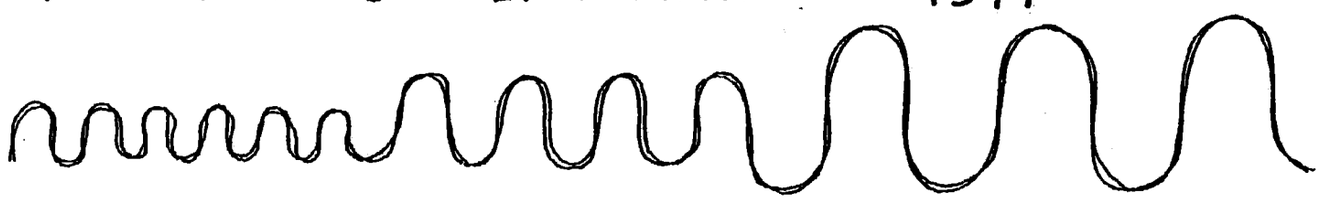
NOTE: Authority cited for Article 4 (Section 1092): Sections 17910 through 17995, 18900 through 18915, 19870 through 19877 and 37039, Health and Safety Code.

History: 1. New Article 4 (Section 1092) filed 3-22-74 as an emergency; designated effective 8-22-74 (Register 74, No. 12).
2. Certificate of Compliance filed 6-11-74 (Register 74, No. 24).
3. Amendment filed 6-26-74 as procedural and organizational; effective upon filing (Register 74, No. 26).
4. Amendment of subsection (e)(4) filed 8-27-74 as an emergency; effective upon filing (Register 74, No. 35).

ENVIRONMENTAL HAZARDS ELEMENT

MARIN COUNTYWIDE PLAN

MARIN COUNTY PLANNING DEPARTMENT - 1977



ENVIRONMENTAL HAZARDS ELEMENT

Comprising the Marin County Seismic Safety and
Safety Elements and Environmental Impact Reports

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Revision-December 1977
Endorsed by Board of Supervisors
11/15/77

Adopted by Board of Supervisors
12/13/77

ENVIRONMENTAL HAZARDS ELEMENT

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VIII LIST OF FIGURES, TABLES & CHARTS (continued)

IX LIST OF APPENDICES (Appendix C included herein, all others may be consulted at Marin County Planning Dept.)

SUMMARY - ENVIRONMENTAL HAZARDS ELEMENT

There are many possible environmental hazards. Seismic and non seismic geologic hazards and fire and flood are specifically included in this element because:

1) They have all occured in Marin in recent history, sometimes with devastating effect, and they all could occur again in the future, and

2) These topics are mandated by state law to be part of each jurisdictions' adopted general plan.

Environmental hazards that are not included in this element include: vector related health hazards, air pollution, water supply contamination, noise, airport landing and take off safety zones, and others which are not likely to significantly impact Marin, have been addressed elsewhere in the Countywide plan, or are not required by the state for inclusion in a general plan.

Objectives:

The objectives of this element are to reduce potential injury or loss of life and to lessen possible property damage.

Policy: County initiated measures to lessen risk to human life and property should focus upon:

1) Areas identified as known or suspected greatest natural hazard areas,

2) Areas of greatest population concentration, and

3) Those hazards which can be avoided or mitigated for new development through improved land development practices.

Summary of Findings:

1) The most direct seismic hazard to manmade structures is fault movement causing rupture of the ground surface. Buildings or utility lines astride a fault when movement occurs will certainly be affected. Such zones are mapped and regulated by the state.

The only known and mapped active fault zone in Marin, as defined by the Alquist-Priolo Safety Zone Act, is the San Andreas Fault going directly through Olema Valley and Tomales Bay.

Much of the fault zone is under water or in Federal parklands. Areas of development on or adjacent to the fault are limited and population is not dense. Another fault, not confirmed as active by the state, and not, therefore, similarly regulated by state law is the Mt. Burdell Fault in North Novato.

2) Ground shaking from an earthquake causes the most widespread damage to life and property. Areas of greatest hazard from ground shaking are also mapped as part of this element. These include both slope stability hazard areas and areas underlain by bay mud.

3) Other seismic hazards such as tsunami (seismic sea waves) cause localized damage primarily to the shoreline and to structures at the waters edge, or lowlands below sea level behind levees. The potential for dam failure inundation of inhabited areas has been mapped.

4) Ground failure involving landsliding or differential settlement can occur as a result of earthquake or other natural forces, including heavy rains, erosion, removal of vegetative cover by fire, and by human actions such as grading, and other development activities, Cliffs and bluffs are undercut by heavy storms and wave action.

5) Flooding can occur as a result of heavy rains, dam failure, levee failure, tidal action, seismic sea waves, or a combination of these events. Flood danger has probably increased in some areas because of subsidence or settlement and in others because of loss of downstream ponding or storage areas and increased surface runoff due to increased development upland. It also occurs in many areas due to unwise urban encroachment onto natural flood plains. The "100 year flood" (maximum flood level used in design of flood protection measures) is likely to occur once each century - but could happen in any year and is included as part of this study as mapped by the Department of Housing and Urban Development.

6) Fire can also be triggered as a result of severe earthquakes or more frequently by other causes. Among the complexities of responding to fire caused by earthquake are the possible disruption of life support distribution and communication systems, ruptured water lines and gas and electric networks, landslide blockage of roads and structural damage to freeway overpasses. These factors cause fires to become a devastating consequence of a severe earthquake and substantiate the need for auxilary water supply sources and for keeping emergency plans up to date. The intensity of wild fires in dry weather periods fanned by prevailing winds depend on fuel characteristics which can be regulated and managed to a great extent, while structural fires occurring in densely settled areas cause the greatest danger to life and property.

Summary Of Recommended Actions Related to these Findings

1) Mapped areas of greatest environmental hazards should be superimposed on the Countywide plan maps and used in the review of development proposals and for focused and detailed site specific environmental impact reports.

2) Because most densely settled areas are within incorporated areas, the most appropriate County role is to provide technical assistance and cooperation to the individual cities and when requested serve in a coordinating capacity for mutual aid protection. When possible, a uniform and consistent response to identified environmental hazards would make the efforts of all jurisdictions in Marin more effective.

3) Public information on these environmental hazards should be as widely available as possible, not to frighten the populace, but to insure that knowledge of the risks and appropriate responses to these risks can be developed by residents of the County. Ongoing emergency preparation plans should attempt to reach as many residents as possible.

4) The policies specified on pages 84-93 of this document should be adopted and implemented by the County Planning Commission and the Board of Supervisors.

Part IV of this Environmental Hazards Element contains the recommended-for-adoption policies and implementation measures. The balance of the text contains background material which is not intended for adoption.

Reducing Risks

An idealized safety plan for Marin would regulate development to minimize risk from natural disaster. Development should be less dense in areas of greatest hazards. Ideally also, emergency facilities with safe access routes should be distributed to serve a maximum of the population affected by these risks. Many areas where extreme hazards exist might be considered as areas where no occupied structures should be built, or allow only low occupancy buildings designed to meet special regulations. But, since the knowledge for preparing an idealized plan was not available years ago, prior to development, there are developments in risk areas now where it is not feasible to remove the existing structures. Hazard mapping could be applied to these areas so that appropriate geologic or engineering investigations could be required prior to redevelopment, or before substantial additions to structures are allowed.

While earthquake-proof, flood-proof, or fire-proof buildings do not exist, there are measures which can be taken to increase safety in hazardous buildings. Some of these measures are inexpensive. Others which are costly, could be phased over time, or incentives or financial assistance, such as rehabilitation loans could be provided.

Should major damage be inflicted upon Marin, as a result of future floods, fires or earthquakes, an opportunity for rebuilding Marin, to minimize future damage, should not be ignored. While it is hoped that no great natural disaster will destroy homes or cause loss of life, the County has a responsibility to its citizens to be as prepared as possible by anticipating some of the hazards and taking measures to strengthen buildings of high occupancy, control development in high risk areas and prepare for post-emergency action.

INTRODUCTION

This Environmental Hazards Element to the Marin Countywide Plan examines some of the special problems of developing in Marin's unique environment and proposes strategies to insure that Marin remains a safe as well as an environmentally attractive setting.

The text is arranged to:

1) Provide an overview of the environmental setting of Marin County, in geologic, seismic and other hazard terms,
2) describe the relationships of these natural hazards.
3) Propose policies in the context of Countywide Plan goals, designed to lessen costs and dangers of these hazards.
4) Append and reference important technical and background information.

Why an Environmental Hazards Element?

This element has its origin in State law and much recent public concern. State law mandates the inclusion of a seismic safety and safety element as part of every local government's adopted General Plan.[1]

Beyond this mandate however, there are compelling reasons for citizens and decision-makers to concern themselves with identifying and ameliorating hazards inherent in Marin's natural setting. Marin homeowners, developers and government officials experience real hazard problems, often with significant property losses and occasionally with danger to people in their daily activities.

There are frequent small landslides, differential ground settlements and soil shrinkages causing foundation cracking, road bucklings, utility breakages and sometimes complete wreckage of structures.

In addition to this regular toll exacted by the environment in response to inadequately planned or engineered projects, there are unavoidable sudden dangers of flood or wildfire. These too, draw most of their threat from the lack or inadequacy of land planning of an earlier time.

Looming over all is the ever present potential for another major or great earthquake as in 1906, with the possible difference that, a now vastly more developed, eastern Marin might be devastated as was San Francisco then.

Obtaining the Necessary Information

Several of the incorporated communities have joined the County and the California Division of Mines and Geology in a cooperative program of geologic mapping, geologic hazards identification and evaluation. This program has been underway since 1972-73 and is scheduled for completion in August, 1977 after having covered about thirty percent of the County - but more importantly over 95% of the populated areas. The program provides the technical background and substantiation for most of this element, and the technical reports and maps should be con-

sidered as the primary resource materials for geographic application of policies and general reference.

In addition certain specialized data including that relating to tsunamis was obtained from the SF Bay Region Environment & Resources Study, produced by the USGS-HUD-ABAG effort from 1970 to 1975.

Response to Hazard - How much Risk at What Cost?

While these costs and dangers are impressive, they can in part be avoided altogether, almost always be reduced and, in the case of major earthquakes, at least be well prepared for.

There are varying degrees of protection that can be taken to safeguard against the hazards associated with the environmental conditions discussed in this element. The costs necessary to insure against damage can be very great and judgements about the risk entailed must include a weighing of the consequences for not undertaking such measures. Many of the recommendations which take the form of policies in P a r t IV are measures which the County, as a rule, implements at the present time. Some of the measures are not formalized, and as such, are not adopted policy of the County. Implementation techniques for those measures are suggested together with a description of the implications of the review requirements and expenditure of staff time. The County decision-makers, the Planning Commission and Board of Supervisors. will be the ultimate judges of the questions of "who pays" and "how much risk is too much risk". Every year brings us a greater knowledge of the sciences which explain the complex phenomena and earth processes involved in these environmental hazards; each year our ability to assess risk and develop measures to preclude or mitigate such risk increases. The policy recommendations attempt to reflect the evolution of the "state of the art" and they demand a sophisticated degree of case by case evaluation.

1

Government Code Section 65302 (65302. l) - A seismic safety element consisting of an identification and appraisal of seismic hazards such as susceptibility to surface ruptures from faulting, to ground shaking, to ground failures, or to the effect of seismically-induced waves such as tsunamis and seiches. The seismic safety element shall also include an appraisal of mudslides, landslides, and slope stability as necessary geologic hazards that must be considered simultaneously with other hazards such as possible surface ruptures from faulting, ground shaking, ground failure and seismically induced waves.

A safety element for the protection of the community from fires and geologic hazards including features necessary for such protection as evacuation routes, peak load water supply requirement, minimum road widths, clearances around structures, and geologic hazard mapping in areas of known geologic hazard.

THE GEOLOGIC SETTING OF MARIN COUNTY

Marin County occupies a geologic setting that is both complex and dynamic. The County lies astride the San Andreas Fault, an active rupture between two great plates of the earth's crust. For many millions of years the Pacific Plate, which includes Point Reyes Peninsula, has been migrating northwest, sporadically jerking and sliding past the North American Plate along this rupture. As a result, different bedrock sequences that originated many miles to hundreds of miles from each other have been juxtaposed on opposite sides of the fault, which follows the trough-like Olema Valley and Tomales Bay (See figure 1).

Other than the San Andreas, no active faults, established as potential sources of earthquakes, are known within Marin County. However, most of the County is sandwiched between two major active fault zones, the San Andreas and the Hayward, both of which have generated great earthquakes during the 200 years of our recorded history of the area.

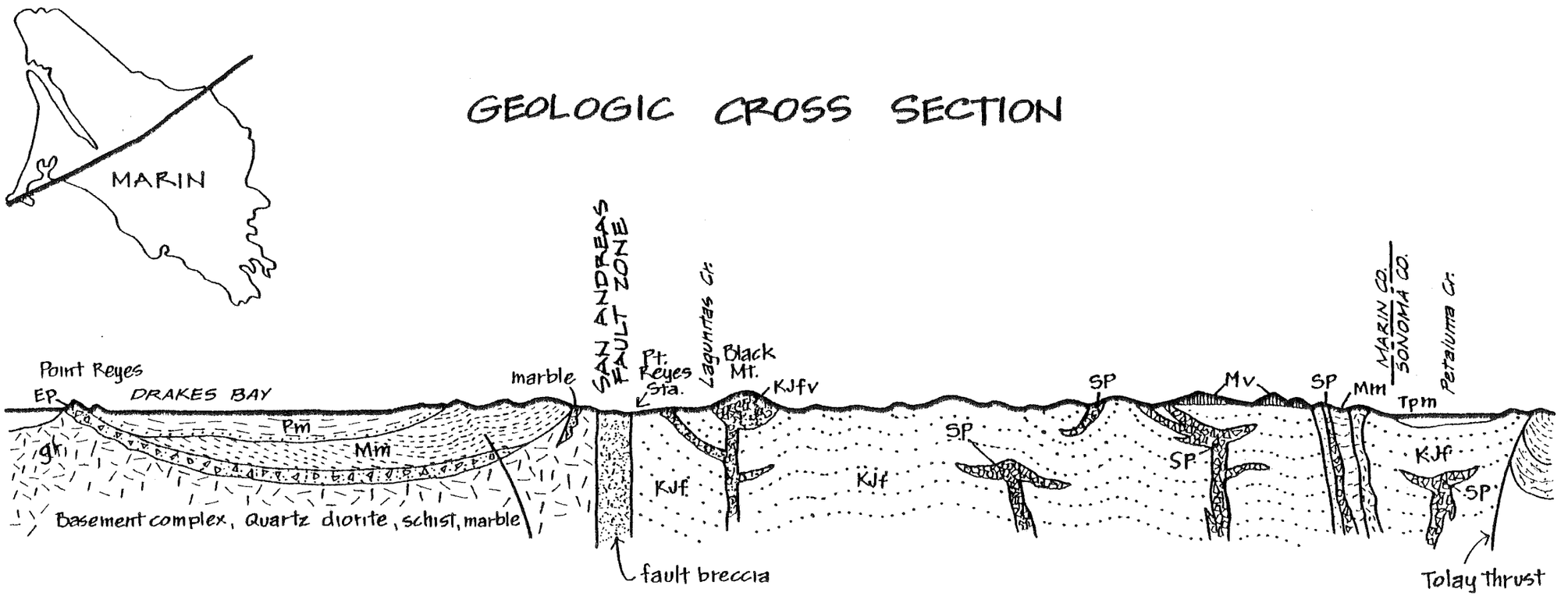
East of the San Andreas Fault

On the "mainland" side of the San Andreas Fault, the bedrock of Marin County is a complex, disrupted assemblage of sedimentary, igneous, and metamorphic rock masses generally called the Franciscan Formation.(KJf). The Franciscan is widespread in the Coast Ranges. It originated during late Jurassic and Cretaceous time (roughly between 150 million and 80 million years ago), when the North American plate was moving westward and overriding the crust of the earth beneath the Pacific Ocean. The San Andreas Fault had not yet been created (See figure 2).

The Franciscan is composed mostly of sandstone and mudstone that originated as sediments deposited in the ocean. But the formation also includes some of the volcanic rocks(KJfv) and pelagic radiolarian cherts of the ancient oceanic crust on which these sediments were deposited, along with a variety of exotic and enigmatic metamorphic rock masses, and much intensely sheared rock material that originated in an immense ancient fault zone.

The Franciscan sediments probably accumulated in a submarine trench formed at the junction of the two interacting plates. Rocks occupying this zone of disruption were more or less dismembered, large and small blocks and slabs of the more resistant sandstone being swept along in a matrix of weaker sheared muddy debris, and mixed with fragments of volcanic rocks of the oceanic crust on which they had been deposited. By complex thrust faulting mechanisms not yet fully understood, fragments and giant slabs of unusual metamorphic rocks and of serpentine, both from beneath the crust, also ended up in places chaotically mixed with rock materials that had originated on the ocean floor.

FIGURE 1


MARIN
GEOLOGIC CROSS SECTION
Point Reyes
EP
DRAKES BAY
Pm
Mm
gr
Basement complex, Quartz diorite, schist, marble
marble
SAN ANDREAS FAULT ZONE
Pt. Reyes Sta.
Lagunitas Cr.
Black Mt.
KJfv
KJf
fault breccia
SP
Mv
SP
Mm
MARIN CO.
SONOMA CO.
Petaluma Cr.
Tpm
KJf
SP
Tolay thrust

The most disrupted zones of the Franciscan are called melange, and are made up of resistant masses (large and small fragments) of the various rock types embedded in an intensely sheared, fine-grained matrix. Melange yields some of the most interesting landscape in the County. The weak, sheared matrix is seldom exposed, for it is easily eroded away, leaving an uneven surface decorated with scattered knolls, blocks, and monuments of the various unsheared and resistant rock masses that had been enclosed in it.

Many of the prominent ridges, hills, and knolls in this part of the County are made up of great, relatively coherent blocks and slabs of sandstone, volcanic rocks, or chert, up to many miles in dimensions, that resisted dismemberment during the great shearing deformations, but most or all of these rock masses have faulted boundaries. Most of our valleys have been formed by erosion of weaker mudstone and melange matrix.

Following the formation and initial disruption of the Franciscan assemblage, there is a gap in the geologic record of many tens of millions of years during which mountain building processes further deformed and uplifted the former marine environment into a mountain range. This long period of uplift, along with concurrent erosion, molded the basic character of our mountainous terrain.

The next geologic event recorded in the rocks was an episode of volcanic activity during Miocene time, about 11 million years ago, that erupted the andesitic volcanic rocks (Mv) now capping Burdell Mountain. A few dikes of similar volcanic rocks cutting the Franciscan rocks in central and southern Marin suggest that eruptions may also have taken place there, but any lava or volcanic ash erupted from them has been eroded away.

During late Pliocene and early Pleistocene time, perhaps 1 to 2 million years ago, local downwarping of the earth's crust resulted in a deep marine embayment in northwestern Marin and southwestern Sonoma County. By the time renewed uplift drained the bay, as much as several hundred feet of weakly cemented pebbly sandstone and siltstone, called the Merced Formation (Pm)had been deposited on a beveled surface of Franciscan rocks. Remnants of these deposits now cap broad, gently rounded ridges in that area.

The final episode in the geologic development of eastern Marin County came during Pleistocene time (the "Ice Age") with the formation of the depression of San Francisco Bay by downfaulting or downwarping of the earth's crust there. Accumulations of immense quantities of water in the great continental ice sheets lowered sea level as much as 350 feet at times. These glacial maxima drained the bay and led to great erosion by the Sacramento River passing through the resulting valley,

and by increased effectiveness of tributary streams to cut steep-sided valleys, gorges, and ravines into the Marin uplands.

With the melting of most of the last ice sheets, beginning about 12,000 years ago, sea level gradually rose to its present level about 7,000 years ago. During this drowning process, as at present, most of the clay and silt carried by river flood waters were deposited within the now quiet waters of the bay. Thus the old valley system has been partially buried by the soft organic silty clay called bay mud (Qal) that makes up our marshlands and mudflats (and underlies some recent housing development).

West of the San Andreas Fault

As mentioned earlier, the bedrock units on Point Reyes Peninsula, west of the San Andreas Fault, originated many miles to many hundreds of miles southeast of their present location, and have reached their present location by displacement along the fault. The Pacific Plate, including Point Reyes Peninsula, is continuing its intermittent northwesterly migration past Marin County at an average rate of 2 inches or more per year. It was a sudden displacement of 15 to 20 feet along the San Andreas Fault, to release accumulated strain within the adjacent plates, that created the great "San Francisco" earthquake of 1906. Similar earthquakes must have occurred innumerable times in the past resulting from this relentless driving mechanism, and will no doubt occur in the future.

The oldest of the rock types of the peninsula are the granitic rocks (Gr) of Inverness Ridge and Point Reyes (about 80 million years old), along with some small remnants of older metamorphic rocks embedded in them. The nearest granitic rocks on the east side of the San Andreas Fault with which the ones of Point Reyes Peninsula might be correlated are in the Tehachapi Range, in the southern "hook" of the Sierra Nevada, some 300 miles to the southeast.

During the course of their travels northward, the granitic and metamorphic rocks of the Point Reyes Peninsula region have been periodically and locally depressed below sea level, thus accumulating Cenozoic marine deposits of conglomerate, sandstone, siltstone, and mudstone in places. The coarse conglomerate(Ep) resting on granite at Point Reyes is of Paleocene age (about 60 million years). The Monterey Formation (Mm) of the area between Bolinas and Bear Valley, and the Drakes Bay Formation(Pm) of the central peninsula area, are shallow water marine deposits of late Miocene to early Pliocene age. Similar sedimentary rocks do not occur on the east side of the San Sandreas Fault in Marin County or vicinity.

MAJOR GEOLOGIC FORMATIONS IN MARIN COUNTY

The major geologic units are discussed here in terms of those characteristics which are relevant to an understanding of natural hazards (See Map 1). Greater detail of their origin and mineralogic composition can be found in the four technical reports and detailed legends to the large scale maps prepared for the County and cities by the California Division of Mines and Geology. (Copies of these technical reports and their accompanymaps are available at the Marin County Planning Department).

Franciscan Melange

The principal bedrock formation of the coast ranges, and of Marin, (east of the San Andreas fault) is the Franciscan Formation.

The Franciscan rocks consist predominantly of sandstone and shale formed from sand and mud washed into the ocean during late Mesozoic time, roughly between 90 million and 150 million years ago. In Marin County, the formation also contains large amounts of greenstone (altered from lava erupted under the sea), of radiolarian chert (a hard sedimentary rock of deep sea origin), of serpentine (an altered igneous rock related in origin to the mantle of the earth, beneath the crust) and scattered small but resistant masses of some unusual types of metamorphic rocks.

A large percentage of the Franciscan Formation in Marin County occuring over about half of the eastern corridor consists of Franciscan Melange. This is a disrupted assemblage of small and large masses of various hard rock types embedded in, and separated from each other by more or less intensely sheared * and crushed rock material. This material represents one or more great, ancient fault zones, where broad zones of the old bedrock were broken and sheared by the interaction between plates of the earth's crust driven in opposing directions by forces deep within the earth.

Melange terrain in Marin County is characterized in many places by the presence of scattered prominent outcrops or monument-like masses of hard rock projecting out of otherwise smooth grassy slopes. These hard or resistant masses ordinarily comprise an assortment of rock types, principally sandstone, greenstone, chert, serpentine, and glaucophane schists, that rarely show evidence of continuity between outcrops. Even when nearby outcrops are of a single rock type, such as sandstone, close examination most commonly reveals they are different from each other in texture, composition, and history.

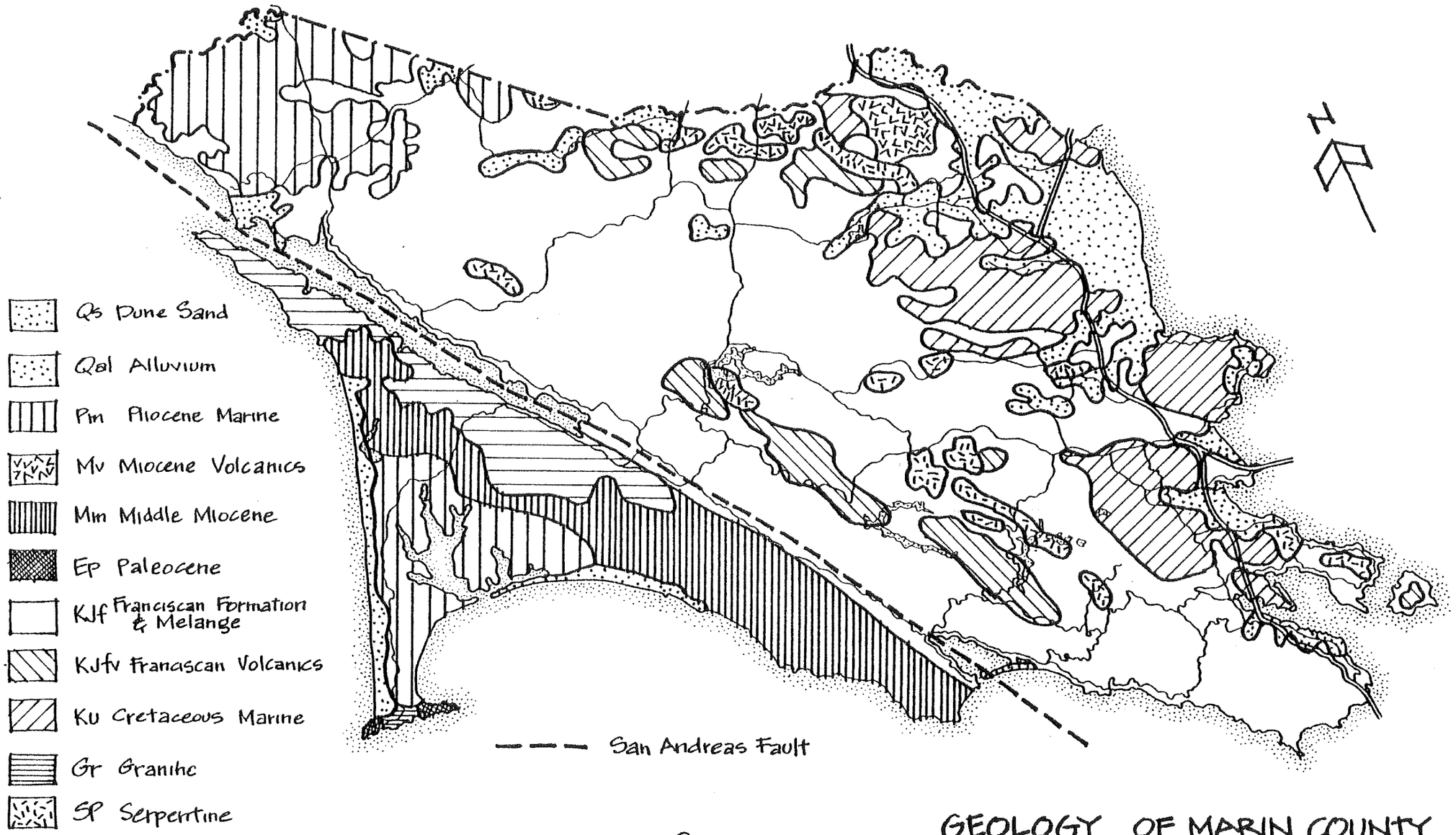
Serpentine commonly occurs as extensive masses in melange. The presence of this waxy green rock in the Franciscan should strongly suggest the presence of the melange. Serpentine is an unusual rock type that originated below the crust of the earth; therefore, its presence at the surface supports the concept that the soft, sheared matrix of the melange represents a zone of great disruption. Although it is almost everywhere more or less thoroughly sheared in such settings, the

*See Glossary

CHART 1 (See Fig. 2 opposite)

RELATIVE GEOLOGIC TIME			ATOMIC TIME (in millions of years)	ROCK UNITS IN MARIN COUNTY with map symbols	
Era	Period	Epoch		WEST OF THE SAN ANDREAS FAULT	EAST OF THE SAN ANDREAS FAULT
Cenozoic	Quaternary	Holocene		Dune sand (Qs) and Alluvium (Qal)	Dune sand (Qs) and Alluvium (Qal)
		Pleistocene	1.8	Marine terrace sediments (Qs)	Marine terrace sediments (Qs)
	Tertiary	Pliocene	7	Marine sedimentary rocks (Pm)	Marine sedimentary rocks (Pm)
		Miocene	26	Marine sedimentary rocks (Mm)	Volcanic rocks (Mv)
		Oligocene	37-38		
		Eocene	53-54		
		Paleocene	65	Marine sedimentary rocks (Ep)	
Mesozoic	Cretaceous	Late Early	136	Granitic rocks (Gr)	Marine sedimentary rocks (Ku) Franciscan melange & Fran. Formation (KJf) Franciscan Volcanic rocks (KJfv) Serpentine (SP)
	Jurassic	Late Middle Early	190-195		
	Triassic	Late Middle Early	225		
Paleozoic	Permian	Late Early	280	Rocks of these ages are not known to be present in Marin County	
	Carboniferous Sys: Pennsylvanian	Late Middle Early			
	Carboniferous Sys: Mississippian	Late Early	345		
	Devonian	Late Middle Early	395		
	Silurian	Late Middle Early	430-440		
	Ordovician	Late Middle Early	500		
	Cambrian	Late Middle Early	570		
Precambrian			3,600+		

FIG. 2



GEOLOGY OF MARIN COUNTY

serpentine tends to be a relatively stable material compared to the melange matrix that underlies or surrounds it, and that occasionally undermines it by landsliding.

Because of the sharp differences in inherent strength characteristics of the various components of the melange, areas underlain by this type of material exhibit highly erratic slope stability characteristics. The crushed and intensely sheared melange is not only inherently weak in most places, but commonly it also weathers to yield a highly expansive clay-rich soil. Moderately steep slopes underlain by such material often exhibits evidence of slow downhill creep or debris flow landslides. As a result of the relative instability and erodibility of the melange, wide zones tend to form a disrupted topography. Bold outcrops of hard, resistant rock masses and hummocks of soil-covered and more easily weathered sandstone and shale are separated by subdued swales that are the result of differential erosion and downslope migration of the weak melange and its soil cover.

The unsheared masses of coherent rock enclosed within the melange tend to have high strength characteristics. Where imbedded and not influenced by near-surface downslope movement, these masses also manifest high slope stability. Such masses commonly act as buttresses at the bottoms of slopes to support weak melange upslope from them - - an important factor to be recognized before such buttresses are removed in notching the base of slopes for house sites or road construction.

*See Glossary

Semi-Schist and Related Metamorphic Rocks

The oldest rocks in eastern Marin County are the semi-schists phyllites, metacherts, and metavolcanic rocks that underlie parts of the Novato, Terra Linda and Tiburon Peninsula areas. These rocks are the products of partial to complete recrystallization (metamorphism) of sandstones, shales, cherts and volcanic rocks. They generally have significantly different physical properties than their unmetamorphosed equivalents, and yield different soils.

The most abundant of these rocks are the semi-schists, derived from massive to thin bedded sandstones. Semi-schists are coarsely foliated* rocks that tend to split along parallel planes defined by parallel orientation of abundant tiny flakes of micaceous minerals that are products of the metamorphism.

Phyllite, derived by metamorphism of shale and mudstone, is associated with the semi-schists in places.

Soils developed by weathering of the semi-schists and phyllite typically have a high content of clay minerals which determines the important physical properties of these soils. When they are wet, they become quite plastic, have little strength, and thus are particularly susceptible to downslope creep* and other modes of landsliding. Indeed, these soils are so weak when wet that accumulations more than 2 or 3 feet deep on moderate slopes tend to exhibit evidence of landsliding.

Metachert (metamorphosed chert) is associated with the semi-schist and phyllite in many places as relatively small, isolated masses up to about 100 feet long. In a few places (southwestern slopes of Tiburon Peninsula) the metachert occurs in much larger masses.

The metachert yields thin rocky soils and colluvium that have relatively high slope stability, except where interbedded with abundant phyllite. In the latter case, clay derived from weathered phyllite can be sufficiently abundant to lower the wet strength of the material and lead to creep or landsliding on slopes.

Metavolcanic rocks are also present in places with or near semi-schists. These are compact, hard, fine-grained rocks that are mostly similar in appearance to greenstones of the Marin Headlands, but different in their mineralogy and in many physical properties.

These are strong rocks, with high slope stability characteristics. Their soils are reddish brown in most places, and tend to be thin and rocky. The largest outcrops of these metavolcanic rocks are on the ridge crest north of Terra Linda, on Belvedere Island, and on the southern slopes of Tiburon Peninsula.

The Novato Conglomerate is a thick accumulation of well rounded pebbles and boulders in a well-cemented sandy matrix. It is a strong and stable rock, capable of standing firm in very steep cuts. Weathering of the rock yields a thin, gravelly, permeable soil that is quite stable. The soil supports a rather dense oak forest that effectively protects it from serious erosion. However, on the characteristically steep slopes underlain by the conglomerate, the soil is potentially subject to rapid erosion when stripped of vegetation.

Sandstone and Shale

Most of the hills and ridges of the southern Novato area are underlain either by thick-bedded, massive, coarse-grained sandstone or by a sequence of thin beds of shale alternating with thin beds of fine-grained sandstone. Similar sandstone and shale formations are the most abundant rock types in Central and parts of Southern Marin.

Bedding planes seldom are visible in the massive sandstone, except in deep cuts, and even there the widely spaced fracture planes of joints and minor faults are commonly more evident than bedding. The faults are ancient ones -- not potentially active -- but are significant in that they are planes of weakness that should be recognized in any deep excavation.

Both the thinly bedded unit and the massive sandstone yield sandy or silty soils that are well drained. But slopes are so steep in most areas underlain by these rocks that soils remain thin, being removed by erosion about as fast as they form. Thus thick masses of the soils are rare except in swales near and at the base of the slopes. Although they are relatively stable

and not given to landsliding under natural conditions, these sandy soils are susceptible to liquefaction* in local zones where saturated, either by unusually heavy rain or more commonly by drainage from streets and roads. They are also highly susceptible to erosion when stripped of their vegetative cover.

Alluvium

Unconsolidated sedimentary deposits of clay, silt, sand, and gravel underlie the main stream and valley bottoms in eastern Marin and along the coast. These deposits are all of Quaternary age. Upstream from the ancient sea level contour, these deposits contain abundant coarse detritus* (sand and gravel) along with the finer-grained clay and silt. These soils were eroded from the steep local watershed slopes and transported by flooding streams to the gently sloping alluvial fans and floodplains of the valleys. In contrast, the bay plains, marshlands and mudflats of the bay are below sea level, and are predominantly silt and clay transported from the east by the Sacramento River and deposited from bay tide waters. These latter deposits are called bay mud, and are described later in the text.

Alluvial deposits of the area are rarely well exposed, even in the banks of deeply incised streams. Although they are moderately well compacted, these deposits are unconsolidated and relatively weak, so they tend to slump when undercut by stream erosion. Where observed they consist of interbedded layers of silty or sandy clay, clayey sand, and gravel. The deposits vary in composition and texture from valley to valley, depending on the nature of the different rock materials being eroded from the various local watersheds. Most of the alluvium in eastern Marin is rich in clay derived from the clay-rich soils that form on semi-schist and melange. In the southern part of the Novato area, however, the alluvial deposits consist of sandy layers interbedded with gravel, with a small percentage of clay, due to their derivation from the local sandy soils from slopes underlain mostly by coarse-grained arkosic sandstones.

Colluvium

Colluvium is a general term for deposits of unsorted and unconsolidated soil material and weathered rock fragments that accumulate on or at the base of slopes by gravitational or slope wash processes. Soil and rock debris in colluvial deposits were derived by weathering and decomposition of the bedrock materials underlying the slopes on which they lie, and are present on most slopes in the southeastern Marin area.

Rapid erosion prevents colluvium from accumulating to depths of more than a few feet on the steepest slopes in the area. However, it accumulates in deposits many feet to many tens of feet in some ravines, draws, and swales that separate the spurs of the ridges.

* See Glossary

Bay Mud

The present and former marshlands and mudflats bordering the bay in eastern Marin County are underlain by various and uneven thicknesses of bay mud. Substantial portions of the former wetlands exist behind dikes which were created for agricultural and industrial purposes. This mud is a soft, unconsolidated, water-saturated silty clay, containing peaty plant remains and mollusk shells. Its general physical characteristics have been appropriately pictured as "....semi-viscous material similar to jelly which can easily change its geometric configuration" (Lee and Praszker, 1969, p. 47).

The characteristics of the bay mud are the result of its origin and youthful age. It has been deposited over the last 10,000 years during the post "Ice Age" creation of San Francisco Bay. Lenses of peat and peaty clay within the resulting bay mud deposits indicate intermittent marshy growths that were successively buried by the floods of new silt that accompanied surges in the rise of sea level.

About 7000 years ago the sea had reached its present level and the topography of the old valley system region had been partially buried by the soft, water-saturated, organic silty clay - bay mud. It has not had time to have the water squeezed out of it by slow, natural compaction processes.

Not only is bay mud highly compressible, but, when saturated, it will flow laterally under the influence of localized pressure such as thick fills placed on it over too short a period of time. Similar soft mud underlies the mudflats and marshlands at the head of Tomales Bay and of Bolinas Lagoon.

SEISMIC HAZARDS

The Nature of Earthquakes

Earthquakes are sudden releases of strain energy stored in the earth's bedrock. The energy originates in the geologic forces which cause the continents to change their relative positions on the earth's surface. The process is called "plate tectonics"* and will be discussed below. Earthquakes represent adjustments between these plates as they slip past one another to establish a new equilibrium. In the process, the features of local landscapes are created as mountains and ridges rise up and as valleys are formed.

Energy can be stored in the earth's crust because its bedrock formations are more or less elastic. Under pressure, they may be permanently distorted, or, they may store the energy for later release. Like the hard steel of springs or the wood of bows, they can bend under pressure and hold the strain energy. They can release the pressure slowly, or they can "break" and release it rapidly, and often destructively.

Earthquakes occur when either the resistance of friction between rock masses is overcome along an existing crack (fault) or when the shear strength of the hard rock material is exceeded, and it "breaks". The main break of an earthquake may be signalled by foreshocks and followed by aftershocks.

The energy being received in local rock formations may be released almost as soon as it is generated or it may be accumulated and stored for long periods of time. The individual releases may be so small and gentle that they are detected only by sensitive instruments or measured as tectonic "creep", or they may be massive and so violent that they cause destruction over vast areas.

During an earthquake, opposite sides of the crack (fault) move relative to one another. The displacement may originate at great depth in the earth and be absorbed within the earth or it may propagate to the surface. The relative movement between the rock formations on either side of the fault may be horizontal,vertical, or a combination.

The Cause of Earthquakes

Earthquakes are thought to be a form of local adjustment to a worldwide geologic process called "continental drift" or "plate tectonics". It has been popular speculation for centuries that the earth's continents originated as a common land mass and gradually drifted apart, but it was not until discoveries were made of earth spreading under the Atlantic Ocean in the 1960's that scientists were able to piece together a global theory of drift that satisfactorily explained what was happening and why. According to this theory, the earth's crust is divided into a few vast plates which form its continents and underlie its oceans. Along the ridge systems on the floors of the Atlantic and Pacific Oceans, molten material from within the earth's mantle is being forced to the surface through cracks in the

* See Glossary

crust and is causing the plates to spread apart. This spreading motion inevitably results in collision of plates, such as occurs at the Peru-Chile trench, where the plate which underlies the Pacific Ocean collides with the Americas Plate (see Figure 3).

The Effects of Earthquakes

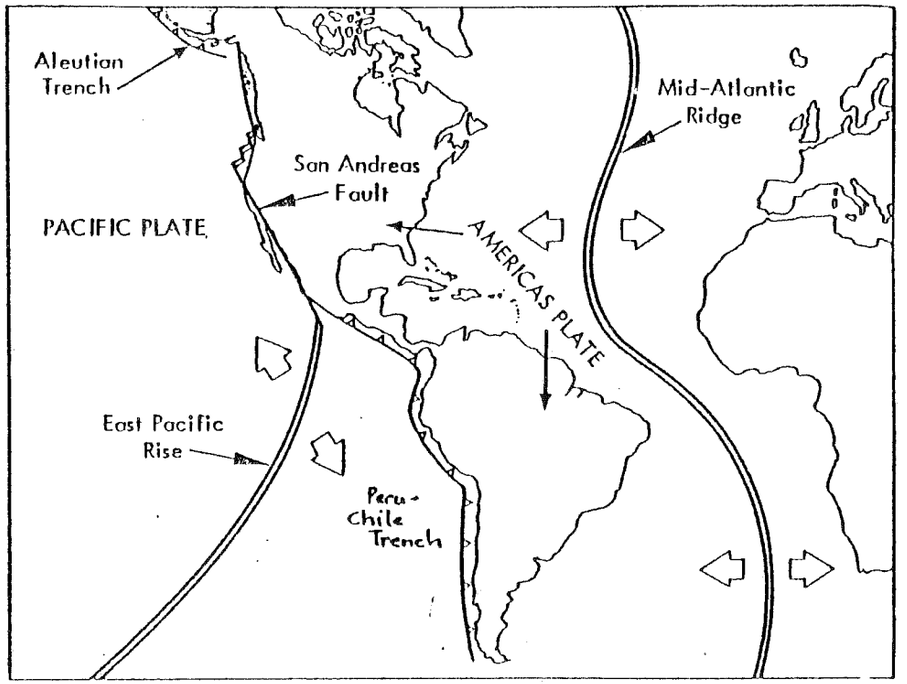
The instant an earthquake is triggered a series of events which can have serious consequences for property and people is set into motion. These events involve interactions between seismic forces, natural features, and man-made structures.

From the location along the earthquake fault where energy is released (the "focus")*, force is radiated outward in the form of waves which dissipate gradually. Near the focus, the forces may be strong enough to physically stress landforms and buildings, while at greater distances the waves can be detected only with instruments.

The force which radiates outward from an earthquake is transmitted through the hard rock crust in short, rapid vibrations; these are transformed into long, high amplitude motions when the waves enter soft ground materials. Sometimes, the undulations are long and deep enough to be visible as they move across the surface. (See figure 4).

* See Glossary

PLATE TECTONICS

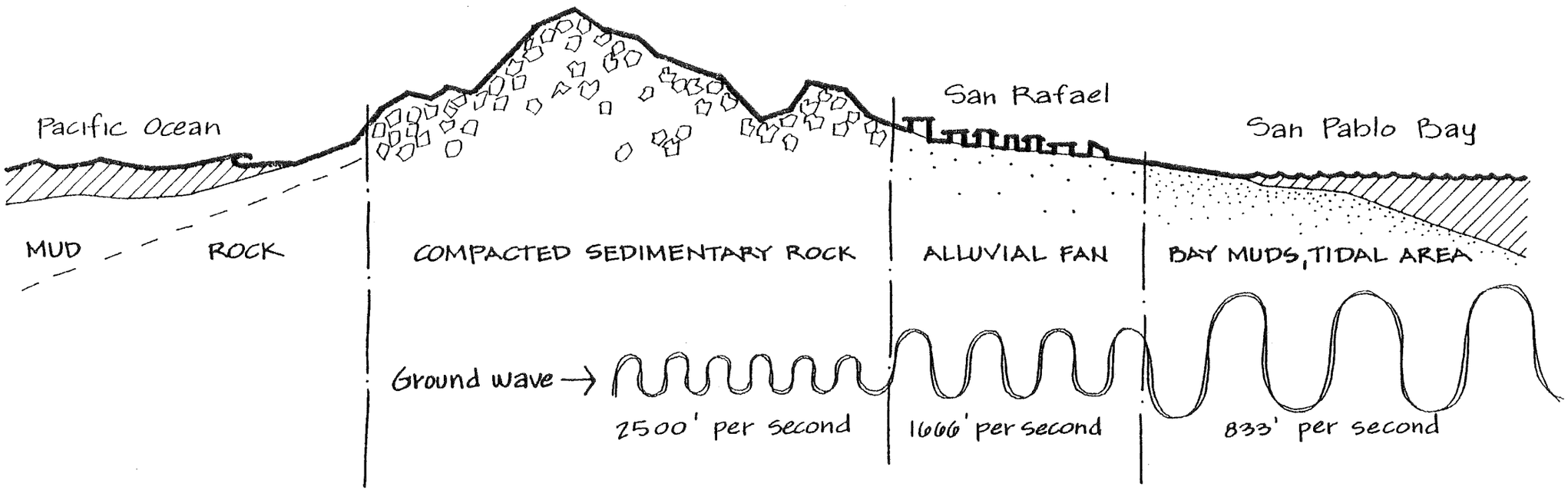


The earth's "crust" is composed of several large "plates". These plates are slowly being pushed across the surface of the earth, away from the mid-ocean ridge systems. California is situated on the western edge of the Americas Plate, with the San Andreas fault forming the boundary between the Americas and Pacific Plates. The high seismicity of California is a direct result of its location on the edge of a plate.

FIGURE 3

FIG. 4

AMPLITUDE OF SEISMIC GROUND WAVES



The relative frequency, amplitude, and duration of ground waves increases as it passes from highly compacted material to less compacted material. Therefore, ground shaking will last longer and have a greater amplitude in the bay muds than in the hills underlying sedimentary rock.

As previously noted, the shear movement within the earth's crust that occurs during most California earthquakes may cause surface displacement along an existing fault or result in the creation of new fault breaks. However, earthquakes that originate at great depths within the earth and earthquakes of Richter magnitude less than approximately 6.0 are generally not accompanied by surface faulting.

Faults are seldom single cracks but typically are braids of breaks that comprise shatter zones. These link to form networks composed of major and minor faults. A fault having recorded movement, or one which shows evidence of geologically recent displacement (within the last 10,000 years) is regarded as "active" and is more likely to generate a future earthquake than a fault which shows no signs of recent movement.

Although rock or ground rupture along a fault is dramatic, the physical effects of faulting are highly localized. Not so are the effects of ground shaking which are widespread and cause most earthquake damage. In a great earthquake, major damage from ground shaking can occur over one hundred miles from the source of the earthquake.

* See Glossary

Intensity and Magnitude

Intensity* is a description of the physical effects of earthquakes. The lowest intensity ratings are based on human reactions, such as "felt indoors by few". The highest intensities are measured by geologic effects, such as "broad fissures in wet ground, numerous and extensive landslides, and major surface faulting". The middle intensity range is based largely on the degree of damage to buildings and other structures. Intensity ratings are based on visual observation and are not measured with instruments. The scale used to measure the intensity of a quake is the Modified Mercalli Scale with intensities ranging from I to XII. (See chart 3).

Specific locations may have an intensity rating of VIII due to soil conditions and building type while other locations affected by the same earthquake may only have an intensity of IV. Therefore, a single earthquake can have different intensity ratings based on geologic conditions, structural design, or distance from the earthquake's epicenter.*

In 1932, Charles Richter developed a system of tables and charts to deduce from seismological instruments a method of measuring the magnitude of an earthquake. The measurement of magnitude* assigns a number to the calculated energy release of the earthquake, allowing comparison of seismic events. By this method, an earthquake is rated independently of the place of observation. Magnitude, derived from seismograph records, as

measured on the Richter scale, is a unique value for each earthquake. The scale is logarithmic, and each whole unit represents an increase of about thirty times in the energy released. (See Chart 2 and Table 1).

California and Bay Area Setting and Marin Seismic History

California is located in one of the most seismically active areas of the earth. The explanation for this is that the state is located on the boundary between the plate underlying the Pacific Ocean and the one forming the American continent and the western North Atlantic Ocean floor. The Americas Plate, as the latter is called, is thought to be"drifting"southwesterly relative to the Pacific Plate and being forced to override the latter. The main line of contact between the two plates is the San Andreas fault system. Simply stated, as these plates shove and grind against one another, movement occurs on the San Andreas fault, or a fault parallel to it, and California has earthquakes. (See Figure 5).

The San Andreas fault trends northwesterly through the Bay Area, as shown on Figure 9. It is paralleled by the Hayward, Calaveras and other major faults. These faults comprised a system which collectively, has given rise to at least one documented "great" earthquake (1906) and from four to eight other major or great earthquakes since 1800, based on historical records of felt intensity. It must be remembered that until after 1906 there were no instrumental measurements of earth-

(see page 22)

CHART 2

INTENSITY VS. MAGNITUDE

Although no direct correlation can be made between intensity and magnitude, it certainly is true, at least for shallow-focus earthquakes (most California earthquakes), that the zone of destruction increases as the magnitude increases.

Richter (1958) proposed the following comparisons for earthquakes occurring in Southern California:

MAGNITUDE:	2	3	4	5	6	7	8
INTENSITY:	I-II	III	V	VI-VII	VII-VIII	IX-X	X-XII

The following earthquakes are cited to give an indication of the relationship of magnitude vs. intensity:

1. San Francisco, 1906, Magnitude 8.3: the Intensity VII effects extended out approximately 85 miles from the fault plane.

2. Kern County, 1952, Magnitude 7.7: the Intensity VII effects extended out approximately 50 miles from the fault plane.

3. San Fernando, 1971, Magnitude 6.6: the Intensity VII effects extended out approximately 15 miles from the fault plane.

4. Parkfield, 1966, Magnitude 5.5: the Intensity VII effects extended out about 5 miles from the fault plane. An earlier earthquake of Magnitude 5.1 caused only mild alarm and no apparent damage.

MODIFIED MERCALLI SCALE OF EARTHQUAKE INTENSITIES

I. Earthquake shaking not felt.

II. Shaking felt by those at rest.

III. Felt by most people indoors; same can estimate duration of shaking.

IV. Felt by most people indoors. Hanging objects swing, windows or doors rattle, wooden walls and frames creak.

V. Felt by everyone indoors, many estimate duration of shaking. Standing autos rock. Crockery clashes, dishes rattle or glasses clink. Doors close, open or swing.

VI. Felt by everyone indoors and by most people outdoors. Many now estimate not only the duration of shaking but also its direction and have no doubt as to its cause. Sleepers awaken. Liquids disturbed, some spilled. Small unstable objects displaced. Weak plaster and weak materials crack.

VII. Many are frightened and run outdoors. People walk unsteadily. Pictures thrown off walls, books off shelves. Dishes or glasses broken. Weak chimneys break at roof line. Plaster, loose bricks and unbraced parapets fall. Concrete irrigation ditches damaged.

VIII. Difficult to stand. Shaking noticed by auto drivers. Waves on ponds. Small slides and caving in along sand or gravel banks. Stucco and some masonry walls fail. Chimneys, factory stacks, towers, elevated tanks twist or fall. Frame houses move on foundations, loose panel walls thrown out.

IX. General fright, people thrown to the ground. Steering of autos affected. Branches broken from trees. General damage to foundations and frame structures. Reservoirs seriously damaged. Underground pipes broken.

X. General panic. Conspicuous cracks in ground. Most masonry and frame structures are destroyed. Serious damage to dams, railroads bent slightly. Some well-built wooden structures and bridges destroyed.

XI. General panic. Large landslides, water thrown out of canals, rivers, lakes. Sand and mud shifted horizontally on beaches and flat land. General destruction of buildings. Underground pipelines completely out of service, railroads bent greatly.

XII. General panic. Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into air. The ultimate catastrophe.

TABLE 1

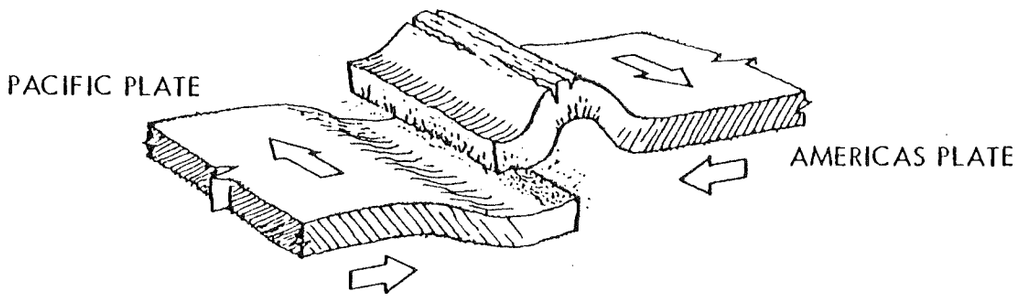
ENERGIES OF EARTHQUAKES
(MAGNITUDE 1.0-9.0)

Earthquake Magnitude	Approximate Earthquake Energy in T.N.T.
1.0	6 ounces
1.5	2 pounds
2.0	13 pounds
2.5	63 pounds
3.0	397 pounds
3.5	1,990 pounds
4.0	6 tons
4.5	32 tons
5.0	199 tons
5.5	1,000 tons
6.0	6,270 tons
6.5	31,550 tons
7.0	199,000 tons
7.5	1,000,000 tons
8.0	6,270,000 tons
8.5	31,550,000 tons
9.0	199,000,000 tons

This chart shows how the energy release increases logarithmically with the corresponding increase in magnitude. The common belief is that a 9.0 quake is only four times as great as a 5.0 quake. However, as shown on the chart, an energy release of a 9.0 magnitude is one million times stronger than a 5.0 quake.

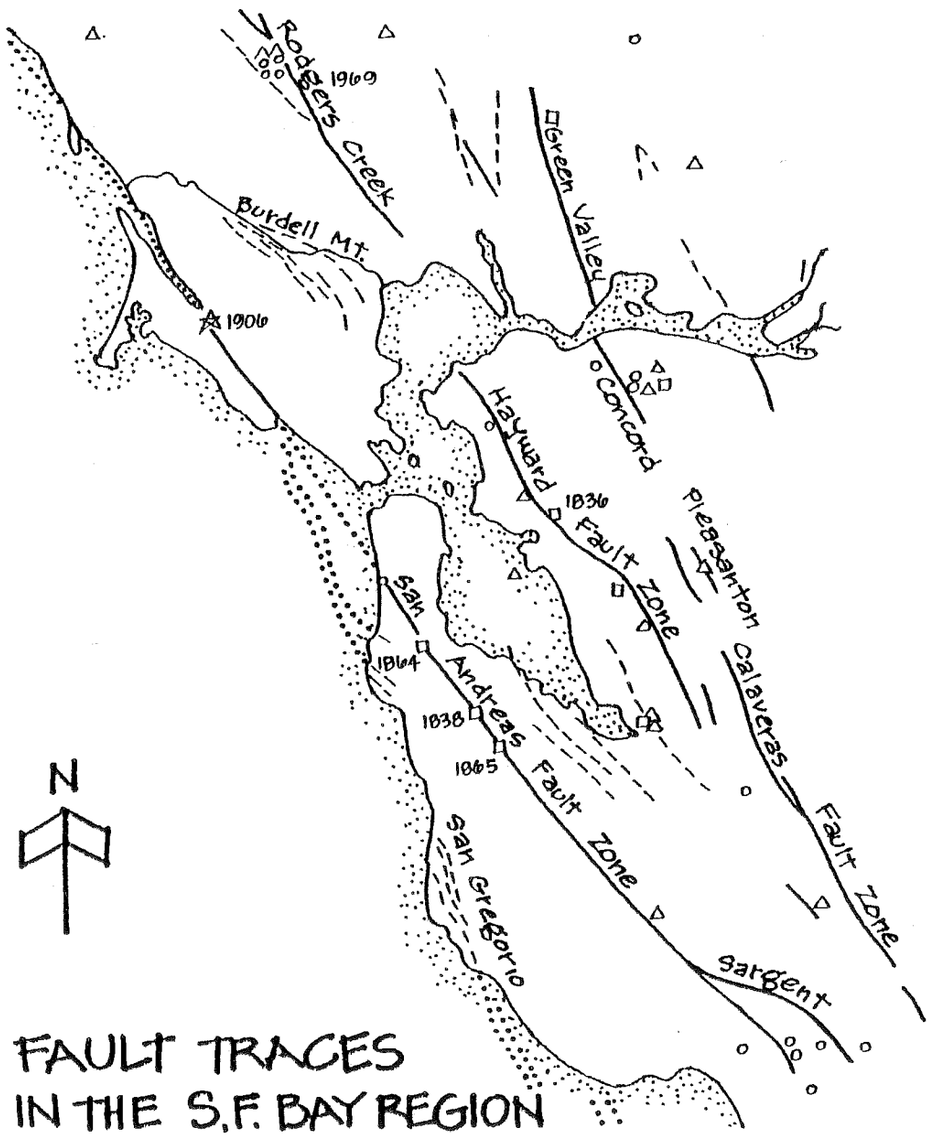
FIG. 5

PLATE TECTONICS



As the Americas Plate is shoved westerly, away from the Mid-Atlantic Ridge, it over-rides the Pacific Plate. Because of its location on the western edge of the Americas Plate, California has been subject to earthquakes, faulting and folding as the two plates collide and grind against one another. Movement of the Pacific Plate, away from the East Pacific Rise, accounts for the lateral (strike-slip) movement on the San Andreas fault.
Source: Contra Costa County Planning Department Illustrations.

FIG. 6



FAULT TRACES
IN THE S.F. BAY REGION

quake magnitude. A descriptive listing of the 60 important earthquakes affecting the Bay Area can be found in appendix B. Many more seismic events - the majority of them minor - have been instrumentally recorded, or calculated after the fact, in the Bay Area. Reported epicenters in Marin and parts of adjacent counties through 1973 are shown by magnitude and approximate location in figures 7 & 8.

The April 18, 1906 Earthquake

The greatest Bay Area earthquake about which detailed quantitative information has been established is, of course, the April 18, 1906 shock on the San Andreas fault, which has traditionally been rated at 8.25 magnitude on the Richter scale. This would be the key seismic point of historical reference for Marin in any event, but the more so since its epicenter was located in the vicinity of Olema in western Marin.

San Francisco suffered the well known spectacular property damage and some 450 direct or indirect deaths from that earthquake, while Santa Rosa and other more built-up urban areas also experienced substantial property losses to a lesser extent. Marin, being sparsly inhabited, particularly in the rural areas along the San Andreas fault itself, experienced relatively moderate property losses and only 2 people killed.

However, along the fault zone where settlement and buildings were at all concentrated, multi-storied or located on alluvium, damage was severe - notably including Bolinas and Tomales. In the towns of east Marin, some 15 miles from the fault zone, damage was characteristically of the fallen chimney and cracked wall type - over 1200 chimneys reportedly fell - although some larger structures, including the San Anselmo Theological Seminary, were more extensively damaged.

West Marin along the San Andreas fault zone was, however, the scene of some of the most pronounced natural earthquake phenomena in the 300 mile length of California affected. These included the maximum horizontal displacement - 21 feet near the head of Tomales Bay - reported anywhere in this earthquake. These ground displacements are described in a later section of this report.

The 1906 earthquake was the last significant seismic event with its epicenter located in Marin or which produced significant damage or ground movement phenomena in Marin, although minor effects of moderate Bay Area shocks epicentered elsewhere were felt in parts of Marin.

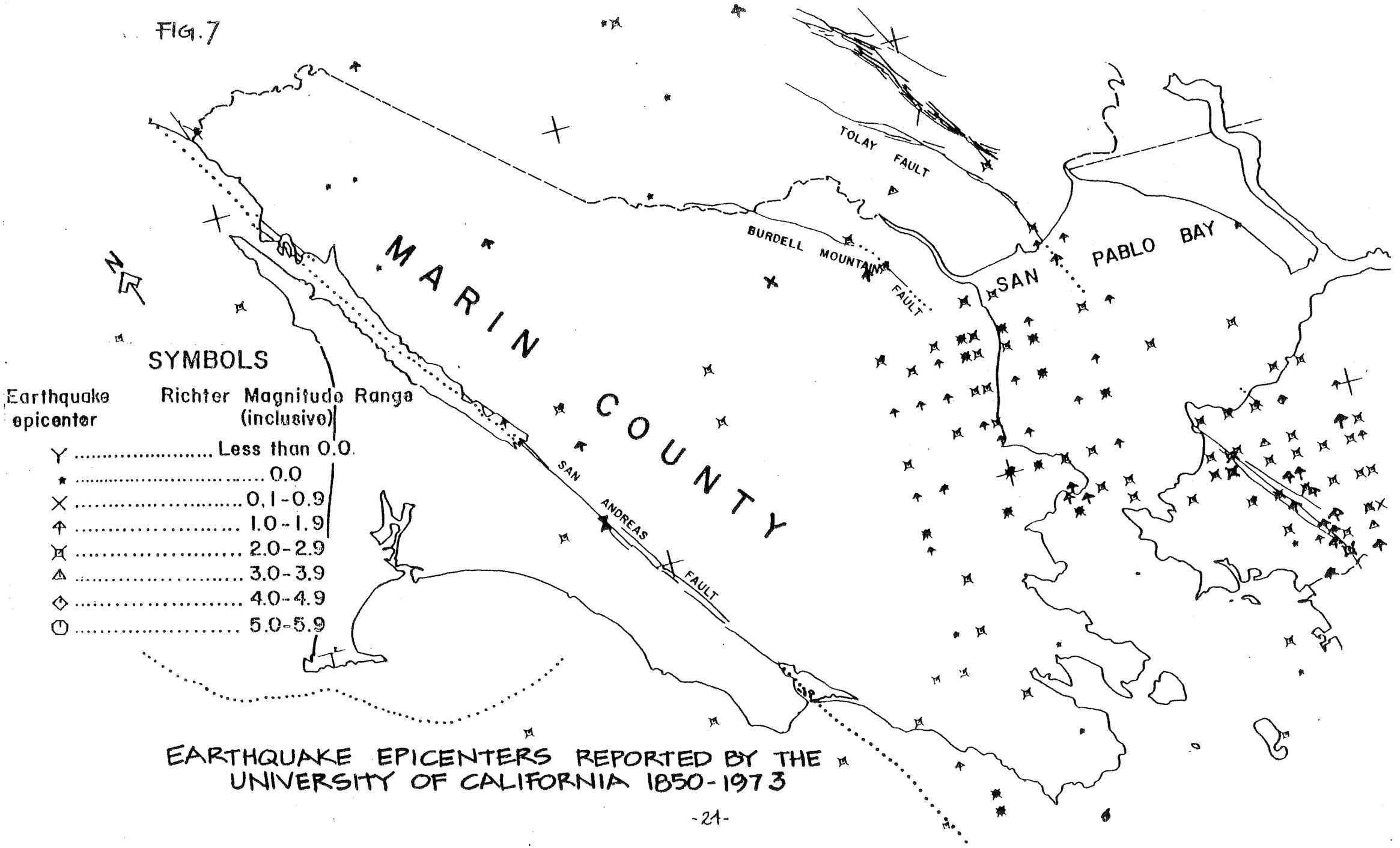
Evidence Suggesting Future Movement Along Faults

Evaluation of historic fault movements and their identifying characteristics have led earth scientists to believe that there are particular faults along which movement may again occur. Of special significance in Marin County is the knowledge that the San Andreas fault produced surface displacement in earlier earthquakes in 1838 and 1890. In addition, the trace of the fault was characterized by such physiographic features as linear ridges and depressions, sag ponds and scarps; and was known to offset geologic deposits of Pleistocene age formed within the last 1.8 million years. These and related characteristics are found worldwide along faults with historic movement. They are now accepted as evidence that a fault is likely to sustain future movement.

This evidence can be divided on the basis of its age into three categories: 1) historic fault displacement, at the surface; 2) displacement during Holocene time (last 10,000 years); 3) displacement during Quaternary time (last 1.8 million years).

The frequency of recurrence of earthquakes is perhaps the most difficult to assess of all these topics. Until more geologic data are available, recurrence estimates are tentative at best and depend heavily on our knowledge of recurrence of historic earthquakes. (See Figure 8). This historic record in the bay region is little more than 150 years old, an inadequate sample for faults that have been active for millions or tens of millions of years. But even that record shows a crude pattern

FIG. 7

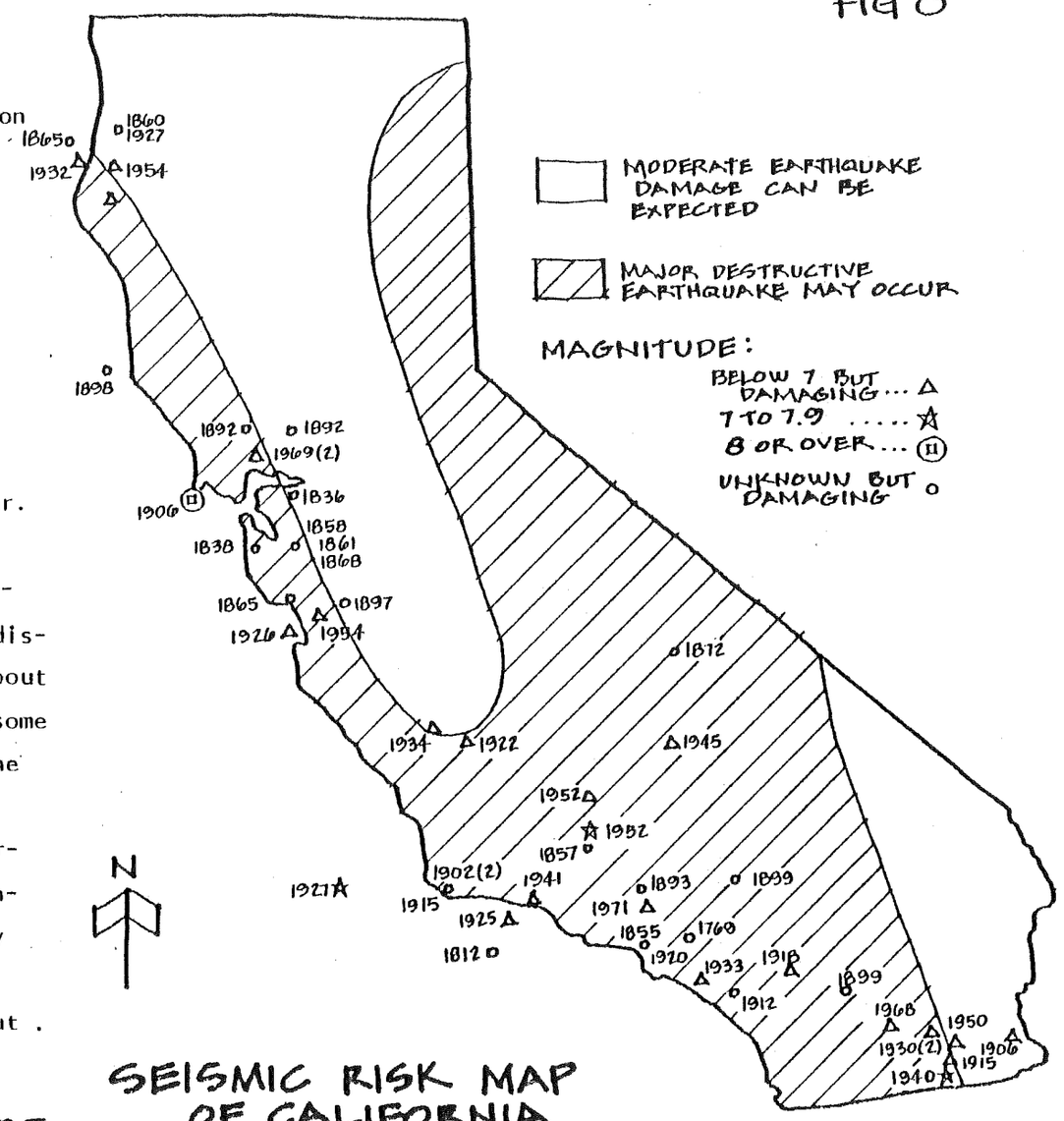


EARTHQUAKE EPICENTERS REPORTED BY THE UNIVERSITY OF CALIFORNIA 1850-1973

of damaging earthquakes and several bay region faults exhibit fault creep along portions of their length. Despite the need for more accurate data on frequence of recurrence, the phenomenon of recurrence is well established.

The level of seismicity that is indicated in Figure 7 is considered ominously low by many seismologists and geologists, particularly with regard to the paucity of epicenters along the San Andreas Fault Zone northwest of the Golden Gate. The 1906 "San Francisco" earthquake is the only significant epicenter in this area. It is known that the earth's crust west of the San Andreas is "drifting" northwest relative to that on the eastern side at some significant rate, perhaps 2 inches or more per year. Southeast of the Golden Gate there are hundreds of minor earthquakes each year centered along the fault zone, and along a segment near Hollister there is more or less constant non-seismic displacement of the surface along this fault (called "creep") of about half an inch per year. Such activity is evident of release of some of the constantly accumulating strain. However, northwest of the Golden Gate the San Andreas is considered to be "locked" since very little of the strain is relieved by frequent small or moderate-magnitude earthquakes. Instead, this region should be considered subject to infrequent but major earthquakes generated by sudden large movements along the fault. The frequency of these episodic earthquakes cannot be reliably predicted at present, but known rates of strain accumulation suggest that at least one or two per hundred years should be anticipated.

FIG 8



SEISMIC RISK MAP OF CALIFORNIA

Types of Seismic Hazard,

There are, in general, four broad aspects of seismic risk to the human environment in Marin County: (1) rupture of the ground surface by displacement along active faults; (2) shaking of the ground caused by passage of seismic waves through the earth; (3) ground failure induced by shaking, such as landslides, liquifaction and subsidence of unstable ground, with associated secondary destructive and disruptive effects, especially fire and disruption of utilities and transportation routes; and (4) tsunamis.

These hazards will be discussed in the following four sections.

Ground Ruptures and Surface Displacement

Natural Characteristics

Although the danger of structures being torn asunder, as a result of surface displacements along faults passing directly beneath them, is a real one in California, ground rupture will always account for only a small percentage of earthquake damage, even in areas traversed by active faults. Marin County and other local faults are shown in figure 9.

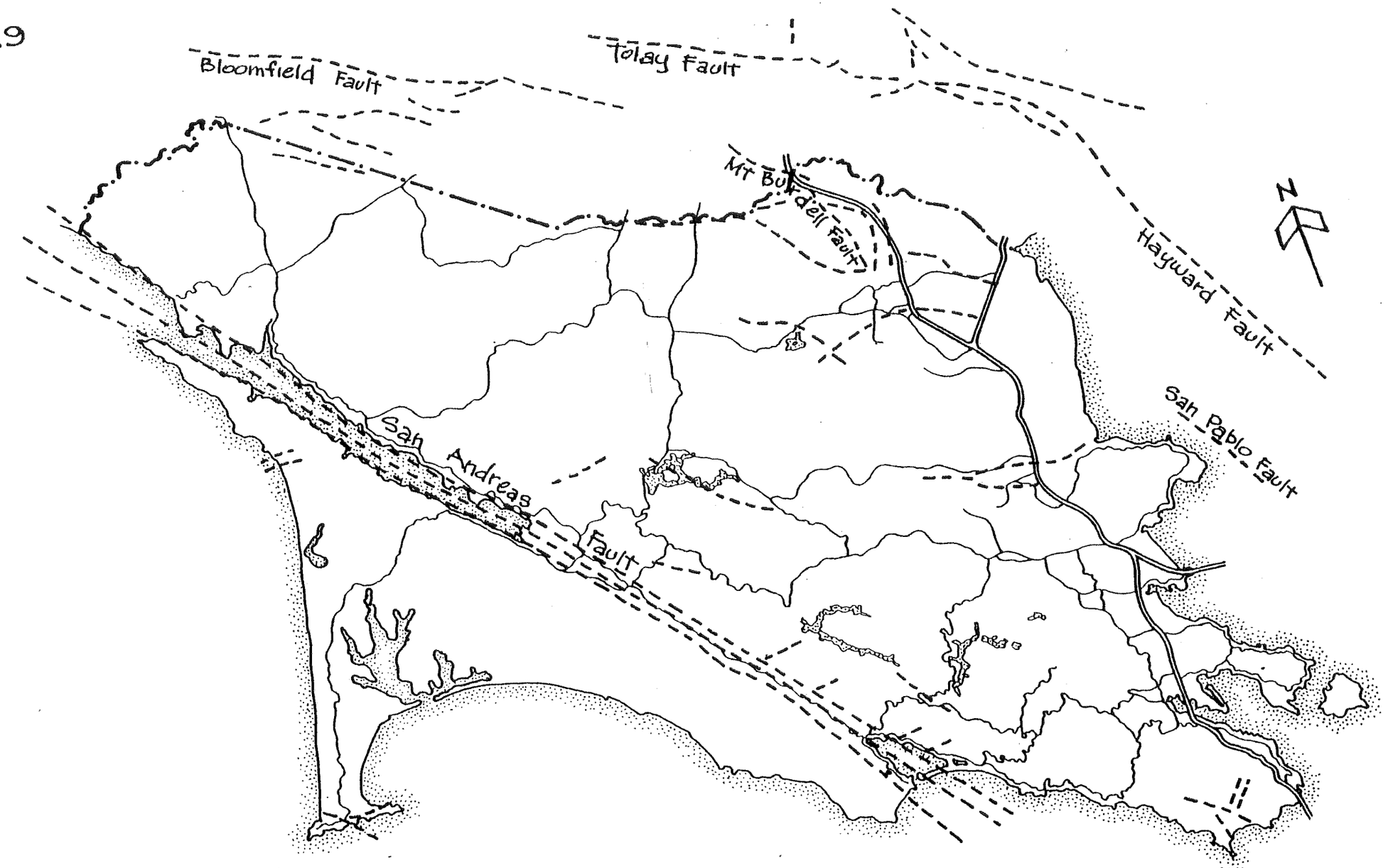
Ground rupture along fault traces usually only occurs during moderate to great (Richter 5.3-7.7+) quakes, with the probability of rupture increasing with magnitude. The length of ground rupture and amount of displacement is generally related to both earthquake magnitude and the total length of the fault. The potential for both a great earthquake and surface displacement increases with fault length.

Relative displacement of the ground surface along a fault trace can be horizontal, vertical, or a combination of both, depending on the type of displacement along the fault plane: vertical displacement is involved in normal and thrust faults; and horizontal (strikeslip) displacement is involved in right-lateral and left-lateral faults. (Figures 10 and 11).

Ground rupture along fault traces during earthquakes has been classified into three categories: The main fault zone; branch fault zone, (ruptures branching from the main fault zone); and secondary fault zone (ruptures parallel to, and separate from the main and branch fault zones). The width of the fault zone depends in part on the nature of the fault displacement: vertical fault movements tend to produce wider zones of ground rupture than horizontal fault movements. The amount of displacement along these three zones usually is greatest on the main zone and least on the branch and secondary zones, and the amount of displacement is generally greatest near the epicenter. Local patterns of ground rupture within these zones may consist of a single narrow rupture or a series of en echelon* ruptures, depending on the surficial and bedrock geologic conditions.

* See Glossary

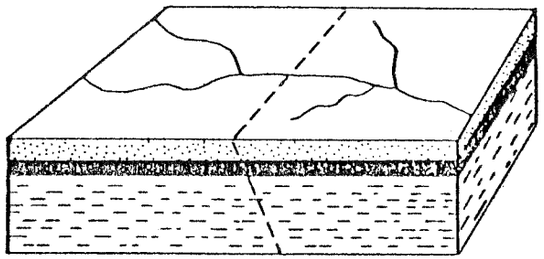
FIG. 9



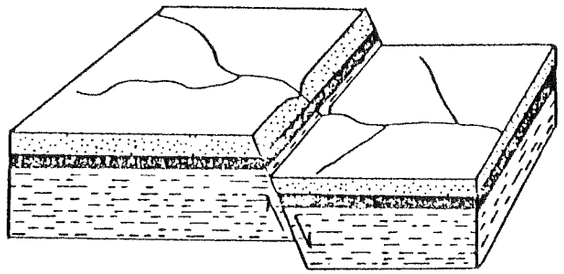
FAULT TRACES IN MARIN COUNTY AND ADJACENT AREAS

FIG. 10

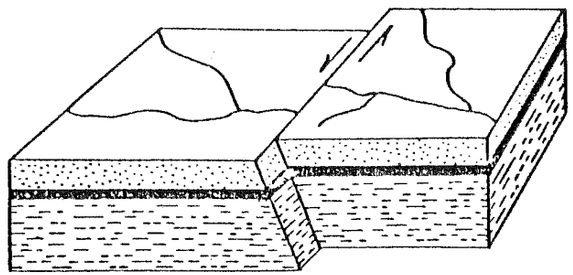
TYPES OF FAULT MOVEMENT



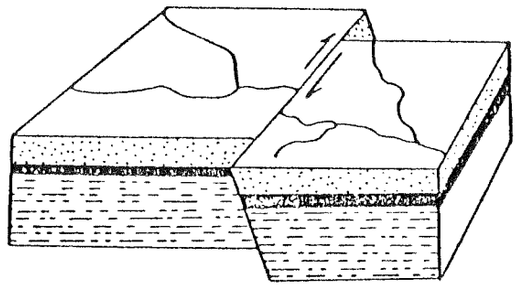
Earth block before movement



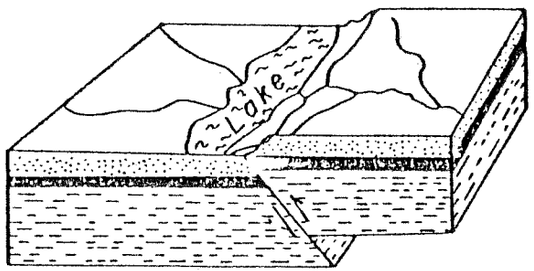
Normal fault



Left lateral fault



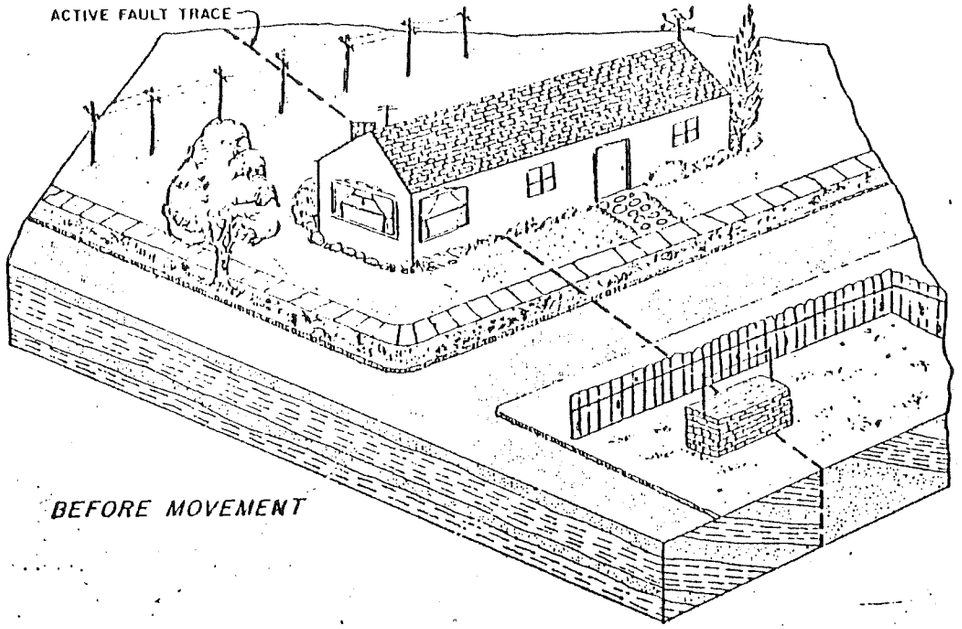
Right lateral fault



Thrust or reverse fault

Movement on many of California's major faults is a type of strike-slip called "right-lateral". The sense of movement is determined by the observer facing the fault plane. If the block on the opposite side of the fault plane is displaced toward the observer's right hand, the fault is described as a right-lateral fault. Conversely, if the displacement is to the observer's left the fault is described as a left-lateral fault.

FIG. 11



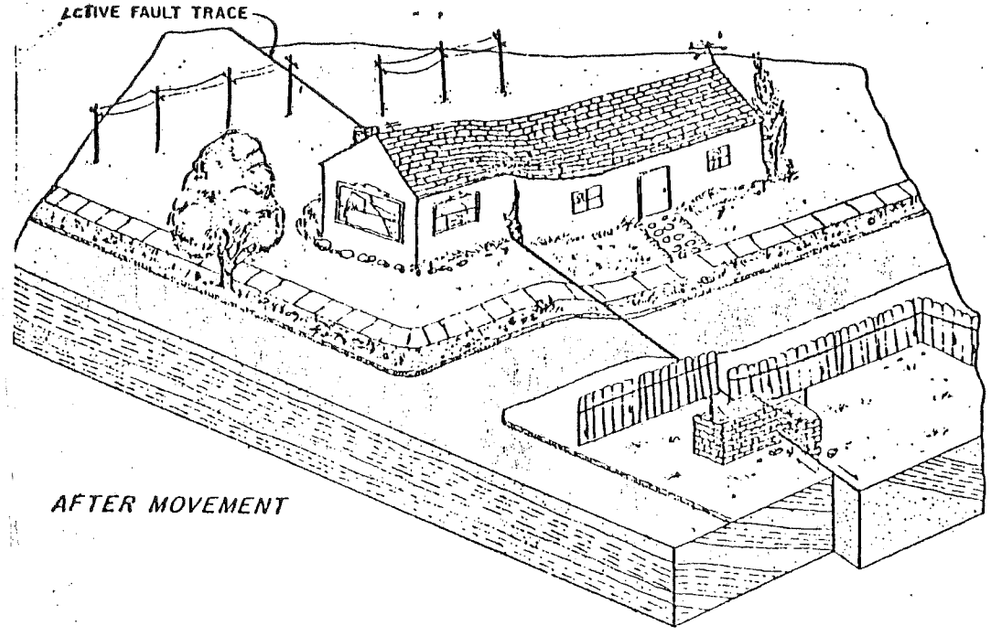


ILLUSTRATION OF DAMAGE FROM RIGHT LATERAL FAULT MOVEMENT

Surface fault movement is not always rapid or a result of a major earthquake. Imperceptibly slow movement, called "fault creep" occurs along the Hayward, Calaveras, and some other faults and may be accompanied by microearthquakes. Similarly, not all deformation of the earth's surface produces fault displacements. Strains in the earth deform the rocks until their strength is exceeded and they rupture, producing the earthquake. Accompanying this bending, however, is a certain amount of plastic deformation. Both rupture and plastic deformation commonly occur along active fault zones and may be sufficient to damage or destroy structures over particularly strongly deformed rocks. Earthquakes deep within the earth may result from rupture of deeply buried rocks but without fault displacement at the ground surface, although the surface rocks may be deformed.

There is little doubt that the San Andreas fault zone in Marin has seen repeated ground rupture and displacements in geologically "recent" time. The only such ground movements for which we have recorded observations, however, occurred in the great California earthquake of 1906. The displacements seen at that time were among the most striking ever documented, including the maximum reported horizontal displacement of 15-20 feet near the head of Tomales Bay.

For most of its lineal traverse across West Marin the 1906 earthquake produced a visable rupture trace consisting primarily of a ridge 3 to 10 feet wide and a few inches to 1½ feet high, or by a trench averaging less than a foot deep, and systems of branching and simple straight surface cracks. Some of the cracks showed vertical throws up to 6 feet high and openings up to 6 inches which remained months after the event.

No instances of observed ground rupture or displacement were reported in East Marin although there was moderate but widespread damage from ground shaking.

While it is true that earthquake damage resulting directly from ground displacement accounts for only a small percentage of all damage it is not to deny the destructiveness of surface rupture where it does occur. The classic definitive account of the 1906 earthquake, the Report of the State Earthquake Investigation Commission by Lawson, Gilbert, et al (Carnegie Institute report) is replete with documented accounts of the impressive destructive effects of 8 to 15 foot, horizontal displacements on barns, rural houses, roads and fences. This destruction was most evident in Bolinas, Tomales and the ranch structures of the Olema Valley and to a lesser extent in Inverness and Point Reyes Station.

With this experience in mind, the California Legislature included the San Andreas fault zone in the area governed by the provisions of the Alquist-Priolo Geologic Hazard Zones Act of 1972. The Act (SB-520), prohibits any new construction for human occupancy across known traces of specified active faults or within a minimum 50 foot distance of such traces. The 50-

foot building setback is determined by geologic investigation of individual sites when development, or construction of four or more single family houses, is proposed. An example of the mapping developed for this Act by the California Division of Mines and Geology, is shown in Figure 12. The text of the Alquist-Priolo Special Studies Zone Act of 1972, as amended, and policies and criteria pertaining thereto form Appendix C of this document.

Burdell Mountain Fault Zone

While the San Andreas is the only proven active fault in Marin County there is one other local fault zone - Burdell Mountain - for which some evidence of geologically "recent" (last 10,000 Years) activity exists. This is found primarily in the upland areas, and particularly in some youthful appearing topographic features northwest of Rancho Olompali. This evidence is discussed in some detail in the 1975 report on geologic hazards in the Novato area prepared by the State for Marin County (see references). While there is as yet no definitive determination that this is an active fault, the evidence is suggestive enough to be kept in mind when developing land-use policies in the vicinity of the zone.

Ground Shaking

Background

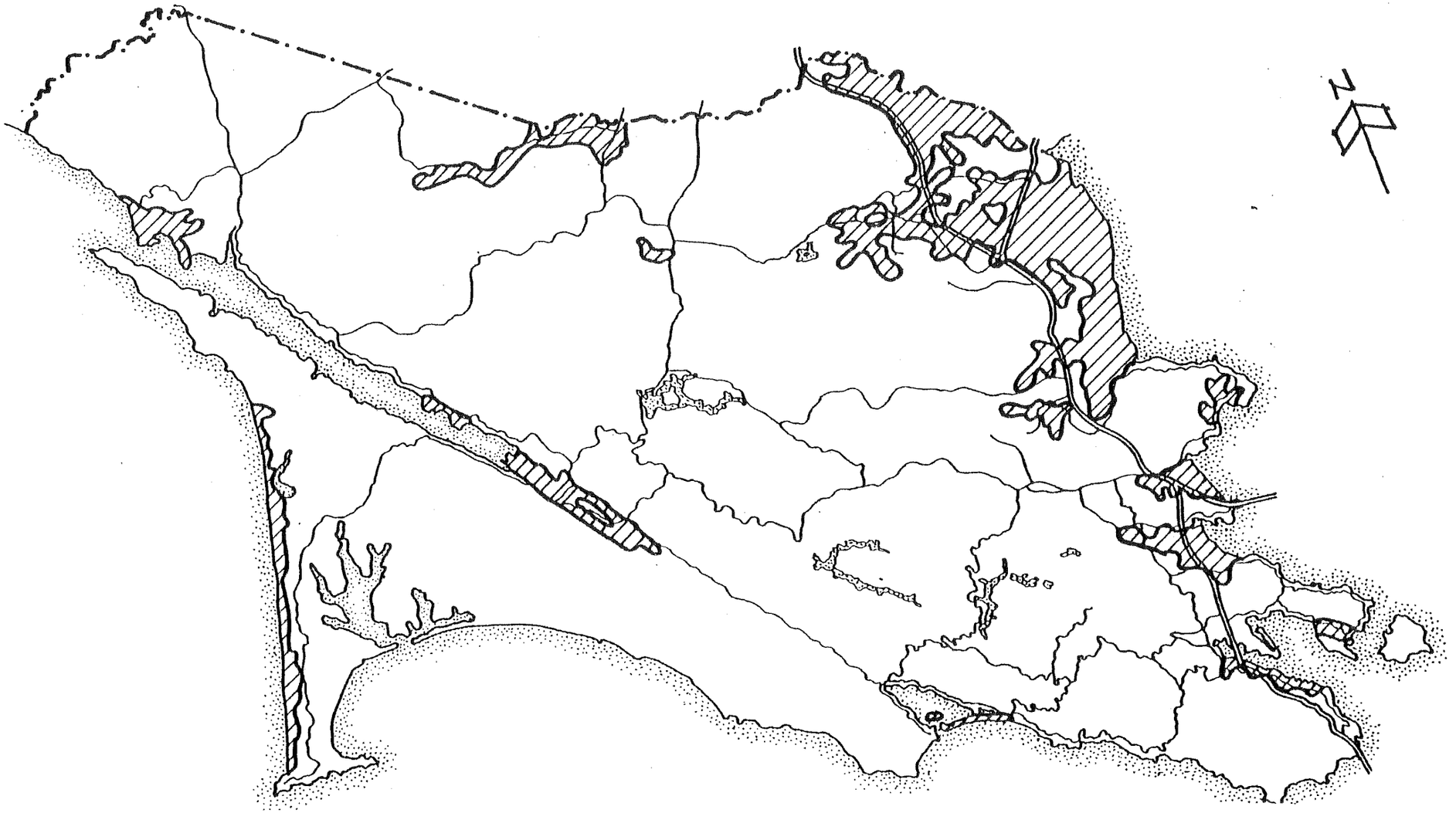
In terms of human and economic losses, seismic shaking is the most significant factor contributing to the overall earthquake hazard. Shaking contributes to losses not only directly through vibratory damage to manmade structures but also indirectly through triggering of secondary effects such as landslides or other modes of ground failure. Thus, an important element in attempting to classify areas by seismic risk is the geographical assessment of potential ground shaking.

It has long been recognized that the intensity of ground shaking during earthquakes and the associated damage to buildings is profoundly influenced by local geologic and soil conditions. Data from past earthquakes have shown that the intensity of ground shaking can be several times larger on sites underlain by thick deposits of saturated sediments than on bedrock. Consequntly, the greatest losses, resulting solely from shaking, may occur where tall structures are built on thick, relatively soft, saturated sediments and the least where they are built on firm bedrock. (See Figure 14). In addition to the amplification effects of local geologic deposits the amount of ground shaking at a particular site depends both on characteristics of the earthquake source (for example, magnitude, location, and area of causative fault surface) and the distance from the fault. To anticipate the severity of ground shaking likely

FIG. 12

ALQUIST-PRIOLO SPECIAL STUDIES ZONE OF THE SAN ANDREAS FAULT SYSTEM (PORTION OF INVERNESS SHEET OF OFFICIAL MAP ISSUED BY CALIFORNIA STATE GEOLOGIST 7/1/74)

FIG.13

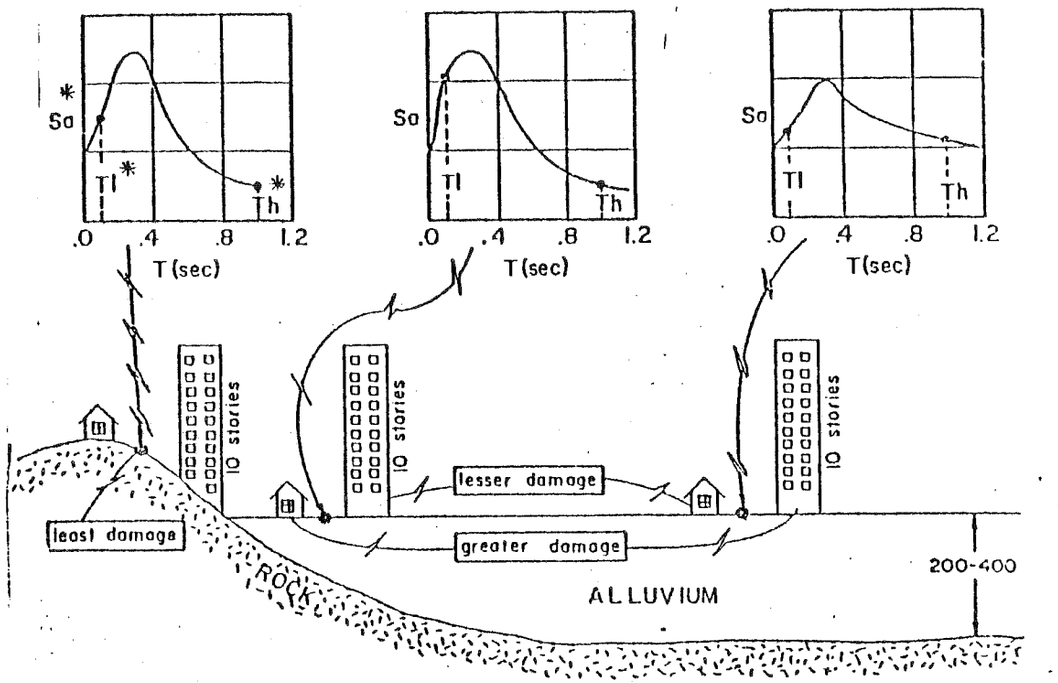


AREAS MOST SUSCEPTIBLE TO SEVERE GROUND SHAKING.

FIG 14

to occur at a site, each of these factors must be taken into account. Damage which results from shaking is also a function of the structural integrity of buildings before the earthquake, which is discussed in detail in Section III, Structural Hazards.

One useful tool to assess potential building damage from knowledge of ground conditions is to correlate the fundamental period of a building with the ground on which it rests. A damaging resonance commonly develops where the fundamental building period coincides with the natural period* of the ground. In a very general way, the fundamental ground period* is related to its firmness, thickness, and degree of saturation. Tall buildings have a long fundamental period (2 sec.or more) and are subject to greater damage where they stand on ground with a long fundamental period (Figure 14).



* Sa=relative spectral acceleration of ground shaking
Tl =resonant period of low building
Th=resonant period of high building
T =period of ground shaking

SCHEMATIC REPRESENTATION OF RELATIONSHIP BETWEEN GEOLOGY, RESPONSE SPECTRA, BUILDING HEIGHT, AND POTENTIAL DAMAGE IN A STRONG LOCAL EARTHQUAKE.

It should be noted that research into this relationship has taken structures of 5-9 stories as the lower end of the height scale. As a practical matter, therefore we should be cautious in generalizing the theoretically destructive effect of structure/ground period coincidence to predict the response of one or two story structures to ground shaking. Ideally, therefore, one means of expressing ground shaking is in terms of the likely response of specific building types -- wood frame residences, single-story masonry structures, low-rise (3-to 5-story), moderate-rise (6-15-story), and highrise (more

* See Glossary

than 15 story) building. Each of these building classes, in turn, can be translated into occupancy factors* and generalized into land-use types (low or high density residential, commercial,etc.)

Although we cannot presently predict when, where, or how great the next earthquake will be, several qualitative approaches can be used for planning purposes to anticipate where ground shaking would be the most severe in a seismic event:

1) Correlation of earthquake effects with the general firmness of rock and soil, an empirical technique based on examination of damage from numerous historic earthquakes. A determination of the fundamental ground period requires knowledge of sediment thickness and measurements of the shear velocity* of the geologic units. Maps prepared on this basis can only serve as a general guide to relative effects of ground shaking. Fig. 15 & Chart 4 represent samples of this type of mapping developed for the Novato area by the California Division of Mines and Geology.

2) Intensity maps, based on the Modified Mercalli* or a similar intensity scale, have been made in many areas from damage studies of past earthquakes. In a general sense, intensity is a function of ground conditions and distance from the epicenter.

Analyses based on the above provide only general qualitative guidelines for ground shaking and earthquake-resistant design. They do not provide quantitative estimates of ground shaking for use in estimating engineering design parameters, nor do they necessarily distinguish the effects on structures due solely to ground shaking from those due to ground failure.

Theoretical models to predict surface ground motion have existed for many years. Not until relatively recently, however, have enough observations been available from earthquakes and from in situ ground measurements to provide reliable data to use in the models and on which to base an evaluation of the validity of the models.

These techniques are still in the developmental stage but with expanding knowledge of earthquakes and their mechanism they may soon gain more widespread acceptance and perhaps eventually allow their application to general land-use problems.

In the meantime, the very broad generalized approach in characterizing the firmness of the ground appears to be adequate to assess the gross effects of ground shaking for general planning purposes.

Historical Experience of Ground Shaking Damage

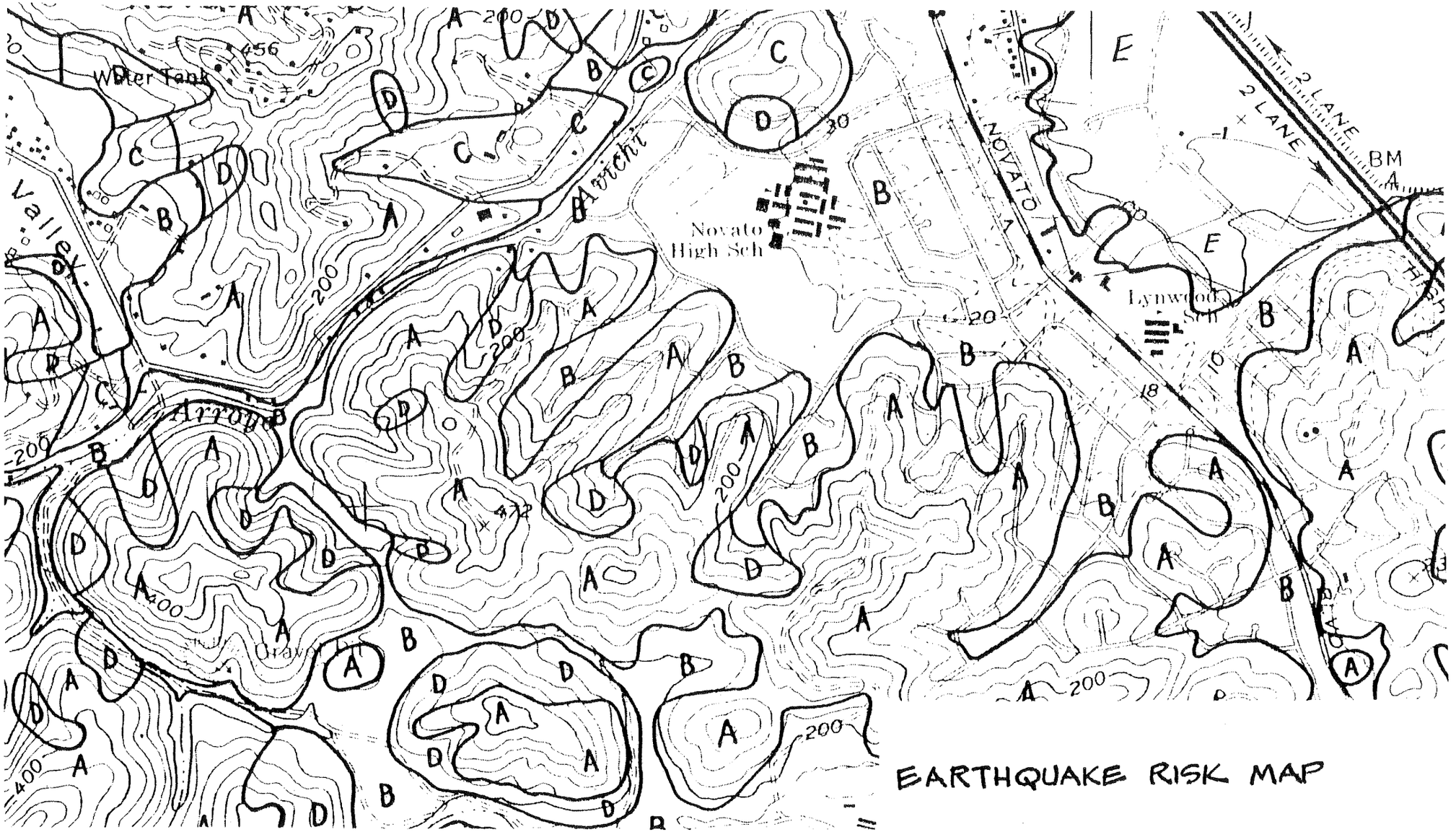
Marin experienced its greatest ground-shaking damage in the 1906 earthquake, which, unlike the damage resulting directly from ground displacement, was prevalent in eastern Marin as well as along the San Andreas fault zone in the west.

Apart from the collapse of most chimneys, the State Earthquake Commission's report of that event generally did not specify whether damage in West Marin was from shaking or the more impressive shifting of structures from their foundations by the dis-

(see page 38)

* See Glossary

FIG. 15



EARTHQUAKE RISK MAP

Estimates of General Response of Various Geologic settings to an Earthquake of Magnitude 8, with Epicenter located in the Northern San Francisco Bay Region.

A. Probable low damage areas underlain by firm, relatively unweathered bedrock (compact metamorphic rock, well cemented sedimentary rock, and volcanic rock) that crops out at the surface or is covered by only thin layers of soil or colluvium. Subject to relatively high frequency vibrations. Some very steep slopes in this zone are potentially subject to earthquake-induced rock debris avalanches or rock falls.

B. Probable low to moderate damage areas, valleys underlain by relatively shallow compacted alluvium and colluvium on flat or gently sloping surfaces. Subject to relatively low frequency vibrations. In places may be threatened by landsliding derived from upslope area.

C. Probable low to moderate damage areas underlain by sheared and disrupted zone in bedrock. Subject to lower frequency vibrations than in A, and possibly to landsliding on steep slopes as a result of failure of the relatively weak bed material.

D. Potentially high damage areas underlain by deep upslope landslide deposits and by thick deposits of colluvium or deeply weathered bedrock on steep slopes. Subject to more intense shaking than A and C, and possibly to downslope movement particularly if saturated.

E. Probable high damage areas, underlain by bay mud ranging in thickness from a few feet to more than 100 feet. Subject to relatively low frequency vibration whose amplitudes depend to a large extent on the thickness of unconsolidated water saturated deposits overlying the bedrock. Damage to structures from shaking alone will be related to the natural periods of vibration of the structures, but in this setting is likely to be

less for one and two-story buildings than for multistory structures that have not been specifically designed for the site (Seed, 1969, p. 96). Major damage in this setting is likely to result from secondary effects of the earthquake vibrations, especially from rapid differential settlement and disruption of the fill caused by accelerated compaction of any included granular materials, or lateral flow of the mud beneath the fill. Buried utility pipes in this setting are subject to disruption both from the low frequency vibrations and from differential displacements of the ground.

SOURCE: CALIFORNIA DIVISION OF MINES AND GEOLOGY GEOLOGY FOR PLANNING, NOVATO AREA, 1975 PLATE I

placed or heaving earth. Notable among the shaking damages in the west were the collapse of a stone church and other stone buildings in Tomales, the crumbling of the ocean bluffs at Bolinas and the tipping over of a railroad engine and three cars at Point Reyes Station.

While no ground displacement was reported in eastern Marin in 1906, damage from ground vibrations was common though usually moderate or light. Very widespread chimmney and some stone wall collapse was reported, as well as some cases of wall cracking. San Rafael and Sausalito experienced greatest damage.

The post-1906 moderate Bay Area earthquakes with epicenters elsewhere, were felt in Marin, but with maximum intensities (modified Mercalli) of only V or VI and usually very slight damage. The strongest shaking effects experienced since 1906 would be typified by localized reports of intensities V and VI during the March, 1957 Daly City earthquake (Richter magnitude 5.3). There were, in that shock, a few reported instances of moderate damage in Sausalito, Mill Valley and San Anselmo, but most reports were of just slight damage, or of strongly felt motion and loud sounds frightening residents. To convey a fuller picture of what this and other seismic events felt like in Marin, excerpts from the U.S. Coast and Geodetic Survey Abstracts of Earthquake Reports should be consulted.

* See Glossary

Ground Failure and Related Secondary Effects

The processes and phenomena grouped within the general phenomenon called ground failure include landsliding, liquefaction, lateral spreading, lurching, differential settlement, and bedrock shattering. All of these involve a displacement of the ground surface due to loss of strength or failure of the underlying materials during earthquake shaking.

Some of these phenomena, particularly landslides and differential settlement, also commonly occur in Marin without a triggering seismic event. Those occurrences are discussed in Chapter II, under Non-Seismic Natural Hazards. Liquefaction* is a common mechanism causing many types of ground failure. It occurs when the strength of saturated, loose granular materials (silt, sand, or gravel) is dramatically reduced, such as may occur during an earthquake. The earthquake-induced deformation transforms a stable granular material into a fluidlike state in which the solid particles are virtually in suspension, similar to quicksand. The Juvenile Hall landslide during the 1971 San Fernando earthquake resulted from liquefaction of a shallow sand layer and involved an area almost a mile long and a failure surface that had a slope of only 2.5 percent. Where the liquefied granular layer is thick and occurs at the surface, structures may gradually sink downward. The tilting and sinking of 4-story apartment buildings during the Niigata earthquake, in 1965, illustrate this phenomenon.

Loss of strength in fine-grained cohesive materials is another mechanism of ground or foundation failure and manifests itself in squeezing or "lateral spreading" of soft, saturated clays, such as San Francisco Bay mud. It can result in rapid or gradual loss of strength in the foundation materials and structures can either gradually settle or break up as foundation soils move laterally by flowage.

Loss of resistance also occurs when ground water is raised and frictional resistance is reduced along a potential failure surface and when water or earth masses serving as a buttress to prevent downslope movement are removed.

In Marin, the liquefaction-prone geological materials, in order of decreasing susceptability are artificial fill, sand and alluvium. The bay mud is least stable where lenses of sand are present, although the extent to which clay is present is considered to be one important deterent to liquefaction since the clay tends to bind the sand together. The alluvium is least stable in deep water-saturated deposits. Areas underlain by hard bedrock at shallow depth are seldom subject to liquefaction. See section E of Chart 4 for a discussion of this effect.

Landslides

The predominant sources of earthquake damage to be expected in the uplands of Marin County are from landslides and fires triggered by the shaking.

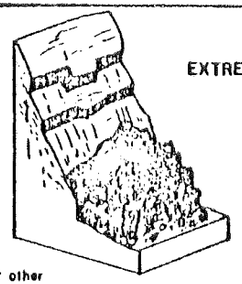
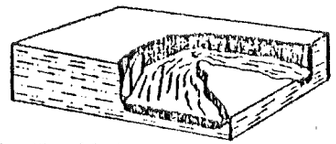
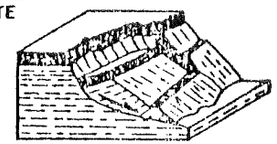
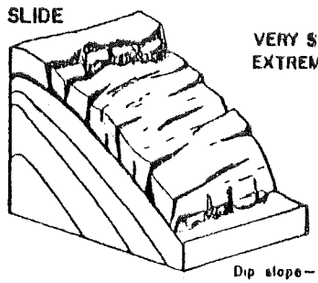
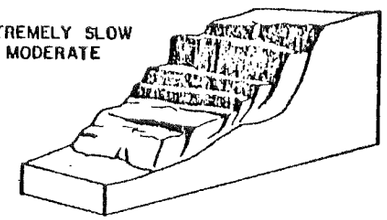
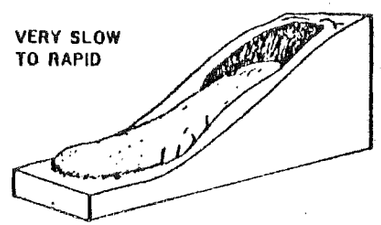
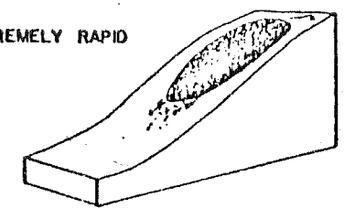
Landslides involve downslope movement of soil and rock material and include a wide variety of materials and mechanisms ranging from rockfalls to earth flows. The descriptive classification of landslides shown in Figure 16 applies to all landslides, whether earthquake induced or not. Earthquake-induced landslides will occur generally in the same marginally stable areas as landslides induced by other natural energy sources, such as intense rainfall, and may be indistinguishable from them in appearance. The addition of earthquake energy may induce landslides that otherwise might not have occurred until a future rainy season. For a discussion of this phenomena, see Sections C, D, and E in Chart 4.

Landslides on hillsides are due to failure of either surface material (soil, colluvium) or bedrock, or both. Landslides in areas of low slope angles can result from liquefaction of subsurface sand layers during earthquakes as in the Alaska earthquake of 1964 and the San Fernando earthquake of 1971.

Natural slopes, even very steep ones, that are underlain by bedrock and do not have existing significant landslides, can be expected to exhibit a high degree of stability during earthquakes. In places, however, such slopes have been undermined by deep, sometimes vertical cuts for highways, streets, and quarries and some of these will be the scenes of rock falls or other forms of slope failure under the influence of strong earthquake vibrations.

FIG. 16

TYPES OF LANDSLIDES COMMON TO MARIN COUNTY

	BEDROCK	UNCONSOLIDATED MATERIAL
FALLS	ROCK FALL EXTREMELY RAPID  Control by joints or other planar weaknesses. Support removed by erosion or quarrying.	SOIL FALL VERY RAPID  Undercutting of bank.
SLIDES	ROTATIONAL SLUMP EXTREMELY SLOW TO MODERATE  BLOCK SLIDE VERY SLOW TO EXTREMELY RAPID  Dip slope—control by bedding planes or shear zones.	ROTATIONAL SLUMP EXTREMELY SLOW TO MODERATE  DEBRIS FLOW VERY SLOW TO RAPID  DEBRIS AVALANCHE EXTREMELY RAPID  Virtually no debris left at site of scar.

APPROXIMATE RATE OF MOVEMENT

EXTREMELY RAPID
3m/second
VERY RAPID
0.3m/minute
RAPID
1.5m/day
MODERATE
1.5m/month
SLOW
1.5m/year
VERY SLOW
0.3m/5 years
EXTREMELY SLOW

(modified from Cooke and Doornkamp, 1974)

Because many streets in the hills of central and southeastern Marin County traverse upslope landslide deposits, and streets are the usual routes of underground utility pipes, it should be expected that a great earthquake generated in the north Bay Area will result not only in disruption of some transportation routes, but also in rupturing of water,gas, and sewer lines as a result of earthquake-induced landslides.

Fire is also likely to be a destructive by-product of a great earthquake in this area - - perhaps by far the worst if the earthquake occurs during the dry season. It was the great fire in San Francisco that accounted for much or most of the property damage there from the earthquake of 1906.

Fire was the significant source of property damage in the San Francisco 1906 earthquake.

Similarly, it should be expected that many fires would be ignited in Marin County from a major or great earthquake. These fires would probably be caused by gas appliance pilot flames which would ignite the gas escaping from ruptured pipes, especially from topheavy water heaters which could come loose from their pipe connections.

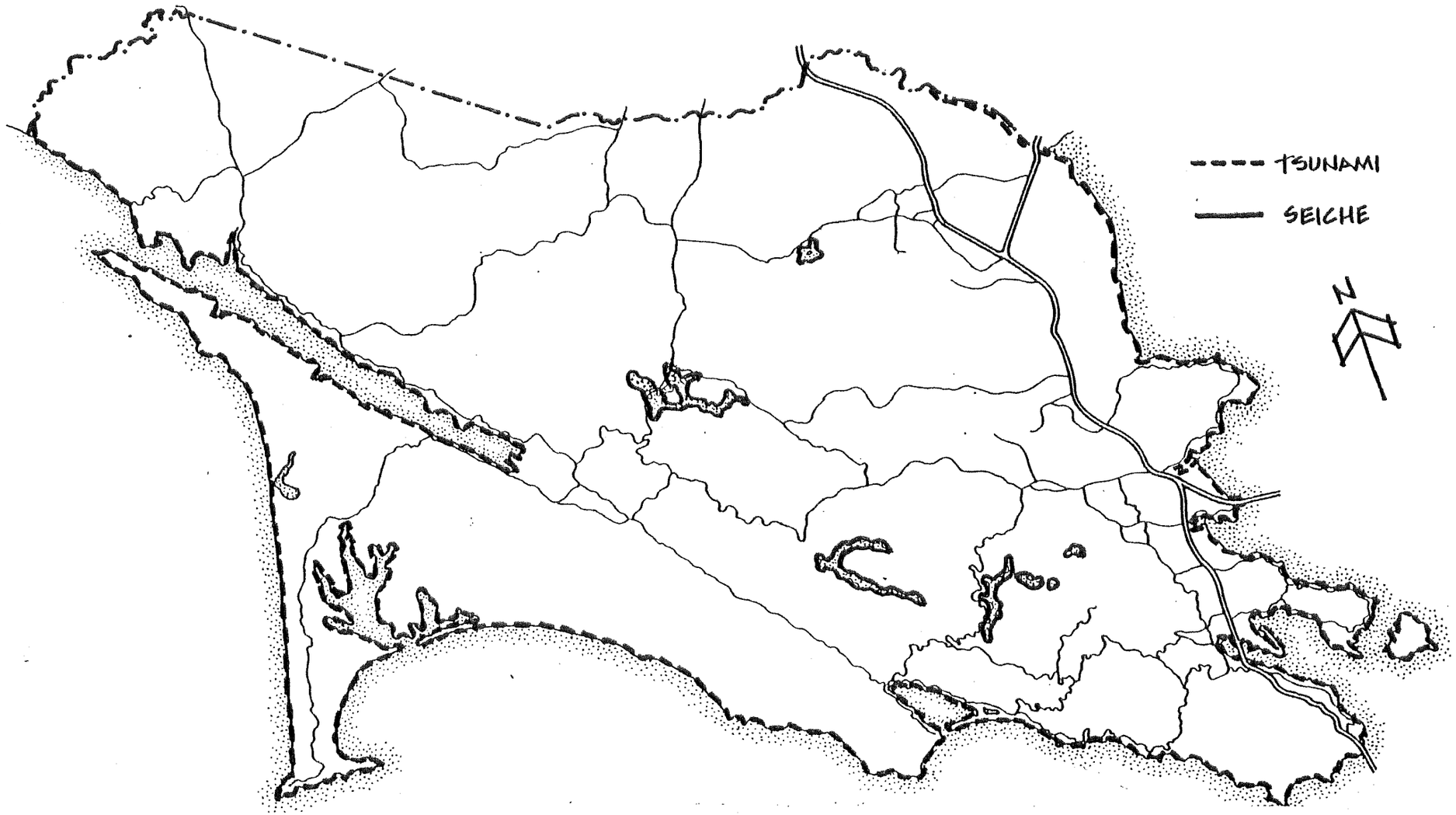
* See Glossary

Tsunami and Seiche Effects

Natural Process

Tsunamis* are large ocean waves generated by rapid changes in elevation of large masses of earth and ocean. They are commonly caused by vertical faulting beneath the ocean that rapidly moves a large volume of earth and water. Such rapid movement may generate huge waves of destructive force that can travel thousands of miles. During the 1964 Alaskan earthquake, for example, faulting and crustal warping created tsunamis, or sea waves, tens of feet high that spread more than 1,500 miles from the source area and caused devastation to many coastal communities within their reach. The effects of tsunamis can be greatly amplified by the configuration of the local shoreline and the sea bottom. Since a precise methodology does not exist to define these effects, it becomes important, through examination of the historic record, to determine if a particular section of the coastline has been subjected to tsunamis and to what elevation they have reached. Figure 17 shows areas of Marin subject to these seismic effects. Seismic seiches, or earthquake-generated standing waves, occur within enclosed or restricted bodies of water (lakes, reservoirs, bays and rivers). They can be likened to the oscillations produced by the sloshing of water in a bowl or a bucket when it is shaken or jarred. Seiche waves generally have a low amplitude (less than a foot), but in shallow areas or where the water is constricted, wave runup can

FIG. 17



AREAS SUBJECT TO TSUNAMI INUNDATION AND POSSIBLE SEICHE

be as great as 20 or 30 feet (McCulloch, 1966). Obviously, such high runups can have a devastating effect on people and property within their reach, dams and reservoirs can be overtopped and large volumes of water released to inundate downstream development. Because local faults are strike-slip, rather than thrust type, seiches are less likely to occur in Marin.

Historical Experience

Tsunami waves may reach fifty feet in height on unprotected coasts, and one on record (Japan, 1896) killed nearly 30,000 people and destroyed over 10,000 homes. In 1964, the tsunami generated by the "Good Friday" Alaska earthquake resulted in deaths of eleven people in Crescent City, 4 in Oregon and 107 in Alaska. Thus far, Marin has experienced no such extreme consequences. Tsunamis have been recorded along with tides in San Francisco Bay by the U.S. Coast and Geodetic Survey (a function now of the U.S. Geological Survey). From these data, a 1970 study by R. L. Wiegel states that at least 19 tsunamis were recorded at the Golden Gate tide guage between 1867 and 1969. The highest wave that was recorded there resulted from the March, 1964 Alaskan earthquake. This wave was about 7 1/2 feet in height at Fort Point; amplitude, or greatest elevation of the water above the existing tide at the time was 3 3/4 feet. The height of tsunamis vary from place to place. Comparisons of tsunamis at Fort Point and areas of Marin indicate that wave height will gradually diminish as it moves up the bay, so that at Paradise Cay wave height will be about half that of Fort Point and Lime Point, and beyond Paradise Cay it will be even less. Areas most likely to be inundated are artifically filled marshlands that are still below sea level, unfilled marshlands, and tidal flats.

A 1975 study by Garcia and Houston indicates tsunamis of a 7 foot height may occur on the average of once every 100 years. Such tsunamis can be disastrous to people along the shoreline, and currents associated with them can damage moored boats and marinas. For example, the 1964 tsunami caused little damage in San Francisco Bay as a result of inundation, but yacht harbors in San Rafael and Sausalito suffered a total of some $275,000 damage from currents generated by the tsunami (San Rafael Independent Journal, 3/25/64).

NON-SEISMIC GEOLOGIC AND OTHER NATURAL HAZARDS

Setting

Marin County, and particularly its eastern, suburbanized corridor has two contrasting topographic settings that define sharply contrasting geologic conditions and stability problems which exist independent of any triggering seismic event. These are:

1. The steep hills and ridges which are subject to landslides and downhill creep.
2. The bay plains, marshlands and mud flats subject to subsidence and differential settlement.

It should be noted that in the absence of a major earthquake, these conditions are the source of most of the losses due to natural hazards in Marin County. In addition, this section on non-seismic hazards will consider in some detail, Wildfire and Flood hazards.

Slope Instability and Landslides

This section focuses on the mechanics of non-seismic slope instability as it is expressed in Marin's upland geologic setting. The description of the extent of hazard from unstable slopes is adapted from the extensive, four year, geologic hazard investigation and mapping project covering eastern Marin undertaken for the County and cities by geologists of the California Division of Mines and Geology. Relevant aspects of the major geologic materials are summarized in charts appended to those studies, and also discussed on pages 7-13 herein.

Figures 18 and Chart 5 illustrate the type of slope stability interpretive maps prepared by the State geologists for the County studies. The principal factors considered in making the interpretations were:

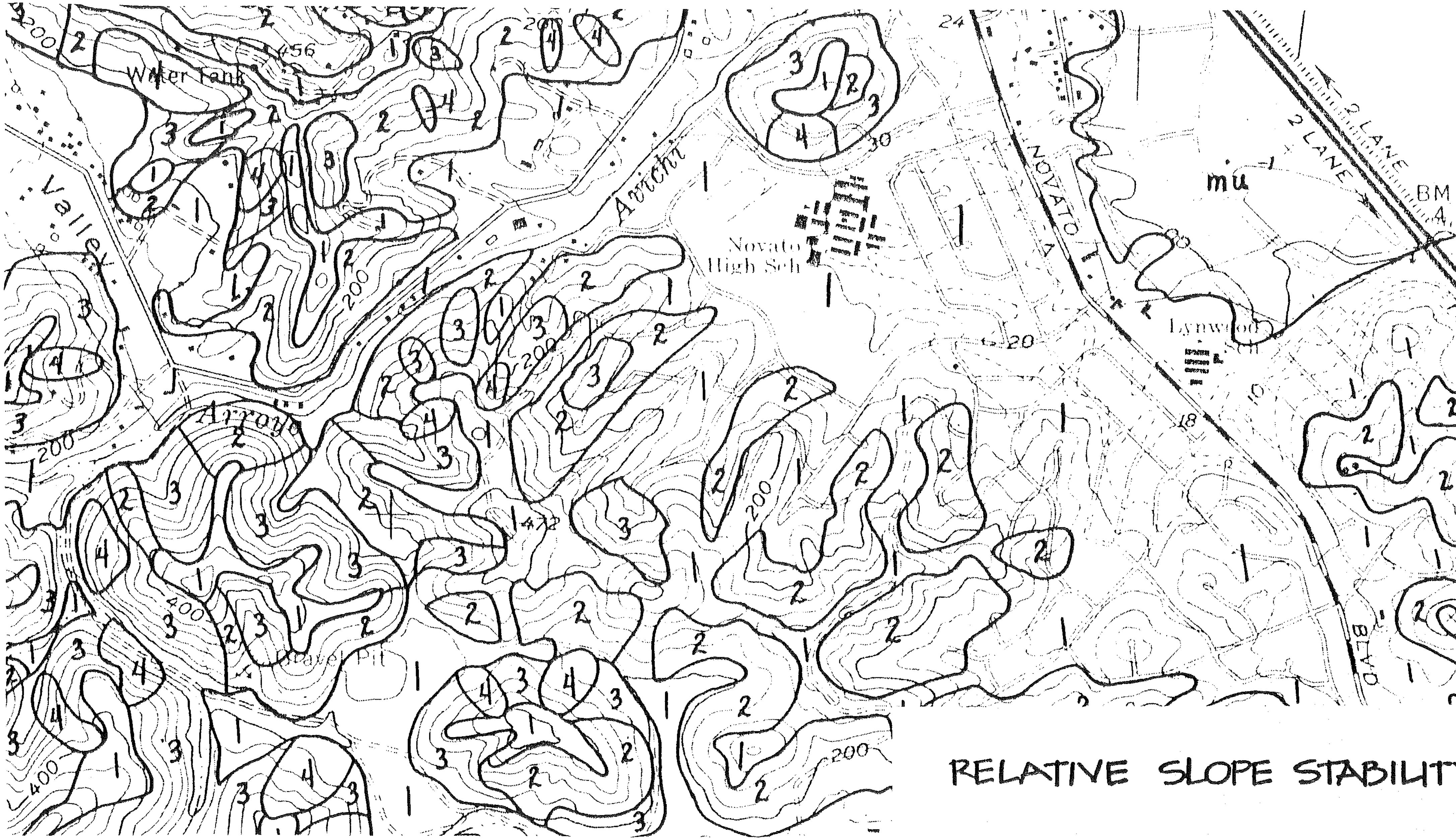
The broad stability characteristics of geological materials underlying the slopes,

Steepness of slopes, and

The presence of active or intermittent natural forces that tend to cause slope failure.

The maps provide broad evaluations of land stability patterns which have been prepared to aid in general land-use planning. Discussion of the uses and limitations of these maps will be found in the detailed explanatory legends on the map sheets. (Prints available from Marin County Planning Department.)

FIG. 18



RELATIVE SLOPE STABILITY

CHART 5

(See also Fig. 18 opposite)

RELATIVE LAND STABILITY

Zone 1 - The most stable category. This zone includes resistant rock that is either exposed or is covered only by shallow colluvium or soil. Also included in this zone are broad, relatively level areas along the tops of ridges or in valley bottoms that may be underlain by material that is quite weak (such as Franciscan melange matrix and alluvium) but occupies a relatively stable position. Some landslide deposits that have moved to relatively stable positions at or beyond the base of the slopes from which they were derived are also included in zone 1.

Zone 2 - Includes narrow ridge and spur crests that are underlain by relatively competent bedrock, but are flanked by steep, potentially unstable slopes.

Zone 3 - Areas where the steepness of the slopes approaches the stability limits of the underlying geological materials. Some landslide deposits that appear to have relatively more stable positions than those classified within zone 4 are also shown here.

Zone 4 - The least stable category. This includes most landslide deposits in upslope areas, whether presently active or not, and slopes on which there is substantial evidence of downslope creep of the surface materials. These areas should be considered naturally unstable, subject to potential failure even in the absence of man's activities and influences. Banks along deeply incised streams are also included in zone 4.

These judgments are interpretive, and apply generally to large areas. Within each area conditions may range locally in detail through all stability categories. Hence, an area designated 1 may locally contain unmapped landslides, and an area designated 4 may locally contain relatively stable sites.

mu - The bay mud, underlying the bay plains, marshlands, and mudflats, has unique and severe stability problems that are not comparable to those of the uplands. Bay mud is unconsolidated, semi-fluid, and highly compressible. Thus it is highly sensitive to loads placed on it, reacting by compaction and lateral flow to cause settlement of the fill -- often differential settlement -- that continues for many decades where the thickness of the mud exceeds about 25 feet.

Landslides and swelling soils constitute the principal geologic hazards to structures, roads and utilities in the uplands of Marin County. Both are widely but unevenly distributed in the area, and both are related to the bedrock geology and the surface soils and colluvium derived by weathering of the bedrock. Figure 19 illustrates the relative abundance of landslides in Marin County.

Landslides are not random - - - - - they occur in certain areas for specific and relatively predictable reasons, and not in other areas. Their likelihood should be accounted for in land use planning and in site development. (See Figure 20).

The hills and ridges of eastern Marin sharply differ from place to place in the strength and relative stability of the rock formations and other geologic materials that underlie the surface. Even without knowing the identity of the underlying materials, these differences in strength and stability can generally be inferred by the presence, absence, or relative abundance of landslides on the various slopes. Where landslides are abundant, the slopes are likely to be inherently unstable; where they are few or lacking on the steep slope characteristic of eastern Marin, those slopes are relatively stable.

Even in those areas where very steep natural slopes have relatively few landslides, indiscriminate deep cuts, both for streets and house sites, can be expected to cause some serious and long-term problems. Adversely dipping fractures and bedding planes that are a part of the structure of the underlying rock may become planes of movement when undercut.

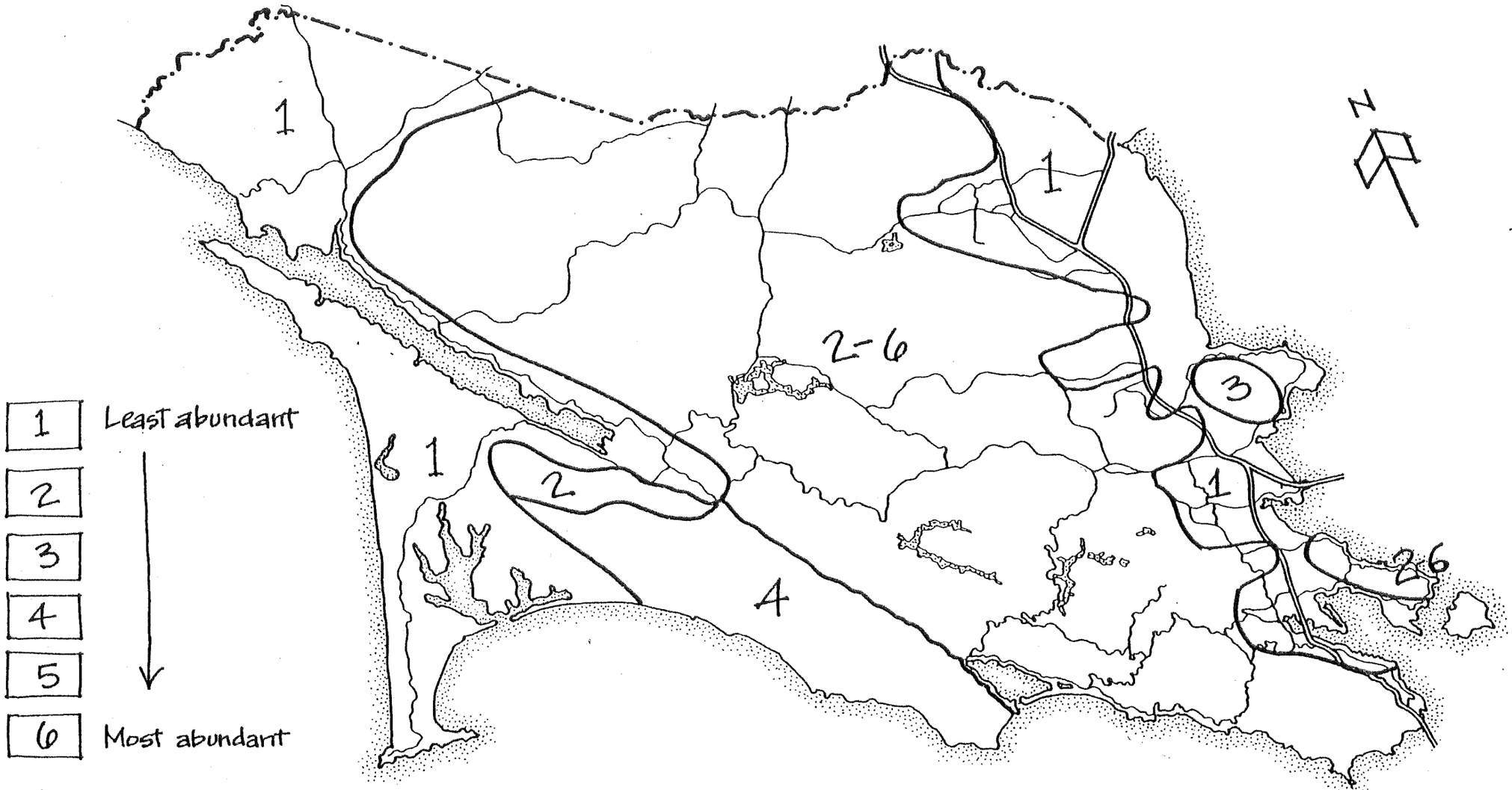
Landslide deposits are widely but unequally distributed in eastern Marin County. These surficial deposits of rock or soil materials have separated from their original position on slopes and have moved downslope under the influence of gravity. They exhibit characteristic topographic expressions that result from the downward and outward displacements of the landslide masses. Prominent topographic features that commonly develop in landsliding include scarps, terracelike benches that commonly have topographic sags or depressions on them, hummocky or disrupted ground surfaces, and anomalous drainage patterns.

Figure 16 illustrates basic types of landslide movements and their topographic expressions, with names often applied to them, and figure 21 presents a morphology of slides. Most landslide deposits in Marin County are debris flow but many or most of these were composite in their development. Typically such landslides originate as rotational slumps*, but disintegrate with further movement into debris flows*. On unstable slopes many such landslides commonly merge to form aprons of these deposits in which individual landslides are difficult or impossible to distinguish.

Where their topographic expressions have been modified or masked by erosion, forest cover, or grading operations, most landslide deposits can be identified from exposures in gullys,

* See Glossary

FIG. 19

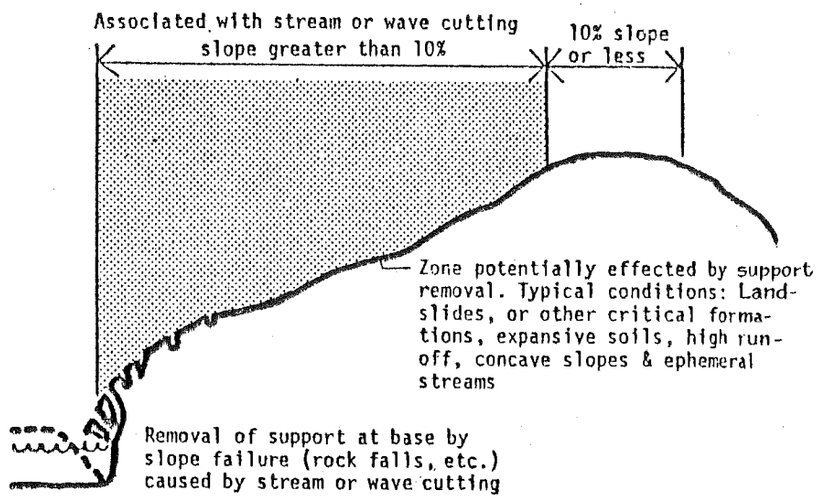


MODIFIED FROM RADBRUCH AND WENTWORTH USGS BASIC DATA CONTRIBUTION, 1971

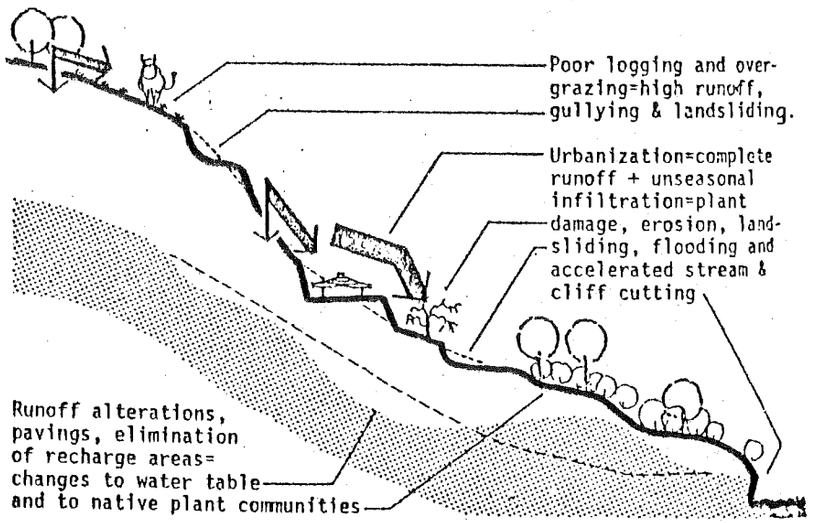
ESTIMATED RELATIVE ABUNDANCE OF LANDSLIDES IN MARIN COUNTY

FIG. 20

NATURAL LANDSLIDES



HUMAN INDUCED LANDSLIDES



SOURCE: The Santa Cruz Mountains Regional Pilot Study
Early Warning System

road cuts, or other excavations. This is because they are typically composed of chaotic mixtures of angular rock fragments, of various sizes and orientations, that are embedded in an unconsolidated, fine grained, clay-rich matrix.

One type of landslide, the debris avalanche*, leaves a scar behind as the only evidence of its occurrence that can be recognized a year or more after the event. The source of this type of fast moving landslide is limited to the regolith (soil and colluvium), never bedrock, and the avalanche mass is so fluid that it flows to the base of the slope, or beyond, and spreads out as a thin coating of mud over the surface.

A typical soil debris avalanche in Marin County involves a few hundred cubic yards of soil and colluvium and is the result of total saturation of a part of the regolith on a hillside. In general, it occurs only in sandy and silty soil that has little clay content. In southeastern Marin County such soils form principally on sandstone. (The highly fluid nature of these flows leads them to follow gulches and creek canyons to the base of the slope; so the mouths of such gulches and canyons at the base of sandstone ridges, such as Big Rock Ridge and San Pedro Ridge are highly vulnerable to such avalanches.)

During the last 20 years, they have occurred abundantly in Marin County when about 4 inches or more of rain has fallen in 10 hours or less. In places, though, they have occurred during normal rainfall as a result of excessive water introduced into the susceptible hillsides by domestic water use. Houses in the County have suffered damage or destruction from these avalanches both by being struck by the fast moving flows and by being undermined because foundations were embedded in the soil that liquified, rather than in the bedrock beneath the soil.

Important elements in the determination of the potential stability of a landslide deposit include its position on the slope, the angle of the slope, and the state of consolidation and other physical characteristics of the deposit. Though introduced from time to time as evidence of relatively higher stability of landslide deposits, old age, apparent or actual, has little significance regarding the potential stability of such deposits.

Most landslide damage in Marin County has taken place within pre-existing landslide deposits as a result of continuing or renewed movement within them. The great majority of these damaging landslides are soil and rock debris flows developed on slopes underlain by Franciscan melange. Their heaving soils and slow downslope movements strain houses by cracking foundations, and crack and disrupt streets and utilities. Most of the landslide deposits that show on our maps are of this type.

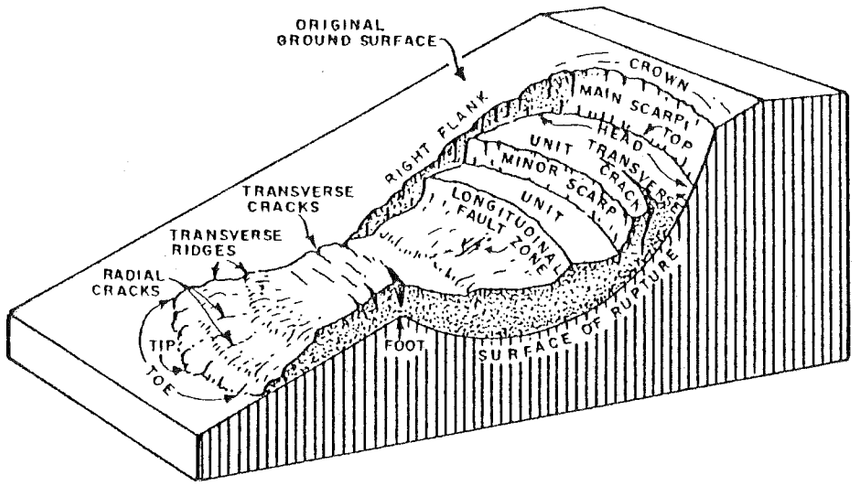
Soils that swell when wet and shrink when dry also cause considerable damage to structures, streets, and roads in places in Marin County. These are clay-rich soils, composed largely of mortmorillonite, an expansive clay mineral. In southeastern

(see p. 54)

* See Glossary

FIG.21

MORPHOLOGY OF LANDSLIDES



EXPLANATORY LEGEND

MAIN SCARP-A steep surface on the undisturbed ground around the periphery of the slide, caused by movement of slide material away from the undisturbed ground. The projection of the scarp surface under the disturbed material becomes the surface of rupture.

MINOR SCARP-A steep surface on the disturbed material produced by differential movements within the sliding mass.

HEAD-The upper parts of the slide material along the contact between the disturbed material and the main scarp.

TOP-The highest point of contact between the disturbed material and the main scarp.

FOOT-The line of intersection (sometimes buried) between the lower part of the surface of rupture and the original ground surface.

TOE-The margin of disturbed material most distant from the main scarp.

TIP-The point on the toe most distant from the top of the slide.

FLANK-The side of the landslide.

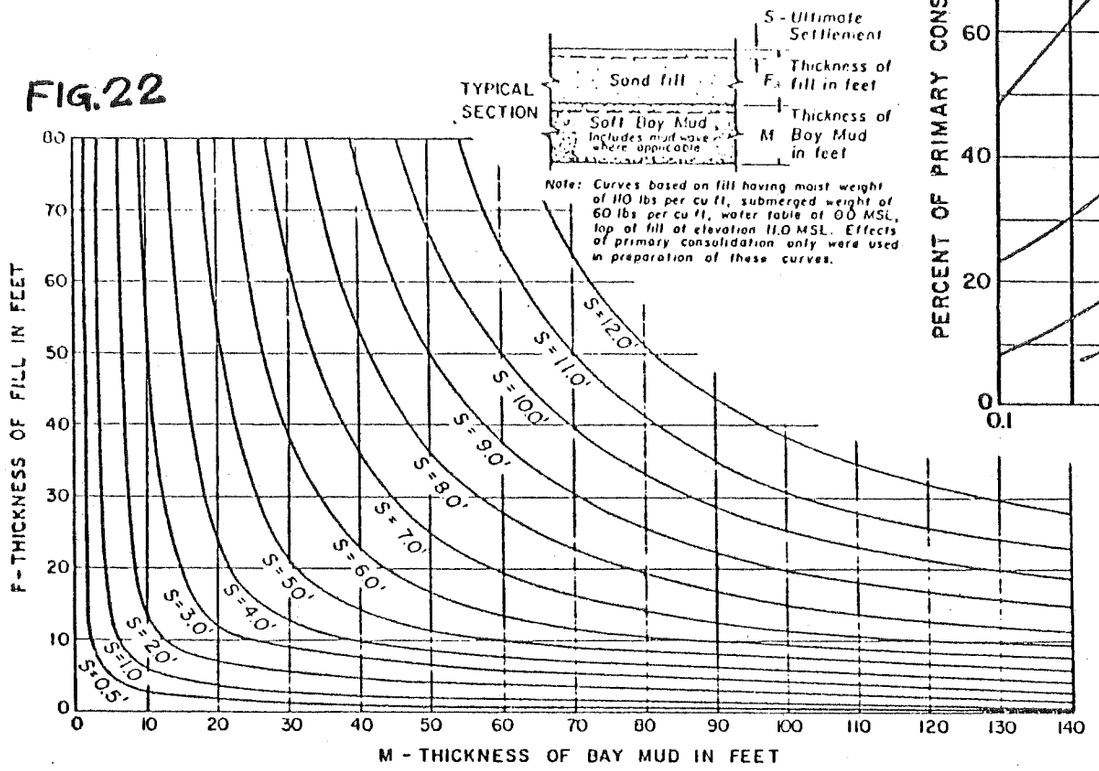
CROWN-The material that is still in place, practically undisturbed and adjacent to the highest parts of the main scarp.

ORIGINAL GROUND SURFACE-The slope that existed before the movement which is being considered took place. If this is the surface of an older landslide, that fact should be stated.

LEFT AND RIGHT-Compass directions are preferable in describing a slide, but if right and left are used they refer to the slide as viewed from the crown.

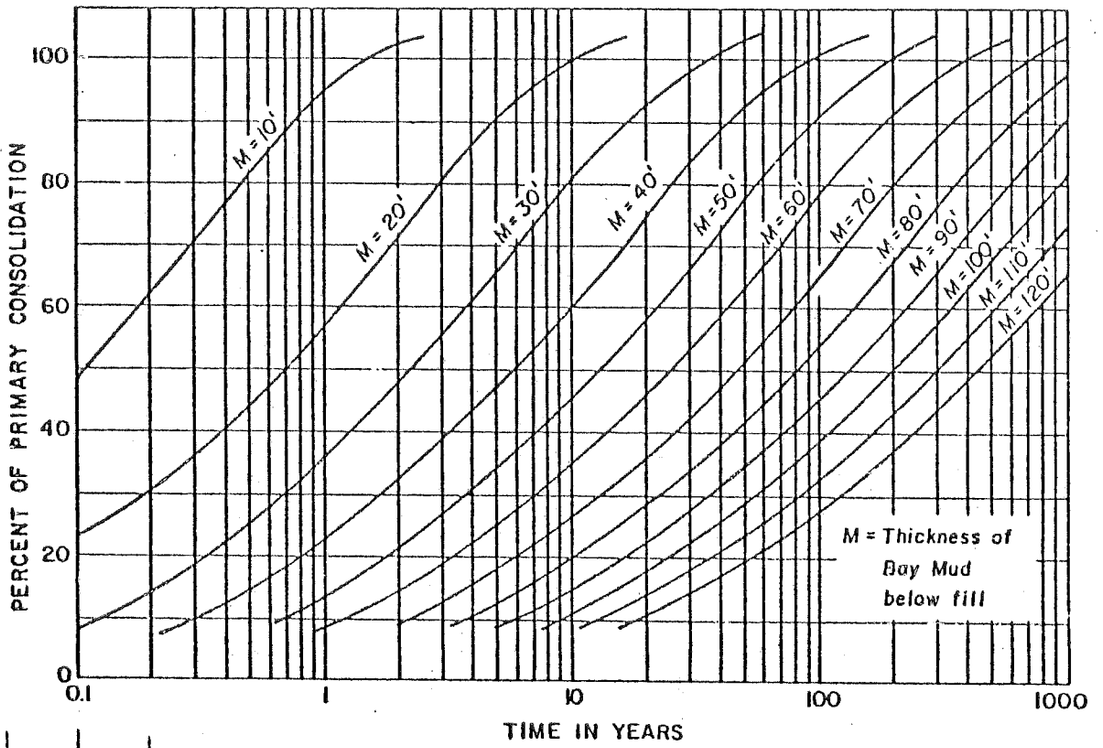
SUBSIDENCE

FIG.22



Ultimate amount of settlement of fills according to thickness of fill and thickness of underlying bay mud.
Source: Adapted from U.S. Army, Corps of Engineers, Comprehensive survey of San Francisco Bay and tributaries, March, 1963, Appendix E, figure 23.

FIG.23



Percent settlement of fills over time according to thickness of mud. Source: As figure at left on page.

Marin County these soils form in areas underlain by Franciscan melange where the fine-grained matrix of that unit is abundant. Such soils are dark gray in most places. In late summer they exhibit wide desiccation cracks (1 to 3 inches wide in many places), and at this time the soil is literally rock hard. Swelling of the clay minerals closes the cracks in the wet season, and the soil then is plastic and very weak. The forces exerted during expansion and contraction are sufficient to heave and distort buildings, and to crack shallow foundations and pavements. Such soils should be recognized prior to construction, and special engineering methods used to help reduce the stresses on buildings.

The expansion-contraction characteristic of these soils causes slow downslope creep of the surface where they lie on a slope, thus adding to their potential for disruption of structures and facilities.

These soils are abundant in most landslide deposits that lie on melange slopes, and are the principal reason for the inherent instability of such slope deposits.

Subsidence and Differential Settlement

Developments on fill placed upon the marshlands and mud flats of San Francisco Bay are susceptible to several severe types of stability problems. Such developments in Marin County have been the cause of great distress to individual citizens, as well as business people,and great public expense for many years, primarily because the continuing subsidence of fills results in intermittent flooding of residential neighborhoods, commercial and industrial areas and because differential settlement of fills in places damages structures, utilities, and roadways.

As discussed on Page 13 in more detail, the bay mud that underlies marshlands and mud flats (and many existing developments on fills placed upon such lands) is an unconsolidated, jelly-like material that is both highly compressible and subject to lateral flow when loads are placed on it.

Some appreciation of the problems related to instability of the bay mud environment can be gained by consulting graphs that show computed amounts of settlement and rates of settlement for different thicknesses of fill placed on different thicknesses of typical soft bay mud (see Figures 22 and 23.) Thick fills may settle to a great degree within a short time, but require two centuries to achieve total compaction, while the shallower fills may settle in a shorter period.

The settlement of fill on bay mud is well exhibited in Sausalito in a portion of the World War II shipyard development

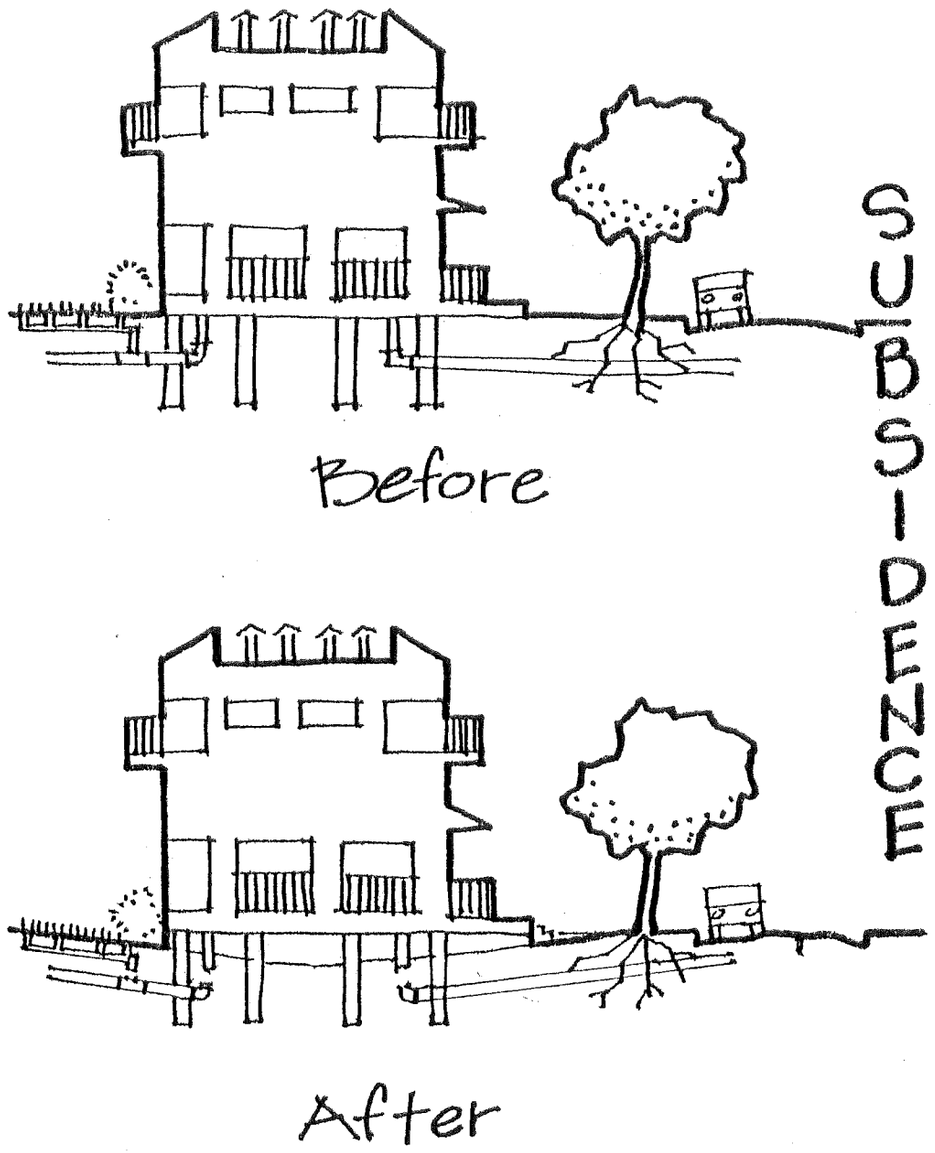
adjacent to Bridgeway and Harbor Drive, across from the"Big G Market" parking lot. In about 1940, clusters of pilings were driven through fill and underlying bay mud to help support a huge warehouse-like sub-assembly building and a concrete pad that served as its floor. The building has been removed, and the partially collapsed floor displays the amount of settlement that has taken place. Deep pilings are generally relatively stable in bay mud, and the small pads of concrete directly supported on the clusters of pilings now stand about 3 feet above the unsupported concrete surfaces that have settled with the fill. In places large broken portions of slabs are tilted up to their anchors on the pilings.

Structural Hazards Related to Settlement of Bay Fill

In most of the Bay Area very early bay fills were placed haphazardly and although recent fills have been placed with the aid of available technological skill, there still exist some uncertainties with regard to their ultimate behavior. Problems encountered range from tilted buildings, cracking of walls, and vertical separation of buildings, to sinking of surrounding ground in the case of piled foundations.

A number of examples of such types of structural damage can be found in the various developments constructed on bay fill in Marin County. Recent cases receiving what, for this type of damage, is unusual publicity include parts of the Greenbrae

FIG. 24



Marina and Larkspur Isles areas of Larkspur and a new townhouse development on Lucky Drive in Corte Madera. Damage caused by differential settlement of the fill included cracks in walls, sidewalks and garages, undermining of foundations, damage to gas lines, plumbing and electric wiring and actual tilting of townhouses under construction.

Two buildings in the Larkspur Isle Apartments had to be temporarily condemned and tenants of 26 units evicted, in 1973, as a result of settlement of fill beneath the one year structures (San Rafael Independent Journal, September 14, 1973, page 12). In this case, the structures are supported on deep, relatively stable pilings, but settlement of the underlying and adjacent fill in which utilities are embedded disrupted utility lines under them. See Figure 24.

FIRE HAZARDS

Introduction

For the purposes of the Seismic Safety and Safety Element, fire hazards will be dealt with on the basis of structural hazards and wildland fire hazards.

Structural fire hazards are those that exist with residences, business, industry and other man-made structures. Structural fires are a result of improper design or use of materials, inadequate or nonexistant fire detection or suppression equipment and poor building maintenance practices.

Structural Fire Hazards

Structural fires pose a greater threat to life and property than do wildland fires. Most human activity takes place within structures devoted to homes, employment, socialization and shopping. Most structural fires are due to carelessness or negligence, and in some cases deliberate action by people.

Table 2

Causes of Structural Fire in the United States

	% of Fires	% of $ losses
Electrical	16	12
Heating and cooking	16	8
Smoking and matches	12	4
Incendiary, suspicious	7	10
Flammable liquid fires and explosion	7	3
Children and matches	7	3
Open flames and sparks	7	4
Rubbish, ignition source,unknown	3	1
Spontaneous ignition	2	1
Exposures	2	2
Lightening	2	2
Miscellaneous known causes	2	6
Unknown	17	44
TOTAL	100	100

National Fire Protection Association Estimates

All aspects of fire prevention and suppression requires vigilence on the part of public officials and the public in order to maintain an acceptable level of risk. Efforts on the part of the private sector to prevent fire by placing suppression devices within buildings helps reduce the incidence of fire, loss of life and property damage. From a fiscal standpoint, more emphasis needs to be placed upon the property owner's responsibility for fire proofing, fire detection and/or suppression equipment systems in homes, offices, stores and factories. Owner responsibility for fire protection could, in the long run, lower government costs.

Altering Existing Structural Fire Hazards

Addressing existing fire hazard problems by offering methods by which the general public may reduce the threat of fire hazard is an important aspect of this element. The following four methods are recommended for consideration by all property owners and fire service districts.

1) The type of material contained within a structure is of extreme importance. The abundant use of synthetic materials and plastics are dually dangerous in that they are normally more flammable than natural materials and result in heavy smoke and toxic gasses when inflamed.

Exterior materials such as highly flammable wood-shake shingles have yet to be discouraged by building codes and continue to threaten the safety of County residents. The inclusion of fireproofed wooden shingles as part of the Uniform Building Code would reduce their potential for sustaining or spreading fire.

2) Fire safety lags behind other building considerations such as the design of buildings and construction. However, the design of upper floors, especially in single family residences, has recently generated concern for alternative fire escape routes should the stairwell become impassable. (Uniform Building Code, 1976)

Owners of single family residences, who for their own safety considerations use enlightened design, flame-resistant materials, smoke and heat detectors, sprinkler systems or other fire reduction methods should be eligible for reduced insurance premiums. Insurance industry officials should develop programs wherein benefits to the property owner would result from weighing premiums against fire reduction methods.

3) There are a multitude of standards dealing with fire hazards, contained within seven codes. They are: Building Code - Applies principally to new construction and alterations, though it is sometimes made retroactive and applied to existing building if past deficiencies are discovered to be critical or the value of new construction, or remodeling, constitutes a significant percentage of existing dwelling unit value.

Fire Prevention Code - May govern the maintenance of the building once a building is constructed, and govern the introduction of materials into the building for the sake of fire safety.

Housing Code - Concerned with livability standards for sanitation, health facilities and building maintenance.

Electrical Code - Sets requirements for materials and equipment used in electrical systems.

Plumbing Code - Provides for delivery of potable water and safe disposal of flushed wastes and water-type fire suppression systems.

Mechanical Code - Applies to heating, ventilating and air conditioning.

Elevator Code - Governs materials, equipment, and installation of elevators and their use.

The first two are the most important from the standpoint of fire safety. Typically, about two-thirds to three-fourths of the provisions of a building code apply to fire safety, as do all the provisions of a fire prevention code.

Presently the County is covered by the 1976 editions of the Uniform Building Code (UBC) and Uniform Fire Code (UFC). In general, the Uniform Fire Code governs the maintenance of buildings and premises; it safeguards life, health, property and public welfare by regulating the storage, use and handling of dangerous and hazardous materials, substances and processes, and by regulating the maintenance of adequate egress facilities. The UFC is an important step in helping reduce existing hazardous fire conditions and lessen the possibility of major new fire hazards developing. Moreover, it enables fire prevention agencies-to-inspect the interior of buildings which might be a fire hazard.

A 1976 edition of the UFC has been developed by the Western Fire Chiefs Association with the International Conference of Building Officials. The County, as well as all cities should adopt the 1976 edition of the UFC as a standard for contemporary fire safety.

4) An alternative mitigation of existing structural fire hazard involves fire safety technology. Providing structures with heat and smoke detectors to alarm occupants and/or the fire department, and providing automatic and/or manual fire suppression equipment appears to be the best solution among those previously discussed. The marketing of commercial heat or smoke detectors for residential use in recent years has resulted in higher quality detectors becoming available to the public.

Smoke detectors are now required as a condition of construction and new residential structures or adding a sleeping addition to an existing residential structure. Fire alarms are required as a condition of constructing apartment houses over 12 units, schools and other institutional occupancies.

There is enough information and numerous technological choices to permit architects, engineers and builders to plan and create buildings with low fire hazards. New construction embodies many enlightened techniques for fire hazard prevention. What is required are incentives such as: reduced fire insurance premiums, reduced taxes for fire protection if fire requirements are met, and more efficient, safe building design. If combinations of all of the aforementioned alternative solutions were implemented by both government and the private sector, the risk from structural fire hazards would be reduced.

WILDLAND FIRE

California has a wildland fire potential that is found nowhere else on earth. The combination of highly flammable vegetation, long and dry summers, rugged topography, and people who work or recreate in the wildlands adds up to a situation which results in several thousand wildfires each year. Dependent upon local burning conditions, these fires can and do occur in any month of the year throughout the state.

Most wildfires are controlled within the first few hours by a fire protection system that includes federal, state, and local government fire protection agencies. On a few occasions fires escape initial control efforts and become large and especially destructive. These few fires -- which cause most of the annual loss to natural resources, life and property -- most frequently occur within a small number of critical days each year when air temperature commonly rises to over 100 F., relative humidity drops to near zero, and hot dry north or east winds blow at high velocities. Fires burning under these conditions have two characteristics in common: rapid spread and high intensity (i.e., high rate of heat energy output). Generally they spread with only minor regard to topography and narrow breaks in the vegetation. They may project flaming embers several miles ahead of the main fire front and engulf individual residences or large numbers of homes in rural subdivisions or around the perimeters of urban communities.

The potential for fire increases as residential and recreational developments encroach further into the wildlands. Many steps can be taken to reduce this potential loss to life and property by wildfire: enforcement of proper building codes designed to make homes built in the wildlands relatively safe; implementation of fire safe practices, including proper road construction and adequate water systems; and perhaps most important, proper land use planning and zoning which will designate where and under what conditions people should live in the wildlands relative to their exposure to the hazard of wildfire. Government agencies need basic information so that such land use policies and zoning criteria can be developed to help reduce the possibilities of wildfire disaster.

Factors Affecting Wildfire Behavior

Wildland fires are started by two general causes: lightning and people (a small number of other fires are caused by a few miscellaneous agents not related to people. Once started, fires burn according to a set of chemical and physical laws. Those factors most important to fire behavior are fuel (in the form of wildland vegetation) plus man's structural improvements, topography, and weather.

Wildland fire hazards exist in varying degrees over approximately 90% of the County (open space, parklands and agricultural areas). Hazards arise from a combination of climatic, vegetative and physiographic conditions. Although wildland

fires have always occurred naturally, from lightning, people are responsible for 9 of 10 wildland fires today.

A Fire Hazard Severity Scale has been developed by the California Division of Forestry which provides a practical and logical system for classifying and delineating areas of varying severity of fire hazard in wildlands. The Scale utilizes three criteria:

.. Fuel loading (in terms of wildland vegetation)
.. Fire weather
.. Slope

The County, along with the California Division of Forestry should undertake a program of identifying and mapping extreme fire hazardous areas and apply standards to development in such areas.

Fuel loading includes three classes. Light fuels occupy the uncolored areas on USGS maps and represent flammable grass and annual herbs. Medium fuels are shown as "scrub" on the USGS maps and include brush and other perennial shrubs less than six feet in height and having a crown density of 20 percent or more. Heavy fuels are shown as "woods-brushwood" on the USGS maps and include the heavier brush species, woodland types, and timber types over six feet in height and having a crown density of 20 percent or more.

Fuel characteristics help determine how a wildfire burns: fuel loading (quantity of flammable vegetation and other fuel per unit of land area), moisture content, distribution of size classes, arrangement, ratio of dead vegetation to living vegetation, and chemical content. Those factors which contribute most to a high intensity fire (high rate of heat energy output) include high fuel loading, low moisture content and a high proportion of large sized fuels.

Fire Weather includes three classes. Each class is related to the frequency of critical fire weather days occurring in in each of the state's Fire Danger Rating Areas over a 10-year period. The Low class (Class I) includes all those Fire Danger Rating Areas which experience fire weather in the "very high" or "extreme" ranges an annual average of less than one day; the High class (Class II) an annual average of 1 to 9.5 days; and the Extreme class (Class III), an annual average of more than 9.5 days. Each USGS topographic map in the state is keyed to one of the Fire Danger Rating Areas and assigned that Area's critical fire weather frequency classification.

Weather elements have many complex and important effects on fire intensity and behavior. Wind is of prime importance; as wind increases in velocity, the rate of fire spread also increases. Relative humidity (i.e., moisture content of the air) also has a direct effect; the drier the air, the drier the vegetation and hence the more likely the vegetation will ignite and burn. Precipitation (its annual total, seasonal distribu-

tion and storm intensity) has further effects on the moisture content of dead and living vegetation and hence important effects on fire ignition and behavior.

Most of Marin's wildlands have experienced critical fire weather conditions at some time in the past and undoubtedly will in the future. Determining what frequency of critical fire weather can be tolerated in respect to classifying fire hazard areas is a major factor in fire safety.

Slope plays several important roles in determining how fires normally spread and behave. Generally speaking it can be said that topography causes fires to burn more rapidly upslope than downslope; the steeper the slope, the greater will be the rate of fire spread. Topography, in combination with solar re-radiation, is also responsible for small scale local wind blowing upslope or downslope, causing fire to spread accordingly. In relation to its effects on large scale wind blowing inland from the Pacific Ocean, "the shape of the land" produces a channeling of those winds and hence affects direction of fire spread. Topography's normal effects on wind and fire behavior diminish in importance, however, when even larger scale air masses produce high velocity north or east winds, prime factors in the spread of the most damaging conflagrations.

Slope aspect influences fire behavior in that burning conditions are in general much worse on south and west facing slopes than on north or east facing slopes. However, for purposes of rating fire hazard, it is felt that aspect is so greatly overshadowed by the importance of vegetation, fire weather, and steepness of slope that it need not be considered.

Slope includes three classes: 0-40 percent, 41-60 percent, and over 60 percent. Each class is assigned a value, derived from California's Interagency Wildland Fire Danger Rating System. Slope is recognized by that system as having an effect on fire behavior similar to the effect of wind, i.e., an increase in slope produces an increase in the rate of fire spread. The system therefore assigns values to slope which modify the various fire danger indexes accordingly.

Each class of fuel loading, fire weather, and slope is assigned a severity factor value. The values are multiplied in a matrix form to produce a Fire Hazard Severity Scale.

Although the three classes of fire hazard were established by arbitrarily dividing the matrix values, it is felt that (1) the resulting class designation is logical in relation to expected fire behavior and potential fire damages; (2) it will withstand the scrutiny of fire behavior experts, fire protection planners, and land use planners; and (3) it will serve as a relative guide in planning, building and zoning decisions.

CHART 6

Fire Hazard Severity Scale for Delineation of California's Wildlands.

CRITICAL FIRE WEATHER FREQUENCY ⇩	I			II			III		
FUEL LOADING ⇨	SLOPE %			SLOPE %			SLOPE %		
	0-40	41-60	61+	0-40	41-60	61+	0-40	41-60	61+
Light (Grass)									
Medium (Scrub)									
Heavy (Woods - Brushwood)									

MODERATE HIGH HAZARD EXTREME HAZARD

FLOOD HAZARDS

Background

Flood hazards as addressed in this element consider several causative processes; stream overflow, flood due to bay tidal activity, earthquake related flood and dam failure flooding. On file in the Marin County Department of Public Works and Planning are maps of the 100-year flood plain (one percent chance of flood in any one year) prepared by for the U.S. Department of Housing and Urban Development as part of the National Flood Insurance Act of 1968 & the Flood Protection Disaster Act of 1973. These maps identify areas of naturally occurring flood and flood due to bay tidal activity. (See Figure 25 for a representative sample of these inundation maps). Areas subject to earthquake-generated tidal waves - tsunamis* - have been identified by USGS and are on file in the Planning Department. Tsunami hazards are discussed in detail under Seismic Hazards in . Areas subject to inundation as a result of dam failure at Stafford Lake, Phoenix Lake, Nicasio Reservoir and Alpine and Peters Dams have been prepared by various agencies to meet requirements of the California State Dam Safety Act of 1972. Both the Dam Safety Act and its implementation program and the National Flood Insurance Act are described in , Public Policy, and in the Appendix.

These mapped expressions of flood hazard areas will be subject to some form of regulatory procedures to reduce the risk of property damage, disease and loss of life. Recommendations to reduce risk from flood hazard are an important aspect of a safety element. Figure 26 provides a generalized countywide flood hazard map.

Policies of the Countywide Plan, Environmental Quality Section (see Section IV,Public Policy for extracts) are substantiated by the hazards inherent in flood plain development. The role of water both as a natural resource and as an environmental hazard pervades the Countywide Plan and its elements. Creation of a flood hazards program as part of this safety element which is mutually supportive of the conservation/land use/circulation aspects of the Countywide Plan will aid in the development of a more complete understanding of water resource management.

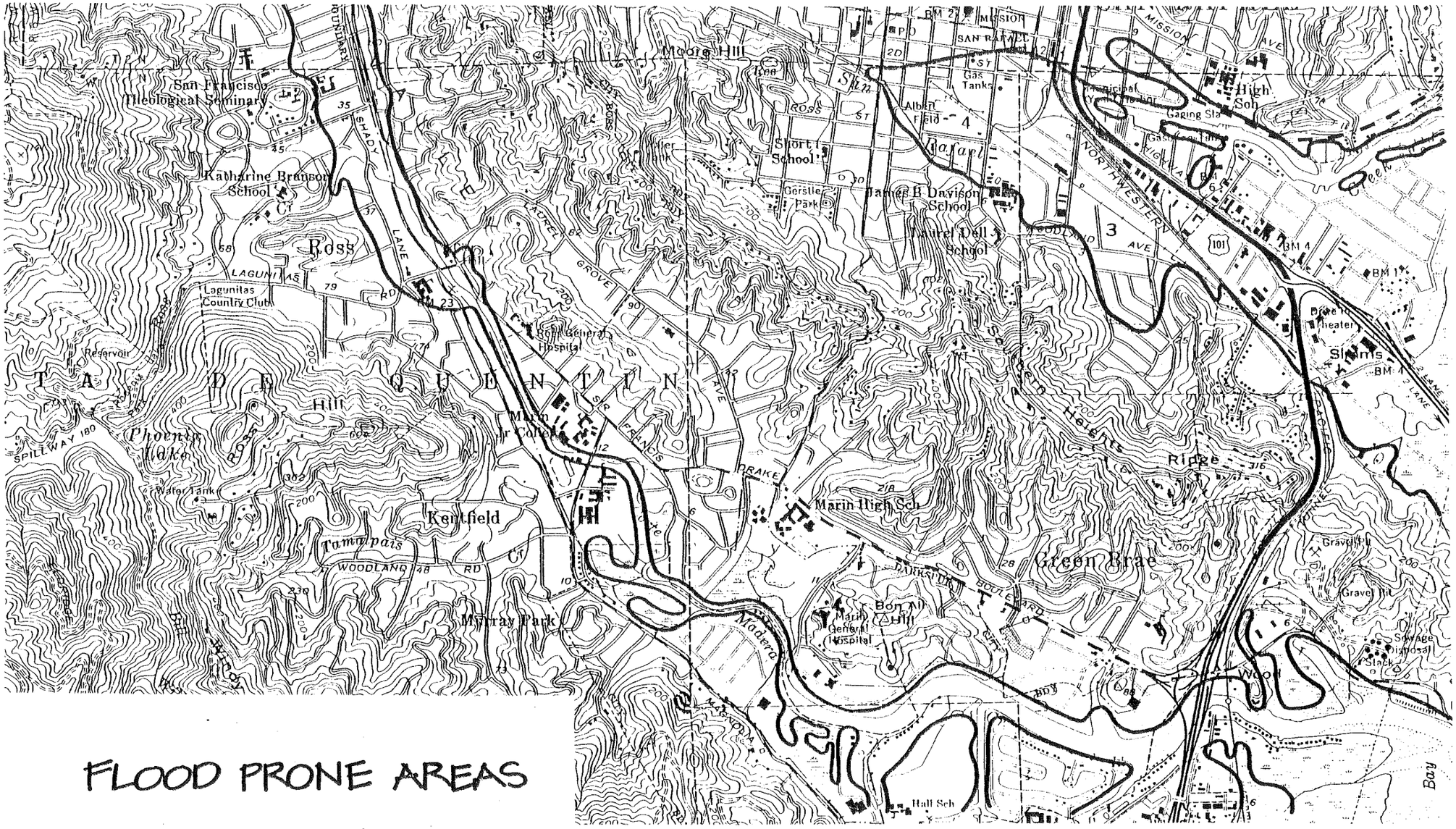
Natural Flooding

The numerous creeks and waterways in Marin County are usually subject to some form of flooding during the annual wet winter rain season. The degree of flooding is dependent upon topography, vegetation, the duration and intensity of rain and consequent storm water runoff.

Stormwater runoff,which exceeds the capabilities of physical channel characteristics of a stream,results in localized flooding. Flooding is a natural action which, as well as bringing large amounts of water to flat valley floors, the flood plain also deposits sedimentary soils from erosion in those valleys.

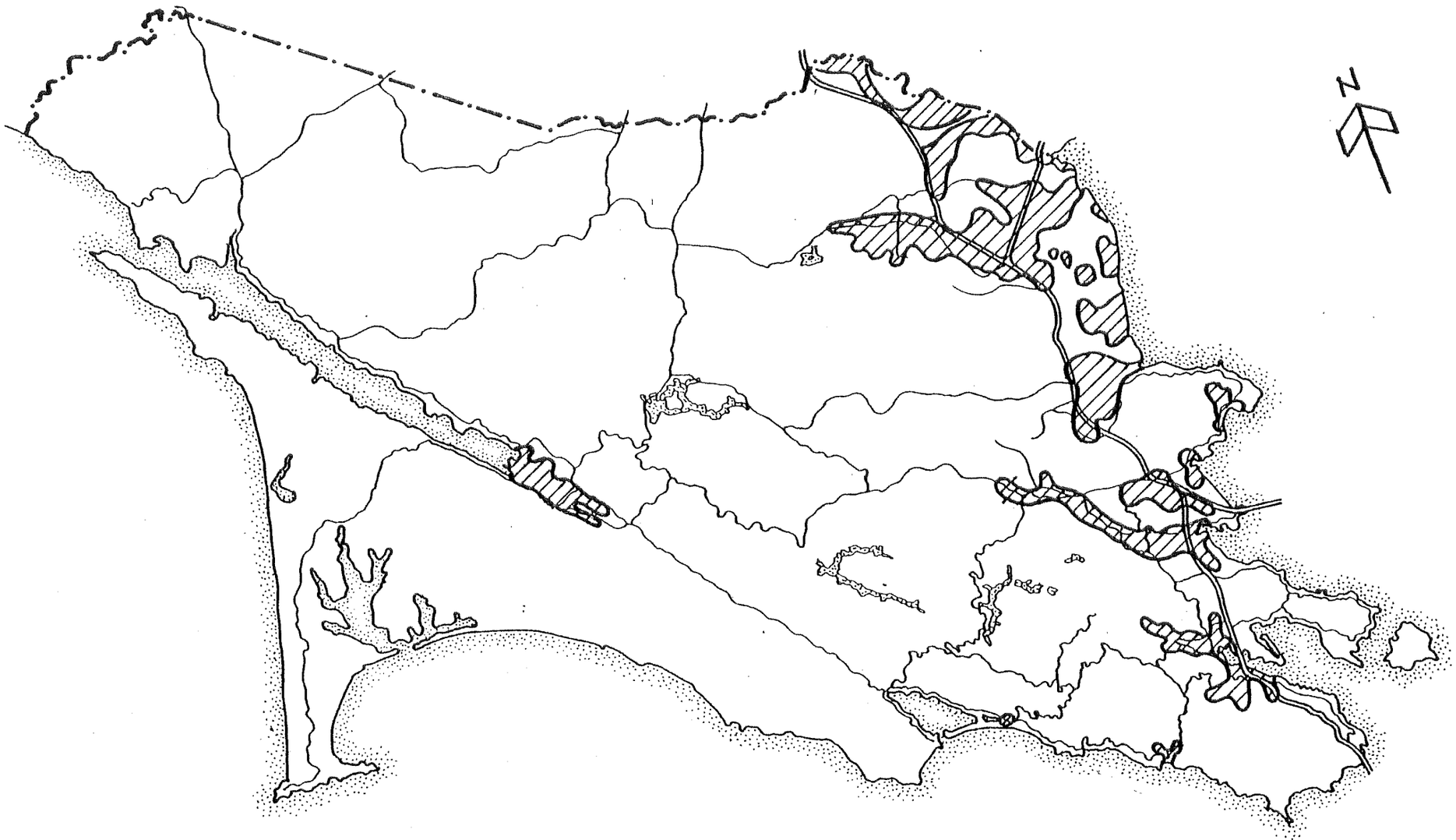
* See Glossary

FIG. 25



FLOOD PRONE AREAS

FIG. 26



FLOOD PRONE AREAS

The Floodplain is a natural portion of any waterway. The relative infrequency of a waterway's use of its floodplain should not obscure the fact that the floodplain is a physical portion of the waterway. By delineation of the floodplain, appropriate land uses may be accomodated while high risk land uses may be avoided.

Flooding is only considered a problem when it affects people - and it affects people because development has been allowed in flood-prone areas without full consideration of environmental, economic and social impacts. Flooding, though most dramatic,is just one of the problems resulting from development in floodplains. The riparian* environment is severly damaged or destroyed by intensive human encroachment. Aside from the danger of flooding, other features such as: high water tables, poor drainage and high erosion are typical problems when building encroaches on the floodplain.

Residential development is continuing to occur in floodplain areas in Marin. Floodplain and marshland along San Pablo Bay has witnessed such recent developments as Bel-Marin Keys, Bahia and Paradise Cay. Development pressures along San Pablo Bay for commercial/industrial uses as well as residential development will continue. Conflicting policies of accomodating growth while maintaining environmental and public safety policies will be addressed by the Planning Commission and Board of Supervisors as development projects are proposed.

The historic development and growth of cities in Marin has followed a classic course, i.e. along flat bottom lands subject to seasonal inundation. Portions of Mill Valley , Tiburon, San Rafael, Novato and the Ross Valley usually suffer some flood damage annually.

The Corte Madera Creek watershed drains the Ross Valley and has been the subject of a Corps of Engineer flood control project since 1962. A four-phase project of dredging and concrete channelization to reduce flooding was proposed - three phases have been completed.

The fourth phase, which proposed 3,000 feet of continued concrete channelization was halted by local citizens who requested that alternatives to channelization be considered. A recently completed study by local citizens, the Town of Ross, County officials, Army Corps of Engineers and a consulting team recommended limited tree and shrub removal, rip-rap in areas of extreme erosion, raising several existing residences, the construction of low flood control walls and a system of higher "wing" walls ($2\frac{1}{2}$ to $7\frac{1}{2}$ feet in height) to achieve flood protection without construction of 3,000 feet of concrete channel. This progressive method of flood protection in an existing developed area may be viewed as a model for future flood control projects.
jects.

Historically, flood problems caused by human encroachment into the floodplain and/or waterway have been met by the construction of flood channels, dikes and multi-purpose dams, methods

which further alter the natural waterway system. In Marin County, flood plain zoning (which precludes construction and/or construction which increases the flood problem) has been applied to an area along State Highway #37, southeast of Novato. One of the primary recommendations of this element is the evaluation and consideration of alternatives to construction-related methods to control flooding and to promote innovative regulatory methods which enhance riparian environments. Flood plain zoning may be a useful tool to preclude development which excerbates flood problems, while other methods are developed.

The Marin County Flood Control and Water Conservation District was established by the California State Legislature in 1953 to deal with drainage and flood problems. At the present time seven flood control zones are in existance. They are: Novato Creek, Richardson Bay, Bel Air, Stinson Beach, Rafael Meadows, Santa Venetia and Ross Valley.

Contemporary flood control district policy stresses the alleviation of existing flood problems in developed areas. Such methods include the outright purchase of land to re-establish the flood plain, the flood proofing of property by raising flood prone buildings, construction of berms and retaining walls, making dwellings watertight, flood plain zoning; as well as construction of physical facilities such as stream channelization, pump station and levees.

Flood control projects are financed by a Drainage Improvement tax levied within each zone.

By resolution of the Board of Supervisors, specific drainage systems for three of the seven flood control zones have been identified as major systems requiring the District to exercise its primary efforts and resources toward the efficient control of these systems. (See Appendix). The Flood Control District has two ordinances with which it deals. These are Ordinance Number 2025, which allows the district to enforce creek encroachments and debris control within the incorporated city limits, and Ordinance Number 1698, which involves encroachments into the right-of-way on Corte Madera Creek. All other code enforcement relative to creeks are a part of Marin County Code, enforced by the Department of Public Works. Flood Control as a part of DPW staff assists in that enforcement. Public Works review, however, extends to all developments within the unincorporated area of the county.

Within some of the flood control zones, a degree of inspection and enforcement takes place which is over and above normal procedures adopted by the county. An explanation of each zone and their degree of enforcement follows:

Flood Control Zone #1 (Novato)- This zone encompasses the entire watershed tributary to Novato Creek which includes all of the City of Novato plus a substantial amount of unincorporated area around Novato. The zone pays for the employment of a full-time creek naturalist whose job includes patroling the creeks desig-

nated to be under the zone jurisdiction and enforcing of the County Creek Ordinance and Ordinance 2025 within the city limits of Novato.

Flood Control Zone #3 (Richardson Bay) - Includes the area tributary to the upper end of Richardson Bay, therefore, all the City of Mill Valley, plus unincorporated areas, such as Tamalpais Valley, Homestead Valley, the Alto-Sutton Manor area, and portions of the Strawberry Peninsula. This zone also has adopted a resolution of jurisdiction and pays for creek inspection services to the extent that the County can make them available for enforcement of Ordinance #2025 and the Marin County Code along creeks designated to be under the jurisdiction of the zone.

Flood Control Zone #4 (Bel Air) - is a small zone located off Tiburon Boulevard, and includes portions of the City of Tiburon. There are only two major watercourses through the area and an internal drainage system mostly culverted. The zone inspects the two watercourses and enforces necessary code or ordinance provisions along those creeks.

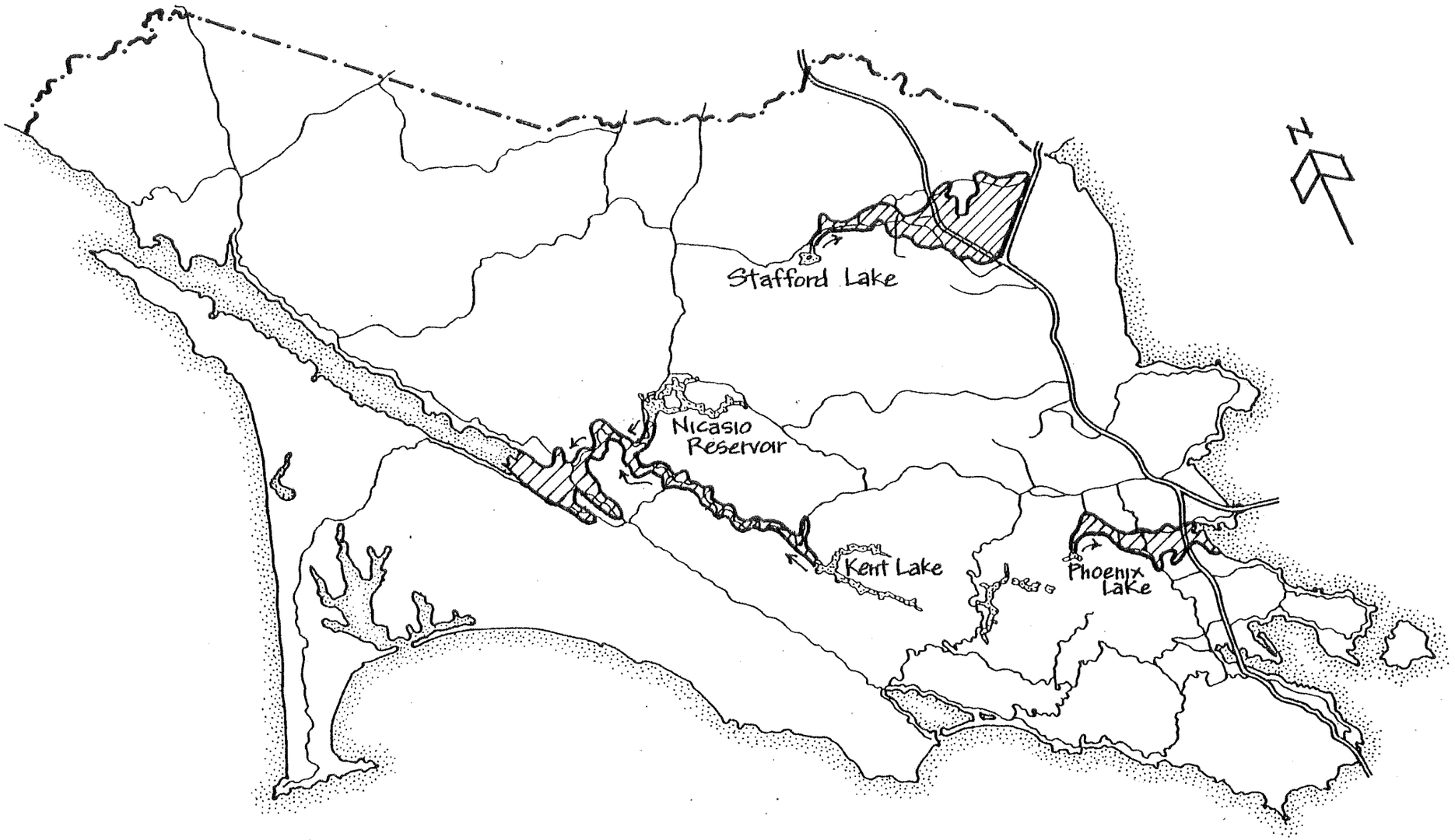
Flood Control Zone #5 (Stinson Beach) - This small flood control zone includes all of the area tributary to Eskoot Creek which is the main creek running through Stinson Beach. The zone has a very limited budget and its present policy includes maintenance operations only. Periodical inspection of the creek and required enforcement of county code regarding debris and/or illegal structures is under the jurisdiction of the Flood Control District.

Flood Control Zone #6 (Rafael Meadows) - This small flood control zone located across the highway from the Marin County Civic Center has recently been annexed to the City of San Rafael. The City of San Rafael has assumed all maintenance responsibilities, and the zone exists only for future capital projects expenses.

Flood Control Zone #7 (Santa Venetia) - This small flood control zone located east of the Marin County Civic Center has no real creeks running through the area; however, all of the internal drainage systems are presently under the control of the Flood Control District.

Flood Control Zone #9 (Ross Valley) - This zone encompasses all of the Ross Valley which is tributary to Corte Madera Creek with the exception of the Cities of San Anselmo and Fairfax. The zone has adopted a resolution of jurisdiction, spelling out those creeks within the zone boundaries which it will assume responsibility for. The zone pays for a full-time Creek Inspector and enforcement of county codes in the unincorporated area and Ordinance #2025 within the Cities of Corte Madera, Larkspur, and Ross. The Flood Control District also enforces Ordinance #1698 along Corte Mdera Creek. Under present law, it is not possible for the Flood Control District to extend services into the Cities of San Anselmo and Fairfax, as they are outside the boundaries of the zone.

FIG. 27



AREAS SUBJECT TO INUNDATION FROM DAM FAILURE

California Dam Safety Act of 1972 (SB 896)

The Marin County Office of Emergency Services has developed a Dam Failure and Evacuation Plan (DAMEVAC) to implement the provisions of the California Dam Safety Act. The Act requires preparedness against the sudden failure (partial or total) of any dam that could result in death or personal injury. Further, the Act requires that areas of potential flooding in the event of a dam failure be identified on inundation maps, and that procedures be developed for emergency evacuation and control of populated areas within identified flood zones. Also, other statues and regulations pertaining to the supervision of dams and reservoirs define which dams will be considered in dam failure plans and what the criteria are for defining the boundaries of potential innundation zones. See figure 27 for areas subject to inundation as a result of dam failure. More detailed maps are available through the Office of Emergency Services.

The provisions of the Dam Safety Act apply to those dams and populated areas in Marin County listed to the right side of this page. The DAMEVAC plan establishes procedures for evacuation and control of populated areas below these dams, and for subsequent re-entry into these areas.

DAM	EVACUATION AREA
Stafford Lake Dam	Novato
Peters Dam (Alpine & Kent Lakes)	Samual P. Taylor Park Lagunitas & Point Reyes Station
Phoenix Dam	Ross, San Anselmo, Kentfield, Larkspur, Corte Madera and San Rafael
Nicasio Dam	Point Reyes Station

The County of Marin and Marin Operational Area Emergency Plan

The Emergency Plan was developed for use as a guide for the effective coordination of emergency operations in Marin County and its political sub-divisions which, along with certain non-governmental agencies, comprise the Marin Operational Area.

The Emergency Plan contemplates that, while the probabilities of nuclear war are remote, emergency preparedness for this eventuality is a necessity, and that natural disasters, major accidents and incidents are more likely to strike without warning, causing undue suffering, loss of life and property damage involving unknown numbers of our citizens. A viable emergency plan to provide operational and organizational guidance, therefore, is an absolute requirement if we are to minimize the effects of these disasters.

The purpose of the Emergency Plan is to provide guidance for maximum attainment of protection of life, property and community facilities in the event of a disaster. It recognizes that effective response during war and peacetime emergencies is an inherent responsibility of government. Accordingly, this Plan provides for organization of Emergency Services, and the management of critical resources in the County of Marin and Marin Operational Area, and contains guidance for fulfillment of those responsibilities.

County of Marin Office of Emergency Services

The County of Marin Office of Emergency Services was established by ordinance in December 1971 and designated a staff agency responsible directly to the Board of Supervisors, operating administratively within the aegis of the County Administrator.

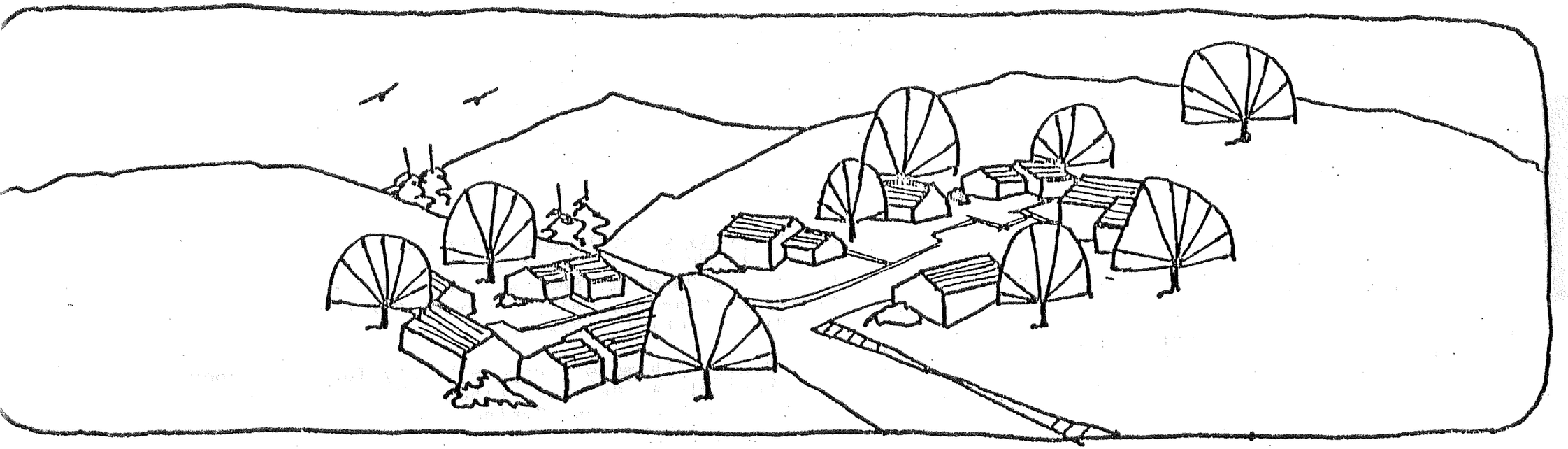
It has responsibility for coordination of all disaster emergency functions of the county government and all public agencies within the county. Under a special joint agreement with the cities and towns it also assists those jurisdictions with their disaster emergency planning and related programs.

The OES staff is constantly involved in preparing or revising emergency plans and annexes as outlined in the current County of Marin and Marin Operational Area Emergency Plan. The office prepares and conducts disaster exercises and conducts emergency training workshops for county departments and city/town fire and police agencies. Other major activities of OES include the administration of the Federal Disaster Relief Act (PL 93-288), the federal surplus and excess property programs, and miscellaneous disaster assistance depending upon the nature of the emergency. As a service to the county as a community, the County Office of Emergency Services provides disaster planning guidance and assistance to schools, hospitals, and convalescent homes, in the form of assistance in preparation of disaster plans and provision of informational materials on emergency preparedness, especially earthquakes and the emergencies that can result therefrom, such as floods, fires, and medical casualties.

Subsequent to a major earthquake the County Office of Emergency Services will immediately activate the Emergency Operations Center in the Civic Center where representatives from all county departments, utilities agencies, the California Highway Patrol, Cal-Trans, schools, and news media (radio/TV) will operate collectively as an EOC staff in coordinating mutual aid requirements countywide, outside the county and internally within a specific division.

DESIGN STANDARDS AND PROCEDURES FOR PLANNED RESIDENTIAL DISTRICTS

MARIN COUNTY, CALIFORNIA



EXCERPTS FROM TITLE 22 (ZONING) MARIN COUNTY CODE

APPROVED by MARIN COUNTY PLANNING COMMISSION, MARCH 24, 1975

ADOPTED by MARIN COUNTY BOARD OF SUPERVISORS, APRIL 22, 1975

PUBLISHED by MARIN COUNTY COMPREHENSIVE PLANNING DEPARTMENT, ROOM 308, CIVIC CENTER, SAN RAFAEL, CA 94903

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INTRODUCTION

The Marin County Board of Supervisors has adopted this zoning ordinance amendment as part of a continuing effort to implement the 1973 Marin Countywide Plan. These density and design standards for planned residential developments seek to protect the natural environment and attain high quality in the man-made environment. They also inform property owners early and specifically about what criteria will be used to evaluate plans.

These standards apply to all properties zoned RMP (Residential, Multiple Planned District) and RSP (Residential, Single-Family Planned District) in unincorporated areas. Planned residential districts are provided in the Zoning Ordinance to allow varied types of housing to be designed without the confines of specific yard requirements. Master Plans must be approved by the Planning Commission and Board of Supervisors, followed by more detailed Development Plans which may be approved by the Planning Director or Planning Commission. An exception to these submission requirements is the single-family home on an existing lot zoned RMP or RSP, for which only Design Review is required.

One of the Board's other major actions to implement the Countywide Plan was the rezoning to very low density residential planned districts of some 12,500 acres of unincorporated land designated as low density residential Ridge and Upland Greenbelts in the plan. When these rezonings were done, both the Planning Commission and the Board stated that there could be consideration of "either a higher or lower density, according to the specific characteristics of the site at the time development plans are presented.."

Precisely how much density increase can be allowed without a rezoning application and specifically how design must relate to characteristics of the site are spelled out here. The design standards are based primarily on the "Suggested Development Review Checklist for Environmental Zones," Table 2.1 of the Countywide Plan.

All other parts of the Zoning Ordinance that pertain to processing planned residential developments are also included in this pamphlet. It, therefore, consists of five sections:

I Permitted Uses for RMP and RSP districts. (As previously included in Zoning Ordinance.)

II Density Bonuses. (New provisions for automatic density increases for very low density properties only--parcels zoned one unit per four acres or lower.)

III Design Standards (New provisions affecting all RMP and RSP properties. These standards will be used in Master Plan reviews and in evaluating single-family home applications in RMP and RSP districts, where only Design Review rather than a Master Plan is required.)

IV Processing Requirements for Planned Districts. (As previously included in Zoning Ordinance.)

V Design Review Requirements. (As previously included in Zoning Ordinance. To be used for proposed single-family homes on existing lots in RMP and RSP districts.)

I PERMITTED USES IN ALL RMP AND RSP DISTRICTS:

1. One-family dwellings.
2. Public parks and public playgrounds.
3. Crop and tree farming and truck gardening.
4. Nurseries and greenhouses, but not including any salesrooms or other buildings for the sale of any products unless and until a Use Permit is secured therefor.
5. Home occupations, provided that there shall be no external evidence of any home occupation.
6. Schools, libraries, museums, churches, retreats, monasteries, convents, golf courses, country clubs, tennis courts and similar non-commercial recreational uses; day child-care centers for six or more children, subject to securing a Use Permit in each case in RSP districts.
7. Accessory buildings and accessory uses.
8. When three or more acres per dwelling unit are required, then those land uses enumerated in Chapter 22.10 (Agricultural and Conservation Districts) Section 22.10.020 (A) shall be permitted subject to the securing of a use permit in each case. Horses, donkeys, mules, and ponies shall be permitted subject to provisions of Section 22.68.040. The grazing of livestock shall not be permitted in areas where it is likely to cause damaging soil erosion or water pollution.

ADDITIONAL PERMITTED USES IN RMP BUT NOT RSP DISTRICTS

9. Two-family dwellings, multiple dwellings and dwelling groups.
10. Lodges, fraternity and sorority houses.
11. Museums not operated for profit.
12. In an apartment house designed, constructed or used for twenty-four or more families and in a hotel designed, constructed or used for fifty or more guest rooms, there may be conducted a business incidental thereto for the convenience of the occupants and the guests thereof; provided that there will be no entrance to such business except from the inside of the building in which the same is located; and that the floor area used for business purposes shall not exceed twenty-five percent of the ground floor area of such building, and provided, further, that no street frontage of any such building shall be used for such business and that no sign shall be exhibited on the outside of any such building in connection with such business.
13. The following uses, subject to the securing of a use permit in each case.

    a) Hospitals, rest homes, sanitariums, clinics, and other buildings used for similar purposes.

b) Philanthropic and charitable institutions.

c) Automobile courts (motels).

d) Hotels.

e) Offices.

14. Accessory buildings and accessory uses.

II DENSITY BONUSES

All properties zoned RMP or RSP have a specific assigned density, indicating maximum units per acre. Thus, RMP-1 allows one unit per acre, RSP-4 allows 4 units per acre, and RMP 0.5 allows one unit per two acres. Where there are approved master plans in these districts, the zoning shows the density of the plan--for example, a 10-acre parcel on which a plan for 52 units is approved would be zoned RMP 5.2.

The newly adopted standards permit density bonuses, for certain RMP and RSP parcels zoned one unit per four acres, five acres, ten acres, or more. This is in keeping with the Planning Commission and Board of Supervisors' stated policy at the time of the Ridge and Upland Greenbelt rezoning that some flexibility in density would be allowed. This new provision would apply to the approximately 12,500 acres zoned RMP.0.1 or 0.2 (one unit per 10 or 5 acres) under this program.

The bonus density is computed as follows:

If the property adjoins an existing publicly maintained arterial street, as defined in the Annual Road List of the County of Marin, or a State highway, an addition of 20% over the number of units allowed under existing zoning is computed. If the property adjoins an existing publicly maintained local street, this computation is 10%. Any fraction of a unit resulting from computation of a bonus density is counted as a whole unit.

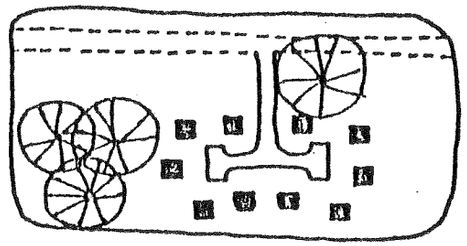
Any additional density which may be authorized by new ordinances in the future relating to low, moderate, and middle-income housing will also be included in the bonus density.

The density thus computed shall in fact be the upper limit. The applicant must demonstrate how many units can be developed on the site consistent with the findings from the Environmental Reconnaissance or the Environmental Impact Report and Design Requirements.

This computation would work as follows:

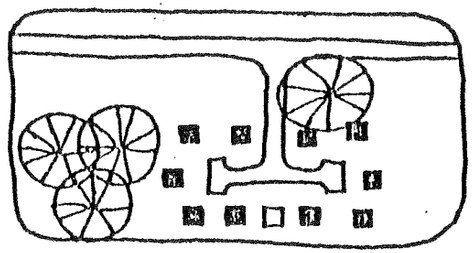
For a 100-acre parcel zoned RMP 0.1 (one unit per 10 acres), the base density would be 10 units. If the parcel is adjacent to a local street, the 10% bonus would allow one additional unit for a total of 11. If adjacent to an arterial street or State highway, the 20% bonus would allow two additional units, for a total of 12.

The following illustrations show how this would work for a clustered development on part of a 100-acre parcel.



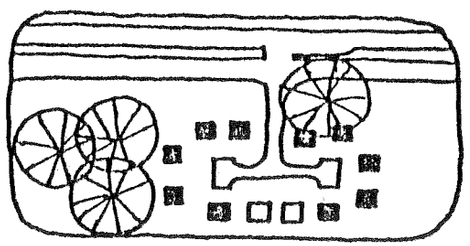
Base Density:

10 units



Adjacent to Local Street:

11 units



Adjacent to Arterial Street or State Highway:

12 units

Similarly, for a 50-acre parcel zoned RMP 0.2:

Base density: 10 units

If adjacent to local street, a 10% bonus or 1 unit, for a total of 11 units.

If adjacent to arterial street or State highway, 20% bonus or 2 units, for a total of 12 units.

For a 24-acre parcel zoned RSP or RMP 0.25 (4 acres per unit):

Base density: 6 units

If adjacent to local street, 10% bonus or .6 unit, counted as a whole unit, for a total of 7 units.

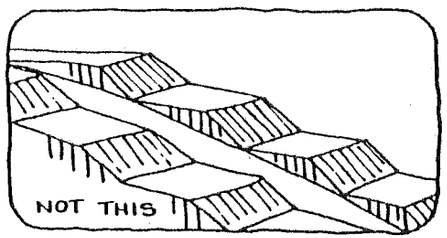
If adjacent to arterial street or State highway, 20% bonus or 1.2 units counted as two whole units, for a total of 8 units.

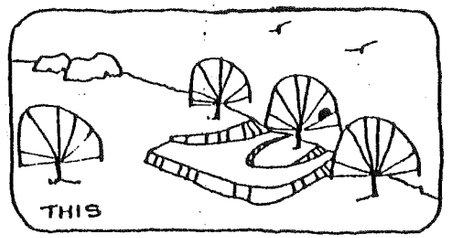
III DESIGN REQUIREMENTS

The following standards for site preparation and project design will be used in evaluating Master Plans for developments in RMP and RSP planned residential districts, by the Planning Department staff, the Planning Commission and the Board of Supervisors. Where applicable, they will also be used by the Planning Department staff in Design Reviews for proposed single-family homes on existing lots in RMP and RSP districts.

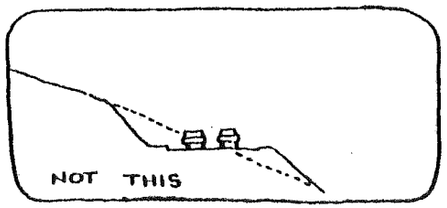
1. Site Preparation

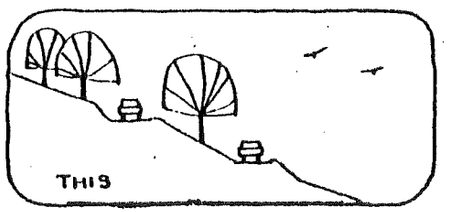
A. Grading. All grading shall be reviewed by the Environmental Protection Committee (consisting of the Directors of the Planning, Public Works, and Parks and Recreation Departments) or by staff members designated by the Committee. Grading shall be held to a minimum. Every reasonable effort shall be made to retain the natural features of the land: skylines and ridgetops, rolling land forms, knolls, native vegetation, trees, rock outcroppings, water courses. Where grading is required, it shall be done in such a manner as to eliminate flat planes and sharp angles of intersection with natural terrain. Slopes shall be rounded and contoured to blend with existing topography.





B. Roads. No new roads shall be developed where the required grade is more than 15% unless convincing evidence is presented that such roads can be built without environmental damage and used without public inconvenience.





C. Erosion Control. Grading plans shall include erosion control and revegetation programs. Where erosion potential exists, silt traps or other engineering solutions may be required. The timing of grading and construction shall be controlled by the Department of Public Works to avoid failure during construction. No initial grading shall be done during the rainy season, from November through March.

D. Drainage. The areas adjacent to creeks shall be kept as much as possible in their natural state. All construction shall assure drainage into the natural watershed in a manner that will avoid significant erosion or damage to adjacent properties. Impervious surfaces shall be minimized.

E. Trees and Vegetation. In all instances every effort shall be made to avoid removal, changes or construction which would cause the death of the trees or rare plant communities and wildlife habitats.

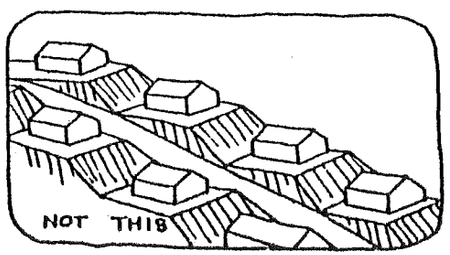
F. Fire Hazards. Development shall be permitted in areas of extreme wildfire hazard only where there are good access roads, adequate water supply, a reliable fire warning system, and fire protection service. Setbacks to allow for fire breaks shall be provided if necessary.

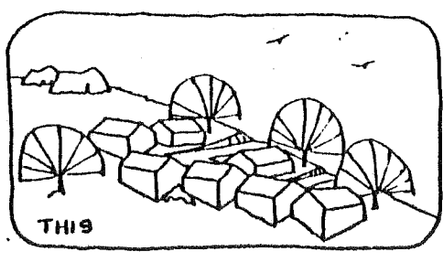
G. Geologic Hazards. Construction shall not be permitted on identified seismic or geologic hazard areas such as on slides, on natural springs, on identified fault zones, or on bay mud without approval from the Department of Public Works, based on acceptable soils and geologic reports.

H. Watershed Areas. All projects within Water District watershed areas shall be referred to that district for review and comment. In such areas, damaging impoundments of water shall be avoided.

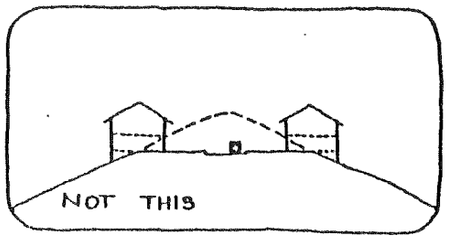
2. Project Design

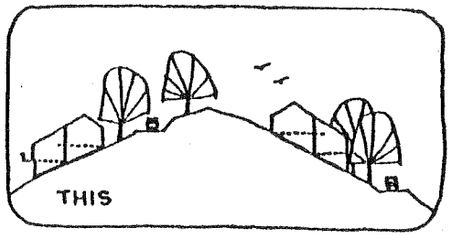
A. Clustering. Generally, buildings should be clustered in the most accessible, least visually prominent, and most geologically stable portion or portions of the site, consistent with the need for privacy to minimize visual and aural instrusion into each unit's indoor and outdoor living area from other living areas. Clustering is especially important on open grassy hillsides. A greater scatteration of buildings may be preferable on wooded hillsides to save trees. The prominence of construction can be minimized by such devices as placing buildings so that they will be screened by wooded areas, rock outcroppings and depressions in the topography.





B. Ridgelines. There shall be no construction permitted on top or within 300 feet horizontally, or within 100 feet vertically of visually prominent ridgelines, whichever is more restrictive, if other suitable locations are available on the site. If structures must be placed within this restricted area because of site size or similar constraints, they shall be on locations that are least visible from nearby highways and developed areas.

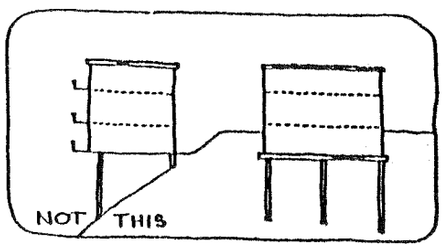


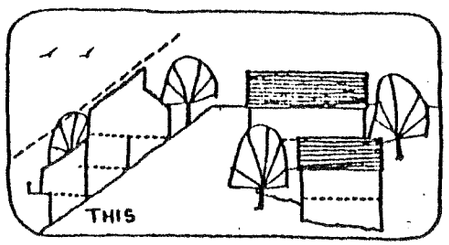


C. Landscaping. Landscaping shall minimally disturb natural areas, including open areas, and additional landscaping in a natural or semi-natural area shall be compatible with the native plant setting. Fire protection and minimal water use shall be considered in landscaping plans. Planting shall not block views from adjacent properties or disturb wildlife trails.

D. Utilities. In ridgeland areas designated by the Countywide Plan, roads shall be designed to rural standards. (Generally, not more than 16 feet pavement width, depending on safety requirements.) In ridgelands areas street lights, if needed, shall be of low level intensity, and low in profile. In all areas, power and telephone lines shall be underground, where feasible.

E. Building Height. No part of a building shall exceed 30 feet in height above natural grade, and no accessory building shall exceed 15 feet in height above natural grade. The lowest floor level shall not exceed 10 feet above natural grade at the lowest corner. Where a ridge lot is too flat to allow placement of the house down from the ridge, a height limit of one story or a maximum of 18 feet to the top of the roof shall be imposed. These requirements may be waived by tne Planning Director, upon presentation of evidence that a deviation from these standards will not violate the intent of this ordinance.





F. Materials and Colors. shall blend into the natural environment unobtrusively, to the greatest extent possible.

G. Noise Impacts on residents and persons in nearby areas shall be minimized through placement of buildings, recreation areas, roads, and landscaping.

H. Facilities. Where possible, facilities and design features called for in the Countywide Plan shall be provided on the site. These include units with three or more bedrooms, available to households with children; child care facilities; use of reclaimed waste water; use of materials, siting and construction techniques to minimize consumption of resources such as energy and water; use of water-conserving appliances; recreation facilities geared to age groups anticipated in the project; bus shelters; design features to accommodate the handicapped; bicycle paths linked to city-county system; and facilities for composting and recycling.

I. Open Space Dedication. Land to be preserved as open space may be dedicated by fee title to the County of Marin prior to issuance of any construction permit, or may remain in private ownership with appropriate scenic and/or open space easements in perpetuity, and the County may require reasonable public access across those lands remaining in private ownership.

J. Open Space Maintenance. The County of Marin or other designated public jurisdiction will maintain all open space lands accepted in fee title, as well as public access and trail easements across private property. Where open space lands remain in private ownership with scenic easements, those lands shall be maintained in accordance with the adopted policies of the Marin County Open Space District and may require the creation of a homeowners' association or other organization for the maintenance of these private open space lands where appropriate.

K. Open Space Uses. Uses in open space areas shall be in accordance with policies of the Marin County Open Space District. Generally, uses shall have no or minimal impact on the natural environment. Pedestrian and equestrian access shall be provided where possible and reasonable. The intent is to serve the people in adjacent communities, but not attract large numbers of visitors from other areas.

IV PROCESSING REQUIREMENTS FOR PLANNED DISTRICTS

The following sections of the Zoning Ordinance apply to all planned districts, non-residential as well as residential. Included are information required to be submitted with Master Plan and Development Plans, and procedures to be followed by the Planning Department, Planning Commission, and Board of Supervisors:

22.45.010 Application of general regulations. The following general regulations shall apply in all Planned Districts as noted below, and shall be subject to the provisions of Chapters 22.62 through 22.74 of this title.

R-M-P	R-C-R	R-M-P-C
R-S-P	M-3	R-F
C-P	R-X	

22.45.020 Application of specific regulations. Specific regulations, in addition to the general regulations applicable to each planned district, are contained in the provisions for each type of district (Chapter 22.47).

22.45.030 Plan area. The area of the Master Plan and Development Plan shall include at least all contiguous properties under the same ownership; the area may also include multiple ownership.

22.45.040 Submission requirements.

a. Master Plan. Four copies of the following maps, plans or written material, as applicable, shall be submitted to the Planning Director. Specific requirements may be waived by the Planning Director for good cause.

1. Preliminary conceptual grading plans, showing existing and proposed grades, the extent of cut and fill, and slope angle of all banks. Preliminary grading plans may be based on a photogrametric survey to a scale not less than 1"-100'. Contour lines of existing grades shall have the following maximum intervals:

   a. Ten-foot contour interval for ground slope over 15%.

   b. Five-foot contour interval for ground slope below 15%.

   All grades and elevations shall be based upon Mean Sea Level Datum for any property below an elevation of 25 feet above Mean Sea Level.

2. Existing use of property including building location, prominent geographic features and man-made improvements.

3. Preliminary Landscaping Plan (may be combined with site plan) showing:

   a. All existing trees spaced more than thirty feet apart by common name and spread. Trees to be removed shall be indicated.

   b. In more densely wooded areas or in tree clusters, only the outline need be shown. However, outstanding trees within the clusters must be shown, if they are to be removed.

   c. A conceptual plan for proposed trees and other plant material.

4. Proposed site plan indicating vehicle and pedestrian circulation; bicycle pathways, if the property is included in or affected by the County Bicycle Path Master Plan; paving coverage; access to adjoining streets; building configurations including existing or proposed major trees; and location and use of adjacent structures within fifty (50) feet of the periphery of the property.

5. Description of the proposed development including density, building heights, major open space, sewage disposal and public utilities.

6. A conceptual drainage and flood control plan including conformance with flood plain zoning requirements if applicable.

7. A preliminary geological reconnaissance report prepared by a registered civil engineer or a registered engineering geologist.

8. Such additional information as may be required by the Planning Director.

b. Development Plan. Four copies of the following maps, plans or written material as applicable shall be submitted to the Planning Department. If the master plan and development plan are filed concurrently, the submission requirements may be modified to avoid duplication. The selection of submission requirements shall be by the Planning Director.

1. Boundary survey map.

2. Final grading plans, showing existing and proposed grades, the extent of cut and fill, and slope angle of all banks, contour lines of existing grades shall have the following maximum intervals:

   a. Ten-foot contour interval for ground slope over 15%.

   b. Five-foot contour interval for ground slope below 15%.

   The scale shall be sufficiently large to show the details of the plan clearly (preferably 1"-100'). All grades and elevations shall be based upon Mean Sea Level Datum for any property below an elevation of 15 feet above Mean Sea Level.

3. Precise drainage and flood control plans.

4. Proposed site plan with precise building locations, parking spaces, public area, vehicle and pedestrian circulation including access to adjoining streets. The number of parking spaces per parking area shall be delineated.

5. Landscaping plans (may be combined with site plan), including species, can size and irrigation and maintenance plans.

6. Architectural plans for all buildings including floor plans, elevations, perspectives as necessary to illustrate design concept, color and material samples, and proposed signs.

7. Summary statement on net and gross densities, area of public and private open space, coverage of land by structures, number and types of units, required and proposed number of parking and loading spaces, public utilities including methods of sewage disposal and maintenance of all common facilities.

8. Preliminary land division or subdivisions where applicable (may be filed concurrently).

9. A preliminary soils report based upon adequate test borings or excavations and prepared by a registered civil engineer.

10. A preliminary geological report based upon adequate tests and prepared by a registered civil engineer or registered engineering geologist.

11. Such additional information as may be required by the Planning Director.

c. Rezoning. If required, a rezoning application for the subject property shall be filed concurrently with the application for master plan approval.

22.45.050 Approvals

a. Master Plan

1. Action by Planning Commission.

The Planning Commission may recommend approval, conditional approval or denial of any application. The Planning Commission's actions may specify any condition which is likely to benefit the general welfare of future residents in the development, their environment, and the purposes of the district, or ameliorate any burdens the development will otherwise thrust upon the community.

2. Action by the Board of Supervisors

The Board of Supervisors may approve, conditionaly approve or deny the master plan as recommended by the Planning Commission. Any modification of the plan must be referred back to the Planning Commission in the manner specified by law. This approval shall be by ordinance which shall include, but shall not be limited to, the following:

a. That the development, maintenance and use of the property shall be carried on in conformance with certain maps and plans as approved.

b. That the maps and plans designated in the ordinance shall be filed in the office of the Planning Department of the County of Marin.

c. That no building shall be constructed, maintained or used other than for the purpose specified on the maps and plans as filed.

Development Plan

1. After approval of the master plan no development and/or land improvements and/or building construction except filling of land in conformance with the master plans, shall commence until a development is approved for a portion of, or for the entire area of, said master plan. All development and/or land improvement and/or building construction shall be substantially in conformance with the approved development plan. The development plan for all or a portion of the master-planned area shall be approved by the Planning Commission by resolution; its action is final unless appealed to the Board of Supervisors. A mandatory finding shall be made that the development is in substantial accordance with the approved master plan. Public areas necessary for convenience and general welfare shall be dedicated or reserved for public purpose. If the development plan is in complete accordance with the approved master plan, the applicant may elect to request action thereon by the Planning Director rather than the Planning Commission.

22.45.060 Expiration date

If no application for a precise development plan is filed under a master plan or if no building permit is issued under a development plan, said plan shall expire 2 years from the date of the ordinance approving the master plan or the final approval of the development plan. One extension for a maximum period of one (1) year from the date of initial expiration may be granted by the Planning Director.

If the master plan or development plan expires and if a rezoning was granted pursuant to said plans, the Planning Commission shall initiate a rezoning of said property to its former zoning district within three (3) months of the expiration date of the master or development plan. One extension for a maximum period of one (1) year from the date of initial expiration may be granted by the Planning Director.

22.45.070 Amendments

A master plan or a development plan may be amended by the Board of Supervisors or the Planning Commission, pursuant to the same procedures specified for initial approval. Amendments must be initiated 18 months from the date the ordinance or the plans to be amended were initially approved, otherwise the plans are void. If an extension is granted the plans may also be amended during this period. Submission requirements will be as required by the Planning Director.

22.45.100 Notification of Hearings

Notice of public hearings on master plans and development plans shall be mailed to property owners within 300 feet of the proposed planned area based on their names and addresses as they appear on the latest assessment roll. Such notices shall be mailed, by regular mail, at least ten (10) calendar days prior to the date of the hearing.

22.45.110 Use Permits

Uses requiring a Use Permit shall be permitted in a Planned District if the Planning Commission can make the findings required for the issuance of a Use Permit by Section 22.88.20. Use Permits may be granted simultaneously with master plan approval.

V DESIGN REVIEW REQUIREMENTS

The following sections of the Zoning Ordinance spell out Design Review procedures which will be used for proposed single-family homes on existing lots in RMP and RSP districts:

22.82.050. Prohibition. No work shall be started, or authorized, on any matter which is subject to design review until a design review application is approved, unless written approval for such work is given by the Planning Director or his authorized representative. (Ord. 1611 § 1; October 31, 1967).

22.82.060. Applications. Applications for design review, together with the appropriate fee and required drawings and other materials, shall be filed in the office of the Marin County Planning Department. (Ord. 1611, §§ 1, Oct. 5, 1967).

22.82.070 Required drawings and other materials. Every application shall be accompanied by such drawings, maps, plans, specifications, and graphic or written material as may be required to describe clearly and accurately the proposed work and its effect on the terrain and existing improvements. (Ord. 1611, §§ 1, October 31, 1967).

22.82.080 Filing date. The filing date of an application for design review shall be the date on which the office of the Planning Department receives the last submission, plan, map, or other material required as a part of that application, unless the Planning Director or his authorized representative agrees in writing to an earlier filing date. (Ord. 1611 § 1; October 31, 1967.

22.82.090 Action on application. When filing an application, the applicant shall select one of the following procedures for action and shall clearly indicate his choice on the application form, except that where the Board of Supervisors has established a design review board which has jurisdiction over the area in which the use is located then only the procedure outlined in (3) action by design review board below shall be followed:

(1) Action by Planning Director

(a) The Planning Director shall act on an application under his jurisdiction within twelve (12) working days of the filing date of the application, unless a later date is agreed to by the applicant, but in no event shall the Planning Director act sooner than two (2) working days after the date of mailing notices. In the event of denial, the Planning Director shall notify the applicant of the reason for denial.

(b) Failure of the Planning Director to act within the time established for a particular application shall constitute approval of that application. (Ord. 1611 § 1; October 31, 1967).

(2) Action by Planning Commission

(a) The Planning Commission shall act on an application under its jurisdiction not later than the third regular meeting after filing date of the application unless a later date is agreed to by the applicant, but in no event shall the Planning Commission act sooner than the first regular meeting following the date of mailing notices. In the event of denial, the Planning Commission shall notify the applicant of the reason for denial.

(b) Failure of the Planning Commission to act within the time established for a particular application shall constitute approval of that application.

(3) Action by Design Review Board

(a) The Design Review Board shall act on an application under its jurisdiction not later than the second regular meeting date after the filing date of the application unless a later date is agreed to by the applicant, but in no event shall the Design Review Board act sooner than the first regular meeting following the date of mailing notices. In the event of denial, the Design Review Board shall notify the applicant of the reason for denial.

(b) Failure to act shall constitute approval of that application subject to conditions recommended by advisory agencies.

22.82.100 Approval, conditions, and guarantees. An application for design review may be approved, approved with modifications, conditionally approved, or disapproved. (Ord. 1611 § 1; October 31, 1967).

Guarantees, sureties, or other evidence of compliance may be required in connection with, or as a condition of, a design review permit.

An approved application, and all other related and approved maps, drawings, and other supporting materials constituting a part of the approved application, shall be so endorsed by the Planning Director or his authorized representative.

The Planning Director or his authorized representative shall review construction drawings, final plans, and other similar documents for compliance with the approved design review application, any conditions attached thereto, or any approved or required modifications thereof. (Ord. 1611 § 1; October 31, 1967).

22.82.110 Non-compliance. Failure to comply in any respect with an approved design review application shall constitute grounds for the immediate stoppage of the work involved in said non-compliance until the matter is resolved. (Ord. 1611 § 1; October 31, 1967).

22.82.120 Appeals. Chapter 22.89 of the Marin County code shall apply to appeals on design review matters. (Ord. 1611 § 1; October 31, 1967).

22.82.130 Expiration and extension of design review approval. Approval of a design review application shall expire one year from the effective date of said approval unless a different expiration date is stipulated at the time of approval. Prior to the expiration of a design review approval, the applicant may apply to the Planning Director for an extension of one year from the date of expiration. Not more than one extension shall be granted. The Planning Director may make minor modifications of the approved design at the time of extension if he finds that there has been a substantial change in the factual circumstances surrounding the originally approved design.

If building or other permits are issued during the effective life of a design review permit, the expiration date of the design review permit shall be automatically extended to concur with the expiration date of said other permit. (Ord 1611, § 1, October 31, 1967).

STRUCTURAL HAZARDS

Background

While structural damages resulting from significant earthquakes are effects rather than causes, it is useful to view response characteristics of various structure types as a class of hazards in themselves. This approach is warranted by the innate hazard potential of certain structural features or standards. A discussion of structural damages due to non-seismic landslides, subsidence, flood, etc. is found in Section II, in Non-Seismic and other Natural Hazards.

Ground shaking and ground rupture and surface displacement, induce structural responses which can themselves be a hazard.

Previous discussions of the fundamental period of the ground and correlation between ground period and that of structures in the determination of intensity of shaking is pertinent to the following description of the characteristic responses of several structure types to seismicity:

Wood Structures

Small wood structures tend to withstand shocks well if the frame is bolted to the foundation. Much of the strength found in these structures depends upon diagonally sheathed wood (or plywood) diaphragms with the edges tied together at the corners. The use of better foundation ties in modern single family dwelling is generally a strengthening element. On the other hand, the trend towards the use of more and larger windows weakens the ability of wood dwellings to resist shocks. The replacement of wood sheathing by line-wire stucco (plaster of mesh-and-paper backing) leads to uncertainties in predicted strength depending on the cement content and nailing of the mesh to the wood studs - as a result, separate bracing systems are required. Construction of single family homes on slopes and on poor soil will also increase the effect of the possible amount of damage; also, one-story dwelling units perform better than two-story dwelling units.

Small Steel Structures

Steel structures, such as gasoline stations, tend to hold up quite well. These light weight metal structures are usually designed to resist wind forces which exceed earthquake design. Mobile homes normally do not suffer substantial damage; however, the precast concrete pyramid-shaped piers, not normally anchored to the ground, will roll over causing the coach to drop onto the piers which pierce through the floor.

Larger Steel Structures

Larger steel buildings, not including tall buildings, may or may not suffer damage depending on the design and strength of the X-bracing rods used in the walls. However, rod bracing may not always be used, in such instances moment-resisting connectors could be used. No significant structural damage was sustained by 30

steel frame high-rise buildings analyzed after the San Fernando earthquake whereas several highrise reinforced concrete buildings suffered structural damage.

Reinforced Concrete Structures

Reinforced concrete structures do not hold up as well as steel frame structures where neither is of earthquake resistant design. There seems to be more opportunity for poor construction with concrete than steel. However, as a class, reinforced concrete structures tend to hold up well if the workmanship is good, especially at the points of connection between pours. Good earthquake resistant design for this material should include low story height and a limited number of wall openings.

Tilt-Up Concrete or Unit Masonry Walls

Most new industrial buildings and many shopping center structures have single story tilt-up concrete or unit masonry walls with a plywood roof which acts as a diaphragm and distributes horizontal and lateral forces. This type of construction showed a 20% loss in the San Fernando earthquake where there was little ground disturbance on site. Comparable data for poured-in-place reinforced concrete walls was not available. When damage to tilt-ups was due directly or indirectly to ground displacement, it was found not to be economically feasible to overcome the problems through construction. However, detailed geologic investigation and careful site planning may avoid the hazardous locations.

Investigations following the San Fernando earthquake revealed that no buildings of this type had totally collapsed in an examination of 61 light industrial buildings, even though the structures were subject to seismic forces greater than the design forces required in the Uniform Building Code. The most critical hazard construction detail is the roof-to-wall tie.

Masonry

Old, unreinforced masonry and hollow-tile walled buildings have been demonstrated in all California earthquakes to be extremely vulnerable to ground shaking. Even old, reinforced masonry walls are strongly susceptible to damage. The strength of brick construction depends upon the quality of the brick itself, the mortar, grout, and the use of reinforcing steel. The San Fernando earthquake was very destructive to old reinforced masonry buildings, not only in the area of strong shaking but also in adjacent older communities 15 to 25 miles away from the epicenter.

Non-Structural Elements

In addition to the possibility of damage to the building itself and its occupants, hazards outside the building can cause personal and property injury. Buildings which are close to each other will pound together in a rocking motion during an earthquake, and poor foundation soil will intensify this motion. Non-structural parts of a building such as veneer, window glass, gable walls, unreinforced chimneys, pediments and parapets can

become dislodged by such motion and cause injury to persons and damage to property in the vicinity.

Involuntary and Critical Occupancy Structures

The risk to life from structural failure is compounded by structures occupied by large numbers of persons, such as office buildings, schools, and hospitals. In addition, those structures occupied involuntarily such as prisons, hospitals, etc., or by persons not able to be appraised of the safety of the structure, such as office workers, hospital patients and students, should be considered critical structures and maintained and constructed to strict standards of safety. The California Administrative Code, the Field Act and the 1976 edition of the Uniform Building Code all establish more rigerous standards for some of these types of structures and occupancies. As discussed below, the 1976 U.B.C. also defines and specifies requirements for a category of "essential structures".

Present Hazard Requirements for New Structures

Uniform Building Code

In California Counties, the Uniform Building Code, specifically its sections relating to earthquakes, functions as the basic set of minimum requirements for seismic shaking and ground displacement resistance in all new structures.

While a substantial strengthening of the Uniform Building Code earthquake provisions occurred in 1973, the California Legislature's Joint Committee on Seismic Safety in 1974 reccommended yet greater augmentation of these regulations to reflect the weakness found as a result of the 1971 San Fernando earthquake. The thrust of most of the technical structural recommendationdations made by that Committee was to significantly increase the lateral design force requirements (basic earthquake force resistance). This was to be accomplished both by direct quantitative increases in required strengths and by the introduction of new concepts. Much of this strengthening and several of the most important concepts have been included in the adopted 1976 version of the Uniform Building Code. Among the latter area:

1. A quantitative factor to take account of the structure-site resonance characteristic - the so-called "S" coefficient. This can be crucial in understanding what strengthening is required for an identical building in

sites of differing fundamental ground period.(see Section II, Ground Shaking).

2. Another new concept really extends an approach already in use, i.e.: differentiating strength requirements according to intended use, to a category of "essential structures" (defined as buildings - hospitals, fire stations, etc. - which must be safe and usable for emergency purposes after an earthquake). This Occupancy Importance Factor"I" is an additional coefficient superimposed upon the formula for calculating the required minimum earthquake resisting forces for new structures.

3. The new 1976 code introduces a new highest zone ("zone 4")on the Seismic Risk Zone map of the U.S. (see figure 28) covering parts of California and Nevada including all of Marin County and the Bay Area. The zone classification directly affects one of the coefficients in the formulas by which the required degree of structural strengthening is calculated.

With the strengthened 1976 minimum earthquake resistance regulations for new construction in force, and a generally effective level of administration and enforcement of the uniform building Code by Marin County Building Inspection Departments, it seems reasonable to conclude that now existing regulations are adequate to prevent new structures from becoming sources of hazard in themselves. The County should consider adoption of future editions of the Uniform Building Code to insure contemporary "state-of-the-art" protection.

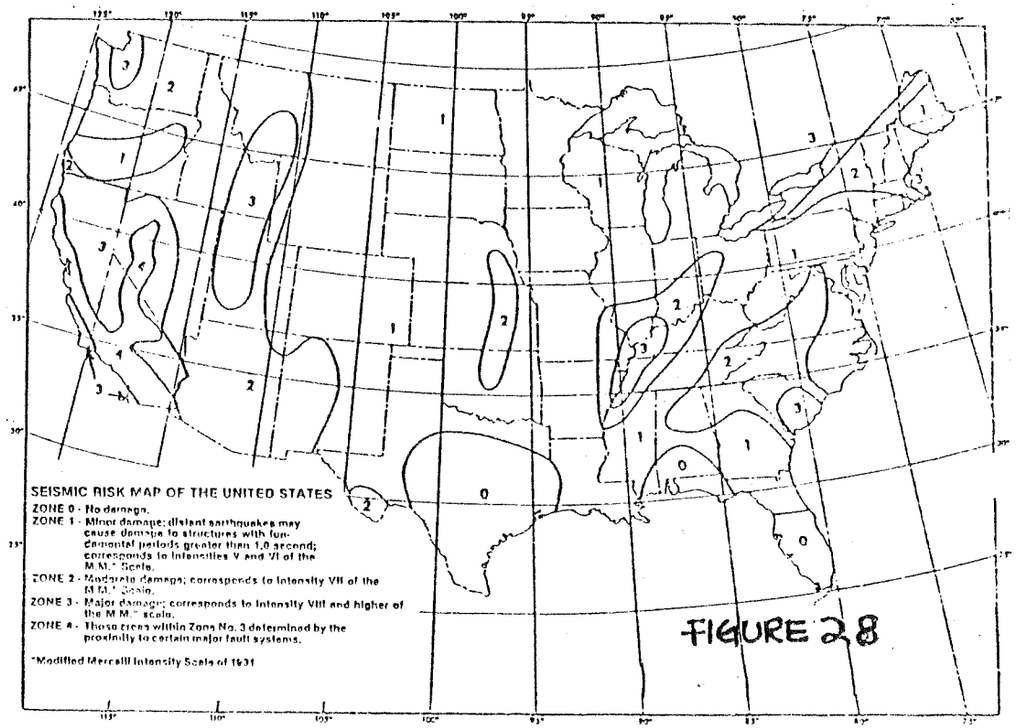


FIGURE 28

Other Codes Regulating New Construction

The Field Act, adopted after the Long Beach earthquake of 1933, consists of very detailed and rigorous specifications for construction materials, minimum earthquake loads and provisions for supervision of construction of all public school buildings to these standards.

Although little new public school construction is expected in Marin in this period of shrinking school enrollments, the provisions of the Field Act, as embodied in the State Education Code and Titles 21 and 24 of the California Administrative Code are ample to prevent school buildings themselves from posing hazards. Similiarly, the California Health and Safety Code requires a detailed review of hospital plans and supervision of their construction.

The Excavation, Grading and Filling Ordinance (Marin County Code Section 23.08) may signal the presence of geologic hazards to future building or development sites if geologic reports (Sec. 23.08.050 4d) are required and may have the effect of avoiding or mitigating these hazards.

GENERAL PLAN CONTEXT AND POLICIES

All elements of the General Plan interrelate; the Marin Countywide Plan integrates several of the mandated elements into a three part framework: community development, environmental quality, and transportation. The Seismic Safety and Safety Element will be integrated into the Environmental Quality section of the Countywide Plan. This new element contributes information on the comparative safety of using lands for various purposes, types of structures and development standards.The Environmental Quality section of the Countywide Plan contains broad policy recommendations which are represented in the components of the new element; the recommendations were necessarily broad to accomodate the level of specificity of the knowledge of seismic and other hazards. The existing policy recommendations provided policy inputs to the other sections of the Countywide Plan, and in the long run, there may be little or no conflict between those sections' recommendations pertaining to transportation and community development and newly recommended policy.

The Environmental Quality section recommended that several studies and programs be undertaken to implement the Plan's recommendations. The geologic studies undertaken by the California Division of Mines and Geology in cooperation with the cities and County of Marin helped fulfill the recommendations in providing a high level of geologic information about the County, information which is the basis of the recommendations contained herein and can be the basis of specific site development research.

The overriding goal, pertinent to the discussion of environmental hazards, is that which promotes "...high quality in the natural and built environments, through a balanced system of transportation, land use, and open space. This goal" the Countywide Plan further states, "is a choice against suburban sprawl and development that deteriorates or pollutes the environment, in favor of a better balance between the uses to which land is put and the public interest."

Further articulating the goal of a healthy and balanced environment are the following adopted policies:

1) Closely regulate development in areas prone to fire, flood and landslides;

2) Regulate the construction of concentrated or hazardous uses; including schools, hospitals, other institutions, high-density housing, or reservoirs, in fault zones, flood plains, and severe geologic risk areas, to assure public safety.

3) Require thorough field investigation of geologic hazards as a prerequisite to development approval, and require site work to minimize such risks.

The policies to support creative design standards and rigorous environmental analysis of developments are means of achieving a safe and high quality environment.

Existing Public Policy

The following section represents the body of existing public policy; city, County, state and federal, which pertains to seismic, flood, fire and geologic hazard. The policy framework is significant in that it represents a system for coordinating implementation of new policy and the functions of various levels of government.

The survey of existing policy includes the specific policies from the Environmental Quality Section of the Countywide Plan. These policies should be amended to reflect the thrust of policies adopted in this Seismic Safety and Safety Element. In this fashion, the Countywide Plan will be kept up to date with refinements in County policy.

Incorporated Area Seismic Safety and Safety Element Review

The incorporated towns and cities of Marin County have addressed seismic safety and safety considerations and are in various stages of development, adoption and implementation of these elements. The purpose of this section is to briefly review and report the status of these elements and place them into the context of a Countywide perspective.

The County and the towns and cities of Belvedere, Corte Madera, Fairfax, Novato, Ross, San Anselmo, San Rafael, Sausalito and Tiburon have contracted with the California Division of Mines and Geology (CDMG) to receive geologic information. The report, "Geology for Planning, Central and Southeastern Marin County, California ", and a similar, earlier study, "Geology for Planning, Novato Area, Marin County, California", may affect land use planning. The results of the studies are presented in the form of geologic and slope stability maps and as tabulation of geologic and engineering properties of mappable units. However, some aspects of the geologic settings that are particularly complex or deserve special mention are elaborated upon in the reports.

The city of Mill Valley has an adopted public health and safety element as part of their General Plan based upon geologic and related data developed by an earth science consultant. The city of Larkspur's basic geologic and seismic safety data was developed by engineering and planning consultants and included new geologic and slope stability interpretive mapping at large scale by James Bangert, a graduate student at the University of California. These materials were used to develop an Environmental Hazards Element to their General Plan.

Status of Cities' Seismic Safety & Safety Element 6/77

	Seismic Element		Safety Element		
	In Prep.	Compl.	In Prep.	Compl.	
Belvedere		X		X	Commuter safety element. Geology. Slope stability. Fire hazard. Police & Fire equip. access.
Corte Madera	X*		X *		Seismic safety element. Open space & conservation, housing, commercial services elements.
Fairfax		X		X	Seismic Safety and Safety Element.
Larkspur	x *		x *		Environmental Hazards Element.
Mill Valley		x		x	Public Health and Safety Element. Geology. Seismic Hazards. Flood. Fire.
Novato		x		x	Conservation and Safety Element.
Ross		x		x	Seismic Safety and Safety Element.
San Anselmo		x		x	Open Space and Conservation and Land Use Elements.
San Rafael		x		x	Environmental Hazards Element.
Sausalito	x		x		Seismic Safety and Safety Element.
Tiburon	x		x		Seismic Safety and Safety Element.

* Pending Public Hearings

June, 1977

General Policy Goals and Recommendations

The policies articulated in the following pages are based on the information contained in Sections I, II and III of this element, the California Division of Mines and Geology reports on geology for planning, and other professional papers referenced in this element. The policies are annotated with a brief of whether or not they are currently implemented, and to what degree and how the policy be institutionalized and implemented.

Policy Goals

1) Support continuing public awareness of environmental hazards by actively advising citizens of the availability of the results of countywide and local area hazards studies, sources of hazard information and public services.

2) Recognize the continuing need for engineering geologic expertise in County and local government and develop a workable proposal to meet this need. Such a staff or consultant engineering geologist would:

- .develop accurate detailed information on geologic hazards in areas subject to planning studies
- .review and approve for adequacy all geologic reports required as part of the environmental and development review process
- .formulate appropriate measures to mitigate geologic hazards in development.

3) Continue to support scientific geologic investigations to refine, enlarge and improve the knowledge of active fault zones, areas of instability, severe ground shaking and similar hazardous conditions in Marin County.

4) Structures which are necessary for the protection of public health and safety or for the provision of emergency services should not be located in any area subject to slope failure, isolation by flooding or where it could not withstand ground failure in a seismic event, unless the only alternative location would be so distant as to jeopardize the safety of the community served.

5) Construction shall be located and designed to avoid or minimize the hazards from earthquake, erosion, landslides, floods, and fire.

Overview Policies

6) To reduce potential damage from future earthquakes within designated fault zones, critical public uses should be prohibited, including schools, hospitals, utility and public safety facilities, high density housing, and reservoirs.

7) Steps should be taken as soon as possible to minimize earthquake damage from existing public buildings. Such steps could include removal of hazardous structural features, structural strengthening or even building relocation. Special methods should be adopted to assure earthquake-resistant construction of critical structures such as hospitals, schools, high density buildings, bridges, overpasses and dams.

8) Consider creating a Geotechnical Review Board composed of qualified engineers, architects, geologists, seismologists and relevant County officials to formulate, direct and define the procedures proposed herein.

9) Consider developing a method whereby prospective property owners can be informed of potential safety hazards.

A. GROUND RUPTURE AND SURFACE DISPLACEMENT

POLICIES

1. The Alquist-Priolo Special (Seismic) Studies Zones Act shall continue to be implemented by the County. Every effort should be made to inform applicants early in the project review process of the existence of known fault traces which might affect their property, site development and design.

2. No structure for human occupancy, or which will imperil structures for human occupancy, public or private, shall be permitted to be placed across the confirmed (through geologic investigation) trace of an active fault. However, neither this policy nor #3, following, shall be interpreted as being more restrictive of single-family residential construction than the Alquist-Priolo Act.

3. It is assumed that the area within fifty (50) feet of an active fault is underlain by active branches of that fault unless and until proven otherwise by an appropriate geologic investigation.

STATUS OF IMPLEMENTATION

Existing Procedures

- *Planning/building staff checks S.S.Z. parcel overlays at time of building permit/development application and determines applicability of Alquist-Priolo Act. Applicant may then be required to submit site investigation report by registered geologist.*
- *Consulting geologist on County retainer evaluates submitted geology reports for adequacy and accuracy of active fault trace locations from which DPW staff concludes project may or may not proceed.*
- *Applicant may appeal decision of Dept. of Public Works to BOS.*

Authorization

- *Direct-Marin County BOS Resolution #74-426 (implementing State Alquist-Priolo Act).*
- *Related - Marin County Code Titles 11.04 (Dams); 19 (Buildings); 20.20 (Subdivision); 22.45,.97 (Planned Districts) 23.08.080 (Excavation, Grading & Filling)*

Additional Steps Needed

- *Revised consolidated list of affected properties and explanation needed for public distribution.*

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4. Public financing or support should be withheld from buildings within the studies zone where there is a confirmed fault trace unless it can be established that there is no potential for surface fault displacement or ground rupture which would injure the public investment or the fulfillment of its purpose.

Existing Procedures

- *No such explicit programs in existance, however, State Legislation governing such buildings as hospitals and schools, the County Dam ordinance and the Alquist-Priolo Act itself can accomplish most of this policy.*

Authorization

- *Marin Co. Code Title 11.04 (Dams); State Field Act (Schools); Calif. Health & Safety Code (Hospitals)*

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5. No new building sites should be created within the Studies Zone unless an appropriate geologic investigation establishes sufficient and suitable land area for development according to existing zoning and other applicable County ordinances.

6. In the Special Studies zones, applications for development or division of land into two or more parcels shall be accompanied by a geologic report prepared by an engineering geologist and directed to the problem of potential surface fault displacement through the project site.

(See comments for policies 1,2,3 above.)

B. GROUND SHAKING

POLICIES

1. The development of structures for human habitation, including residential, commercial and industrial uses, shall incorporate engineering measures to mitigate against risk to life safety in the areas identified as subject to ground shaking, at least to the extent provided by Title 19, Marin County Code.

2. Applications for developments proposed to be sited on landslide deposits, non-engineered fill, or bay mud shall be accompanied by a geotechnical engineering investigation directed to the problem of ground shaking and ground failure. The engineering geologist and civil engineer shall submit recommendations regarding site development, structural engineering, drainage, etc.

3. No structure which is necessary for public safety or the provision of needed emergency services shall be built in an area subject to ground failure and consequent structural failure unless the only alternative sites would be so distant as to thereby jeopardize the safety of the community served.

4. The design of structures to be occupied by a large number of people, such as restaurants and hotels, shall accomodate any constraints dictated by the foundation site conditions, as determined by the engineering geologist and civil engineer conducting the site investigation. Such structures shall be designed to be as safe as similar structures in locations not subject to excessive ground shaking or other geologic hazard.

STATUS OF IMPLEMENTATION

Existing Procedures
- *Building inspection Departments enforce strengthened 1976 UBC lateral design force and other requirements.*

Authorization
- *Marin County Code Title 19 (Buildings)*

Existing Procedures
- *Planning Department requires submission of soils and geologic reports with master plan applications, soils reports with subdivision applications and may require geologic reports with latter.*
- *Department of Public Works reviews reports submitted to determine adequacy of hazard mitigation in proposed development*
- *DPW may also require soils or geologic reports for any excavation grading or filling.*
- *Building Inspection Dept. may require soils or geologic engineering reports for any permit application.*

Authorization
- *Direct-Marin County Code Titles 19 (Buildings); 20.20 (Subdivision) 22.45, .47 (Planned District); 23.08 (Excavation, etc.);*
- *Related-Marin Co. Code Title 22.77 (Tidelands)*

Additional Steps Needed
- *Provide reference maps*

Existing Procedures
- *No such explicit program exists . However, State legislation governing hospitals or schools, the County Dam ordinance and provisions of Planned District & Tidelands ordinances can partly accomplish this policy.*

Authorization
- *Indirect - Marin Co. Code Titles 11.04 (Dams); 22.47 (Planned Districts); 22.77 (Tidelands)*

Additional Steps Needed
- *Organize review procedures involving CIP & EIR processes and HCDA project analysis to screen such structures in subject areas.*
- *Provide reference maps.*

Existing Procedures
- *As in policy #2 (above) with emphasis upon building inspection function for individual structures.*

Authorization
- *Direct - Marin Co. code title 19 (Buildings); 22.77 (Tidelands)*

C. SLOPE INSTABILITY AND LANDSLIDES

POLICIES

1. Projects** proposed for slopes rated 3 or 4 in stability classification (CDM&G...) shall be evaluated for stability prior to consideration of site design or use. The evaluation should include the structural foundation engineering of the actual site and should include possible impact of the project on adjacent lands. Where, in the course of Land Development review, it is determined to be necessary, this evaluation shall also apply to construction on existing single family lots.

2. In projects where such evaluations indicate that state-of-the art measures can correct instability, the County should require that the foundation and earth work be supervised and certified by a geotechnical engineer and where deemed necessary, an engineering geologist.

3. Known landslides and landslide-prone deposits on steep slopes should not be used for development except where engineering, geologic site investigations indicate such sites are stable or can be made stable providing appropriate mitigating measures are taken. In such cases, it must be shown to the satisfaction of the County that the risk to persons or property or public liability can be minimized to a degree acceptable to the County.

4. Pacific coastal bluff and cliff development shall be in accordance with the California Coastal Commission's Statewide Interpretive Guidelines for Development Permits as adopted by the California Coastal Commission on 5-3-77.

**"projects" is defined as more than one single family home on an existing single family lot.

STATUS OF IMPLEMENTATION

Existing Procedures

- *Project submits excavating, grading or filling permit application to Dept. of Pub. Wks. for review. DPW may require soils and/or geologic reports; may condition permit upon corrective work to avoid slides, etc. and must deny permit if adequate corrective work not possible.*
- *DPW has similar review and approval functions regarding master plan and subdivision referrals from the Planning Dept.*
- *Bldg. Inspection Dept. has similar powers to optionally require soils and geologic reports and construction permits.*

Authorization

- *Direct-Marin Co. Code Titles 19 (Buildings);23.08 (Excavation, etc.)*
- *Indirect-M.C.C. Titles 20.20 (Subdivisions); 22.45 (Planned Districts) and 22.82 (Design Review)*

Additional Steps Needed

- *Amend Titles 20.20; 22.45 and 23.08 to specify that any required geologic reports are to be prepared by an engineering geologist.*
- *Establish procedural regulations with concurrance of DPW that, for projects on slope types specified in policies 1 and 3, geologic reports shall, as a rule, be mandate*

D. SUBSIDENCE AND DIFFERENTIAL SETTLEMENT

POLICIES

1. Filled land which is underlain by compressable materials (bay mud, marsh, slough) should receive special attention during site planning; soils investigations should include borings and sufficient examination to determine the location of former sloughs and other factors which would accentuate differential settlement; the investigation should delineate those areas where settlement will be greatest, subsidence will occur, etc. and should recommend the site preparation techiques which could be employed to preclude hazard.

2. Site planning should accomodate the areas of greater potential for differential settlement in uses which would not be damaged by such activity and which would provide minimum inducement to settlement which is detrimental to persons, property and public investment.

3. Site preparation shall include, where necessary, several years of settlement monitoring, sufficient for detailed foundation engineering and site planning to be based on the site's particular characteristics.

4. Surcharge may be a necessary site preparation and other mitigating measures designed to accomodate compression and settlement may be required in high risk areas where surcharge is necessary.

5. Structural design of foundations and utilities shall reflect the potential for differential settlement and subsidence.

STATUS OF IMPLEMENTATION

Existing Procedures

- *Soils reports are required for subdivisions and development plans, and on filled land these address subsidence hazards and are reviewed for adequacy by Dept. of Pub. Wks;*
- *Environmental Protection Committee or Planning Commission must make the finding that the proposed fill, excavation or grading will not unduly or unnecessarily create a safety hazard.*
- *Dept. of Pub. Wks. may require applicants for fill permits to submit soils reports addressed to problem of subsidence; review may result in imposing conditions on development, or denial of permit.*
- *Bldg. Inspec. Dept. may also optionally require soils and/or geologic reports and condition permits.*

Authorization

- *Direct-Marin County Code Titles 19 (Buildings); 20.20 (Subdivisions); 22.45 (Planned Districts); 22.77 (Tidelands); 23.08 (Excavation, filling, etc.)*

Additional Steps Needed

- *Arrange publicized availability of maps of filled lands.*
- *Explore possibility of refining existing mapping of filled and bay mud areas, and systematic and accessible compilation of existing drilling log data.*

Existing Procedures

- *Department of Public Works enforces development standards with particular reference to minimum elevations and ultimate settlement.*
- *Building Inspection Dept. enforces building code requirements for structural design of foundations and utilities.*

Authorization

- *Direct-Marin Co. Code Titles 24.04 (Development Standards); 19 (Buildings)*
- *Indirect - see under policies D1, 2 above*

Additional Steps Needed

- *Dept. of Public Works should propose means of augmenting its soils engineering expertise to specifically evaluate bay mud and fill development data.*

	POLICIES	STATUS OF IMPLEMENTATION
6.	No structure which is needed for public safety or the provision of needed emergency services shall be located where an interruption in service could result from structural failure due to settlement or subsidence, unless the only alternative sites would be so distant as to thereby jeopardize the safety of the community served.	*Existing Procedures* • *Dept. of Public Works enforces this implied standard with regard to dams but no other procedures are explicitly directed to carrying out this policy at present.* *Authorization* • *Marin County Code Titles 11.04 (Dams)* *Additional Steps Needed* • *Implementation study should develop explicit additio o Marin County Code Titles 16, 19, 20.20, 24.04.*
7.	With respect to old or new projects where structures have not not been erected, efforts should be made by public agencies to determine the extent of inadequately engineered fills to determine whether or not future risk to property or life exists. Remedial measures which are indicated should be disclosed publicly, and measures and funding of remedy should be proposed. Such measures may include de-watering of a fill, clean-out of drainage facilities, load removal from a slide, surface drainage modifications, and maintenance of drainage facilities.	*Existing Procedures* • *None at present except as byproducts of EIR's or other special studies.* *Authorization* • *None at present* *Additional Steps Needed* • *Implementation study should develop long-range programs possibly under aegis of expanded Environmental Protection Committee called for in the Countywide Plan.*

E. DAM SAFETY

POLICIES

1. Dams and levees should be designed and located in such a manner as to insure their safety from all maximum credible seismic events.

STATUS OF IMPLEMENTATION

Existing Procedure

- *Dept. of Public Works reviews applications for dam permits where the dam size is below that requiring permits from the State of California, and may approve with or without conditions or deny.*
- *Completed work is also subject to detailed review prior to issuance of certificate of approval.*

Authorization

- *Marin County Code Titles 11.04 (Dams); 23.08 (Excavation, Grading & Filling)*

Additional Steps Needed

- *Dept of Public Works should examine the feasibility of amending Title 11.04 (Dams) to call for systematic inspection of existing dams.*

2. Property owners within areas of possible inundation due to dam and levee failure should be notified as to timing and susceptibility to flood hazard.

Existing Procedure

- *Marin County Office of Emergency Services has compiled lists of all property owners affected by inundation boundaries shown on official Dam Evacuation maps, and is preparing to notify them of this fact, and emergency warning provisions. Thus far, residents of Ross have been notified.*

Authorization

- *California Dam Safety Act, 1974.*
- *County of Marin and Marin Operational Area Emergency Plan, 1974.*

Additional Steps Needed

- *Notification program should be expedited.*

F. FIRE HAZARD

POLICIES

1. The County should undertake a program of identifying and mapping extreme fire hazard areas. This should be done in conjunction with the County Fire Department and based upon criteria drawn from that of the State Division of Forestry as applied by the County and other local fire fighting agencies.

2. Land development and residential building permit application should be referred to the County Fire Department or pertinent local fire district for review and recommendation.

3. New subdivisions and land divisions in areas identified as having extreme fire hazards should only be allowed where it is determined that adequate on or off site fire suppression water supply is or can be made available. For residential subdivisions access should be provided from more than one source where feasible. Fire trails and fuel breaks should be required to be construced where necessary as a mitigation of excessive risk if at all possible. If development is to occur in extreme fire hazard areas, fire resistant materials, clearances from structures, and landscaping with fire resistant plants should be required.

4. The Marin County Fire Department, or other local fire protection agencies in concert with the Division of Forestry and the National Park Service, shall encourage and promote the maintenance of existing fuel breaks and emergency access routes for effective fire suppression.

5. The Board of Supervisors and the appropriate County agencies and all other agencies having fire protection responsibilities should continue to implement the latest Uniform Fire Code.

STATUS OF IMPLEMENTATION

1. *Existing Procedures*
   - *Planning Dept. in practice refers all development proposals to appropriate fire chief, and in consultation develops chief's recommendation into appropriate fire hazard condition on proposed development.*

   Authorization
   - *Direct-Marin Co. Code Titles 16 (Fire); 20.20 (Subdivisions); 22.47 (Planned Districts-Specific Regulations)*
   - *Related-M.C.C. Title 19 (Buildings)*

   Additional Steps Needed
   - *Planning Dept. should prepare proposed revisions to various chapters in M.C.C. Titles 20.20 and 22 to make these codes more evenly consistent with present county practice. Specifically: referral language should be added to Title 22 and standards language should be added to Title 20.*

2. - *County should consider contracting with the California Division of Forestry to develop fire hazard maps.*

3. *Existing Procedures*
   - *Apart from normal operational coordination, no specific procedures exist.*

   Additional Steps Needed
   BOS resolution and input from State/Federal agencies may be in order. County Fire Chief should recommend further on this.

4. *Existing Procedures*
   - *1976 Uniform Fire Code.*

POLICIES

1. No structures necessary for public safety or the provision of needed emergency services should be located in an area subject to tsunami inundation, unless the only alternative sites would be so distant as to thereby jeopardize the safety of the community served.

STATUS OF IMPLEMENTATION

Existing Procedures

- *No such explicit program exists. The County can however utilize general EIR procedures to partly accomplish this purpose.*

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2. In locating public safety structures on-site consideration should be given to p l a c e m e n t of persons within the range of injury from a tsunami; improvements should be designed to withstand impact from the tsunami; and the debris it will carry; these improvements which could become dislodged or detached (docks, decking, floats, vessels) should be situated so that they do not become potential implements of destruction.

Existing Procedures

- *Planning Dept. enforcement of relevant provisions governing subdivisions and tidelands developments.*

Authorization

- *Marin County Code Titles 20.20 (Subdivision) and 22.77 (Tidelands)*

H. FLOOD HAZARDS

POLICIES	STATUS OF IMPLEMENTATION
1. Consider the use of flood plain zoning overlay in flood areas to minimize flooding hazards. 2. Continue to promote multiple uses of areas set aside for flood retention ponding purposes (i.e. agriculture, open space, education, ecology), provided these uses are tolerant of occasional flooding. 3. Encourage regulatory methods of flood control as distinguished from costly methods.	*Existing Procedures* . *Planning and Public Works departments enforce existing flood plain zoning regulations, and inundated areas provisions of subdivision, planned districts and tidelands ordinances.* . *Dept. Public Works enforces hydraulic design provisions of development standards ordinance, and the relevant sections of the Watercourse Diversion ordinance.* *Authorization* . *Marin County Code Titles 11.08 (Watercourse Diversion);20.20 (Subdivisions); 22.45 (Planned Districts); 22.77 (Tidelands); 22.94,.95(Flood Plains); 23.08 (Excavation, Grading and Filling) and 24.04 (Development Standards).* *Auditional Steps Needed* . *Maintain coordination with County Flood Control District* . *Implementation study for policy #2 should be developed as a function of expanded Environmental Protection Committee concept of the Countywide Plan.*
4. Consider adopting an implementable creek setback ordinance to reduce flood damage and protect creek environments in conjunction with the acquisition of drainage easements.	*Steps Needed* . *This policy is to be implemented as part of the Countywide Plan Environmental Quality Element.*
5. Re-evaluate flood prone areas regarding changes to elevations as a result of off-site development or natural forces.	*Existing Procedure* . *not explicitly stated at present, although by implication, Tidelands zoning and the Excavation, Grading and Filling ordinance cover such changes.* *Authorization* . *Marin County Code Titles 22.77 (Tidelands) and 23.08 (Excavation, etc.)* *Additional Steps Needed* . *Amend above two ordinances to explicitly cover these situations.*
6. Insure adequate capacity to handle anticipated flood runoff in natural stream channels by storing, ponding or maintenance dredging in preference to concrete channelization.	(See comments for policies 1, 2, 3 above.)

Implementation of the policies of the Environmental Hazards element can be accomplished in a relatively simple fashion, as a result of the substantial body of adopted County codes which govern land use, zoning, development review, and the environmental impact assessment process. The table at right presents a listing of these basic codes.

The majority of the policy recommendations pertain to the review of development applications, guiding staff and decision-makers in the consideration of land development in hazard zones. Accordingly, there are few alterations to the existing practice of the Departments of Public Works and Planning which would be necessary to accomodate policy implementation. These alterations are indicated in the status notes on the preceding pages.
It is recommended that the first level of implementation be achieved in the following fashion:

1. Institutionalize the Environmental Hazards policies through review for possible amendment of the grading, subdivision, planned district (zoning) building code, design review (zoning), sections of County Code, where indicated in the preceding 10 pages.
2. Prepare for general public availability the hazard zone delineation maps, including floodways, seismic zones, and areas of relative slope stability - enabling site plans to be designed according to the constraints of the site.
3. Consult the hazard zones maps in the conduct of the initial study pursuant to the California Environmental Quality Act.
4. Address the hazard in the preparation of Environmental Impact Reports.
5. Expand the review and control of public and private projects to include environmental hazards by the Environmental Protection Committee.

Subsequent revision to development review practice or County code should take place over time, assessing the degree of progress in the implementation program.

MARIN COUNTY CODE	Section Number	TITLE
16	all	Fire Code
19	all	Building Code; Incorporates 1976 Uniform Fire Code and 1976 Uniform Building Code
20 & 24	all	Subdivision Code and Development Standards
23	23.08	Grading, Excavating and Filling
23	23.06	Mining and Quarrying
11	11.04	Dam Construction and Repair
11	11.08	Watercourse Diversion and Obstruction
22	22.47	Standards for Planned Districts
22	22.73	Lot Slope Requirements
22	22.77	Protection of Tidal Waterways
22	22.82	Design Review
22	22.94 & 22.95	Primary and Secondary Floodways

VI GLOSSARY

(includes terms in text marked *)

amplification: the increase in earthquake ground motion that may occur to the principal components of seismic waves as they enter and pass through different earth materials.

creep: downslope movement which is gradual and almost imperceptible; can be observed from downslope inclination of fence posts, power poles, etc.

debris flow: see figure 17.

debris avalanche: see figure 17.

detritus (geol): accumulation of small rock debris

en echelon: in a parallel, offset, step-like pattern

epicenter: a point on the earth's surface directly above the focus of an earthquake

focus: that point within the earth which is the center of an earthquake and the origin of its elastic waves

foliated: occurring in plates, in parallel planes; due to development under great pressure during regional metamorphism

fundamental ground period: see period

intensity: a measure of the effects of an earthquake at a particular place on humans and/or structures; depends or earthquake magnitude but also upon to distance from the point to the epicenter and the local geology

liquefaction: a sudden large decrease in the shearing resistance of a cohesionless soil, caused by a collapse of the structure by shock or strain

magnitude: a measure of the strength of an earthquake or the strain energy released by it, as determined by seismographic observations

metamorphism: the process of the transformation (recrystallizatior of sedimentary or igneous rocks by intense head and pressure; usually occurs deep within the earth.

Modified Mercalli: see Chart 1

natural period: see period

occupancy factor: the number of people occupying a structure as a determinant of structural and construction standards

period: a number representing the time between seismic wave Peaks to which a building on the ground is most vulnerable; usually measured in seconds

riparian: of or relating to a stream or river; used to refer to a type or class of vegetation or wildlife habitat

rotational slump: see figure 17

shear: a strain resulting from stresses that cause or tend to cause contiguous parts of a body to slide relatively to each other in a direction parallel to their plane of contact

tectonic: pertaining to the crustal forces responsible for faulting, folding, sea-floor spreading, and the general shaping of continents

tsunami: a seismic sea-wave produced by any large-scale, short duration disturbance of the ocean floor, principally by a shallow submarine earthquake; characterized by great speed of propagation, long wave length, long period, and low observable amplitude on the open sea

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V ENVIRONMENTAL IMPACT SUPPLEMENT

This Draft Environmental Impact Report on the Environmental Hazards Element of the Marin Countywide Plan has been prepared to fulfill the requirements of the California Environmental Quality Act as implemented by the State EIR Guidelines in effect as of January 1, 1977. The Guidelines provide that the EIR may be consolidated with the General Plan element if the General Plan addresses all the points required to be in an EIR (Section 15148). The Guidelines also authorize the incorporation, by reference, of all or of portions of other documents which are of public record and generally available to the public (Section 15149). The contents of this EIR, whether contained herein or incorporated by reference, will not be as detailed or as specific as that of an EIR on a construction project, but will focus on the secondary effects that can be expected to follow from the adoption of the element (Section 15147).

The Environmental Hazards Element is being proposed as part of the environmental quality element of the Adopted Countywide Plan. Thus the impacts identified are generalized in nature and emphasize long range and cumulative effects possible from implementing the element over time. No significant, direct, short range environmental consequences of adopting the goals and policies of such a general plan element are identified.

The following index identifies the section of the Environmental Hazards Element where EIR required discussion can be found:

EIR Guidelines Article 9		Location of Information
§ 15141	Description of the Project	1, pp. 1-2, 84-94
15142	Description of Environmental Setting	Ch. 2, all; Ch. 3, all
15143a.	Environmental Impact of Proposed Action	EIR Supp. pp. 2-3
b.	Any Adverse Environmental Effects which cannot be avoided if the proposal is implemented	" " " 4
c.	Mitigation Measures Proposed to Minimize Impact	" " " 4
d.	Alternatives to Proposed Action	" " " 4-5
e.	Relationship between Local Short Term Uses of Man's Environment ant the Maintenance and Enhancement of Long Term Productivity	" " " 5-6
f.	Any irreversible environment Changes Which would be Involved in the Pro-Posed Action should it be Implemented	" " " 6
g.	The Growth Inducing Impact of the Proposed Action	" " " 6
h.	Energy Conservation Measures	" " " 6
15144	Persons who Prepared Document	see credits, 1.

Key to location of Information:

1) Environmental Hazards Element
2) Geology for Planning, Novato area, Marin County, CDM&G, 1975
3) Geology for Planning, Southeastern Marin County, CDM&G, 1977
4) Can The Last Place Last?, Marin County Planning Dept., 1971
5) Countywide Plan, Marin County Planning Dept., 1973

a) The Environmental Impact of Proposed Action

The adoption of the Environmental Hazards element to the Countywide Plan, as a "project or action" will have minimal detrimental impact on the physical environment. The policies, if implemented, would promote a sound basis for environmental planning decisions, and thus serve to mitigate i m p a c t s on the environment. The implementation of the policies will have a beneficial impact on the physical environment, especially in the areas of: minimization of impact to flood plains, erosion-prone areas, geologically unstable areas, reduction of potential inducement of landsliding, and slope and structural failure due to seismic activity.

The implementation of the Environmental Hazards Element will have an impact on the social and economic environment, and could require a greater degree of engineering investigations and design to be required prior to development in certain hazardous areas, such as areas subject to liquefaction, or slope instability. Currently, the Alquist-Priolo Special Studies Zones Act of the State requires such extensive engineering geologic investigations prior to development in certain areas underlain by known or assumed traces of faults deemed by the State Geologist to be "sufficiently active and well-defined as to constitute a potential hazard to structures ..." and which have been zoned by the State Geologist. While, in Marin County, thus far, the implementation of this law has not precluded development, it has caused potential developers to secure special tests of their development site, in order to locate a building site free from the trace of a fault. This cost is partially repaid the developer by the knowledge that the building will not be subject to forces that are known to be of devastating proportions. Such development may be less likely to cause loss of life or be destroyed in a seismic event.

The recommended policies of this element are to a great degree, already being carried out by the County through engineering review and Environmental Impact Assessment carried out under CEQA. However, this element would institutionalize some of these practices and add more. The costs would be borne by the consumer in the form of higher costs of acquisition of dwellings or commercial, institutional, or industrial space. The costs would be "out front", that is, be required prior to construction and would involve some increased standards of construction. Costs of long-term maintenance would not be affected. The State's Joint Committee on Seismic Safety estimated that the seismic resistance of most new structures could be increased significantly with less than one to two percent additional construction costs. High occupancy facilities might require 5 to 15 percent increase in construction costs, and 5 to 25 percent increase might be required for vital facilities such as hospitals. Intrinsic hazards, such as a landslide on site or a flooding problem, will always affect the value of undeveloped land. The consumer, or developer, might not pay the same for a piece of land requiring a high level of engineering prior to development as he would for a like site unaffected by such standards.

Value of lands identified as high-risk may reflect the assumption that there would be a highly technical assessment of the site's development by governmental officials. There could be some impact on the value of lands subject to liquefaction, differential settlement,and subsidence in view of both the general awareness of the extent of the application of the Federal Flood Insurance Act and more widespread knowledge of the experience of a number of developments in such areas of the County.

Future costs may be lower to the consumer where development conforms to the policies recommended in the Element: repair of structural damage caused by settlement, land-sliding, etc.; repair of utilities damaged by differential settlement and subsidence; repair of improvements damaged by seismic activity; loss of life; restoration of structures damaged by fire, etc. These costs incurred, or avoided, of course, cannot be quantified at this time.

Costs to the County

The County can potentially incur some costs in the successful implementation of the Environmental Hazards Element. These costs include the following: more staff time in the review of certain development applications and greater staff supervision the construction of certain structures, In the implementation of policies designed to reduce seismic hazards, the greatest expense borne by the governmental agency is in abatement and code enforcement. This is not a significant aspect of the Marin County policy recommendations, and will not amount to a quantifiable cost to the County.

Although some of the policies may require a greater degree of staff services to insure compliance, many projects will not require quantifiable increases in staff time. As the regulatory processes expand, it is difficult to assign costs to any particular function, but the cumulative effect is of concern to governmental officials. The County of Marin has initiated a streamlined development review, and has shortened the time required to review and decide on an application. Implementation of the policies in this element does not mandate a greater time factor; once County staff incorporates the implementation procedures in their normal review process, and the public (including practicing engineers) learns of the implementation program, the process can be substantially incorporated into the existing framework of development review.

On the other hand, should the County not do all it reasonably can to protect development from those known environmental hazards, the courts may levy substantial costs to the County in the future should losses of life and property or significant injuries be found to be even partly due to the failure of the County to prudently exercise its powers to protect the health and safety of its citizens.

b) Any Adverse Environmental Effects which cannot Be Avoided If the Proposal is Implemented

There are no significant adverse environmental effects that would result from the Implementation of the Environmental Hazards Element of the Countywide Plan. The intent, as described in the introduction and in the Environmental Hazards Element itself, is to minimize impacts to the environment and to property and above all, to human life. Economic impacts are somewhat unavoidable, as discussed In Section (a) above. These impacts, while not quantified, are related to increased requirements for site investigation,for seismic design and construction, or for site modification to avoid non-seismic hazards such as landsliding, flood or fire. These Impacts are not considered significant adverse environmental effects, although they will be considered in the application of the standards, and in development review in general.

c) Mitigation Measures Proposed to Minimize Impact

As discussed in (a) and (b) above, the adoption of the Environmental Hazards Element does not create adverse impacts on the environment. Implementation will result in reductions in environmental impacts resulting from seismic activity, landsliding, wildfire, flooding, etc. The impacts will be in the modifications of land use in some hazardous areas and in the costs of development. These impacts can be mitigated by added knowledge about appropriate techniques to minimize hazard in construction, by the increased availability of base data regarding environmental hazards, and by the careful determination of the nature of the site investigation required by the particular characteristics of the site itself. The principal impacts which can be mitigated are those described in the Enviromental Hazards element, the impacts which the element proposes to minimize through the programs and procedures recommended in the policies of the element.The hazards defined In the element can be mitigated through the adoption and implementation of policies. Loss of life, property damage, and environmental degradation are the impacts which could be mitigated.

d) Alternatives to the Proposed Action

There are essentially three alternatives to the proposed activity:

1) adopt stronger policies than those proposed, including the outright prohibition of development in certain areas; or
2) adopt less stringent policies than those proposed; or
3) enact no Envlronmental Hazards element pertaining to seismic, geologic, flood, fire,and other hazards;

The text of the proposed element describes the risks which are inherent in certain geologic formations, landforms, vegetative types, etc. These risks to life and property can be mitigated through the enforcement of certain standards of construction, avoidance of certain areas in construction, vegetation management, and a host of other measures. Certain of the mea-

sures proposed in the form of recommended policy reflect consideration of the alternatives. For example: the policies regarding differential settlement could require that all structures be built on piles, thus virtually eliminating the risk of the building settling differentially; however, while the policies support this method of construction, other methods are not precluded by policy. Instead, standards are established and preliminary site monitoring and treatment is recommended.

The decision-makers who will review the proposed element (Planning Commission and Board of Supervisors) will determine, through their review of the recommendations, the degree of risk and corresponding policy which is appropriate for the County.

The impact of "no project" is clear: the County would be obligated to respond to each application for development in hazardous areas without a body of policy to substantiate requests for technical information. There would be the need to evaluate each proposal individually and thus negate the value of learned experience in policy implementation, and the exposure of the public to hazards could increase and cause great expense, if not in lives, in property damage. Further, State law mandates the inclusion of a Seismic Safety and Safety Element as part of every jurisdiction's General Plan.

At the other extreme, the complete elimination of risk from the hazards enumerated in this element is not a viable alternative. This would require substantial public investment in detailed engineering studies of a substantial portion of the County. The alternative is also beyond the realm of public policy as it presumes complete accuracy of engineering investigations and presumes a state of the art that would have to increase over time. At this time, there is no way to predict exactly when, where, or with what damaging force an earthquake could occur.

The 3rd alternative is one which would establish less stringent policy. This alternative was considered as each policy was developed, and the policy recommendations were devised to reflect the feasibility of the engineering necessary to meet the policy and the product which would be achieved. The decision makers may elect less stringent policies which reflect their decision to accept a certain level of risk in exchange for less rigorous development standards.

Both the alternatives of less and greater policy are subjective alternatives which have already been assessed in the process of policy development and which will be options for consideration at the adoption stage of the element.

e) <u>The Relationship between the Short-term Uses of Man's Environment and the Maintenance and Enhancement of Long-term Productivity</u>

The implementation of the Environmental Hazards Element will provide the County with a reasonable level of protection for citizens of the County against personal injury or property damage from the listed environment hazards, protection of the physical environment from activities that could induce such damage as landsliding and erosion, and avoidance of social

and economic disruption that could be caused by serious seismic activity, flooding,or wildfire. The implementation of the policies will provide both long-term and short-term benefits. Beneficial use of the environment will be better maintained, and long-term productivity will be insured by the reduction of hazards and environmental disruption. There may be short-term economic impacts due to the increased public and private costs, with long-term safety benefits as the return on this investment.

f) Any Irreversible Environmental Changes which would be involved in the proposed Action Should It be Implemented

There are no measurable environmental changes that would be induced by implementation of the policies (the proposed action) recommended in the Environmental Hazards Element. Certain land use decisions, which will be made on the basis of the implementation of the "action",may be different than would be made without the geotechnical or other data background presented in the element. However, the background technical reports prepared for this element stand as a known body of information whether the element is adopted or not. Changes in land-use decisions cannot be viewed as irreversible environmental changes induced by the "action", inasmuch as the "action" is not a construction project or some other physical development project. The effect of the project will not be to induce environmental changes but rather to enable decisions based on environmentally sound site planning and land-use decisions.

g) The Growth Inducing Impact of the Proposed Action

Adoption of the Environmental Hazards Element will not induce residential or commercial growth, nor will it expressly limit such development. The element, rather, will possibly alter the type of development or development standards, applicable to certain hazardous areas.

h) Energy Conservation Measures

The adoption of the Environmental Hazards Element will not alter the utilization of energy, either in the form of fossil fuels, hydroelectric,or solar energy. The Element, as a project will affect the review of development proposals, will increase development standards, and modify site plans to the extent that certain hazardous conditions would be avoided in land development. While site planning can have an impact on energy consumption (such as the relative energy efficiency of high density development adjacent to public transportation corridors), this element will not significantly affect such considerations in land-use decisions. Utilization of solar energy may, to a very small degree, be affected by the specific concern of avoiding particular site for development (such as avoiding disturbance of a toe of a slope ...), but it is no more likely that the concern for environmental hazards will reduce the potential for

utilization of solar energy than it would increase the passive utilization of solar energy in a case where the site developer had not specifically been planning on such use.

Utilization of some of the information presented in the element and particularly its background technical reports could save substantial time and energy by avoiding the need to duplicate this work on preparing future development proposals, EIRs and city Seismic Safety and Safety Elements.

LIST OF AGENCIES/INDIVIDUALS WHICH HAVE SUBMITTED COMMENT IN RESPONSE TO CIRCULATION OF DRAFT ENVIRONMENTAL HAZARDS ELEMENT TO THE MARIN COUNTYWIDE PLAN

	Agency/Individual	Date & Type of Communication	Date Recd.
*	Marin County Dept. Public Works (Irving Schwartz)	5-16-77 memorandum	5/17/77
*	Marin Co. Bd. of Realtors (Barry Smail)	5-17-77 letter	5/18/77
*	Assoc. of Bay Area Governmts (Charles Q. Forester)	5-19-77 letter	5/20/77
*	Bay Conservation & Development Comm.(Tom Tobin)	5-19-77 Tel. call	5/19/77
*	Marin County Counsel's office -(Douglas Maloney)	5-19-77 memorandum	5/20/77
**	Office of Planning and Research (W. Kirkham)	6-8-77 letter	6-10-77
**	Marin County Fire Dept. (Richard Pedroli)	6-10-77 letter	6-13-77
**	Marin Municipal Water District (J.D. Stroeh)	6-13-77 letter	6-13-77
**	Marin Conservation League and The Environmental Forum (ad hoc committee)	6-13-77 letter	6-13-77
**	League of Women Voters of Central and Southern Marin (Monica Foster)	6-13-77 letter	6-13-77
**	Marin Conservation League (Willis Evans)	6-13-77 letter	6-14-77
+	Calif. Div. of Mines & Geology (R.M. Stewart)	6-3-77 review & comments	6-6-77
+	Calif. Div. Of Mines & Geology (S.J.Rice)	6-6-77 review & comments	6-6-77
**	Response to P.C. Jerry Friedman comments @ 6/13/77 Planning Commission hearing		
**	Marin County Emergency Services (Frank Kirby)	6-13-77 letter	6-15-77
**	Marin Builders Exchange (Peter Arrigoni) (with attached memo from Andrew Sabhlok of Building Code Action)	6-30-77 "	6-30-77
**	Department of Pub. Wks.(Land Development) (Irving Schwartz)	7-8-77 Memorandum	7-8-77
***	Department of Public Works (Herb Wimmer, Chief Building Inspector)	8-15-77 Memorandum	8-15-77
***	Marin County Counsel's office (Douglas Maloney) (response to Planning Staff's inquiry dated 8/10/77)	8-16-77 Memorandum	8-18-77
***	Response to comments in minutes of 7/11/77 Planning Commission Hearing		

* Copies transmitted Marin County Planning Commissio (June 13, 1977)
** " " " " " " (July 11, 1977)
\+ Comments incorporated into Element (no response)

APPENDIX C

ALQUIST-PRIOLO SPECIAL STUDIES ZONES ACT

Excerpts from California Public Resources Code

(Signed into law December, 1972; amended September 26, 1974, May 4, 1975 and September 28, 1975)

DIVISION 1. ADMINISTRATION
CHAPTER 2. DEPARTMENT OF CONSERVATION
Article 3. State Mining and Geology Board and the Division of Mines and Geology

660. There is in the department a State Mining and Geology Board consisting of nine members appointed by the Governor.

673. The board shall also serve as a policy and appeals board for the purposes of Chapter 7.5 (commencing with Section 2621) of Division 2.

DIVISION 2. GEOLOGY, MINES AND MINING
CHAPTER 7.5. SPECIAL STUDIES ZONES

2621. This chapter shall be known and may be cited as the Alquist-Priolo Special Studies Zones Act.

2621.5. It is the purpose of this chapter to provide for the adoption and administration of zoning laws, ordinances, rules, and regulations by cities and counties in implementation of the general plan that is in effect in any city or county. The Legislature declares that the provisions of this chapter are intended to provide policies and criteria to assist cities, counties, and state agencies in the exercise of their responsibility to provide for the public safety in hazardous fault zones.

This chapter is applicable to any project, as defined in Section 2621.6, upon issuance of the official special studies zones maps to affected local jurisdictions, but does not apply to any development or structure in existence prior to the effective date of the amendment of this section at the 1975–76 Regular Session of the Legislature.

2621.6. (a) As used in this chapter, "project" means

(1) Any new real estate development which contemplates the eventual construction of structures for human occupancy, subject to the Subdivision Map Act (commencing with Section 66410 of the Government Code).

(2) Any new real estate development for which a tentative tract map has not yet been approved.

(3) Any structure for human occupancy, other than a single-family wood frame dwelling not exceeding two stories.

(4) Any single-family wood frame dwelling which is built or located as part of a development of four or more such dwellings constructed by a single person, individual, partnership, corporation, or other organization. No geologic report shall be required with respect to such single-family wood frame dwelling if the dwelling is located within a new real estate development, as described in paragraph (1) or (2) of this subdivision, for which development a geologic report has been either approved or waived pursuant to Section 2623.

(b) For the purposes of this chapter, a mobilehome whose body width exceeds eight feet shall be considered to be a single-family wood frame dwelling not exceeding two stories.

2621.7. This chapter, except Section 2621.9, shall not apply to the conversion of an existing apartment complex into a condominium. This chapter shall apply to projects which are located within a delineated special studies zone.

2621.8. This chapter shall not apply to alterations or additions to any structure within a special studies zone the value of which does not exceed 50 percent of the value of the structure.

2621.9. A person who is acting as an agent for a seller of real property which is located within a delineated special studies zone, or the seller if he is acting without an agent, shall disclose to any prospective purchaser the fact that the property is located within a delineated special studies zone.

2622. In order to assist cities and counties in their planning, zoning, and building-regulation functions, the State Geologist shall delineate, by December 31, 1973, appropriately wide special studies zones to encompass all potentially and recently active traces of the San Andreas, Calaveras, Hayward, and San Jacinto Faults, and such other faults, or segments thereof, as he deems sufficiently active and well-defined as to constitute a potential hazard to structures from surface faulting or fault creep. Such special studies zones shall ordinarily be one-quarter mile or less in width, except in circumstances which may require the State Geologist to designate a wider zone.

Pursuant to this section, the State Geologist shall compile maps delineating the special studies zones and shall submit such maps to all affected cities, counties, and state agencies, not later than December 31, 1973, for review and comment. Concerned jurisdictions and agencies shall submit all such comments to the State Mining and Geology Board for review and consideration within 90 days. Within 90 days of such review, the State Geologist shall provide copies of the official maps to concerned state agencies and to each city or county having jurisdiction over lands lying within any such zone.

The State Geologist shall continually review new geologic and seismic data and shall revise the special studies zones or delineate additional special studies zones when warranted by new information. The State Geologist shall submit all revised maps and additional maps to all affected cities, counties, and state agencies for their review and comment. Concerned jurisdictions and agencies shall submit all such comments to the State Mining and Geology Board for review and consideration within 90 days. Within 90 days of such review, the State Geologist shall provide copies of the revised and additional official maps to concerned state agencies and to each city or county having jurisdiction over lands lying within any such zone.

2623. The approval of a project by a city or county shall be in accordance with policies and criteria established by the State Mining and Geology Board and the findings of the State Geologist. In the development of such policies and criteria, the State Mining and Geology Board shall seek the comment and advice of affected cities, counties, and state agencies. Cities and counties shall require, prior to the approval of a project, a geologic report defining and delineating any hazard of surface fault rupture. If the city or county finds that no undue hazard of this kind exists, the geologic report on such hazard may be waived, with approval of the State Geologist.

After a report has been approved or a waiver granted, subsequent geologic reports shall not be required, provided that new geologic data warranting further investigations is not recorded.

2624. Nothing in this chapter is intended to prevent cities and counties from establishing policies and criteria which are stricter than those established by this chapter or by the State Mining and Geology Board, nor from imposing and collecting fees in addition to those required under this chapter.

2625. (a) Each applicant for approval of a project may be charged a reasonable fee by the city or county having jurisdiction over the project.

(b) Such fees shall be set in an amount sufficient to meet, but not to exceed, the costs to the city or county of administering and complying with the provisions of this chapter.

(c) The geologic report required by Section 2623 shall be in sufficient detail to meet the criteria and policies established by the State Mining and Geology Board for individual parcels of land.

2630. In carrying out the provisions of this chapter, the State Geologist and the board shall be advised by the Geologic Hazards Technical Advisory Committee consisting of nine members nominated by the State Geologist and appointed by the board. Members of the committee shall be selected and appointed on the basis of their professional qualifications and training in seismology, structural geology, engineering geology, or related disciplines in science and engineering, and shall possess general knowledge of the problems relating to geologic seismic hazards and building safety. The members of the committee shall receive no compensation for their services, but shall be entitled to their actual and necessary expenses incurred in the performance of their duties.

Policies and Criteria of the State Mining and Geology Board

(with reference to the
Alquist-Priolo Special Studies Zones Act
Chapter 7.5, Division 2, Public Resources Code,
State of California)

(Adopted November 23, 1973; revised July 1, 1974, and June 26, 1975)

The legislature has declared in the ALQUIST-PRIOLO SPECIAL STUDIES ZONES ACT that the State Geologist and the State Mining and Geology Board are charged under the Act with the responsibility of assisting the Cities, Counties, and State agencies in the exercise of their responsibility to provide for the public safety in hazardous fault zones. As designated by the Act, the policies and criteria set forth hereinafter are limited to hazards resulting from surface faulting or fault creep. This limitation does not imply that other geologic hazards are not important and that such other hazards should not be considered in the total evaluation of land safety.

Implementation of the ALQUIST-PRIOLO SPECIAL STUDIES ZONES ACT by affected Cities and Counties fulfills only a portion of the requirement for these Counties and Cities to prepare seismic safety and safety elements of their general plans, pursuant to Section 65302 (F) and 65302.1 of the Government Code. The special studies zones, together with these policies and criteria, should be incorporated into the local seismic safety and safety elements of the general plan.

The State Geologist has compiled and is in the process of compiling maps delineating special studies zones pursuant to Section 2622 of the Public Resources Code. The special studies zones designated on the maps are based on fault data of varied quality. It is expected that the maps will be revised as more complete geological information becomes available. Also, additional special studies zones may be delineated in the future. The Board has certain responsibilities regarding review and consideration of those maps prior to the time that they are finally determined. Cities, Counties and State agencies have certain opportunities under the Act to comment on the preliminary maps provided by the State Geologist and these Policies and Criteria. Certain procedures are suggested herein with regard to those responsibilities and comments.

Please note that the Act is not retroactive (Section 2621.5 of the Public Resources Code). It applies to every proposed *new* real estate development or structure for human occupancy that constitutes a "project" as defined under Section 2621.6 of the Public Resources Code.

Review of Preliminary Maps

The State Mining and Geology Board suggests that each reviewing governmental agency take the following steps in reviewing the preliminary maps submitted for their consideration:

1. All property owners within the preliminary special studies zones mapped by the State Geologist should be notified by the Cities and Counties of the inclusion of their lands within said preliminary special studies zones by publication or other means designed to inform said property owners. Such notification shall not of necessity require notification by service or by mail. This notification will permit affected property owners to present geologic evidence they might have relative to the preliminary maps.

2. Cities and Counties are encouraged to examine the preliminary maps delineating special studies zones and to make recommendations, accompanied by supporting data and discussions, to the State Mining and Geology Board for modification of said zones in accordance with the statute and within the time period specified therein.

3. For purposes of the Act, the State Mining and Geology Board regards faults which have had surface displacement within Holocene time (about the last 11,000 years) as active and hence as constituting a potential hazard. Upon submission of satisfactory geologic evidence that a fault shown within a special studies zone has not had surface displacement within Holocene time, and thus is not deemed active, the Mining and Geology Board may recommend to the State Geologist that the boundaries of the special studies zone be appropriately modified.

The definition of active fault is intended to represent minimum criteria only for all structures. Cities and Counties may wish to impose more restrictive definitions requiring a longer time period of demonstrated absence of displacements for critical structures such as high-rise buildings, hospitals, and schools.

Specific Criteria

The following specific and detailed criteria shall apply within special studies zones and shall be included in any planning program, ordinance, rules and regulations adopted by Cities and Counties pursuant to said SPECIAL STUDIES ZONES ACT:

A. No structure for human occupancy, public or private, shall be permitted to be placed across the trace of an active fault. Furthermore, the area within fifty (50) feet of an active fault shall be assumed to be underlain by active branches of that fault unless and until proven otherwise by an appropriate geologic investigation and submission of a report by a geologist registered in the State of California. This 50-foot standard is intended to represent minimum criteria only for all structures. It is the opinion of the Board that certain essential or critical structures, such as high-rise buildings, hospitals, and schools should be subject to more restrictive criteria at the discretion of Cities and Counties.

B. Application for a development permit for any project (as defined in Section 2621.6) within a special studies zone shall be accompanied by a geologic report prepared by a geologist registered in the State of California, and directed to the problem of potential surface fault displacement through the project site, unless such report is waived pursuant to Section 2623.

C. One (1) copy of all such geologic reports shall be filed with the State Geologist by the public body having jurisdiction within thirty days following acceptance by the approving jurisdiction. The State Geologist shall place such reports on open file.

D. A geologist registered in the State of California, within or retained by each City or County, must evaluate the geologic reports required herein and advise the body having jurisdiction and authority.

E. Cities and Counties may establish policies and criteria which are more restrictive than those established herein. In particular, the Board believes that comprehensive geologic and engineering studies should be required for any "critical" or "essential" structure as previously defined whether or not it is located within a special studies zone.

F. In accordance with Section 2625 of the Public Resources Code, each applicant for approval of a project within a delineated special studies zone may be charged a reasonable fee by the City or County having jurisdiction over the project.

G. As used herein the following definitions apply:

1. A "project" includes any structure for human occupancy or new real estate development as defined under Section 2621.6 of the Public Resources Code.
2. A "structure for human occupancy" is one that is regularly, habitually or primarily occupied by humans; excluding therefrom freeways, roadways, bridges, railways, airport runways, and tunnels. The excluded transportation structures should be sited and designed with due consideration to the hazard of surface faulting. Mobile homes, whose body width exceed eight (8) feet, are considered as structures for human occupancy.
3. A "new real estate development" is defined as any new development of real property which contemplates the eventual construction of "structures for human occupancy."