A PLAN FOR

THE

BOLINAS

GRIDDED MESA

Adopted by the Marin County Planning Commission
September 24, 1984

Adopted by the Marin County Board of Supervisors
November 27, 1984

Approved by the California Coastal Commission
March 27, 1985

THE PREPARATION OF THIS PLAN
WAS FUNDED BY A GRANT FROM
THE SAN FRANCISCO FOUNDATION

Prepared by

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and
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for
THE BOLINAS PLANNING COUNCIL
and
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1.0 INTRODUCTION

1.1 Background and Issues

The Gridded Mesa Plan represents the most recent step in the planning process for Bolinas that stems from the Bolinas Community Plan. It focusses on a distinct portion of Bolinas called the Gridded Mesa.

When the Bolinas Community Plan was adopted in 1975, the problems and issues affecting the Gridded Mesa were recognized and discussed. Three specific recommendations regarding the Gridded Mesa were included in the 1975 Plan, including the creation of a Planning Council and the consideration of a "redevelopment" plan for the Mesa. The major impetus behind this recommendation was the expression by the community at that time was that "some method of redoing this mosaic of buildable and unbuildable lots is a major goal of the Bolinas Plan." The Local Coastal Program (LCP), adopted by the County in 1979 and certified by the State in 1980, also recognized the problems facing Bolinas and identified the need to prepare a restoration plan for the Gridded Mesa.

In order to meet the intention of both these plans, the Bolinas Planning Council was created in 1981 with the purpose of obtaining the funding suggested by the LCP and to proceed with the planning process for the Gridded Mesa. In 1982, the Bolinas Planning Council and the County submitted an application for planning funds to the San Francisco Foundation which was granted. Consultants were then retained and the planning process was initiated. The formal planning process for the Gridded Mesa Plan began in November of 1982. This document represents nearly two years of cooperative efforts by both the Bolinas community and the County of Marin.

This work does not replace the 1975 Bolinas Community Plan. Rather, it is a supplement to Section 10 of the 1975 Plan entitled "Redevelopment of the Gridded Mesa," and should be considered as part of the dynamic planning process which requires all plans to be continuously changing and improving. The process is not completed yet and will continue as changes occur on the Gridded Mesa and elsewhere in the Bolinas community.

Background

The Bolinas "Gridded Mesa" is an area of about 300 acres on a bluff overlooking Bolinas Bay and the Pacific Ocean in unincorporated west Marin County. The area was subdivided in 1927 into 5,336 20' x 100' lots. Many of these lots were sold for $69.50 as part of a subscription promotion by the San Francisco Bulletin. This subdivision consists of a rigid grid pattern superimposed over a former dairy farm, without regard to drainage patterns, slope, bluff erosion or other natural features. The streets on the Gridded Mesa were never accepted by Marin County, and unless maintained by adjoining property owners, many streets remain often impassable. A few of the streets are paved raods maintained by the County. Over the years, some roads have eroded into the sea and others have been abandoned, leaving lots with no public access. Drainage throughout the area is adversely affected by the roadway pattern. The entire area is served by on-site sewage disposal systems.

In November 1971, the Bolinas Community Public Utility District instituted a moratorium on the issuance of water permits, thereby halting new construction on the Gridded Mesa and other areas of Bolinas. This action was based on a shortage of water, specifically during summer months and drought years. Unrestrained development of the Gridded Mesa was also a significant concern due to the limited utilities and the community desire to maintain the town's rural atmosphere. The moratorium continues to be supported by residents of the District, who have voted not to increase water resources beyond that required by the present population.

Marin County officials have agreed that the limited water supply constitutes a significant constraint on development on the Gridded Mesa. The lack of a community-wide sewage disposal system represents another significant constraint. The size of the existing parcels is also a problem. Under a "grandfather" clause in the Marin County Zoning Ordinance, the undersized lots (originally 20' x 100'), in Bolinas are designated as legal building sites even though the ordinance requires residential building sites to be 10,000 square feet in size. While these smaller lots are considered as legal sites, the building, health and safety standards established by the County tend to exclude these lots from development consideration. Where possible, these 20 x 100' parcels may be combined into larger sites meeting the development standards.

The Local Coastal Program-Unit I (LCP), which was prepared to meet the requirements of the State Coastal Act of 1976, also included a recommendation for a moritorium, providing that: "No permits for construction of residential structures on the Gridded Mesa will be issued after the lifting of the water moratorium until the Restoration Study . . . is completed."

In May 1981, residents of Bolinas formed a volunteer Planning Council as recommended by the 1975 plan. After several meetings, the Council voted to prepare a Plan for the Gridded Mesa. There was a strong consensus among Council members that the Plan should be prepared with participation by the Community and within the framework of the goals and objectives of the 1975 Bolinas Community Plan. A Mesa Plan Resource Group was established from interested community members by the Gridded Mesa Plan consultants to assist them in preparing the Plan. Some of the Resource Group had extensive expertise and knowledge of the physical and cultural characteristics of the area. The Resource Group compiled and created the data base from which the Gridded Mesa Plan evolved. Additional consultants were employed to analyze the soil and drainage conditions on the Gridded Mesa and to recommend realistic sewage disposal techniques. The results of that analysis dramatically affected the Gridded Mesa Plan. Once the physical constraints were understood, few land use alternatives appeared to be feasible.

Issues

Today, lot size varies widely over the Mesa, with a large number of the original 20' x 100' lots still remaining. The Mesa accounts for about one-half of the total dwelling units in Bolinas, but over two-thirds of the residentially zoned portion of the Bolinas Planning Area.

For the past three years, the citizens of Bolinas and Marin County officials have held discussions to resolve the problem of "second unit dwellings." These are accessory residential structures which have been constructed in areas zoned for single family use, often without building or other permits. The County has identified between 80 and 100 of these structures in Bolinas, representing the primary stock of low to moderate income rental housing in the community. Most of these units are located on the Gridded Mesa. A Second Unit Ordinance drafted by the Marin County Planning Department with assistance from the Bolinas Planning Council was approved by the Marin County Board of Supervisors, January 12, 1982. Under this Ordinance, community plan amendments may

be introducted by communities in unincorporated areas of Marin to legalize second units. On March 29, 1983, the Board of Supervisors approved a Second Unit Ordinance for Bolinas, requiring permits for all existing second units. By the end of January 1984, only 14 permits had been requested. Of these, only one has been approved and two have been withdrawn.

There are other key issues affecting the Gridded Mesa beyond the water shortage and the limitations related to the parcel size and configuration. Primarily, they are the physical characteristics of the Mesa itself, some of which cannot be changed, such as the soils, and others which are continually changing, such as the eroding bluffs and the unstable slopes. These characteristics have dramatically affected this phase of planning for Bolinas. The following sections will serve to describe the opportunities and constraints inherent in the existing environment and indicate how the current plan was affected by them.

There is a wide range of sentiment about growth among both Bolinas residents and property owners. Some people feel that Bolinas should retain its present scale and level of development; others would welcome residential and commercial growth. This issue of growth versus no-growth was a lively and influential factor throughout the planning process.

1.2 Purpose for the Gridded Mesa Plan

The Gridded Mesa Plan represents a joint undertaking of the Marin County Planning Department, the Bolinas Planning Council and the Mesa Plan Resource Group. It utilized the services of a Program Planner, Local Facilitator, and a Planning Consultant to coordinate the preparation of a plan for the Bolinas Gridded Mesa. This plan is intended to serve as an effective guide to future development and resource preservation in the area. The Mesa Plan outlines the implications for natural resources, community values, and public services of land use alternatives. The 1984 Plan was prepared within the framework of the goals, policies, and objectives of the 1975 Community Plan as well as additional goals identified by the Bolinas Planning Council and the Marin County Planning Department. The goals of the Local Coastal Program were also incorporated in the planning process.

The most important purpose of the planning process at this stage of the community's life is to first identify and accept the existing physical constraints and the existing problems resulting from unrestrained and incorrectly sited development and then determine the policies and programs necessary to implement solutions to those problems. The purpose of this plan is to protect the fragile environment of the Mesa from the documented negative cumulative impact of improper drainage and development as well as to provide a plan for the possibility of safe and orderly future development. Resolving the current problems related to drainage, sewer and water are given the highest priority.

Goals for the Gridded Mesa Planning Process

The Bolinas community has established a set of goals which it feels will help maintain or improve its welfare. These goals were stated in the 1975 Bolinas Community Plan (BCP).

In addition to the BCP goals, the LCP embodies statements of goals which influence land use planning in Bolinas. These were derived through specific community participation and reflect the county and state goals affecting Bolinas. These goals are compatible with the BCP goals. The stated goals and their origins are listed below:

1. Understand, Protect and Engender Elements of Community (BCP)
2. Achieve a Healthy Coexistence Between Man and Nature (BCP)
3. Foster Economic Development (BCP)
4. Accept and Encourage a Wide Range of Lifestyles (BCP)
5. Participate in Planning and Decision Making Affecting Bolinas and Its Surroundings (BCP)
6. Protect and Conserve State Coastal Resources (LCP)
7. Maximize Public Use and Enjoyment of State Coastal Resources (LCP)
8. Ensure Health and Safety of Persons Residing In or Visiting the Local Coastal Unit (LCP)

Marin County also has several jurisdictional obligations which add to the goals and objectives framework for this project. In particular, the County has the responsibilities of maintaining law and order, protection of lives and property and maintaining health standards.

Plan Objectives

The 1975 Plan goals are general in nature. From each general goal, more specific statements, objectives, are derived. Goals are better understood when they are further defined by objectives. The following summary list shows the relationship of the goals to the objectives stated in the 1975 Bolinas Community Plan, including the Local Coastal Program goals:

Goal 1: Understand, Protect and Engender Elements of Community

Objectives:

- Maintain existing land use patterns (this could conflict with 1984 plan)
- Maintain Bolinas as resident, not tourist community
- Minimize/control impact of autos on community

Goal 2: Achieve a Healthy Coexistence Between Man and Nature

Objectives:

- Accept reasonable mix of residential and agricultural uses
- Respect wildlife systems
- Respect vegetative systems
- Preserve unique aesthetic value of landforms

Goal 3: Foster Economic Development

Objectives:

- Prepare capital improvement programs for roads, signs, ponds, drainage

- o Monitor parks and county for employment opportunities
- o Promote cottage industry and small scale agriculture

Goal 4: Accept and Encourage a Wide Range of Lifestyles

Objectives:

- o Pursue codes for owner-built architectural diversity
- o Implement low- to moderate-income housing and rentals

Goal 5: Participate in Planning and Decision Making Affecting Bolinas and Its Surroundings

Objectives:

- o Ensure local input in planning/administration for Bolinas
- o Change BCP to reflect changing local conditions

Goal 6: Protect and Conserve State Coastal Resources

Objectives:

- o Limit stream impoundments
- o Do not alter/remove trees in major vegetative areas
- o Protect upland grassland feeding area
- o Discourage shoreline protective devices
- o Do not adversely affect archaeological/paleontological resources
- o Protect scenic and visual coastal resources

- o Avoid large-scale development changing rural village character

Goal 7: Maximize Public Use and Enjoyment of State Coastal Resources

Objectives:

- o Continue Bed and Breakfast program
- o Encourage social and economic diversity
- o Preserve views to scenic resources from roads and trails

Goal 8: Ensure Health and Safety of Persons Residing In or Visiting the Local Coastal Unit

Objectives:

- o Ensure new buildings are not threatened by cliff erosion
- o Ensure development meets Alquist-Priolo standards
- o New septic systems shall meet water quality guidelines
- o Water quality should be monitored

Conflicting Goals and Objectives

In some instances, the stated objectives (and goals) conflict with each other. While some objectives, such as "maintain existing land use patterns" and "encourage social and economic diversity," may both be desirable objectives, Bolinas cannot necessarily maintain its current land use patterns and provide low cost housing or develop cottage industries. Similarly, Bolinas may not be able to both limit stream impoundment or diversions and encourage residential development or road access to all parts of the Mesa. Where objectives conflict, it is necessary to set priorities. This does not happen as a singular event during the planning process. Since the process is dynamic, the goals

and objectives must be periodically reviewed and adjusted. Throughout this phase of the planning process the Planning Council emphasized that the goals and objectives included in the 1975 Community Plan were still valid for the 1984 Gridded Mesa Plan. However, additional objectives were identified as the process progressed. The 1975 goals and objectives, supplemented by those developed during the Gridded Mesa Plan process are used to create specific policies and programs for implementing the preferred plan.

2.0 OPPORTUNITIES AND CONSTRAINTS

Opportunities

There are several planning opportunities inherent in the Gridded Mesa. The location of the Gridded Mesa with its ocean and bay coastal areas and the accompanying views and vistas provides a unique environment. There is access to the extraordinary Duxbury Reef, a National Preserve, from the Mesa. Views and vistas of the coastal hills also contribute to the aesthetic quality of the Mesa.

On the Mesa itself, the many parts of the drainage system, including the creeks and ponded areas, define the form and quality of the rural environment. The rolling mesa land, much of which is undeveloped, provides an excellent opportunity for the community to plan a system of open area elements integrated with development. "Active" areas could be set aside for neighborhood parks or community gardens, with "passive" areas reserved for walking, sitting or observing.

Similarly, because land is available, including land well sited to take advantage of the variety of views and vistas, exceptional residential development opportunities are possible. Due to the level topographic character of most of the Mesa, as well as ease of access to the Mesa, opportunities exist to reduce the cost of residential construction. The size and location of undeveloped parcels provide opportunities for developing housing units in clusters, reducing impacts on the environment as well as construction costs.

The existing vegetation pattern contributes to the aesthetic quality of the Mesa; it provides protection and fuel, as in the case of some of the larger stands of trees. However, these vegetation elements can also become constraints. These, and other constraints are discussed below.

Constraints

Prior to the preparation of the Gridded Mesa Plan, a great deal of data had been compiled on the physical characteristics of the Mesa. Some of this data, such as the status of the water supply, is much documented and widely discussed and had become an important factor in the Bolinas Planning Process in the last 13 years. Other important data, such as the characteristics of the soils on the Mesa, were never confirmed until now.

During the development of the Gridded Mesa Plan, the known data were updated and supplemented by field work and laboratory analysis. As a result, the community and the County now have a reliable data base from which to formulate some realistic planning guidelines.

The environmental characteristics discussed in this section are described individually so that a better understanding of the existing conditions is possible. In reality, none of these characteristics is isolated. Each is a part of the whole and when one factor changes or is changed, the others are affected in some way. The soils, the geology, the slope and slope stability, the existing land use and ownership patterns, and the modified drainage patterns tend to limit the planning opportunities more than do other factors, such as the existing vegetation and wildlife characteristics. Where limiting factors overlap, cumulataive constraints act to further direct the planning process. For example, soil characteristics, when considered by themselves, may limit on-site sewage disposal, construction of buildings and roads, and agriculture. When such soil limitations are combined with the constraints associated with excessive slopes or the existing surface drainage patterns, cumulative constraints may prohibit development of any kind in that area. Thus, it is often a combination of factors that constrain the planning options. The remainder of this section briefly describes the environmental characteristics having the greatest affect on the Gridded Mesa Plan.

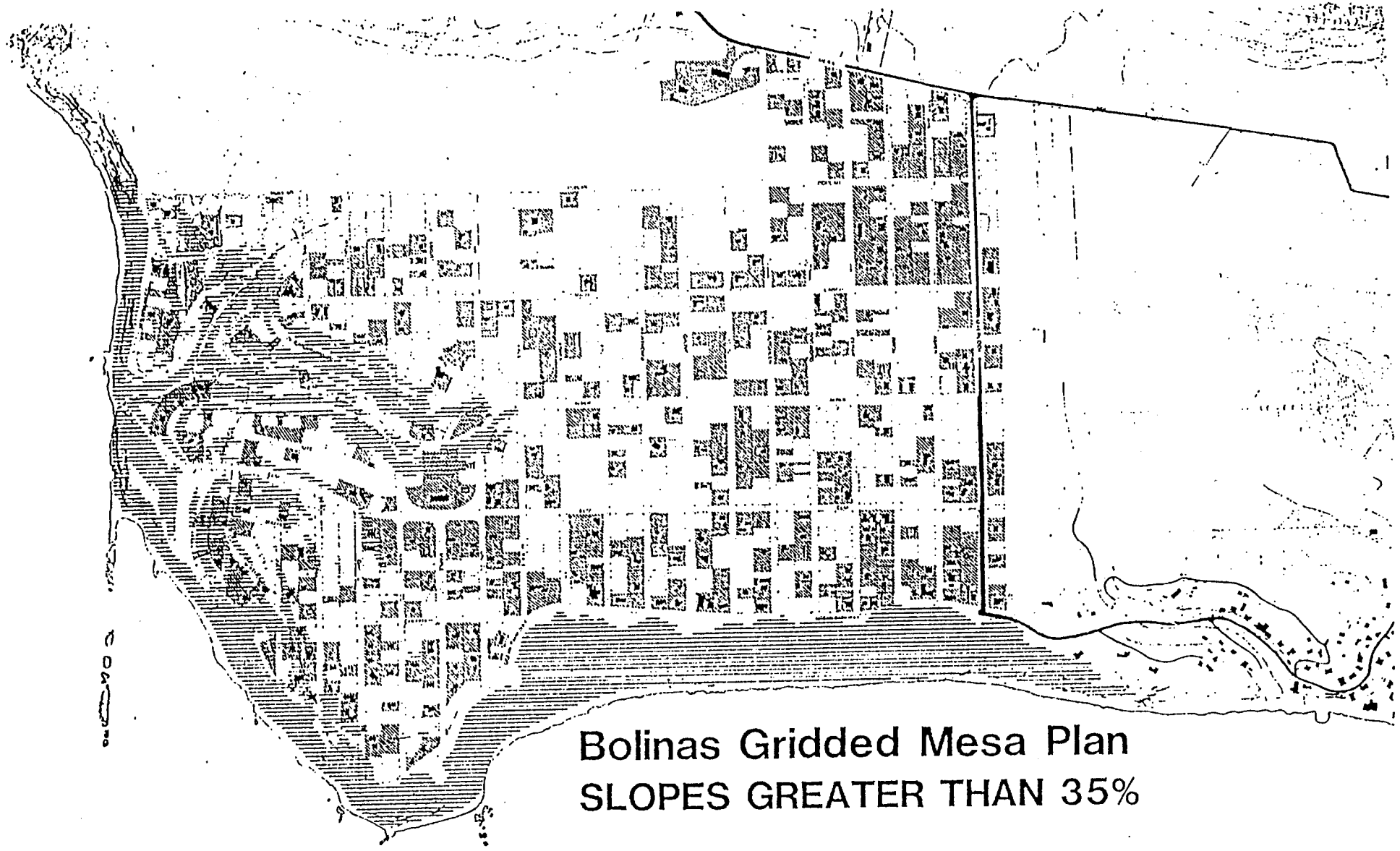
2.1 Physiography

2.1.1 Slope Configuration

The form of the land affects the Gridded Mesa Plan in several ways. Primarily, the slope of the land can inhibit or prohibit building and road construction and on-site sewage disposal systems. Most of the Mesa, particularly the eastern portion, is relatively level (less than two percent slope). The western end of the Mesa, including the major drainageways, ranges from 10 percent slope to greater than 40 percent along the bluffs and creeks. The Slope Map (Figure 2-1) indicates the general slope configuration on the Mesa.

For this plan, slopes greater than 35 percent are considered excessive and development of the areas within the slope category is not recommended. The County's Zoning

Ordinance and the Local Coastal Program restricts construction of residential units in areas with greater than 35 percent slope. As can be seen from Figure 2-1, the steepest slopes occur along the Alder Creek drainage and the bluffs along both the ocean and bay sides of the Mesa. When considered along with the constraints inherent in the Mesa soils, this factor can present significant constraints for any type of land use.



Bolinas Gridded Mesa Plan
SLOPES GREATER THAN 35%

Bolinas Planning Council
Mesa Plan Resource Group
Marin County Planning Department

EDAW Inc. 1983

Existing Built Parcels, 1983

Figure 2-1

2.1.2 Slope Stability and Bluff Slippage

In general, the soils on the Gridded Mesa are relatively stable, with two significant exceptions being the bluff areas and the steep slopes along the major drainage ways. (See Slope Stability map, Figure 2-2.) Slope stability can be affected by factors other than slope such as soil structure, drainage, vegetation, soil disturbance, and seismic activity. In this case, the soil structure exhibits a condition where the soil layers are not cohesive and where water moves longitudinally between these layers. Slippage can be a problem in the areas where this occurs.

The bluff slippage is a readily apparent phenomenon easily visible along the shoreline. The rate of slippage has been measured frequently and several assessments have been completed. The available data indicates that the section of the bluff above Bolinas Bay between Overlook Drive and Duxbury Point is falling away at an average rate of between 12 to 24 inches per year, and the ocean side bluff west of Duxbury Point is eroding at an average rate of nearly 30 inches per year. In any given location, slippage can be substantially greater or less than the average suggests.

Although actual annual erosion tends to be episodic in nature--with annual losses of five feet to ten feet interspersed with more stable periods--the variations appear to be related to the relative wetness of winters. The failures experienced during the winter of 1982-1983 clearly illustrate the potential for significant erosion along the bluff.

Chaparral, grasses, and other vegetation may contribute to the stabilization of slopes up to five to ten degrees steeper than similar non-vegetated areas. However, large shallowrooted trees, such as the eucalyptus and cypress, may contribute to slope destabilization by drastically altering slope conditions when they are toppled because of high winds, senescense, or soil failure.

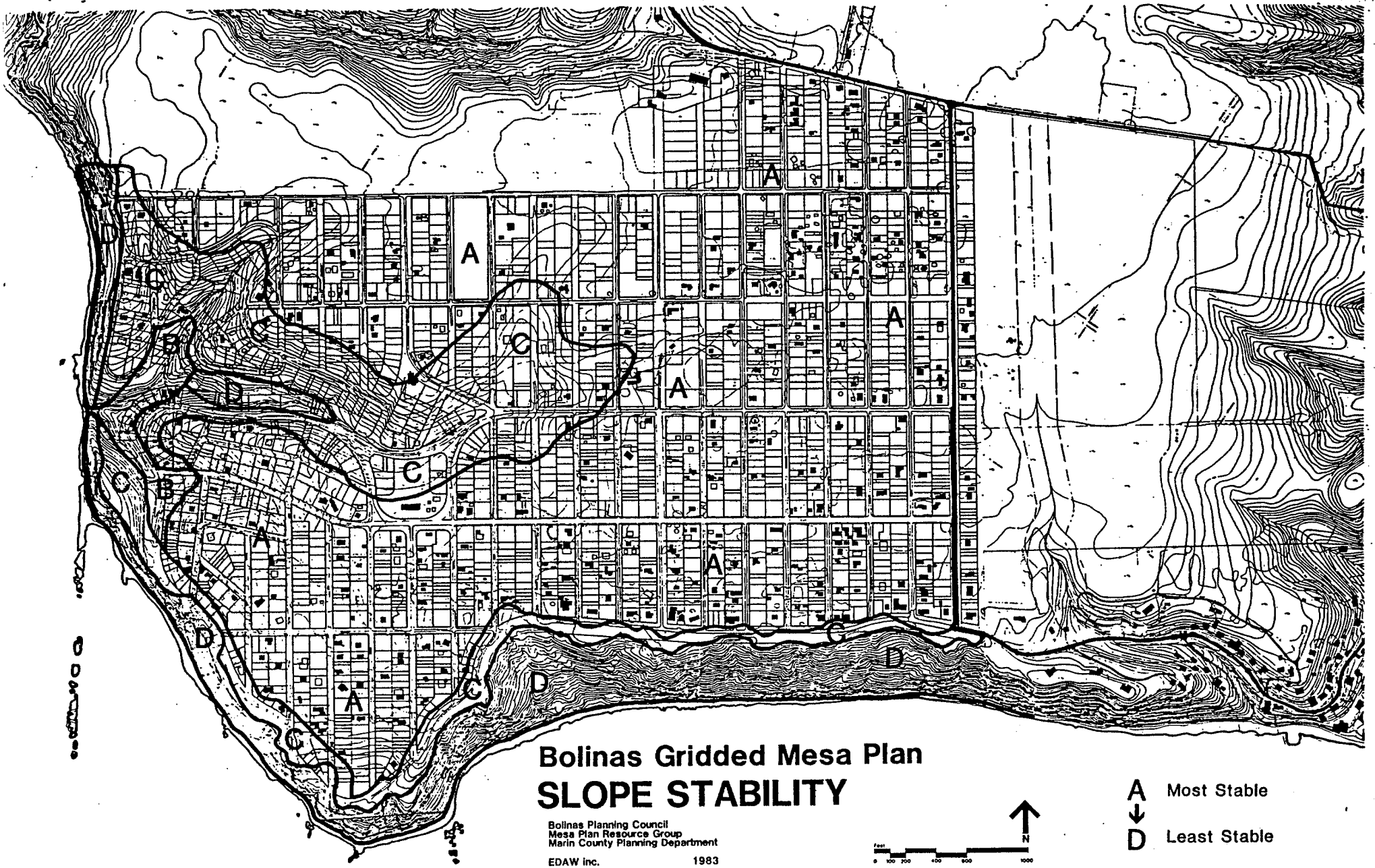

Bolinas Gridded Mesa Plan
SLOPE STABILITY
Bolinas Planning Council
Mesa Plan Resource Group
Marin County Planning Department
EDAW inc. 1983
N
A Most Stable
D Least Stable

Figure 2-2

Differential rates of bluff retreat necessitate differential construction setbacks. Setbacks should be considered on a site specific basis. The Local Coastal Program setback of 150' and the Bolinas Community Plan figure of 120' discussed during the planning process were based on the formula: setback = life expectancy of structure (50 yrs., 100 yrs., 150 yrs.) x rate of retreat + safety factor (45'). (Rate of retreat figures and the safety factor are based upon studies done for the California Division of Mines and Geology in 1977 by David L. Wagner, Geology For Planning In Western Marin County, California.)

Since the two Mesa bluff areas are different, separate bluff retreat rates are considered as follows:

Between Overlook and Duxbury Point:

50 yrs x 2'/yr + 45' (safety factor) = 145'
100 yrs x 2'/yr + 45' (safety factor) = 245'
150 yrs x 2'/yr + 45' (safety factor) = 345'

Between Duxbury Point and Poplar Road:

50 yrs x 2.5'/yr + 45' (safety factor) = 170'
100 yrs x 2.5'/yr + 45' (safety factor) = 295'
150 yrs x 2.5'/yr + 45' (safety factor) = 415'

Because cliff erosion is episodic, not constant, it is difficult to estimate the position of the cliff for any given year in the future. Building life expectancy is highly variable. The setback formula was used by the Mesa Plan Resource Group to determine the zone along both bluffs where no new construction should occur.

2.2 Geology and Soils

Since the Bolinas Community Plan was approved by the County in 1975, additional studies have been completed that have added to the knowledge of the Mesa. Because of these studies, the Mesa Plan has an advantage that the Bolinas Community Plan did not have. The most recent geologic analysis by Wagner (1977), and the soils analysis by Questa Engineering and WESCO (1983), provide the most current data on the structure of the Mesa. These data are critical and much of the Gridded Mesa Plan is based on them.

Geology

The Bolinas Mesa is a wave cut bench of land with a foundation of Miocene Monterey shale bedrock. Five to thirty feet of beach sands had been deposited on this bench that now stands 160 to 200 feet above sea level. Through time the beach sand has eroded and the Mesa's shale bedrock, particularly at the western end of the Mesa, has been subject to weathering and soil development. The depth of these soils ranges from less than two feet along the Mesa ridges to five feet on the sloped areas. Most significantly, these soils are rich in clay and have very slow permeabilities. Groundwater does not move freely in these soils. These conditions are significant because they provide major constraints to future development of the Mesa and suggest that some of the existing development may be in the wrong place.

Several conditions control the flow of groundwater on the Mesa. Specifically, the distance from the surface of the ground to the shale bedrock beneath, usually referred to as depth to bedrock, and the general form of the bedrock and its slope are the primary factors that affect subsurface drainage on the Mesa. Much of the Mesa is underlain by the hard and impermeable Monterey shale bedrock which is a significant obstacle to groundwater percolation. During the rainy season, rainwater passes through the beach sand deposits, perches on the shale bedrock and causes a rise in the groundwater table. On the Mesa, the underlying bedrock slopes gradually from the northeast to the southwest. The perched groundwater flows along this sloped, subsurface bedrock and eventually discharges as a series of springs along the Mesa's bluffs or is intercepted by the various elements of the Mesa-wide drainageway system. Winter groundwater levels on the Mesa range in depth from one foot below the surface in the central portion of the Mesa to more than six feet below along the Mesa's southern edge.

Contrasted with the area of Monterey shale bedrock, the terrace deposits provide a better environment for subsurface drainage of groundwater. In this general area of the Mesa, water percolates more quickly and the groundwater level is lower. The depth to bedrock is greater in this area as is the thickness of the perched beach sand deposits. While the groundwater moves more freely in this area, the Mesa's drainageways do not readily receive the groundwater discharge and do not assist in effectively lowering the Mesa's groundwater table. These drainageways have been filled with layers of fine textured alluvial sediments which restrict the flow of groundwater discharge. Roadways

and ill-placed construction have also obstructed the drainageways. Similarly, discharge to the west side of the Mesa is also blocked by Monterey shale bedrock. In short, the subsurface groundwater flows from the east side of the Mesa to the west, where it is blocked by the underlying bedrock formation, and to the south, where it emerges as springs along the southern bluff face.

In addition, groundwater ponds in localized areas where the subsoil is primarily clay or the underlying bedrock is Monterey shale. During exceptionally wet years, such as the winters of 1981 to 1982 and 1982 to 1983, the groundwater perched on the surface may merge with the groundwater perched on the bedrock to create a saturated zone extending from the bedrock to the surface of the Mesa. Subsurface sewage disposal systems fail to operate under these conditions.

Soils

There are three basic soil groups related to the land form on the Mesa: (1) those occurring on slopes; (2) those occurring in the drainageways; and (3) those found on the gently sloping terraces.

Individually, these soils exhibit special characteristics. However, only a few characteristics are significant for the Gridded Mesa Plan at this time. The soils on the sloped areas generally exhibit slow permeability and a lack of free water movement. Those in the drainageways are also limited in their permeability and are generally saturated during the rainy season. The terrace soils vary in depth to the water table during the winter months, ranging from greater than six feet along the bay side bluff to between two and three feet near the main drainageways. These characteristics represent significant constraints for development, particularly residential development, as these soils severely limit opportunities for on-site sewage disposal on the Mesa

2.3 Hydrology

Just as the Mesa's Soils restrict the development opportunities, the surface drainage characteristics also contribute to the overall drainage problems. While the western portion of the Mesa exhibits sursurface drainage constraints, the eastern portion faces surface drainage problems. The existing land form and topographic conditions combined with artificial barriers caused by the gridded development pattern with its roadway system adversely affect the natural drainage pattern.

The major drainage, specifically Alder Creek and its tributaries, cuts the Mesa from east to west. Lesser drainages are located along the Mesa Road and Terrace Avenue. A complex system of natural channels, roadside ditches, overland flow and groundwater seepage operates on the Mesa, particularly during the wet season. This system is inadequate to drain the developed areas of the Mesa and ponding occurs as a result. This ponding causes localized saturation of the surface soils and flooding of the existing septic system trenches. This results in the surfacing of effluent from the septic systems and the periodic backing up of residential plumbing. In addition, as the ponding occurs and the area retains surface water, the groundwater is recharged and the water table rises and merges with the saturated soils.

The subsurface drainage problems vary across the Mesa, and, in general, the constraints to development are severe. The most well-drained area is found along the southern bluff facing Bolinas Bay. The rest of the terrace area experiences groundwater levels which are two to five feet below the surface. This condition severely constrains the use of traditional trench-style on-site sewage disposal systems. The drainage swales (i.e., along Larch Road), exhibit the worst surface drainage conditions. This is partly due to ill-constructed roadways crossing the swale. Ponding in these areas tends to saturate the soils above the existing water table and adds to the development constraints.

2.4 Vegetation

The vegetation found on the Mesa presents less of a constraint to development than the geology, soils and slope conditions. The existing vegetation does, however, offer some opportunities for maintaining or enhancing the quality of the environment. The opportunities include providing safe habitat conditions for the existing wildlife as well as being part of the aesthetic character of the area.

While not necessarily a constraint to development, some of the existing tree species can present problems and might even be dangerous is some situations. Three of the tree species dominate the taller and most visible stands on the Mesa; tasmanian blue gum, monterey pine, and monterey cypress. The Mesa Plan Resource Group identifies many of these species now found on the Mesa to be over mature and in their decline. They are naturally shallow rooted and have outgrown their own structural support system. The poor soils and hydrological constraints described above add to the problem by causing

these species to be even more shallow rooted. The Mesa Plan Resource Group noted the following:

> "Consequently breakage and windthrow in these stands is becoming a serious financial and safety problem and will likely worsen with time. Many people find they have tree problems they cannot afford to remedy. The tall trees often block sunlight and increase energy consumption. They accelerate the decay of wood buildings and block views where lower-growing species could yield a net decrease in energy consumption, preserve views and privacy, and create more comfortable microclimates. Tall trees on steep slopes and along drainage ways increase erosion. When they are windthrown they disturb large areas of soil and begin a domino series of erosion events. They overtop and suppress lower subordinate vegetation such as brush and grass that are better suited to binding the soil together. Thus, they accelerate erosion. On the positive side they are visually pleasing to many, they provide hawk nesting sites and eucalyptus can be used to dry moist areas and is an excellent source of local money. All three species are commonly used for fuel. (Gridded Mesa Plan Workbook, p. I-27, I-28.)

From a planning point of view, the existence of these dominant tree species should be incorporated into the open space and circulation system for the Mesa and wood lot opportunities should be identified where conflicts with existing or potential residential uses do not exist.

2.5 Wildlife

Like vegetation, wildlife contributes to the quality of life experienced in Bolinas and should be recognized accordingly. The natural habitats of birds and animals on and around the Mesa are diverse. Opportunities exist for preserving substantial areas of relatively undisturbed land around the Mesa as open space which can be linked to a network of open or undeveloped areas on the Mesa itself. As noted by the Mesa Plan Resource Group, the existing wildlife will thus be encouraged to remain or be attracted to the preserved areas. For planning purposes, these opportunities need to be considered as the open space or Mesa Resource area is defined.

2.6 Land Use

The existing lotting pattern and the scattered development provide both a constraint and an opportunity. As stated above, opportunities for well suited residential units with relatively low construction costs exist. On the other hand, the rigid grid pattern and the generally scattered development pattern can constrain future residential or agricultural uses on the Mesa.

The scattered ownership pattern and the variety of parcel sizes also provide constraints. Table 2-1 illustrates the parcel size and ownership pattern on the Mesa and in the Town. The County's zoning regulations call for minimum lot sizes of 10,000 square feet but allow smaller lots because the subdivision predates the current parcel size requirements in the zoning ordinance. Consolidation of lots with contiguous ownership is possible and necessary in most cases as the original 20' x 100' lots are not of sufficient size to meet the County's current building, health and safety standards.

LAND USE DATA

Information	Marin Office of Assessor 12/82 Data*	Bolinas Moratorium Review Lot Survey 1979 Data
Total Number of Gridded Mesa Parcels		1,281 (57%)
Total Number of Gridded Mesa 2,000 SF Parcels		125 (10%)
Total Number of Gridded Mesa 4,000 SF Parcels		341 (26%)
Total Number of Gridded Mesa 6,000 SF Parcels		208 (16%)
Total Number of Gridded Mesa 8,000 SF Parcels		164 (13%)
Total Number of Gridded Mesa 10,000 SF Parcels		381 (30%)
Total Number of Gridded Mesa 20,000+ SF Parcels		65 (5%)
Number of Gridded Masa Parcels 6,000 SF or Larger		818 (64%)
Number of Gridded Mesa Parcels 8,000 SF or Larger		610 (48%)
Number of Gridded Mesa Parcels 10,000 SF or Larger		446 (35%)
Total Number of Parcels (Not limited to Gridded Mesa)	2,345 (100%)	
Non-Taxable Parcels	65 (3%)	
Total Number of Improved and Unimproved Parcels	2,280 (97%)	
Total Number of Improved Parcels	602 (26%)	
Total Number of Unimproved Parcels	1,678 (71%)	
Total Number of Residential Parcels	2,261 (96%)	
Single Family Improved Parcels	569 (95%)	
Multi-Family Improved Parcels	14 (2%)	
Commercial Parcels and Other	19 (1%)	

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* The Marin County Assessor's office has not consolidated adjacent parcels under commission ownership.

BOLINAS PARCEL OWNERSHIP

Ownership--Improved Parcels

	Number	Percent
Local	385	64.0
Marin (except Bolinas)	67	11.0
Outside Marin (State)	132	22.0
Outside State	18	3.0
Total	602	100.0

Ownership--Unimproved Parcels

	Number	Percent
Local	383	23.0
Marin (except Bolinas)	377	23.0
Outside Marin (State)	793	47.0
Outside State	125	7.0
Total	1,678	100.0

Ownership (All Parcels)		Number	Percent
Local	768	33.7	
Marin (except Bolinas)		444	19.5
Outside Marin (State)		925	40.6
Outisde State		143	6.2
Total	2,280	100.0	

2.7 Utilities

Water Supply and Storage

The Bolinas Community Public Utilities District includes all of the Bolinas Mesa within its geographical jurisdiction. The District gets its water supply from Arroyo Hondo which is situated on National Park lands. The District operates on a yearly cycle with water being stored during the rainy season in two dams, Woodrat #1 and Woodrat #2. During the dry season, water from these dams is pumped into the system to keep up with demand. The flow in Arroyo Hondo is not sufficient during the summer to meet the community needs.

Flow

There is no accurate measurement of the flow at all times in Arroyo Hondo because the District can measure it only when all the water in the arroyo is trapped by the catchment or diversion dams and is going into the system. There is no feasible way for the District to measure the flows over these dams in the winter.

Table 2-2 shows the increase in water consumption from 1967 to 1983 to be from 25×10^6 gal. to 53.8×10^6 gal. This increase has occurred even though the water moratorium has been in effect since November 1971.

Table 2-2

Water Consumption Summary

1967	25×10^6 Gallons	1973	43.1×10^6	1978	46×10^6
1968	28.864×10^6 Gallons	1974	44.5×10^6	1979	51.23×10^6
1969	29.8×10^6 Gallons	1975	51.48×10^6	1980	55.43×10^6
1970	32.259×10^6 Gallons	1976	45.8×10^6	1981	44.98×10^6
1972	30.921×10^6 Gallons	1977	33.7×10^6	1982	51×10^6
				1983	53.8×10^6

Reservoir Evaporation:

Evaporation ac. ft. = 40"/yr. x surface in acres/12

Percent Consumption/Mc.

January	6.8
February	6.7
March	7.0
April	7.4
May	8.6
June	9.4
July	10.2
August	10.8
September	10.0
October	8.6
November	7.4
December	7.0

Source: Wm. J. Osward, Ph.D. PE, "Preliminary Evaluation of the Water Supply Potential Available to the B.C.P.U.D., August 1973.

The rate of evaporation at the two reservoirs is 40 inches a year x surface in acres.

Table 2-2 also shows the rate of monthly consumption to vary between January and August from 6.8 percent of the yearly consumption to 10.8 percent. Consumption goes up in the dry season.

The flow in Pine Gulch Creek has been measured by the U.S. Geologic Survey and for similar periods, i.e., when Arroyo Hondo is susceptible to measurement--the latter's flow has been determined to be 30 percent that of Pine Gulch Creek. Pine Gulch Creek drains the San Andreas Fault (proper) and its mouth is located between the school and the nursery on the Bolinas-Olema Road. Table 2-3 estimates the flow for Arroyo Hondo based on the corresponding figures for Pine Gulch Creek. This table shows the relative flow of the arroyo in normal and "dry" years in acre feet. It shows, in "dry" years, a drop from a high of 378 acre feet in a typical winter month to 1 acre foot of flow in September--just before the beginning of the rainy season. In a wet year, the minimum flow is about 8 acre feet per month.

Table 2-4 contains figures on the District's storage capacity. The figures are in gallons for each individual storage facility, four tanks and two dams. The total storage capacity is set out in acre feet after factoring for evaporation, a five acre foot per year legal obligation to Commonweal, and unusable bottom mud and sludge. Five acre feet goes to Commonweal under a settlement made in the condemnation use whereby the District acquired one of the Woodrat sites.

There results a net safe yield for the District's storage capacity of 40.9 acre feet. The maximum flow exploitable by the District at Arroyo Hondo is 200,000 gallons per day.

Table 2-3

Estimated Flow—Arroyo Hondo

	Average Year Acre-Feet	100 Year Dry Acre-Feet
January	1,303	157
February	633	378
March	325	273
April	108	73
May	60	37
June	62	14
July	19	5
August	12	2
September	8	1
October	22	17
November	34	26
December	450	47

Source: Using U.S.G.S. records, Arroyo Hondo flow (30 percent of Pine Gulch Creek).

Consumption

The population of Bolinas is assumed to be about 1,700 people with a requirement of 120 gallons per person per day. The 120 gallon figure is not adjusted for the heavy users downtown, i.e., the bar, restaurants, and laundromat, which exceed the 120/gal. day for each person. Also excluded in this 120 gal/person/day, is leakage which further reduces the personal consumption. The recent drought increased attention to water conservation and consumption was significantly reduced at that time. As these habits erode away, the demand is expected to go up.

Table 2-4

Present Storage Capacity

	Gallons	
Green Tank	420,000	
Gold Tank	420,000	
Terrace Tanks	130,000	
Little Mesa	20,000	
Woodrat #2	6,500,000	net safe yield
Woodrat #1	5,850,000	net safe yield, minus Commonweal
	13,340,000	gallons = 40.9 acre feet

Maximum flow capacity from Arroyo Hondo 200,000 gallons/day*

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* B.C.P.U.D. Daily Logs.

Based on 1,700 population at 120 gal/day, the yearly gross impact need is 228.5 acre feet.[1] Then, from Oswald's figures (Table 2-5) the need is set out for present demand. July, August and September are the critical months. The shortfall for those months approximates the capacity of one of the Woodrat reservoirs, which represents the additional storage needed just to bring the existing community up to a safe level under the present conditions, which includes a leakage factor of 38 percent, twice the state average.

1 One acre foot equals 325,851 gallons.

Table 2-5

Dry Year Water Budget

Assume 1,700 people x 120 gal./Person Day
Gross System Input Need = 228.5 acre feet/Year

Monthly Demand--Dry Season

	Percent				
June	9.4	x	228.5 acre feet	=	21.5 acre feet
July	10.2				23.3
August	10.8				24.7
September	10.0				22.8
October	8.6				19.7
November	7.4				16.9

Table 2-6

Current Demand and Projected Shortfall

	Arroyo Hondo Stream Flow (P.2)	Water Demand	Shortfall
June	14	21.5	7.5
July	5	23.3	18.3
August	2	24.7	22.7
September	1	22.8	21.8
October	17	19.7	2.7
November	26	16.9	None

During the preparation of the Gridded Mesa Plan, the Mesa Plan Resource Group's Water Committee reported that there were two source of additional water for Bolinas: establishing a system of wells along the Bolinas Ridge or creating additional storage facilities on Jack's Creek. In addition, it should be noted that Public Law 95-625 Section 318 states: "The Secretary shall cooperate with the Bolinas Public Utilities District to protect and enhance the watershed values within the seashore. The Secretary may, at his or her discretion, permit the use and occupancy of lands added to the seashore by action of the Ninety-fifth Congress by the utilities district for water supply purposes, subject to such terms and conditions as the Secretary deems are consistent with the purposes of this Act."

Sewage Systems

The existing sewage treatment plant and collection system does not serve the Gridded Mesa residences. The designed capacity of that system will accommodate the equivalent of 200 residential units including the non-residential uses in the Town. As of this writing, 165 residential units are hooked up to the system, leaving a theoretical unused capacity of 35 units. The system is infiltrated by groundwater during the wet season causing the system to overload, thereby limiting the actual excess capacity.

Current BCPUD policy indicates that the excess capacity will not be available to the Mesa, and therefore, cannot be used to solve any of the existing sewage disposal problems.

The existing on-site sewage disposal systems are affected by the characteristics of the soil and geologic formation of the Mesa. The depth of the soil is not a major constraint by itself. As described in Section 2.2, the soil depth varies from three to ten feet depending on the location, with the soil depth at the eastern end of the Mesa being the greatest. The major soil constraint is that there is inadequate depth of permeable, unsaturated soil that could accommodate on-site sewage disposal.

The terrace soils, those found on the eastern end of the Mesa, exhibit percolation rates within the criteria established for conventional and alternative on-site sewage disposal systems. In contrast, the western end of the Mesa is characterized by soils which are much higher in clay content and very slow to percolate. In general, the western end of

the Mesa is not suitable for any on-site sewage disposal system that is currently acceptable by County and State standards.

Another constraint affecting on-site sewage disposal is the shallow depth of the groundwater in the terrace soils of the Mesa. In these areas during the wet season, groundwater is found between one to six feet below the surface depending on the location with the greatest depth found closest to the southern bluffs. Conventional subsurface leaching trenches can be used in this near bluff area. Inland of the bluffs, the seasonal groundwater level is found to be high, being highest in areas near the Alder Creek drainage. Alternative disposal systems are more appropriate in these areas where the groundwater is closer to the surface.

In the nearly level (less than 2 percent slope) terrace soils at the eastern end of the Mesa little problem exists for on-site sewage disposal based on slope characteristics alone. In contrast, the slopes in the western end of the Mesa exceed 30 percent in some areas of the Alder Creek drainage. Combined with the tight soils and poor percolation characteristics of the shale area, the steep slopes contribute to make the western end of the Mesa unsuitable for on-site sewage disposal.

As stated in Section 2.3, the Mesa is drained by a network of drainageways which vary significantly in size. The main watercourse is Alder Creek which runs along the center of the Mesa from the east to the west end, emptying into the Ocean across Agate Beach. A northern tributary of this main channel originates near Poplar and Walnut Streets. These well-defined channels carry water into the summer season. Beyond these are deeper parts of the drainage in the terrace soils which can be characterized as wetland areas. The parcels located in and adjacent to these wetlands are also unsuitable for on-site sewage disposal.

Another constraint affecting on-site sewage disposal is the parcel size. Many of the existing parcels are too small to accommodate a residence using traditional on-site sewage disposal sytems. Because of the poor site conditions, the land requirements for sewage disposal are so great that many parcels now existing are too small and must either be joined to other parcels or abandoned as a possible site for residential development under the current sewage disposal options.

3.0 ALTERNATIVES

Throughout the planning process for the Gridded Mesa Plan, a series of alternative plan proposals were evolved based originally on the expression of the community and the non-resident property owners and then narrowed by the specific findings of the soils investigation. Eventually, four alternatives, ranging from one that recommended no new development to one that recommended full development of all parcels greater than 4,000 square feet, were presented during the Gridded Mesa Plan Workshop series. Of the four, which are described below, three were the subject of an advisory poll of the community in November of 1983. A clear majority of voters preferred the Baseline Alternative which called for no additional growth.

The Alternatives

There are four basic alternatives, each suggesting a different intensity of residential development. These four alternatives have been identified as the Baseline Alternative, the Moderate Growth Alternative, the Regulated Moderate Growth Alternative, and the Full Buildout Alternative. Many of the elements included in the Baseline Alternative, such as the open space concepts, are also included in the others. Each alternative is governed by a set of basic assumptions.

Baseline Alternative

1. Basic Description--This alternative recognizes the existing development pattern to community character and the current impacts of the significant constraints. This alternative includes no new residential development. Based on the constraints related to the soils, slopes and bluff erosion, some areas of the Mesa can be identified that could be included in a permanent open space resource element.

2. Assumptions

   Assumption 1--It is not feasible to expand the supply of water for domestic use at this time.

   Assumption 2--The unused capacity of the existing sewage treatment facility is committed for future use within the area already served by the sewerage system and is not available to the current or future residents of the Mesa.

Assumption 3--It is not feasible to expand the existing sewage treatment plant at this time, nor is a new plant feasible. Correcting the infiltration problem affecting the existing collector lines will not affect the options available for the Mesa because it only improves the system available to the downtown area

Assumption 4--The soils and geologic formation of the Mesa severely limit the use of on-site sewage disposal techniques currently recognized by the County and the Regional Water Quality Control Board. Portions of the Mesa are unsuitable for any additional on-site sewage disposal systems.

Assumption 5--Some mechanisms are available, such as the Land Trust, to make non-developable residential parcels available for other uses, such as open space or limited agricultural uses.

Assumption 6--New residential development is possible but only if water meters can be purchased, transferred or on-site water is available and meets County standrads and the parcel size and soil conditions also meet County standards for residential development.

Assumption 7--It is possible that the County may require an evaluation of the existing on-site sewage disposal systems and may require correction of those systems failing to meet acceptable standards established by County regulations.

Assumption 8--The existing on-site sewage disposal systems that do not now meet the required standards can be altered, repaired, relocated or replaced to meet the county and state requirements. Some of the techniques employed toward that end include relocating the disposal systems to areas with more suitable soils or by installing holding tanks which are pumped at regular intervals. Holding tanks will only be allowed by the County for a short-term solution. The western portion of the Mesa has the most severe constraints. Fixing the failing systems in this area may require expansion of the existing sewage treatment facility or constructing a new facility.

Assumption 9--The existing disposal systems that are failing will probably have to be fixed before any new development can occur. No predictions can be made on

the amount of land available for future development because it is not possible to predict how much of the currently undeveloped land may be required to fix the existing systems that now fail.

3. Key Elements of the Baseline Alternatives

A. The existing development on the Mesa remains essentially the same. The existing roadway network is modified to reestablish the natural surface drainage pattern of the Mesa as part of the program to improve the overall on-site sewage disposal system. Some of the existing unpaved or gravel covered roads will become cul-de-sacs or part of the open space system in the Resource Area. All existing residential units would have adequate fire and other emergency access.

B. A 100-year Bluff Erosion Setback line is established. No new construction of habitable structures is permitted in the area designated between the setback line and the existing bluff edge.

C. A Mesa Resource Area is established as an overlay zone over the Mesa. The Resource Area roughly corresponds to the most severely constrained soils and the areas of steepest slope. This Resource Area includes the elements of a permanent open space system as well as pedestrian, bicycle and equestrian trails. Neighborhood park areas could be included as part of the Resource Area if useful parcels become available for this type of use. This alternative does not include the taking of any parcel for park use. Limited agricultural or horticultural projects could also be located in this area. If non-buildable parcels are made available to the Land Trust or the BCPUD they could be considered for park development if appropriate. This Resource Area can also include areas to be planted as wildlife habitat and wind breaks.

D. As an extension of Resource Area, a community recreation center could be established near the existing Mesa fire station.

4. Costs and Tradeoffs

A. Community Goals

This alternative does not accomplish the goal expressed during the development of the Community Plan and reiterated during the Mesa Plan process of a residential development program averaging six new units per year over a twenty year period. Existing units could be lost as the existing health and safety regulations are enforced by the County. Little possibility exists for low and moderate income housing. It does, however, support the goals stating concern for protection of the community's environment and of state coastal resources.

B. Public Services

(1) The costs of rehabilitating the existing on-site sewage disposal systems are not known at this time since the level of effort will not be known until each system can be evaluated.

(2) There would be no increases in costs to the school since the school population is not increased by this alternative.

(3) There would be no increase in costs to the fire district.

(4) There are no additional costs anticipated for the County's law enforcement program as a result of this alternative.

(5) There are no additional costs anticipated for other County emergency services.

C. Land Ownership

(1) This alternative will have a significant impact on the uses that individual property owners can make of their land. If no new development is possible because the utilities are limited and the area has severe physical limitations, then many of the existing parcels are of limited use.

- o Parcels located in the area with the greatest constraints for on-site sewage disposal would probably not be suitable for development even if additional water were available, although a site-by-site evaluation must be conducted to verify specific conditions.

- o Parcels located along the bluffs, particularly immediately adjacent to the edge are not suitable for development with this alternative. Owners of these parcels may wish to consider the opportunities presented by the Land Trust and other mechanisms which enable them to recover some value for their land.

- o Parcels located between the area back of the bay facing the bluff and the main drainage ways are not suitable for conventional on-site sewage disposal systems. Rehabilitation of the existing disposal systems could require the owners of those systems to increase the size of their lots to accommodate the appropriate sewage treatment system as required by the County.

If on-site rehabilitation is not feasible in the areas with the most soil constraints, specifically the western portion of the Mesa, a sewage treatment plant might be considered as a necessary technical solution. Owners of undeveloped parcels within the areas with the greatest constraints may wish to consider the opportunities presented by the Land Trust or the BCPUD for donation or trade.

Moderate Growth Alternative

1. Basic Description: This alternative assumes that the existing on-site disposal systems that now fail have been corrected and an accounting of the potentially developable land has been revised and the decision can be made by the community and the funds are available from one or more sources, to increase the supply of water to the community for domestic use. With the increased supply of water, some of the now undeveloped or underdeveloped parcels of land on the Mesa can be

considered for development. Sewage treatment on the Mesa utilizes on-site disposal techniques, both conventional systems and those alternatives approved by the County and the Regional Water Quality Control Board (absorption beds, sand trenches and mound systems). The increase in residential units on the Mesa could range from approximately 40, if only the existing large size parcels (greater than 10,000 square feet) are developed, to approximately 120 if all the undeveloped parcels were consolidated and redistributed (through sale or trade) as parcels greater than 10,000 square feet (depending on the soil suitability zone). The range of development could increase the population of the community by 105 to 315 persons. As with the Baseline Alternative, an open space system or Resource Area, becomes an important element in the physical structure of the community.

2. Assumptions

Assumption 1--Additional development on the Mesa does not occur until the existing systems are determined to be adequate or are repaired, removed, relocated, replaced or connected to a sewage treatment facility of some kind.

Assumption 2--It is politically, physically and economically feasible to expand the supply of domestic water for the entire community, including the Mesa. Expanding the supply could include new sources of supply, new or expanded storage facilities and new or rehabilitated distribution systems.

Assumption 3--The unused capacity of the existing sewage treatment facility is committed for future use within the area already served by the sewerage system and is not available to the current or future residents of the Mesa.

Assumption 4--The soils and geologic formation of the Mesa severely limit the use of on-site sewage disposal techniques currently recognized by the County and the Regional Water Quality Control Board. Portions of the Mesa are unsuitable for any acceptable on-site disposal technique.

Assumption 5--It is not feasible to expand the existing sewage treatment plant at this time, nor is a new plant feasible. Correcting the infiltration problem affecting the existing collector lines will not affect the options available for the Mesa because it only improves the system available to the Town.

Assumption 6--Lot consolidation is possible and desirable. Private individuals can sell to others. Private individuals can trade parcels. Private individuals can sell or trade to the Land Trust. The Coastal Conservancy may be involved in a lot consolidation program.

Assumption 7--New residential development is possible because the expanded water supply allows additional water meters and water service to be allocated. The soil and slope conditions suggest that some areas of the Mesa are less suitable for development than others. The County will review each application for development permit against the environmental constraints and determine whether or not the subject parcel can be developed.

Assumption 8--Additional development does not necessarily have to occur within the existing grid pattern established by the original development plan for the Mesa. The existing pattern can be modified to include residential development alternatives such as clustering of development adjacent to a shared sewage disposal system.

Assumption 9--The increased population will result in an increased number of trips to and from the Mesa. Access will have to be studied and probably improved. This increased traffic to the Town will have to be accommodated by either on- or off-street parking. Parking areas will be required in or near the center of the Town. The existing on-street parking areas in Town are not sufficient to accommodate the increased demand for parking.

Assumption 10--The new development on the Mesa is subject to the economic controls exhibited by the market at the time of development. No phasing program occurs.

3. Key Elements of the Moderate Growth Alternative

A. The undeveloped parcels within the existing grid pattern are developed at a rate of six units per year over the next twenty years. The parcels most likely to be developed first are those whose size, soil and slope conditions meet the County's minimum standards for on-site sewage disposal systems. The extent

of the new development is directly related to the availability of water and the capacity of the Mesa's soils to accept on-site sewage disposal. Each application for development permits will be considered on its individual merits. Not every parcel shown by this alternative will be developed. This alternative represents a maximum level of development if all unbuilt parcels could be consolidated, reallocated and developed. The opportunity exists for clustering residential units around or adjacent to common sewage disposal systems.

B. A 100-year Bluff Erosion Setback line is established. No new construction of habitable structures is permitted in the area designated between the setback line and the existing bluff edge.

C. A Mesa Resource Area is established as an overlay zone over the Mesa. The Resource Area roughly corresponds to most constrained soils and steepest slopes. This Resource Area includes the elements of a permanent open space system as well as pedestrian, bicycle and equestrian trails. Neighborhood park areas could be included as part of the Resource Area if useful parcels become available for this type of use. This alternative does not include the taking of any parcel for park use. Limited agricultural or horticultural projects could also be located in this area. If non-buildable parcels are made available to the Land Trust or the BCPUD they could be considered for park development if appropriate. This Resource Area can also include areas to be planted as wildlife habitat and wind breaks.

D. The existing roadway network is modified to improve access to and from the Mesa and to reestablish the natural surface drainage pattern of the Mesa as part of the program to improve the overall on-site sewage disposal system. Some of the existing unpaved or gravel covered roads will become cul-de-sacs or part of the open space system in the Resource Area. All existing residential units would have adequate fire and other emergency access.

E. As an extension of the Resource Area, a community recreation center could be established near the existing Mesa fire station.

4. Costs and Tradeoffs

A. Community Goals

(1) This alternative is consistent with the 1975 Community Plan to the extent that a maximum limit of development can be identified which is similar to the limit discussed during the development of the Community Plan. The extent of the potential for development is not clear at this time and cannot be specifically identified until an evaluation of the existing disposal systems has been completed and a sewage disposal system rehabilitation program is implemented. If no undeveloped parcels were required to complete the rehabilitation program approximately 75 new residential units could be developed (20-22 @ 10,000 square feet, 8-10 @ 20,000 square feet, and 40-43 @ 40,000 square feet). Combined with the development potential in the sewered area of the Town and other suitable parcels in the Planning Area, this development potential exceeds the goals commonly expressed by the community, including a healthy coexistence of man and the environment.

(2) This alternative does not meet the community's expressed goal of regulated phased growth. It is however reasonable to assume tha the allowed growth would occue throughout the planning period.

B. Public Services

(1) The costs of rehabilitating the existing on-site sewage disposal systems is not known at this time since the level of effort will not be known until the results of a system by system evaluation.

(2) The costs of expanding the water system could range between $1,600,000 and $2,162,000 depending on the system alternative chosen.

(3) If 75 new units were developed there is a potential to increase the elementary school age population by approximately 50 elementary school students. This represents a maximum increase, the actual

increase will probably be less if less than 75 units are developed. The existing school currently has unused capacity and will not need to be expanded. Additional teaching staff will probably be required. High school age students can be accommodated by the existing Tamalpais High School in Mill Valley.

(4) If the maximum development occurs, the increased development will probably require some expansion of the existing fire protection program.

(5) Increasing the population on the Mesa would result in an increase in the need for additional law enforcement. The County Sheriff and his staff would be in Bolinas more frequently than with the Baseline Alternative.

(6) With this alternative, all community services will experience a greater demand. The costs of providing these services will have to be paid through increased taxes, bond sales, grants, or assessment districts.

C. Land Ownership

(1) Once the sewage disposal system rehabilitation program has been implemented, property owners with parcels of adequate size and acceptable slope configuration as stipulated by existing county ordinance, as well as exhibiting soils suitable for on-site sewage disposal can seek development approvals from the County. Property owners with parcels smaller than the minimum allowed in each zone or who are unable to consolidate, trade or sell their parcels in the existing market may want to consider sales, trades or gifts to the Land Trust or the BCPUD.

Regulated Moderate Growth Alternative

1. Basic Description: This alternative assumes that the existing on-site disposal systems that now fail have been corrected and an accounting of the potentially developable land has been revised and the decision can be made by the community and the funds are available from one or more sources, to increase the supply of

water to the community for domestic use. With the increased supply of water, many of the now undeveloped or underdeveloped parcels of land on the Mesa can be considered for development. Sewage treatment on the Mesa utilizes on-site disposal techniques, both conventional systems and those alternatives approved by the County and the Regional Water Quality Control Board (absorption beds, sand trenches and mound systems). The increase in residential units on the Mesa could range from approximately 40, if only the existing large size parcels (greater than 10,000 square feet) are developed, to approximately 120 if all the undeveloped parcels were consolidated and redistributed (through sale or trade) as parcels greater than 10,000 square feet (depending on the soil suitability zone). The range of development could increase the population of the community by 105 to 315 persons. As with the Baseline Alternative, an open space system or Resource Area, becomes an important element in the physical structure of the community.

2. Assumptions

Assumption 1--Additional development on the Mesa does not occur until the existing systems are determined to be adequate or are repaired, removed, relocated, replaced or connected to a sewage treatment facility of some kind.

Assumption 2--It is politically, physically and economically feasible to expand the supply of domestic water for the entire community, including the Mesa. Expanding the supply could include new sources of supply, new or expanded storage facilities and new or rehabilitated distribution systems.

Assumption 3--The unused capacity of the existing sewage treatment facility is committed for future use within the area already served by the sewerage system and is not available to the current or future residents of the Mesa.

Assumption 4--The soils and geologic formation of the Mesa severely limit the use of on-site sewage disposal techniques currently recognized by the County and the Regional Water Quality Control Board. Portions of the Mesa are unsuitable for any acceptable on-site disposal technique.

Assumption 5--It is not feasible to expand the existing sewage treatment plant at this time, nor is a new plant feasible. Correcting the infiltration problem affecting

the existing collector lines will not affect the options available for the Mesa because it only improves the system available to the Town.

Assumption 6--Lot consolidation is possible and desirable. Private individuals can sell to others. Private individuals can trade parcels. Private individuals can sell or trade to the Land Trust. The Coastal Conservancy may be involved in a lot consolidation program.

Assumption 7--New residential development is possible because the expanded water supply allows additional water meters and water service to be allocated. The soil and slope conditions suggest that some areas of the Mesa are less suitable for development than others. The County will review each application for development permit against the environmental constraints and determine whether or not the subject parcel can be developed.

Assumption 8--Additional development does not necessarily have to occur within the existing grid pattern established by the original development plan for the Mesa. The existing pattern can be modified to include residential development alternatives such as clustering of development adjacent to a shared sewage disposal system.

Assumption 9--The increased population will result in an increased number of trips to and from the Mesa. Access will have to be studied and probably improved. This increased traffic to the Town will have to be accommodated by either on- or off-street parking. Parking areas will be required in or near the center of the Town. The existing on-street parking areas in Town are not sufficient to accommodate the increased demand for parking.

Assumption 10--A mechanism can be developed by the county and the community to regulate the growth of the Planning area including the Mesa so that the planned community services can remain adequate.

3. Key Elements of the Moderate Growth Alternative

A. The undeveloped parcels within the existing grid pattern are developed over time. The parcels most likely to be developed first are those whose size, soil

and slope conditions meet the County's minimum standards for on-site sewage disposal systems. The extent of the new development is directly related to the availability of water and the capacity of the Mesa's soils to accept on-site sewage disposal. Each application for development permits will be considered on its individual merits. Not every parcel shown by this alternative will be developed. This alternative represents a maximum level of development if all unbuilt parcels could be consolidated, reallocated and developed. The opportunity exists for clustering residential units around or adjacent to common sewage disposal systems.

B. A 100-year Bluff Erosion Setback line is established. No new construction of habitable structures is permitted in the area designated between the setback line and the existing bluff edge.

C. A Mesa Resource Area is established as an overlay zone over the Mesa. The Resource Area roughly corresponds to most constrained soils and steepest slopes. This Resource Area includes the elements of a permanent open space system as well as pedestrian, bicycle and equestrian trails. Neighborhood park areas could be included as part of the Resource Area if useful parcels become available for this type of use. This alternative does not include the taking of any parcel for park use. Limited agricultural or horticultural projects could also be located in this area. If non-buildable parcels are made available to the Land Trust or the BCPUD they could be considered for park development if appropriate. This Resource Area can also include areas to be planted as wildlife habitat, wind breaks, and fuel supplies.

D. The existing roadway network is modified to improve access to and from the Mesa and to reestablish the natural surface drainage pattern of the Mesa as part of the program to improve the overall on-site sewage disposal system. Some of the existing unpaved or gravel covered roads will become cul-de-sacs or part of the open space system in the Resource Area. All existing residential units would have adequate fire and other emergency access.

E. As an extension of the Resource Area, a community recreation center could be established near the existing Mesa fire station.

4. Costs and Tradeoffs

A. Community Goals

(1) This alternative is consistent with the 1974 Community Plan to the extent that a maximum limit of development can be identified which is similar to the limit discussed during the development of the Community Plan. The extent of the potential for development is not clear at this time and cannot be specifically identified until an evaluation of the existing disposal systems has been completed and a sewage disposal system rehabilitation program is implemented. If no undeveloped parcels were required to complete the rehabilitation program approximately 75 new residential units could be developed (20-22 @ 10,000 square feet, 8-10 @ 20,000 square feet, and 40-43 @ 40,000 square feet). Combined with the development potential in the sewered area of the Town and other suitable parcels in the Planning Area, this development potential exceeds the goals commonly expressed by the community. Once the rehabilitation program is implemented, the reduction in the development potential will probably bring the total number of suitable parcels closer to the community goal.

B. Public Services

(1) The costs of rehabilitating the existing on-site sewage disposal systems is not known at this time since the level of effort will not be known until the results of a system by system evaluation.

(2) The costs of expanding the water system could range between $1,600,000 and $2,162,000 depending on the alternative chosen.

(3) If 75 new units were developed there is a potential to increase the elementary school age population by approximately 30 elementary school students. This represents a maximum increase, the actual increase will probably be less if less than 75 units are developed. The existing school currently has unused capacity and will not need to be expanded. Additional teaching staff will probably be required. High

school age students can be accommodated by the existing Tamalpais High School in Mill Valley.

(4) If the maximum development occurs, the increased development will probably require some expansion of the existing fire protection program.

(5) Increasing the population on the Mesa would result in an increase in the need for additional law enforcement. The County Sheriff and his staff would be in Bolinas more frequently than with the Baseline Alternative.

(6) With this alternative, all community services will experience a greater demand. The costs of providing these services will increase.

C. Land Ownership

(1) Once the sewage disposal system rehabilitation program has been implemented, property owners with parcels of adequate size and acceptable slope configuration as stipulated by existing county ordinance, as well as exhibiting soils suitable for on-site sewage disposal can seek development approvals from the County. Property owners with parcels smaller than the minimum allowed in each zone or who are unable to consolidate, trade or sell their parcels in the existing market may want to consider sales, trades or gifts to the Land Trust or the BCPUD.

Full Buildout Alternative

1. Basic Description: This alternative, based on the construction of a sewage treatment facility and an adequate supply of water, illustrates how the Mesa might look if all parcels 4,000 square feet in size or larger, excluding those with slope and bluff setback constraints, were developed.

2. Assumptions

Assumption 1--It is politically, physically and economically feasible to expand the supply of water for domestic use at this time.

Assumption 2--The existing sewage treatment plant can be expanded as the demand for new residential development occurs, or a new sewage treatment facility can be constructed with a capacity sufficient to serve the fully developed Mesa.

Assumption 3--The existing on-site sewage disposal systems are subject to a rehabilitation program prior to the completion of a sewage treatment plant and collector system. The County will do an evaluation of the existing systems prior to preparing and implementing a sewage disposal system rehabilitation plan.

Assumption 4--An opportunity exists under full buildout growth to establish a contractual agreement which regulates growth of the planning area including the Mesa so that the planned community services can remain adequate.

3. Key Elements of the Full Buildout Alternative

A. The existing grid development pattern remains the same and the unbuilt areas are filled in.

B. An interim zoning pattern is established while the sewage disposal system rehabilitation program is implemented. This zoning pattern corresponds to the parcel size recommendations based on sewage disposal requirements (10,000 square feet, 20,000 square feet, 20,000-40,000 square feet).

C. A 100-year Bluff Erosion Setback line is established. No new construction of habitable structures is permitted in the area designated between the setback line and the existing bluff edge.

D. A Mesa Resource Area is established as a permanent open space element. This area corresponds to that portion of the central and western portion of the Mesa where the slopes are greater than 35 percent, the soils are unstable, and the major drainageways occur. A pedestrian, bicycle, equestrian

circulation system can be developed within this Area. Neighborhood park spaces, if desirable, can also be established as part of the Resource Area if land becomes available for such a purpose. Limited agricultural or horticultural projects could also be located in this area.

E. The existing roadway network will be retained and upgraded to provide access to and from the projected residential development.

F. As an extension of the Resource Area, a community recreation center could be established near the existing Mesa fire station.

4. Costs and Tradeoffs

A. Community Goals

This alternative does not accomplish the goal expressed during the development of the Community Plan and reiterated during the Mesa Plan process of a residential development program averaging six new units per year over a twenty year period. However, it does support the goals of fostering economic development.

B. Public Services

(1) The costs of rehabilitating the existing on-site sewage disposal systems is not known at this time since the level of effort will not be known until the results of a system by system evaluation are known.

(2) A new sewage treatment facility and collector system could cost $20 million (1983 dollars).

(3) In order to supply water to the new development, an agreement with a water agency outside the area would be required. No local supply would be adequate.

(4) The alternative would result in an increase in the elementary school age population of approximately 360 students. These students can not be

accommodated in the existing facilities. New facilities would be required.

(5) As the population on the Mesa increases toward full buildout, the fire district would incur increased costs for equipment and operating expenses.

(6) As the population on the Mesa increases toward full buildout the County services would be required on a greater frequency and additional costs would be incurred.

C. Land Ownership

(1) This alternative provides the current land owners with the greatest number of options for using their land. With this alternative, the parcels greater than 4,000 square feet can be developed as single lots, sold or otherwise consolidated with other parcels, donated to the Land Trust or the BCPUD for community purposes or left alone.

4.0 BOLINAS GRIDDED MESA PLAN

The Bolinas Gridded Mesa Plan seeks to meet the goals of the community as expressed by the 1975 Bolinas Community Plan and the Local Coastal Program. The Plan's primary objective is to improve conditions on the Mesa to benefit the health and welfare of the residents of the existing community while preserving native species diversity and habitat and conserving the nature of the environment for residents and visitors as well as to provide a plan for the possibility of safe and orderly development in the future. The Plan addresses those problems currently faced by Bolinas, particularly those related to sewage, water and protection of the coastal environment.

The Gridded Mesa Plan recognizes that the Mesa area is a portion of the Bolinas community within which are areas where residential infill and relocation opportunities exist. One of the major premises of the Plan is that this area of Bolinas was subdivided in 1927 without regard to necessary infrastructure or environmental constraints and that attention must now be addressed to the resulting problems. Any future development that occurs must be consistent with the now recognized environmental constraints prevalent in the area. Relocation may be required to provide safe living conditions and enhance the environment. The following pages describe the characteristics of the Gridded Mesa Plan, its policies and recommended implementation strategies.

4.1 Gridded Mesa Plan

The 1984 Gridded Mesa Plan deals with improving the existing conditions and determining the development capacity of Mesa. No realistic land use or circulation plan can be recommended until the existing problems are solved and an accurate inventory of development or use opportunities can be completed. The Mesa Plan should be implemented in less than five years. After the Plan is implemented, the 1975 Bolinas Community Plan should be reevaluated and updated for the entire Bolinas Planning Area. Existing residents and non-resident property owners should be encouraged to acquire additional parcels to solve their sewage disposal problems or to create adequate parcel size for future development.

4.2 Policies and Programs

The primary objective of the Gridded Mesa Plan is to solve the problems that threaten the health and welfare of the residents of the existing community. This objective overrides all the objectives stated in the 1975 Community Plan. Although the implementation recommendations included in that plan called for continuous monitoring of the performance of the Plan and the identification of "trouble spots," it is clear that the extent of those possible problems was not completely understood at that time. This Plan addresses those "trouble spots." Central to this concept is that the highest priority in addressing these problems will be given to the least costly and least disruptive means possible. The least costly and least disruptive means to solve problems shall be attempted before other measures which may be more costly or more disruptive are applied.

The objectives discussed below are taken directly from the 1975 Bolinas Community Plan and supplemented with 1984 objectives. The policies and programs are specific to the Gridded Mesa Plan and do not necessarily relate to the remainder of the community.

4.2.1 Land Use

There is potential for new residential development on the Mesa if the water supply can be increased. However, this potential is limited by Mesa soils which limit the feasibility of existing and future use of septic tanks and leachfields for sewage disposal on the Mesa. Therefore, while there is a substantial amount of undeveloped land on the Mesa, much of this has no development potential using septic tanks. Development opportunities are also limited by existing parcel sizes and configuration.

The potential for residential development represented by the Plan is less than was assumed during the consideration of the Alternatives. The difference is due to an increased understanding of the constraints inherent on the Mesa.

Given these constraints, the potential exists for 68 to 75 new residential units to be developed on the Mesa. This range assumes that a parcel consolidation program can be implemented since most of the available parcels are below the minimum size needed to allow on-site sewage disposal or do not meet County development standards. The size of

the parcels that can be developed for residential use varies depending on its location on the Mesa.

The range of development potential may change as the effects of the improvement programs recommended by this Plan are evaluated. As the programs are implemented, the availability of water and land will be identified and the residential development potential can be measured as the land needed to repair existing problem septic systems and effectuate a drainage and circulation plan.

The policies set forth below discuss several observed constraints and opportunities for development and, in part, focus on difficulties associated with rebuilding structures in higher risk areas. However, notwithstanding any other provisions of the plan, residential structures destroyed by fire, earthquake or other natural disasters shall be permitted to be rebuilt.

Objective: Any new construction proposed for environmentally-sensitive or potentially dangerous areas, including single-family construction, shall be assessed in relation to its impacts: Cliff Erosion Zone, Drainage Patterns, slope policy area, Alquist-Priolo Seismic Safety Zone, Coastal Commission Permit Zone, Marin Countywide Plan Conservation Zone, and suitability of soils for septic systems, and the cumulative impact of septic systems on groundwater mounding and soil nitrate accumulation. Countywide Conservation Zone standards should be developed for this purpose. (1975 Bolinas Community Plan)

Policy LU-1: There shall be no residential development or substantial construction near the bluffs. (1975 Land Use Policy 6--revised for the Gridded Mesa Plan)

Programs:

LU-1.1--Establish a Bluff Erosion Zone along the Bolinas Bay side of the Mesa. The extent of this Zone shall be based on a 100-year life expectancy for a residential unit. The Zone shall extend from Overlook Drive to Duxbury Point and shall include all land from the edge of the bluff to a line 245 feet inland. This edge shall be reexamined and adjusted as necessary every five years. No new construction and no residential additions amounting to greater than 10 percent of the existing total floor area or 120 square feet (whichever is greater) shall be permitted in this

zone on a one-time basis. Replacement construction will be permitted provided that it conforms to current building and environmental health codes and the waiver provisions of Program LU-1.3 below. (Figure 4-1) Time Frame: Immediately.

LU-1.2--Establish a Bluff Erosion Zone along the Pacific Ocean side of the Mesa. The extent of this Zone shall be based on a 100 year life expectancy for a residential unit. This Zone shall extend from Duxbury Point to Poplar Road and shall include all land from the edge of the bluff to a line 295 feet inland. This edge shall be reexamined and adjusted as necessary every five years. No new construction and no residential additions amounting to greater than 10 percent of the existing floor area or 120 square feet (whichever is greater) shall be permitted in this zone on a one-time basis. Replacement construction will be permitted provided that it conforms to current building and environmental health codes and the waiver provisions of Program LU-1.3 below. (Figure 4-1) Time Frame: Immediately.

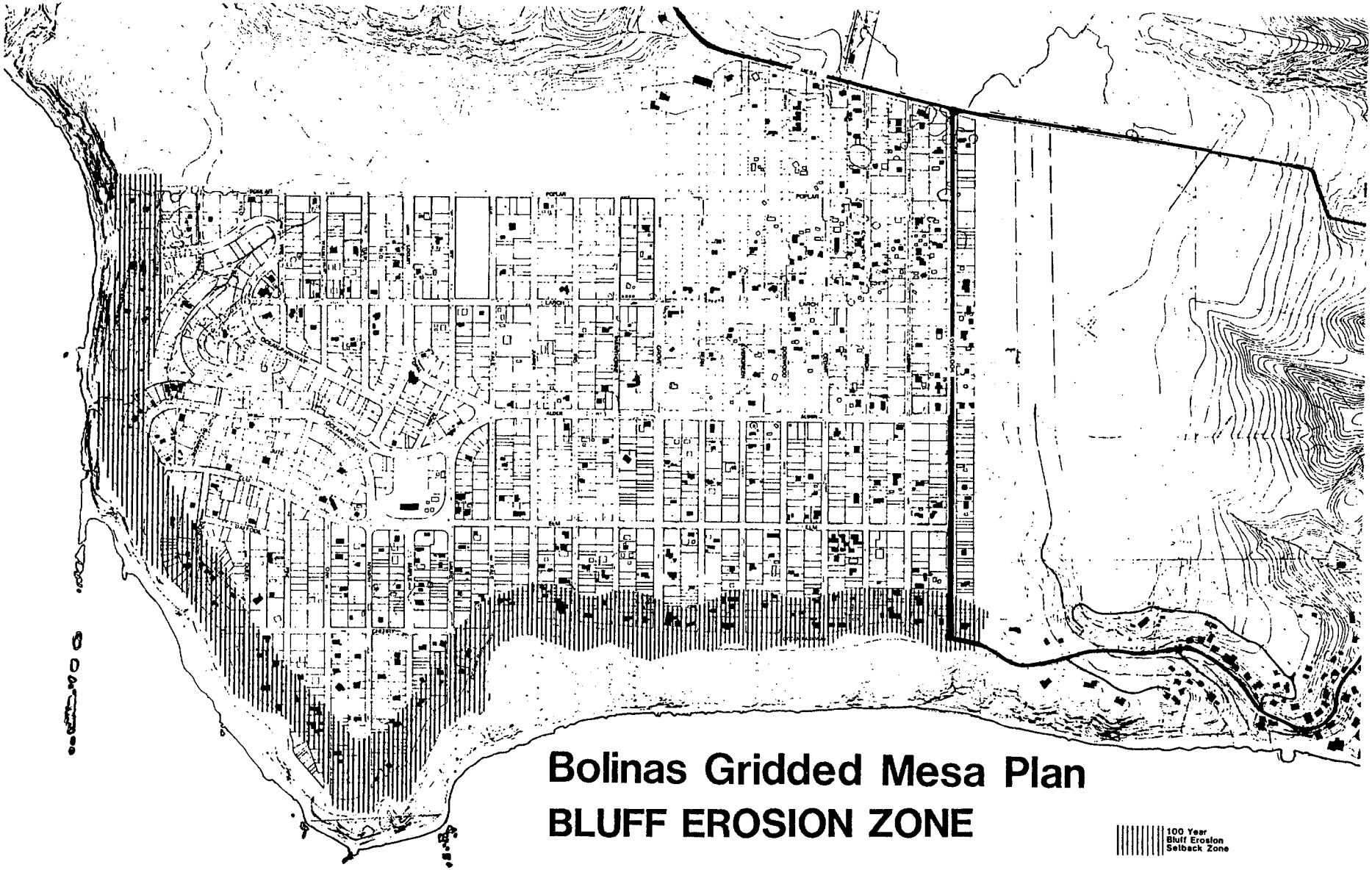

Bolinas Gridded Mesa Plan
BLUFF EROSION ZONE
100 Year
Bluff Erosion
Setback Zone
Bolinas Planning Council
Mesa Plan Resource Group
Marin County Planning Department
EDAW Inc.
1983
N

Figure 4-1

LU-1.3--The restrictions imposed by LU-1.1 and 1.2 can be waived on an individual basis if a site specific engineering report prepared by a licensed engineer can show that hazardous conditions do not exist on that site or that the site-related constraints can be adequately overcome and that construction on that specific site will not contribute to the cumulative negative effects, specifically groundwater mounding, nitrate accumulation and bluff erosion on the Mesa. Any construction (new construction or additions) within either bluff erosion zone will require that permit issuing agencies (e.g., the County, BCPUD) be held harmless for any loss due to erosion. Time Frame: Immediately.

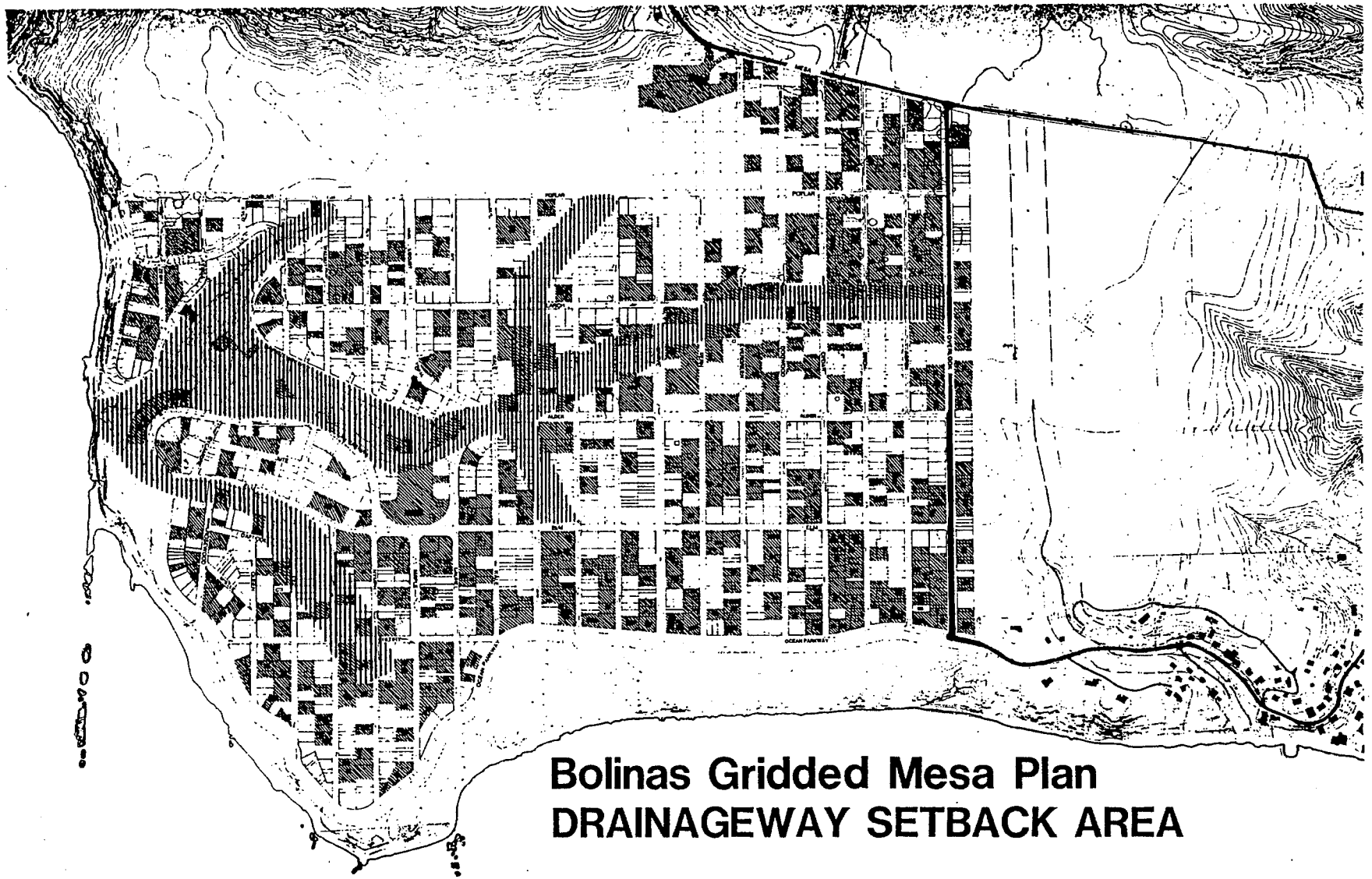
Policy LU-2: There shall be no residential development along the Mesa's major drainageways. (1975 Land Use Policy 6--revised for the Gridded Mesa Plan)

Programs:

LU-2.1--Establish a setback along Alder Creek including its northern tributary (originating near Poplar Road and Walnut Road). The extent of the setback varies with the physiography of the drainage and is shown by Figure 4-2. No new construction shall occur within this setback area except as allowed by Stream Protection Policy 4 of the LCP (page 19, LCP Unit 1). Time Frame: Immediately.

LU-2.2--Replacement construction of single family homes located in the drainageway areas will be permitted provided that it conforms to current building and environmental health codes and provided that engineering data clearly demonstrates how the reconstruction will not impair the functioning and maintenance of the drainageways.

Policy LU-3: An overall surface drainage plan for the Gridded Mesa and adjoining areas shall be made and implemented as soon as possible to help alleviate septic system failures. Lot consolidation, access and road plans and improvements all await this. Piecemeal drainage plans which do not conform to an overall plan are a damage to other property, the cliffs and houses downslope. On-site and surface drainage and improvement of existing drainage should be a first priority. The road plan should be made in conjunction with the drainage system. (1984 Gridded Mesa Plan).



Bolinas Gridded Mesa Plan
DRAINAGEWAY SETBACK AREA

Bolinas Planning Council
Mesa Plan Resource Group
Marin County Planning Department

EDAW Inc.

N

Existing Built Parcels, 1983

Figure 4-2

Programs:

LU-3.1--Prepare a Mesa-wide drainage plan. Time Frame: Immediately.

LU-3.2--Implement a Mesa-wide drainage program based on the recommendations of the Questa report (1983), including:

a. On-site drainage improvements by individual property owners but coordinated with Master Drainage Plan.

b. Install new, or larger, culverts under the existing roads.

c. Clear and enlarge existing drainage ditches.

d. Establish a system of underdrains along existing road rights-of-way. Install perforated lateral drains (3 to 4 inches in diameter) along the roads running north to south. Install main collector lines (8 to 10 inches in diameter--non perforated) along the roads running east to west.

Time Frame: Begin immediately.

LU-3.3--Implementation of this program will be the responsibility of the County, the BCPUD and the Fire Department. An application for outside funding will probably be necessary. Time Frame: Immediately.

Policy LU-4: **There shall be no residential development on the Mesa in areas with restrictive soils where on-site sewage disposal systems are found to fail. Approval of new septic tank installations is dependent upon the recognition of the cumulative impacts of septic systems, including groundwater mounding and soil nitrate accumulation. If a determination of the cumulative impacts indicates that adjacent properties are excluded from development if a second unit is added to an existing development, then the primary unit would be given priority. (This policy applies as long as on-site sewage disposal systems are used on the Mesa.) (1975 Land Use Policy 6--revised for the Gridded Mesa Plan)**

Programs:

LU-4.1--Establish a restricted area on the Mesa corresponding to Zone V identified by the Questa Report of September 1983 (Figure 4-3). No new residential construction which utilizes on-site subsurface sewage disposal systems shall be allowed in this zone. Replacement residential construction of legally constructed homes which utilize on-site subsurface sewage disposal systems may be permitted provided that it conforms to current building and environmental health codes and other policies of this plan. Further study may reveal some areas within this zone which are suitable for inclusion in a different zone. Time Frame: Immediately.

LU-4.2--The County shall, prior to the issuance of new septic permits in the R-10 area, study the cumulative impact of ground water mounding on south bluff erosion.

Policy LU-5: **The minimum parcel sizes for residential development on the Mesa shall be restricted by location if on-site sewage disposal systems are used. There shall be three areas for development corresponding to the constraints to on-site sewage, disposal inherent in the soils. The minimum lot size in these three areas shall be 10,000, 20,000 and 40,000 square feet, respectively. In the area requiring a minimum parcel size of 10,000 square feet, 20 to 22 new residential units are possible if a lot consolidation program is implemented. Similarly, in the area requiring a minimum parcel size of 20,000 square feet, 8 to 10 new residential units are possible, and in the area requiring a minimum parcel size of 40,000 square feet, 40 to 43 new residential units are possible. Further study may reveal some areas within this zone which are suitable for inclusion in a different zone (see Program LU-5.5). Assessment of a site for a zoning change must include consideration of the cumulative impacts of on-site sewage disposal, including groundwater mounding and soil nitrate accumulation. (1984 Gridded Mesa Plan Policy)**

NB--This range of development potential is based on an aggregation of undeveloped parcels within each zone with no reflection of the diverse ownership pattern. During the process of improving or repairing the existing on-site sewage disposal systems, the development potential may decrease.

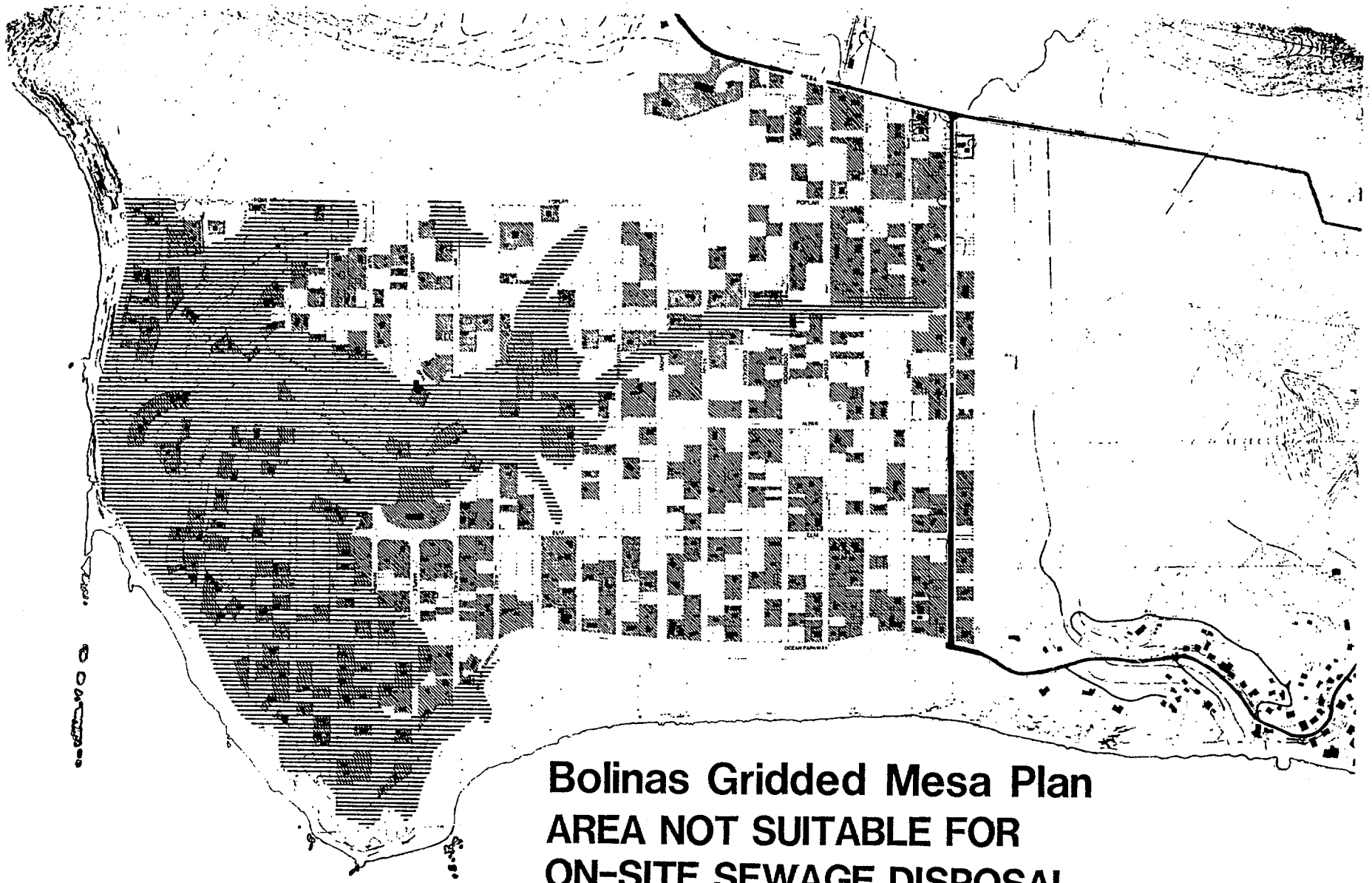

Bolinas Gridded Mesa Plan
AREA NOT SUITABLE FOR
ON-SITE SEWAGE DISPOSAL
Bolinas Planning Council
Mesa Plan Resource Group
Marin County Planning Department
EDAW Inc. 1983
N
Existing Built Parcels, 1983

Figure 4-3

Programs:

LU-5.1--Establish a residential development zone (C-R-A-B2) on the Mesa corresponding to the extent of the T1 soils identified by Questa (1983). Require the minimum lot size in this zone to be 10,000 square feet (Figure 4-4). Time Frame: Immediately. Development potential: 20 to 22 residential units.

LU-5.2--Establish a residential development zone (C-R-A-B3) on the Mesa corresponding to the extent of the T2 soils identified by Questa (1983). Require the minimum lot size in this zone to be 20,000 square feet. County adjusts zoning regulations to reflect Mesa R-20 zone. County and community pursues lot merger and consolidation program on Mesa. Coastal Conservancy funds should be sought to implement this program (Figure 4-4). Time Frame: Immediately. Development potential: 8 to 10 residential units.

LU-5.3--Establish a residential development zone (C-R-A-B4) on theMesa corresponding to the extent of the T3 and T4 soils identified by Questa (1983). Require the minimum lot size in this zone to be 40,000 square feet. County adjusts zoning regulations to reflect Mesa R-40 zone. County pursues lot merger program on Mesa. Coastal Conservancy funds should be sought to implement this program (Figure 4-4). Time Frame: Immediately. Development potential: 40 to 43 residential units.

LU-5.4--Establish a Mesa-wide groundwater mounding monitoring program during the wet season to determine the areas with the most constraints on development using on-site sewage disposal. Time Frame: Immediately.

LU-5.5--Establish an appeal mechanism for each zone so that individual property owners may have their site considered according to its own specific physical characteristics. No waivers or variances can be granted until the cumulative impacts can be determined. Time Frame: Immediately.

LU-5.6--Establish a methodology for reviewing individual sites during the wet season which includes testing the soil for permeability, percolation, effects on groundwater, nitrate impacts and other cumulative effects. Time Frame: Immediately.

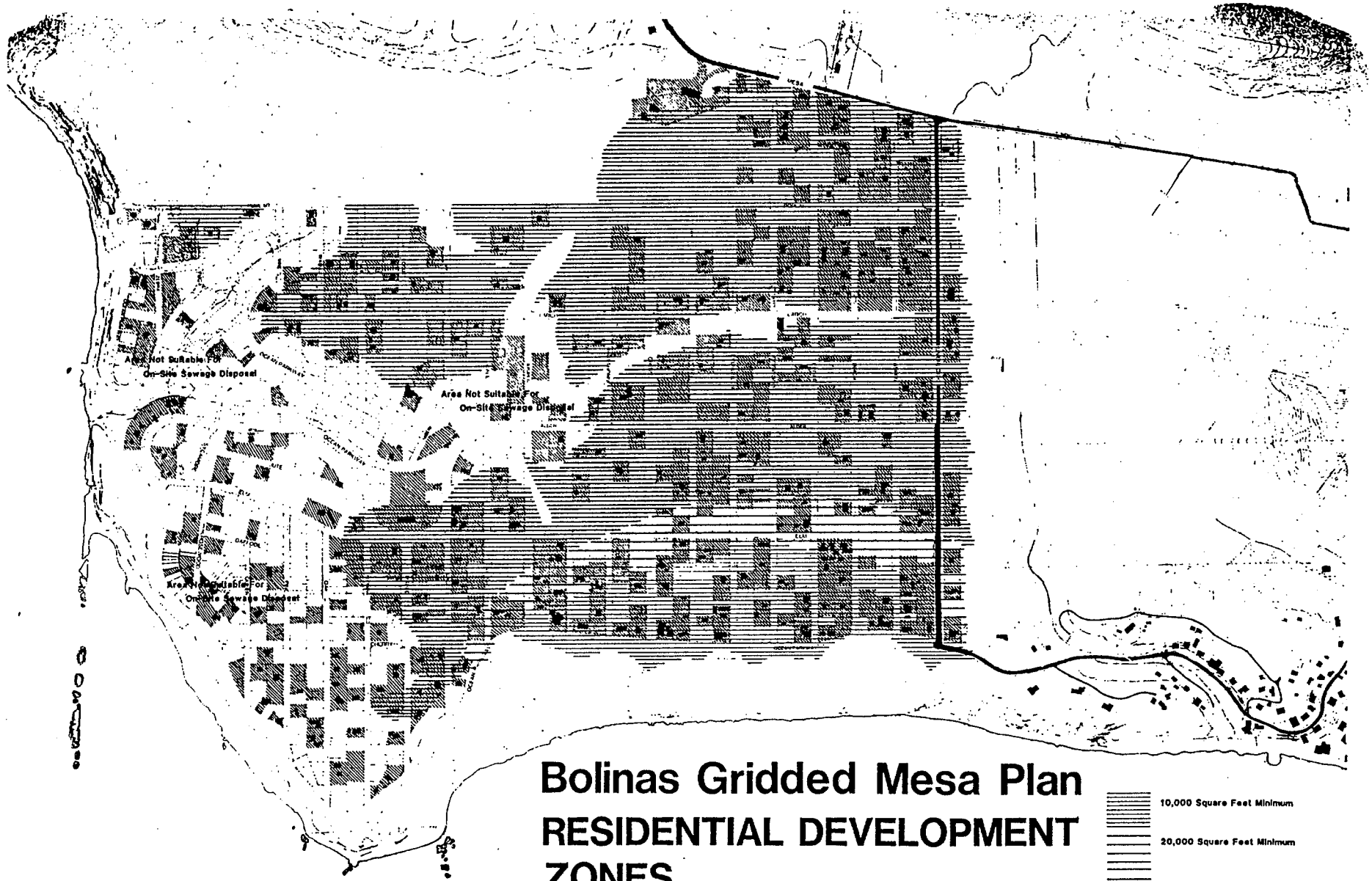

Area Not Suitable For On-Site Sewage Disposal
Area Not Suitable For On-Site Sewage Disposal
Area Not Suitable For On-Site Sewage Disposal
Bolinas Gridded Mesa Plan
RESIDENTIAL DEVELOPMENT ZONES
10,000 Square Feet Minimum
20,000 Square Feet Minimum
40,000 Square Feet Minimum
Existing Built Parcels, 1983
Bolinas Planning Council
Mesa Plan Resource Group
Marin County Planning Department
EDAW Inc. 1983
N
Feet
0 100 200 400 600 1000

Figure 4-4

Policy LU-6: There shall be a permanent Mesa Resource Area which includes undeveloped open space, developed recreation, community gardens or agricultural uses, circulation, wildlife habitats, view and vista preservation areas. (1984 Gridded Mesa Plan)

Programs:

LU-6.1--Establish Mesa Resource Conservation Areas as an overlay to the future land use on the Mesa. The Bolinas Planning Council shall undertake a study of uses on the Mesa and shall recommend appropriate uses and their implementation. These shall include: (1) identification, enhancement and protection of wildlife habitats, seeking to preserve a maximum number of species of wildlife and of native vegetation on the Mesa; (2) an area set aside to establish a community tree nursery; (3) neighborhood parks; (4) butterfly reserves; (5) community gardens; (6) an arboretum; (7) bicycle paths; (8) footpaths; (9) play areas; (10) nature study areas; and (11) observation points. The location of these activities and uses is dependent on the natural landscape features and the availability of land for protection and/or acquisition for these uses. Time Frame: After drainage and road plan.

(Insert maps of Pedestrial trails and Mesa Resource Conservation Areas and Uses.)

Programs:

E-1.1--Amend the Local Coastal Program to include cottage industries and small-scale agriculture in the Coastal Zone. Time Frame: As soon as possible.

4.2.2 Circulation

Objective: Revise the grid pattern of roads on the Mesa to provide access to all developed parcels, minimize the impact caused by vehicular movement, define neighborhood areas, and to respect the natural drainage pattern on the Mesa. (1984 Gridded Mesa Plan)

Policy C-1: Solutions to the most significant traffic and circulation problems shall be a high priority of the Gridded Mesa Plan. (1984 Gridded Mesa Plan)

Programs:

C-1.1--Prepare a Circulation Policy Plan shall be developed to include (Time Frame: Begin 1984):

1. Plan for keeping traffic slow, minimizing straight-a-ways and minimizing arterial intersections.

2. Providing all-weather access to all houses and structures.

3. Facilitating drainage and improving wildlife and scenic resources by avoiding the crossing of drainage systems except with adequate culverts, and avoiding steep slopes and those prone to slide.

4. Reducing overall road area to a more compact and efficient system and the improvement of Terrace Avenue. One method to be considered is the installation of speed reduction devices in the pavement.

5. Minimizing the extent and costs of improvements while providing access. Maximum the tasks that may be accomplished by coordination of neighborhood efforts with those of the BCPUD.

6. Create safe and well designed bicycle trails and footpaths throughout the community.

7. Define small neighborhoods by restricting or eliminating through traffic.

C-1.2--Establish a Mesa Assessment District, or other appropriate financing mechanism, for the purpose of planning and providing access and coordinating circulation with the Mesa-wide drainage program. Time Frame: As soon as circulation and drainage plans are completed.

C-1.3--Abandon unneeded roads and return these areas to their natural state. Time Frame: After circulation and drainage plans are completed.

4.2.3 Utilities

Objective: Pursue studies on Redevelopment/resubdivision of the Gridded Mesa to reduce road, drainage, septic tank, and environmental impact problems of the small lot/grid plan. (1975 Bolinas Community Plan)

Improve the water system (1984 Gridded Mesa Plan)

Policy U-1: **The existing water system shall continue to be upgraded or repaired where necessary to eliminate the current loss of water throughout the system. The existing water system may need to be supplemented with additional capacity to serve additional new residential units consistent with the drainage, roadway, and septic system maintenance plans. (1984 Gridded Mesa Plan)**

Programs:

U-1.1--Conduct a "water audit" to determine the actual amount of water usage in Bolinas. Time Frame: First year.

U-1.2--Eliminate the leakage in the collection and distribution system, specifically the pipeline along Arroyo Hondo and the distribution lines across the Mesa. Time Frame: By end of fifth year of Plan.

U-1.3--BCPUD prepares a water needs plan pursuant to Policy U-1. Time Frame: Following preparation of a revised roadway and drainage plan and when a survey of existing septic systems provides data that would indicate the land suitable and available for future development.

U-1.4--The BCPUD will submit to its voters a plan and funding program to supplement the existing water system to accommodate remaining available building sites within the District. Time Frame: When water plan complete.

U-1.5--All water conserving devices shall be encouraged.

Policy U-2: Develop new strategies to solve existing sewage disposal problems.

Programs:

U-2.1--County and the BCPUD shall develop a program of joint cooperation in the maintenance of existing septic systems and the review of new systems. The Department of Environmental Health in cooperation with the State and BPUD will investigate and consider any feasible proposal that calls for the construction of an alternative sewerage treatment plant. The nature of this cooperative program will be developed immediately following the adoption of the Mesa Plan. Time Frame: Immediately.

U-2.2--The County shall, as part of such a program, in cooperation with BPUD assist in securing funds for septic tank rehabilitation provided that the developed parcel meets all other applicable County Codes. Time Frame: After drainage plan is implemented.

4.2.4 Housing

Objective: Pursue at the State and County levels the development of an owner/resident building code amendment to reduce the cost of shelter. (1975 Bolinas Community Plan amended for the 1984 Gridded Mesa Plan.)

Policy H-1: Provide safe and healthy low cost housing opportunities on the Mesa and in the Town. (1984 Gridded Mesa Plan)

Programs:

H-1.1--Establish a housing organization, as part of the Land Trust or the Ecumenical Association for Housing, to determine ways to provide low cost housing opportunities on the Mesa. Time Frame: Immediately.

H-1.2--Establish a "Self-Help" housing construction program on the Mesa through the Land Trust or the Ecumenical Association for Housing. Time Frame: Begin immediately.

Policy H-2: Utilize existing structures for low cost housing. (1984 Gridded Mesa Plan)

Programs:

H-2.1--Inventory the existing structures in the Planning Area to determine the potential for developing low and moderate income housing. Utilize existing structures for low-cost housing. Existing structures located in the area already sewered should be given priority attention. Time Frame: Begin immediately.

4.2.5 Economic Development

Objective: Expand the economic base of the community by providing opportunities for cottage industries and small-scale agriculture. (1984 Gridded Mesa Plan)

Policy E-1: Cottage industries and small-scale agriculture shall be allowed on the Mesa and the balance of the Planning Area. (1984 Gridded Mesa Plan)

Programs:

E-1.1--Amend local Coastal Program to include cottage industries and small-scale agriculture. Time Frame: Immediately.

4.3 Implementation Strategies

4.3.1 County Actions

1. The County adopts the Gridded Mesa Plan including the policies and programs contained therein.

2. The County establishes the Bluff Erosion Zone as an area where residential development and construction is limited.

3. The County establishes guidelines for reviewing development proposals within the Bluff Erosion Zone on a case by case basis.

4. The County establishes a drainage setback area where residential development is prohibited.

5. The County cooperates with BCPUD and the Bolinas Fire Department to formulate a comprehensive plan for improving the Mesa-wide drainage which incorporates individual on-site drainage programs to avoid adverse cumulative impacts. The comprehensive plan includes grading and excavation to improve cross-Mesa flow and eliminate ponding, culverting throughout the roadway network, realigning the roadway network and the possible installation of a subsurface storm sewer system. The County implements the drainage plan in conjunction with BCPUD and the Bolinas Fire Department. Planning and implementation for drainage programs will be undertakn as funding becomes available.

6. The County assists in the preparation of grant requests for special projects related to implementing the Initial Phase of the Gridded Mesa Plan.

7. The County establishes a restricted development zone on the Mesa corresponding to Zone V from the Questa Report.

8. The County establishes three residential development zones on the Mesa where the minimum lot sizes are 10,000 square feet, 20,000 square feet, and 40,000 square feet, respectively.

9. The County establishes a Mesa-wide groundwater mounding monitoring program.

10. The County enforces existing programs for residential site evaluation and permit approval.

11. The County works with BCPUD to develop a circulation plan.

12. The County assists in establishing a funding mechanism for the circulation plan.

13. The County works with BCPUD to develop a cooperative program for maintaining existing septic systems and reviewing new systems.

14. The County continues to communicate directly with the Bolinas community to establish a greater mutual understanding of the Gridded Mesa Plan.

4.3.2 Bolinas Community Actions

1. The Bolinas Planning Council adopts the Gridded Mesa Plan including the policies and programs contained therein.

2. BCPUD recognizes the Bluff Erosion Zone and new residential hookups in that area consistent with the policies of this plan.

3. BCPUD establishes guidelines for reviewing development proposals within the Bluff Erosion Zone on a case by case basis.

4. BCPUD recognizes the drainage setback area where new residential development is limited consistent with plan policies and programs.

5. BCPUD cooperates with the County and the Bolinas Fire Department on the development and implementation of a Mesa-wide drainage plan.

6. The Bolinas Fire Department cooperates with the County and BCPUD on the development and implementation of a Mesa-wide drainage plan.

7. BCPUD recognizes a restricted development zone corresponding to Zone V of the Questa Report.

8. The Bolinas Planning Council prepares a Mesa Resource Conservation Area Plan.

9. BCPUD works with the County to develop a circulation plan.

10. BCPUD continues to upgrade or repair the existing water system.

11. BCPUD will submit to its voters a plan and funding program to supplement the existing water system.

12. BCPUD will work with the County to develop a cooperative program for maintaining existing septic systems and reviewing new systems.

4.3.3 Other Agency Actions

1. The Coastal Commission approves an amendment to the Local Coastal Program to include the Gridded Mesa Plan and language relating to 1) phased growth based on utility system capacity, and 2) cottage industries.

2. The Regional Water Quality Control Board approves the alternative sewage disposal systems proposed for use on the Mesa.

3. The Land Trust becomes the housing action agency in Bolinas.

5.0 GRIDDED MESA PLAN IMPLEMENTATION SUMMARY

Program	Action Required	Agency Involvement	Estimated Costs
ADOPTION OF GRIDDED MESA PLAN	Public hearings. Formal approvals.	Bolinas Planning Council County Planning Commission Board of Supervisors Coastal Commission	No estimate is available. Costs to be determined.
LAND USE			
1. Establish Bluff Erosion Zone (LU-1.1, LU-1.2) 1985	Define edge of bluff. Define extent of zone.	County Planning Department (Possibly Public Works) BCPUD	No estimate is available. Costs to be determined.
2. Establish Bluff Erosion Zone Site Review Guidelines (LU-1.3) 1985	Refine existing County Planning and Building Department guidelines to apply to Bolinas.	County Planning Department County Building Department BCPUD	No estimate is available. Costs to be determined.
3. Establish Drainageway Setback (LU-2.1) 1985	Prepare drainageway setback map. Establish retrictions.	County Planning Department County Public Works Bolinas Planning Council BCPUD	No estimate is available. Costs to be determined.
4. Prepare Mesa-Wide Drainage Plan (LU-3.1) 1985	Assess drainage constraints based on 1983 Questa report. Identify drainage opportunities. Identify funding sources.	County Planning Department County Public Works BCPUD Bolinas Fire Department	Administrative costs if done by County and BCPUD staff. $20,000 to $30,000 if Plan done by consultant. Cost of construction is dependent on final Plan. Implementation could range from $2,000,000 to $4,000,000.
5. Establish a Restricted Development Zone (LU-4.1) 1985	Adopt Questa Zone V as Restricted Development Zone. Publish map.	County Planning Department County Building Department BCPUD	No estimate is available. Costs to be determined.
6. Establish Three Residential Development Zones (10,000 square feet, 20,000 square feet, 40,000 square feet) (LU-5.1, LU-5.2, LU-5.3) 1985	Adopt Gridded Mesa Plan recommendations. Publish map. Prepare narrative explaining conditions, restrictions and procedures.	County Planning Department County Building Department Environmental Health Department Planning Commission Board of Supervisors BCPUD	No estimate is available. Costs to be determined.
7. Establish a Groundwater Mounding Monitoring Program (LU-5.4) 1985	Budget funds for program (or obtain grant). Contract with professional consultant.	Environmental Health Department	$10,000 to $15,000 consultant's fee.

Program	Action Required	Agency Involvement	Estimated Costs
8. Establish Residential Site Review Guidelines (LU-5.5, LU-5.6) 1985	Review existing zoning--amend if necessary. Review existing permit approval process--amend if necessary (allowing for the continuation of agricultural practices). Review existing permit approval process--amend if necessary.	County Planning Department County Building Department Environmental Health Department Planning Commission Board of Supervisors	No estimate is available. Costs to be determined.
9. Establish Mesa Resource Conservation Area (LU-6.1) After drainage and road plans	Analyze land uses on Mesa. Identify areas to be used for specific purposes. Review existing zoning--amend if necessary.	County Planning Department Bolinas Planning Council	No consultant's cost if BPC does work on voluntary basis. Printing and distribution costs.
CIRCULATION			
10. Prepare a Circulation Policy Plan (C-1.1) Begin 1985	Review existing conditions after Drainage Plan completed.	County Department of Public Works Bolinas Planning Council BCPUD	Administrative for County BCPUD. Consultant's costs could range from $200,000 to $300,000 depending on the extent of engineering involved.
11. Establish a Funding Mechanism to Plan and Coordinate Circulation Plan and Drainage Plan (C-1.2) As soon as circulation and drainage plans are completed	Obtain funding through Community Development Block Grant Program, the Buck Fund of the San Francisco Foundation or by way of an Assessment District.	County Planning Department Planning Commission Board of Supervisors Bolinas Planning Council BCPUD Bolinas Fire Department	Administrative costs for County. $10,000 to $15,000 if consultant does planning. Bond counsel fees are included in Assessment District costs dependent on Drainage Plan and final Circulation Plan. Implementation costs will depend on the extent of road construction specified by the Circulation Plan. Could be between $2,000,000 and $4,000,000.
12. Abandon Unneeded Roads (C-1.3) After circulation and drainage plans are completed	Adopt Circulation Plan. Implement Circulation Plan.	BCPUD	Administrative costs for BCPUD. Implementation costs could be offset by volunteer action. Contracted labor would depend on final Circulation Plan.
UTILITIES			
13. Conduct Water Audit (U-1.1) Begin 1984	Compare water drawdown for storage facilities with water use at meters.	BCPUD	$7,500 to $9,000.
14. Eliminate Leakage in Water System (U-1.2) 1984-1989	Repair and upgrade system. Replace faulty meters.	BCPUD	$2,500,000 to $4,000,000.
15. Prepare Water Needs Plan (U-1.3) After circulation and drainage plans are completed	Calculate projected water needs. Prepare engineering reports. Identify funding sources	BCPUD	$20,000 to $25,000 for engineering studies. $1,000,000 to $2,000,000 to expand water system.

Program	Action Required	Agency Involvement	Estimated Costs
16. Submit Water Plan to Voters (U-1.4) When plan complete	Prepare project description. Prepare ballot.	BCPUD	Printing costs. Election costs.
17. Develop Program for Maintenance and Review of On-Site Sewage Disposal Systems (U-2.1) 1985	Determine condition of existing systems. Establish guidelines. Establish cooperative agreement.	Environmental Health Department BCPUD	No estimate is available. Costs to be determined.
18. Maintain an Active Enforcement Program Regarding Failing Septic Systems (U-2.2) Begin after drainage plan is implemented	Enforce existing laws pertaining to health standards. Identify alternative systems acceptable to County and State agencies.	Environmental Health Department Regional Water Quality Control Board BCPUD	No estimate is available. Costs to be determined.
HOUSING			
19. Establish a Housing Organization to Determine Ways of Providing Low Cost Housing Opportunities (H-1.1) 1985	Utilize Land Trust. Work with established housing organizations (Ecumenical). Seek funding from available sources.	County Planning Department Bolinas Planning Council Land Trust	No estimate is available. Costs to be determined.
20. Establish Self-Help Housing Construction Program. (H-1.3) 1985	Create or adapt existing programs to allow owner-builder or occupant-builder activities to occur.	County Building Department County Planning Department Bolinas Planning Council Land Trust Ecumenical Association for Housing Marin County Housing Authority	Depends on program.
21. Inventory Structures in Planning Area to Determine Housing Potential (H-2.1) 1985	Survey existing buildings in town to determine if potential exists to create low cost housing opportunities. Identify funding sources if remodeling or rehabilitation activities are required.	County Planning Department Bolinas Planning Council Land Trust	Depends on program.
ECONOMIC DEVELOPMENT			
22. Amend Local Coastal Program to Include Cottage Industries and Small Scale Agriculture (E-1.1) 1985	Change wording in LCP.	Coastal Commission	No estimate is available. Costs to be determined.

6.0 ACKNOWLEDGEMENTS

This Gridded Mesa Plan is the result of many hours of work by a large number of dedicated individuals. The Mesa Plan could not have been completed without their efforts. We wish to express our appreciation for their help and guidance.

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