BEAR CANYON ZONING DISTRICT

DEVELOPMENT PLAN
APRIL 6, 1987

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Section 1

The Bear Canyon Plan identifies the agricultural, scenic and development values of the area included in the Bear Canyon Zoning District. Any planning effort must strive to maximize development opportunities within the limits of sound planning pratices. Such practices will include agricultural, scenic, and natural resource considerations. The intent of this plan is to protect and preserve, to the greatest extent possible, the district's scenic, natural resource and agricultural values, and the interests of the family farm.

INTRODUCTION

BACKGROUND

Because of increased subdivision and development pressures in the Bear Canyon area, including a proposed wood-pelletized steam generation plant, citizens petitioned the Gallatin County Board of Commissioners in the Spring of 1985 to create a County Planning and Zoning District pursuant to 76-2-101 M.C.A.

The Gallatin County Zoning Commission appointed a Citizens Study Committee on February 13, 1986, (see cover sheet for list of committee members). The Committee was composed of area residents who supervised and directed work on a development plan and zoning ordinance. The committee met during the winter and spring of 1986 discussing various goals and desires for the Bear Canyon Zoning District. Personnel from the Gallatin County planning staff worked closely with these citizens and helped them formulate their plan.

RESOURCE INFORMATION

Much has been done in the way of environmental research in the Gallatin valley; site-specific data on the Bear Canyon Zoning District must be gleaned from this wealth of information. Montana State University, U.S. Department of Agriculture Soil Conservation Service, U.S. Geological Survey, U.S. Forest Service, Montana Department of Commerce, Gallatin County and other agencies have produced various reports related to the area included in the Bear Canyon Zoning District. Because of the existence of this information and because of limited funding, this plan incorporates the material contained in these reports.

LOCATION

The Bear Canyon Zoning District is located in the extreme eastern portion of the Gallatin valley, flanked by mountains to the north, east and south. The district encompasses approximately 2.25 square miles, or 1440 acres of land. Except for public rights of way, all of the land is in private ownership.

Though not a large land area, the Zoning District is unique. The eastern boundary of the district marks the transition from valley floor to mountains, and the southern boundary marks a similar topographic change. The northern boundary marks the change from prime agricultural land to wet land or riparian zone. Lands bounding the district's west border are presently similar in use and description, but have succumbed to subdivision pressures.

The Zoning District is almost entirely agricultural. Mt. Ellis Academy occupies the northern part of the district. The area is served from the west by Bozeman Trail Road, which acts as an arterial for Interstate 90 which runs east and west just touching the district's north boundary. Mt. Ellis Lane and Bear Canyon Road run from south to north through the district.

HISTORICAL BACKGROUND

The Bear Canyon Zoning District lies close to the origins of recent history in the Gallatin Valley. Lewis and Clark camped very close to the site of the Montana State Agricultural Experimental Station (formerly Fort Ellis) on July 1, 1806. Clark remarked that the site was "one of wondrous beauty and abundant game". The area saw little activity from white settlers until 1867, when Fort Ellis was established, just a mile to the northwest of the district. Protecting new settlers from marauding Indians, the fort contributed to Bozeman's growth and became a significant agricultural trading post. Evidence of fertile area soils is revealed in an 1871 Army Surgeon report which noted that stationed troops were proud of their gardens which produced rutabegas up to 17 1/2 pounds and 4 pound potatoes.

Early fort inhabitants took advantage of convenient adjacent game hunts, but by 1872 ranchers had displaced the area's game, utilizing range right up to the fort's perimeter. Hayden of the famed 1872 Yellowstone Expedition noted encountering cattle on the open pastures of what is now the zoning district as he descended Mount Ellis returning from a day's horse trip.

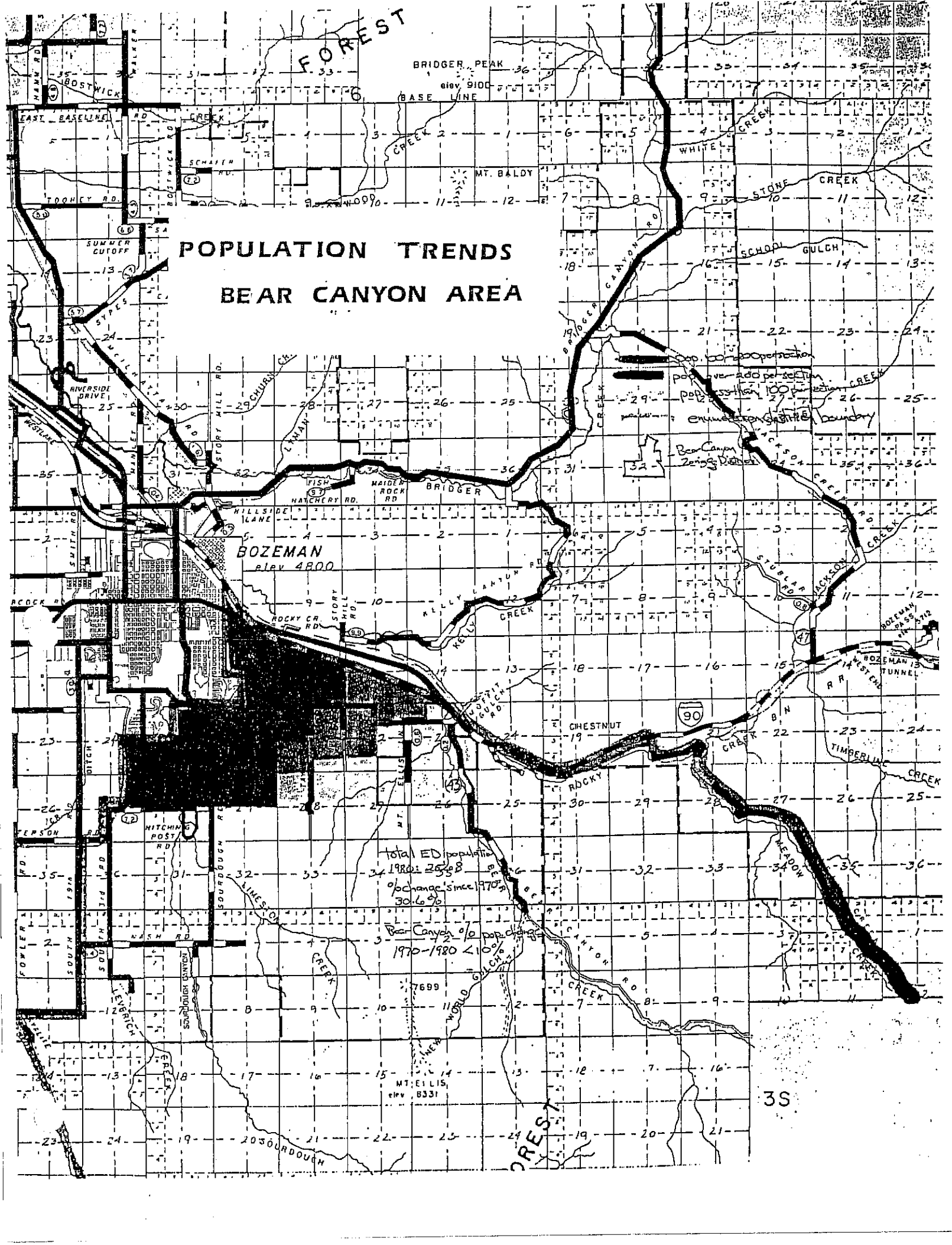
The district and its immediate vicinity has been agriculturally oriented ever since. The old Fort Ellis community schoolhouse was used by local 4-H chapters, and the MSU agricultural station was sited in its present location largely because of its ideal soils.

Mount Ellis Academy has played a role in the area for 80 years. Founded in 1904 at its present site by the Seventh Day Adventist Church, the Academy lies on 25 acres at the north end of the district. Historically, the Academy has shared many experiences with the adjacent landowners; many of their children attended the Academy.

POPULATION/DEVELOPMENT PATTERN

Population information is taken from the 1983 Bozeman Master Plan, the 1980 U.S. Bureau of the Census report, the Montana Department of Commerce 1985 Statistical Abstract and a count of district residents.

A geographically small zoning district, viewing the population figures for the immediate area would be misleading. Presently containing 86 people (not including Mt. Ellis Academy students) and 180, if students were included, the area population has been stable for decades. (See map.)


POPULATION TRENDS
BEAR CANYON AREA
BRIDGER PEAK
elev. 9100
BASE LINE
MT. BALDY
BOZEMAN
elev 4800
Pop. over 400 per section
Pop. less than 100 per section
enumeration district boundary
Bear Canyon Zoning District
total ED population
1980: 2558
% change since 1970
30.6%
Bear Canyon % pop. change
1970-1980 < 10%
7699
MT. ELLIS
elev. 8331
3S

Population patterns in the private lands surrounding the district, however, tell a quite different story. The Bear Canyon Zoning District lies within a census district that contained 2568 people in 1980, a 30% increase from 1970. The zoning district's population, however, only changed by a few people in that span.

A glance at subdivision activity in those ten years gives more insight. According to county records, about 400 lots were created between 1970 and 1983 in a five-mile corridor from Highland Boulevard on the eastern edge of Bozeman to the Bear Canyon area. These lots average 10 acres each. County records and census survey data show that 42% of these lots have been built upon, containing 3.26 people per house, which means an increase of about 550 people. In contrast, the zoning district has not experienced this subdivision pressure and consequent growth. This is most likely because the farmers in the district chose not to divide their land.

There are many influences on population of an area that can not be anticipated. Economic conditions change, lifestyles change, and natural forces such as drought have an influence. Keeping these variables in mind, projections based on historical data point to further subdivision and population pressures on the district and the area surrounding it.

LAND USE

The Bear Canyon Zoning District consists of primarily farmland. Of its 1,440 acres, 1,300 acres are regularly in agricultural use, or 90% of the total district area. Besides a dozen residences associated with farming, other uses of land in the district involve schools and public buildings, and one small manufacturing venture (Blaze King).

Land Classification

	Acres	% Total
Agriculture	1,300	90
Public Buildings/Schools	30	2
Stream Zone/Unbuildable	55	4
Commercial	5	.3
Residential	50	3.5
T O T A L	1,440	100%

There are three schools in the district. Mount Ellis Academy, a parochial school, serves both day students and resident students grades 9 through 12. The academy accommodates 100 students and occupies 35 buildings. The Academy also runs a private K through 8 elementary school a 1/4 mile to the east of the main campus. The grade school sits on 2 acres and serves approximately 50 students. LaMotte School, a public school serving area students K through 8, is situated on Bear Canyon Road, about a mile south from the Academy. The LaMotte School accommodates 48 students on 1 acre of ground. All three schools cease activities between early June and early September. The other public building in the district is the Mt. Ellis Firehall adjacent to Mt. Ellis Academy. The hall houses 4 trucks in a 3,200 square foot building on 1/4 acre.

Other land uses in the area (see map) are the Blaze King Stove manufacturing plant on Mt. Ellis Academy grounds, a commercial dairy on Mt. Ellis Lane, a few home occupations, and a few vacant 20 acre lots slated for ranchette-style residences.

Before the zoning district was formed, its area was included in Bozeman's jurisdictional area master plan. The Bozeman plan recommended a maximum density of one residence for every 20 acres in the area. Twenty acre maximum densities were originally designed to provide for residents desiring a rural setting and small farming operations. In practice, these 20 acre lots have added greatly to the costs of providing public services, and have not been of significant agricultural benefit.

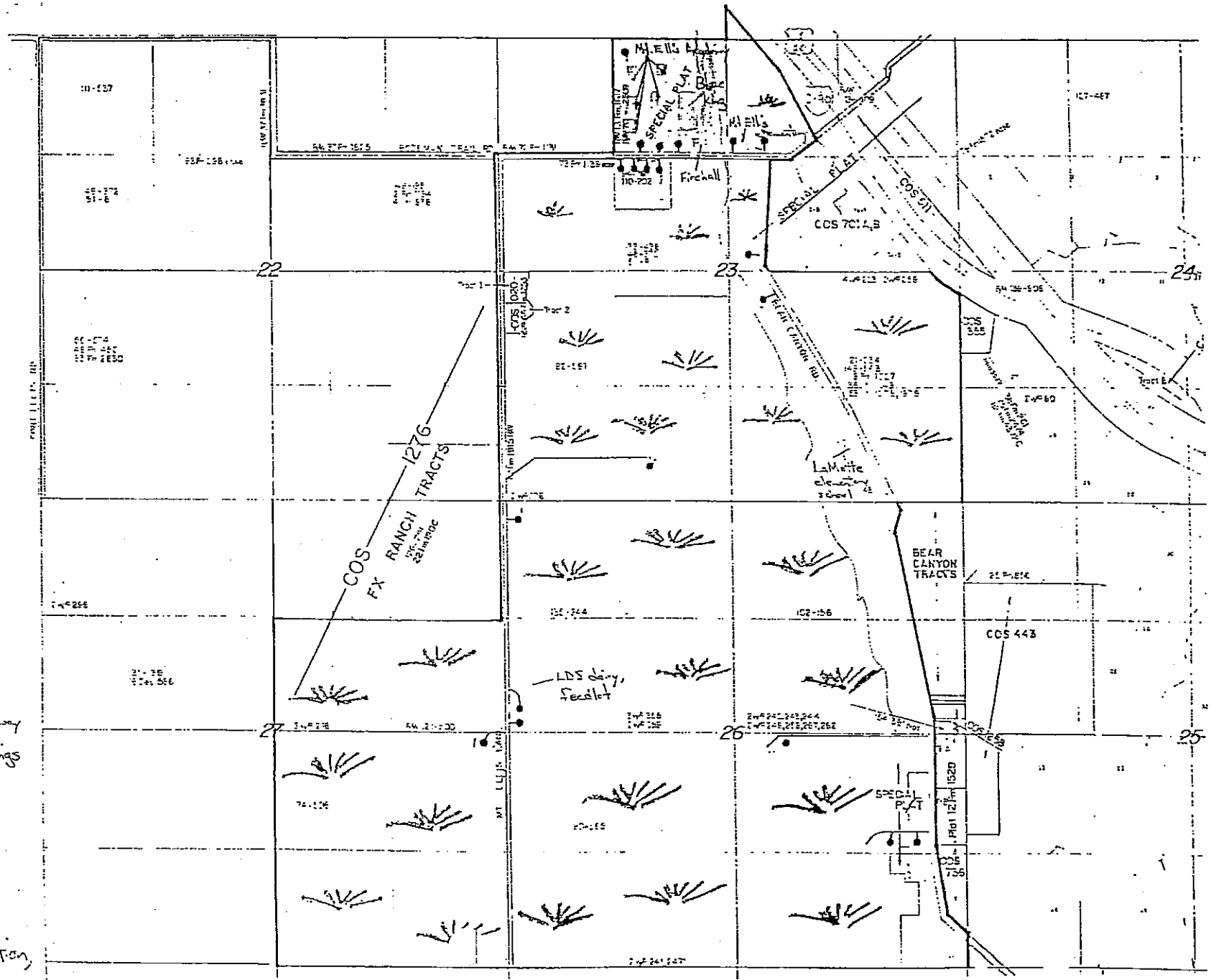
SUMMARY

The zoning district was formed to preserve the best interests of the area family farms. The district wishes to preserve its agricultural nature, but allow for residential, and limited commercial and light industrial, development in areas of the district not vital to its agricultural viability.

Population growth within the zoning district is expected to grow at a slow pace in the foreseeable future. However, if growth pressures do arise, the district will be capable of accepting growth in an orderly fashion.

Existing Land Uses – Bear Canyon

2 South 6 East



Come: on site inspection

Section 2

The following sections identify and describe topography, natural features such as stream zones, soil and vegetative cover, wildlife, and potential flood and earthquake hazards associated with the Bear Canyon Planning Area. The purpose of these descriptions is to define physical limitations to, and suggest possibilities for the area's land use.

TOPOGRAPHY - SLOPE AND VEGETATIVE COVER SLOPE

Applied to the Bear Canyon Zoning District, topography varies ranging from the highest points to the south and the east of approximately 5300 feet to the lowest point on the north of the district of about 4970 feet. The steepest slopes are located on the north and east, with the southern half of the district rising at a lower angle.

The important consideration of slope is the degree of possible degradation of hillsides in the form of erosion and other movement, as well as problems with human accessibility because of gradient and safety factors involved in building structures and roads on steeper slopes. Also, in an area with high visual qualities such as Bear Canyon, it is important to consider the aesthetic qualities and to prevent degradation of those qualities through scarring visible hillsides.

The slope classification map (see topo map shaded) categorizes slope according to two classifications: 1) that area that is above 15% slope, (for a 15 percent slope land rises vertically 15 feet for each 100 feet of horizontal measurement), 2) that area between 6% and 8% slope. Six to eight percent slopes need some erosion control and road considerations, but are generally acceptable for development. Preferably, slopes over 15% should not be developed. Development is, however, possible. Greater hazards to the environment are present when slopes over 15% are developed. Any construction taking place in this category should proceed under strict environmental controls.

The greatest problem in developing slopes over 15% is excessive scarring caused by earth construction work for foundation and road excavation. Extreme erosion of exposed soils in deep cuts and fills, related drainage problems caused by high velocity runoff, and grade and access problems related to normal road systems are problems encountered with development on these steeper slopes.

VEGETATIVE COVER

Consideration of vegetation is important to the plan because it is a base for the area's animal community, provides agricultural commodities, adds beauty to the landscape, and controls degradative processes such as erosion.

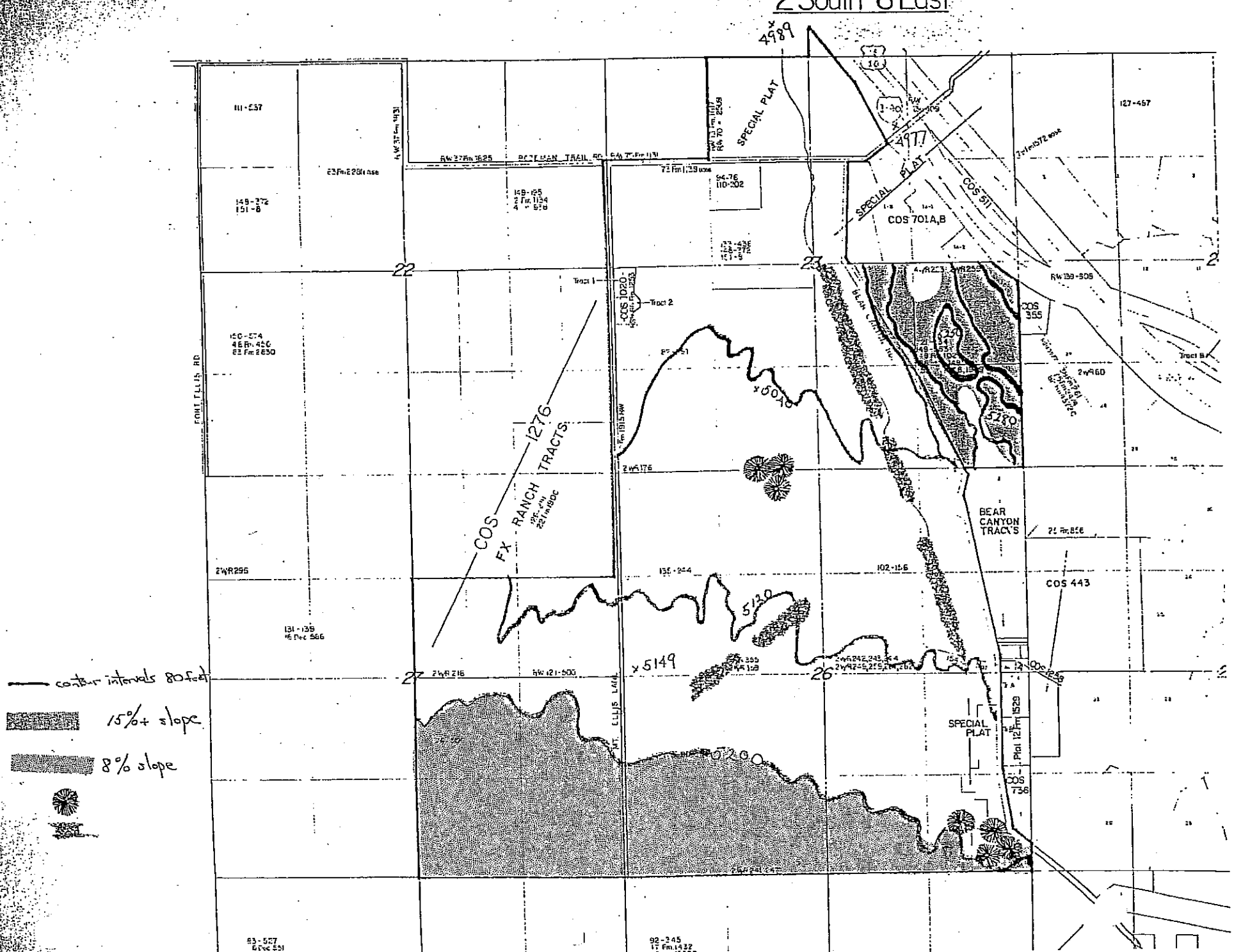
Basically, two areas of vegetation are of concern in the district. The valley fringe farm fields make up the majority of the cover in the areas. The only other vegetation of significance is located in the riparain zone associated with the floodplain and several small, high groundwater, marshy areas.

It is of concern in the plan that these areas remain viable if confronted with development. Because vegetative cover is closely associated with farming practices, it is important that the integrity of the farm is maintained.

Vegetative Cover

Slope – Bear Canyon

2 South 6 East



SUMMARY AND CONCLUSIONS

Slopes of 15 to 20 percent can be developed with proper environmental controls; however, to prevent degradation of the area, development of slopes greater than 20 percent should be restricted.

Development can take place on the open fields now in farming use. Incentives should be offered to maintain the area's farming viability.

Some development of wet lands may take place but only under strict environmental controls. Development requiring individual septic disposal systems will be limited by costly engineering requirements and county and state health department standards.

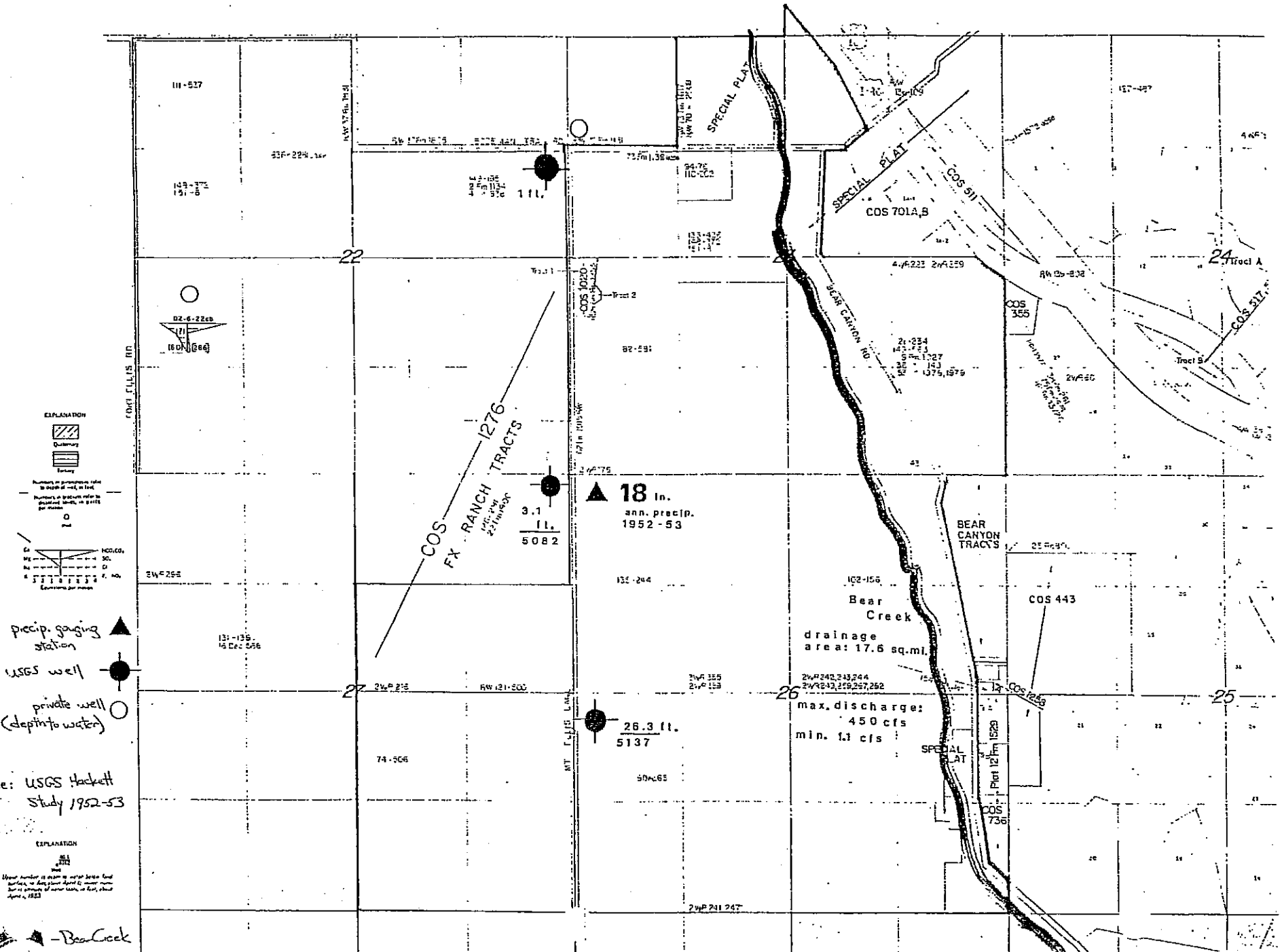
The riparian zone is closely controlled by floodplain management. The district should recognize the value of the vegetative cover in the stream zone for animal species, recreation and open space.

WEATHER AND CLIMATE

The weather and climate of the Bear Canyon Zoning District contribute significantly to the area's agricultural use. The area receives slightly more rainfall than Bozeman, and its open area to the west provides more than adequate sunlight. The growing season runs around 120 days. The average date of the last killing frost is May 22, and the average date for the first one is September 18, but departures from these averages are common. The mean annual temperature is 42.0 degrees Farenheit. May and June have the highest average monthly precipitation (3 inches) with April the next closest at 1.8 inches, then September at 1.7 inhes. Annual precipitation averages 22 inches per year, and the monthly distribution is very favorable for growing conditions (see chart precip.). The summers have long, warm days, cool nights, and little precipitation. Fall witnesses more precipitation, replenishing soil moisture. Winters are long and the ground remains frozen for four months. This retains the fall moisture and then snow melt in the spring adds to the ground's moisture, providing very favorable growing conditions.

WATER P RAMETERS - BEAR CANYON

2 South 6 East



source: USGS Hackett Study 1952-53

WATER RESOURCES

GROUNDWATER

A 1982 MSU review of the water well drill hole data on file at the Department of Natural Resources and Conservation, Montana Water Rights Bureau, Bozeman, indicates the Bear Canyon Development area is probably of limited potential with respect to development of groundwater resources.

This conclusion is based on the following observations.

One, the area is underlain by two basic rock types; a dark shale unit which is in places more than 400' thick and very low groundwater potential, and a sandstone/gravel unit which is a moderate to locally good target for well development. Well production seems closely tied to finding sand/gravel layers within these units that have sufficient permeabilities to provide water transmission.

Two, with many prime building sites along the valley bottom already developed, new residential wells drilled on the valley flanks are obtaining varied results. In the worst case several wells have been drilled in excess of 300' only to produce 1/2 to 3/4 gallon/ min., while several others are producing acceptable residential quantities -om 60' - 100' depths.

SUMMARY AND CONCLUSION

It is recommended that any subdivision development of this area should be preceeded by a detailed study of the Bear Canyon area. This should include precisely mapping the locations of the existing wells as they relate to the geology of the area, conducting pump tests on selected well sites, and modeling the water table drawdown due to the inter-action of these wells. Depending on these results, limited further development of this area may be determined.

Although test wells show extreme depths and small flows in the ridges to the east of the valley, ground water tables rise steadily from the south to the north end of the district. (See water paramenters map). In fact, water tables are too high in many areas for standard on-site septic systems. Most development, especially residential, would be more appropriate in the limited areas which lie between the two extremes.

SURFACE WATER

Bear Creek is the major surface water course in the district. With an annual average run-off of about 8000 acre-feet, Bear Creek is a major -ibutary stream of the East Gallatin River, with a watershed of over / square miles. The Creek flows from south to north the length of the district. Fed mostly by spring run-off from the mountains above, the

stream has reached 100 year flood levels several times in recent decades most recently in 1981. One intermittent spring-fed stream, Cannon Creek, crosses the extreme southwestern and northwestern boundaries of the district. Although not a significant flow, this stream provides influent for surrounding soils which experience, in turn, high water tables.

Bear Creek's presence plays a large role in determining land use in the Bear Canyon area, primarily because of the potential flood hazard presented.

FLOODPLAIN

The Bear Creek floodplain is significant - it involves close to 20% of the district's land area (see floodplain delineated on zoning map).

The 1981 flood, which inundated a large area in the northern part of the district, dramatizes the need for close adherence to federal and state floodplain regulations. Montana law delineates the 100-year floodway and the flood plain of every water course in the state and restricts the use of these designated areas to uses which will not be seriously damaged or present a hazard to life if flooded. Flood Plain building regulations, based upon state minimum standards, have been adopted in Gallatin County.

Some people are concerned about the adoption of flood plain regulations because they feel it is an infringement of their right to exercise free choice in the use of their property. This view neglects the harmful effects that improper land use may have on adjoining or neighboring property. It also overlooks the vast amount of tax dollars expended annually on flood fighting, flood relief, and structural flood control. Because of Bear Creek's flooding potential, understanding the flood hazard is very important.

100 Year Flood

rlood flows for a stream can be calculated through a hydrologic engineering study. A 100-year flood is a flood event that is equalled or exceeded, on the average, once every 100 years. For any given year, there is a one percent chance that a 100-year flood will occur.

Although a one percent chance of flooding may seem insignificant, a 100-year flood has nearly a 23 percent chance of occuring in any 25-year period. Bear Creek experienced a 100 year flood in 1981.

Flood Plains

Flood plains are those relatively flat areas bordering the banks of a water course that are normally dry but become inundated when heavy rains, melting snow, ice jams, or other conditions cause rivers and streams to overflow their banks.

Purpose of Flood Plain Regulations

The purpose of flood plain regulations are to: prevent loss of life; protect public health; prevent excessive property damage; reduce public tax expenditures for emergency operations, evacuation, and restoration; prevent the installation of structures which limit the channel capacity and increase flood heights; prevent damage to industries, transportation, and utility systems; and prevent future unwise expansion and development in unprotected flood plains, thus reducing future expenditures for expensive protective measures such as dams, reservoirs, dikes, etc.

Floodway Zone

When enough technical data are available, state law requires that the 100-year flood plain area be divided into two separate zones. The floodway zone, a higher-hazard area that consists of the stream channel and its banks, is the area which is considered necessary to carry flood waters downstream and is generally subject to faster water velocities and greater flood water depths.

Flood Fringe

The flood fringe zone is a lower-hazard area outside the floodway that would be inundated by a 100-year flood. It consists generally of the flood storage and backwater areas, is subject to low water depths and velocities, and is usually on the outer part of the flood plain.

Building Regulations for the Two Areas

Most construction is allowed by permit in the flood fringe zone as long as the lowest floor is elevated two feet above the 100-year flood level on compacted fill and electrical, heating, and plumbing sytems are protected to minimum standards established by the Board of Natural Resources and Conservation. In the floodway zone, most new development and structures are prohibited. Soil absorption type septic systems are prohibited in both floodway and flood fringe zones. Gallatin County further limits onsite septic systems by prohibiting them within 100 feet of the floodway fringe.

What is Prohibited in a Floodway Zone

The following new uses are expressly prohibited in floodway zones:

- buildings for living purposes, places of assembly, or permanent use by human beings;
- structures, fills, and excavations that will significantly obstruct, alter flood flows, or increase 100-year flood levels;
- mobile homes;
- commercial buildings;
- solid waste disposal;
- soil-absorption sewage systems; and
- storage of toxic, flammable, or explosive materials.

What is Prohibited in a Flood Fringe Zone

In a flood fringe zone, only the following new uses are expressly prohibited:

- solid waste disposal;
- soil-absorption sewage systems; and
- storage of toxic, flammable, or explosive materials.

A permit is required for all other uses requiring structures, fill, or storage of materials and equipment.

CONCLUSION

Any land use decisions must give careful consideration to the Bear Creek floodplain. Floodplains are well-suited for agriculture, open space, and other non-development uses. Because developable areas are limited in the district, the floodplain should be incorporated in open space requirements. It is important that the Bear Creek floodplain data be updated so that both separate zones may be specified.

GEOLOGY

The purpose of this section is not to give a detailed description of the geology or the geological conditions of the Bear Canyon Zoning District, but rather to describe a known concealed fault and briefly outline alternatives for mitigation.

There is evidence of a concealed fault (zoning map) in the Bear Canyon district. When the mountains to the south of the district were formed some time in the mid Tertiary period, or several hundred thousand years ago, tension was created between the falling valley floor and the rising mountains. Covered by alluvium, topographical features identifying the fault are not readily apparent. Experts have not noticed tendencies for recent movement along this fault, and have not corroborated the fault's existence with any evidence except the fact that the mountains rose. There is only a remote chance of geological disturbance from a human time perspective - much less chance than along other identified faults in the region. The fault does exist, though, and identifying risk is appropriate.

Living With Geologic Hazards

Hazard can be dealt with in many ways. Commonly, it is approached from the standpoints of (1) avoidance of an area where known hazards exist; (2) ignoring the hazards on the chance that recurrence or intensity will not be serious; (3) mitigation of hazards by various means; and (4) development of insurance and legal claims to cover possible loss from damaging processes.

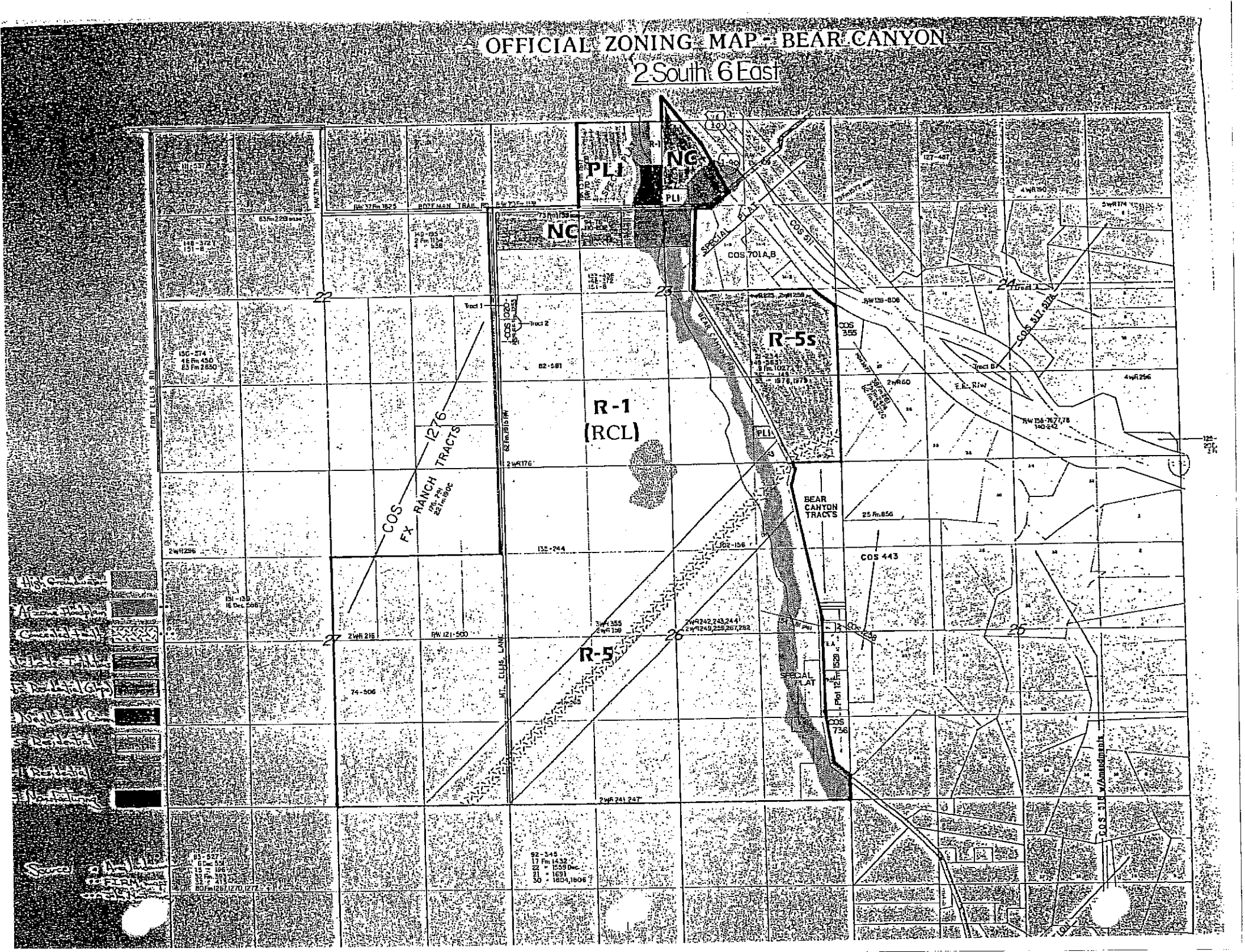
In the above listing, avoidance is not entirely removed from the concept of mitigation because avoidance for one particular use, such as home building, may lead to other uses which are recreation-oriented. Also, in the process of land use planning, development rights are often sold or transferred and concentrated nearby into a less stressed zone that is not subject to the same level of hazard as the former area.

Of all the procedures designed to accommodate living with geological hazards, the process of mitigation would seem to be the most appropriate even though it may not be a panacea for all aspects.

The most logical and viable approach to "living with geologic hazards" is through the process of mitigation in which steps are taken through creative planning, erection of physical barriers, advanced construction design, land classification, and other procedures to reduce the intensity of any hazard, if not to completely eliminate it. Since each area of the Earth is unique, categorical approaches to these problems

OFFICIAL ZONING MAP - BEAR CANYON

2 South, 6 East



must be tempered by a respect for individual characteristics of each location with due attention to the types of rocks, fault systems, plate location, seasonal whims, and political atmosphere.

Although the methods for achieving harmony with nature are seldom completely effective, the experience to date suggests that mitigating procedures are worth the try.

Conclusion

Although not an active fault in comparison to others in the county, the Bear Canyon fault is nevertheless a geologic hazard. Provisions should be made, such as transferable development densities and lower residential densities per acre, to encourage landowners to develop away from the immediate vicinity of the fault.

SOILS

INTERPRETATION OF SOILS

The soils found in the Bear Canyon Zoning district are very productive from an agricultural perspective. Good agricultural soils, however, are not always ideal for placement of development.

Because it is a goal of the district to preserve, within practical limits, agriculture in the area, it is important that the major soil types be identified. Once identified, district landowners should be encouraged to direct development away from the district's prime agricultural soils.

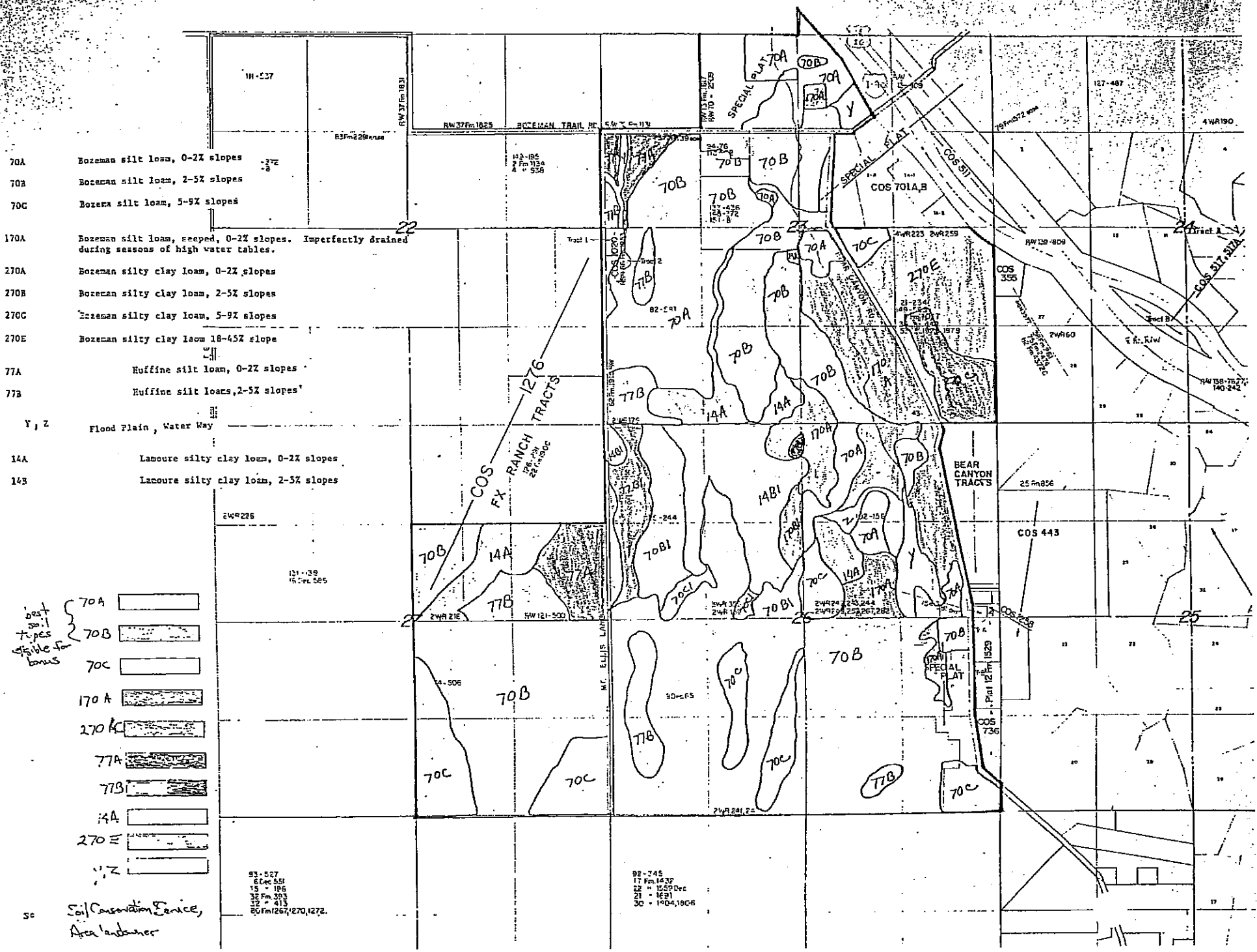
The information that follows describes the soil types present in the district and outlines the limitations for various types of development on each soils series.

SUMMARY AND CONCLUSIONS

Upon reviewing the soil information and the accompanying soils map, it is clear that the district contains soils valuable for agriculture, but also has factors limiting soil use. Some acreage is limited because of high water tables for both farming and development. Farming, in this case, is less restrictive because the acreage can still be used. Some acreage contains poor soils for farming, but adequate for limited development. Other acreage holds excellent farming soils, but is within the floodplain. Generally, the district contains some soils better suited for farming, and some soils better suited for development or other uses, such as open space.

SOILS MAP - BEAR CANYON

2 South 6 East



best soil types eligible for loans

70A
70B
70C
170A
270C
77A
77B
14A
270E
Y, Z

Soil Conservation Service, Area Landowner

BOZEMAN SERIES

These include dark colored, calcareous, loamy loess soils that are more than 36 inche deep and free of any coarse fragments. They have a thick, dark top soil moderately high in organic matter and a subsoil browner in color and more clay content than the topsoil. The underlying lime zone is distinct or prominent. Normally, the surface texture is silt loam, but often becomes a silty clay loam texture when a portion of the B horizon has been incorporated into the surface soil through deep tillage. These soils on the smoother slopes are well adapted to irrigation. They are used extensively in the dryland and irrigated production of small grains and alfalfa.

The following mapping units occur in this series:

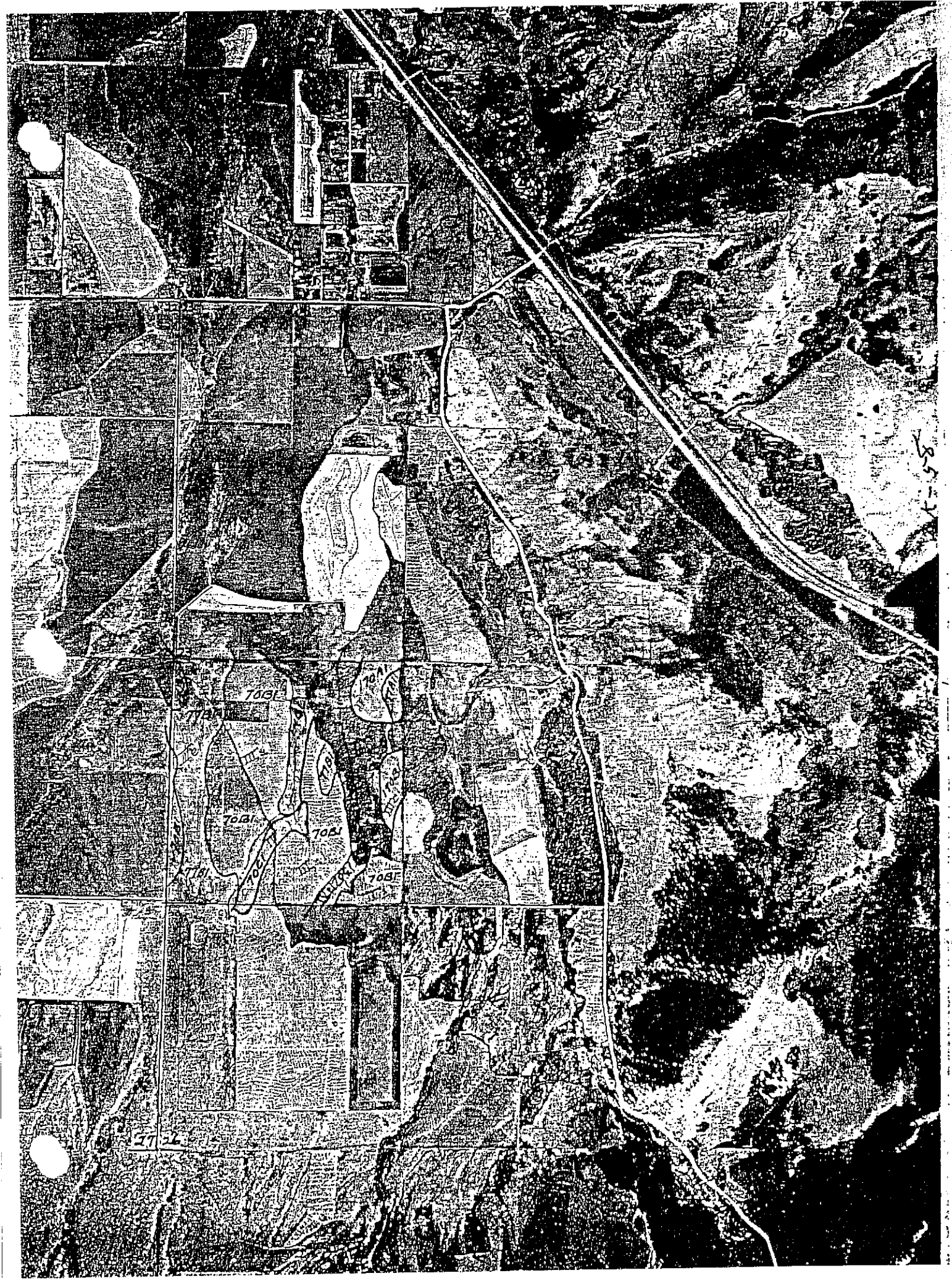
70A	Bozeman silt loam, 0-2% slopes
70B	Bozeman silt loam, 2-5% slopes
70C	Bozema silt loam, 5-9% slopes
70D	Bozeman silt loam, 9-18% slopes
70E	Bozeman silt loam, 18-45% slopes
170A	Bozeman silt loam, seeped, 0-2% slopes. Imperfectly drained during seasons of high water tables.
270A	Bozeman silty clay loam, 0-2% slopes
270B	Bozeman silty clay loam, 2-5% slopes
270C	Bozeman silty clay loam, 5-9% slopes
270D	Bozeman silty clay loam 9-18% slope
270D3	Bozeman silty clay loam, eroded 9-18% slopes. These soils are subject to excessive erosion that has removed the sola and are exposed the lime zone in many areas.
270E	Bozeman silty clay laom 18-45% slope
270E3	Bozeman silty clay loam eroded, 18-45% slopes. These soils are subject to excessive erosion that has removed the sola and exposed the lime zone in many areas

LAMOURE SERIES

These are dark colored, imperfectly to poorly drained Alluvial soils that are usually more than 36 inches deep. They are predeominately clay loam, silty clay loam or loam textures with some statification of sandy loam occurring at variable depths. Some areas may be underlain by sand and gravel at depths below 36 inches. The more poorly drained areas may have thin organic layers of peat or muck on the surface. Modally, these soils are calcareous, but nonlimy phases have been recognized. Because of poor drainage, these soils are strongly mottled and gleyed and some areas show sodic spots within the unit. These soils occupy nearly level to gently sloping bottomlands of the perennial stream valleys and many areas are dissected by meandering stream channels. Primary use of this soil is for hay and pasture.

The following mapping units occur in this series:

14A	Lamoure silty clay loam, 0-2% slopes
14B	Lamoure silty clay loam, 2-5% slopes
214A	Lamoure silty clay loam, mod. deep over gravels, 0-2% slope
314A	Lamoure Silt loam, 0-2% slope
514B	Lamoure silty clay loam, cold, 2-5% slopes


70BI
77BI
70BI
70BI
70BI
77BI
70BI

HUFFINE SERIES

These include well drained, dark colored, silty alluvial soils that mantle very gravelly and sandy deposits on broad fan terraces. They have a dark colored surface soil moderately high in organic matter and overlays a subsoil browner in color and more clayey textured than the surface soil. The C horizon has accumulated and segregated lime and the substrata has loose gravel and sands that is free of any silt or clay. Normally the surface texture is silt loam, but often becomes a silty clay loam texture when a portion of the subsoil has been incorporated into the surface soil through deep tillage. The sola of this soil usually contains a few gravel and cobbles. They occupy nearly level to gently sloping broad fan terraces dissected by shallow stream courses. this soil occurs at elevations of 4000 to 6000 feet and the noraml growing season is from 90 to 110 days.

The following mapping units occur in this series:

77A	Huffine silt loam, 0-2% slopes
77B	Huffine silt loams, 2-5% slopes
177A	Huffine silty clay loam, 0-2% slopes
177B	Huffine silty clay loam, 2-5% slopes
Z	Water Way
Y	Flood Plain

Estimated Soil Limitations or Suited Uses.

Map Symbols and Soil Names*	(As) Amsterdam silt loam; (Av) Amsterdam very fine sandy loam	(Bg) Beaverton gravelly loam; (Bl) Beaverton loam; (Bl) Beaverton loam, dark colored phase	(Bz) Bozeman silt loam; (Bo) Bozeman silt loam, brown phase	(Bc) Bridger silty clay loam; (Bm) Bridger loam; (Br) Bridger gravelly loam	(Bs) Bridger stony loam	(Hr) Huffine gravelly loam; (Hs) Huffine silt loam	(Hs) Huffine silt loam, poorly drained phase	(Hg) Hyrum gravelly loam	(Ma) Manhattan loamy sand; (Mf) Manhattan fine sandy loam (Mf) Manhattan fine sandy loam smooth phase; (Mf) Manhattan fine sandy loam gravelly subsoil phase
Limitations for:									
Cropping	Slight Moderate 3c Severe 3e	Severe 13	Slight Moderate 3c Severe 3e	Slight Moderate 3c Severe 3e	Severe 12	Slight	Severe 2	Severe 13	Moderate 14
Road & street location	Severe 5,9b Severe 3g,5,9b	Slight	Severe 5,9b Severe 3g,5,9b	Moderate 5,8,9a Severe 3g	Moderate 3f Severe 3g	Moderate 2	Severe 2	Slight	Slight Moderate 3f
Urban development -foundations for low bldgs. with basements	Slight Moderate 3f Severe 3g	Slight	Slight Moderate 3f Severe 3g	Slight Moderate 3f Severe 3g	Severe 12	Severe 2	Severe 2	Slight	Slight Moderate 3f
-lawns and landscaping	Slight Moderate 3f Severe 3g	Moderate 12,13	Slight Moderate 3f Severe 3g	Slight Moderate 3f Severe 3g	Severe 12	Slight	Severe 2	Moderate 12,13	Slight Moderate 3f
-parking areas	Severe 5,9b Severe 3e,5,9b	Slight	Severe 5,9b Severe 3e,5,9b	Moderate 3b&c, 5,8,9a Severe 3e	Moderate 3b&c Severe 3e	Moderate 2 Moderate 2,3b	Severe 2	Slight Moderate 3b&c	Slight Moderate 3b&c Severe 3e
Recreation -camp areas	Slight Moderate 3c&f Severe 3g	Slight	Slight Moderate 3c&f Severe 3g	Slight Moderate 3c&f Severe 3g	Severe 12	Slight	Severe 2	Slight to Moderate 3c	Slight Moderate 3c&f Moderate 3c
-picnic areas	Slight Moderate 3e	Slight	Slight Moderate 3e	Slight Moderate 3e	Moderate 12 Moderate 3f,12 Severe 3g	Slight	Severe 2	Slight	Slight Moderate 3f
-ground-	Slight Moderate 3b Severe 3c	Slight	Slight Moderate 3b Severe 3c	Slight Moderate 3b Severe 3c	Severe 12	Slight Moderate 3b	Severe 2	Slight Moderate 3b Severe 3c	Slight Moderate 3b Severe 3c
Waste disposal -septic tank filter fields	Slight Moderate 3c Severe 3e	Slight#	Slight Moderate 3c Severe 3e	Moderate 6b Severe 3e	Severe 3e,12	Severe 2,11	Severe 2,11	Slight" Moderate 3c	Slight Moderate 3c Severe 3e
-sewage lagoons	Moderate 6b Moderate 3b&c,6b Severe 3e	Severe 6c"	Moderate 6b Moderate 3b&c,6b Severe 3e	Moderate 6b Moderate 3b&c,6b Severe 3e	Severe 12	Moderate 6b,11 Severe 6c,11	Severe 2,11	Severe 6c, 11	Severe 6c Severe 3e,6c
-sanitary land fills	Moderate 14 Moderate 3f,14 Severe 3g	Slight#	Moderate 14 Moderate 3f,14 Severe 3g	Slight Moderate 3f Severe 3g	Severe 12	Severe 2,11	Severe 2,11	Slight#	Slight Moderate 3f
Other uses -cemeteries	Slight Moderate 3f Severe 3g	Slight	Slight Moderate 3f Severe 3g	Slight Moderate 3f Severe 3g	Severe 12	Severe 2	Severe 2	Slight	Slight Moderate 3f
-pond reservoir area	Severe 7b	Severe 6c	Severe 7b	Moderate 6b	Severe 12	Severe 6c	Severe 6c	Severe 6c	Severe 6c
Ability as source of:									
Fill material other than embankment	Poor 5,9b	Good	Poor 5,9b	Fair to good	Poor 12	Poor 8,9b	Poor 2	Good	Good
Pond embankment material	Poor 7b	Poor 6c,12	Poor 7b	Good	Poor 12	Poor 7b,8,9b	Poor 2	Poor 6c,12	Poor 6c
Topsoil	Good	Poor 12	Good	Good	Poor 12	Good	Poor 2	Poor 12	Good

mes of soils are tentative and subject

e possibility of groundwater pollution ed where polluted water will drain through coarse, clean gravels and bbles which have little filtering capa-

: These interpretations will not elim site soil investigations for design and construction.

allowed water will drain through coarse, clean gravels and

investigations for design and construction.

EXPLANATION OF TABLE 1 - "Estimated Soil Limitations or Suitability for Selected Uses."

The map sybmols and names of soils given at the top of Table 1 are keyed to the attached soil survey report and map published in 1931. Soils are rated for each of 16 selected uses shown at the left of the table.

Soils rated as slight are relatively free of limitations or have limitations that are easily overcome. Soils rated as moderate have limitations that need to be recognized but can be overcome with good management and careful design. A severe rating indicates limitations that are difficult or costly to overcome. A severe rating does not mean the soil cannot be used for a specific use, but it means that careful planning and design and very good management are needed. In some cases, severe limitations are not economically feasible to correct.

Numbers following ratings of moderate and severe are keyed to 15 limiting properties listed on pages facing Table 1. These numbers identify the major properties which determine the limitations of a particular soil.

All interpretations are based on the upper 5 feet of soil material in its natural state unless otherwise noted. Geologic reports can be of benefit for evaluating material below five feet.

These interpretations are for general planning. All soil differences which occur in the field cannot be shown on a general soil map. Therefore, on-site investigation is needed for specific design and construction.

Unlike modern soil surveys, the 1931 survey does not separate soil areas that are nearly level from those with steeper slopes. Thus, slope percentage must be measured in the field or obtained from topographic maps. Table 1 shows that Amsterdam silt loam, for example, has slight limitations for cropping; moderate limitations if slopes are 5 to 9% and severe limitations if slopes exceed 9%. Other soils such as Bridger stony loam, although they also occur on a variety of slopes, have other limitations such as extreme stoniness which over-ride the problems of slope. Still, other soils such as the Beaverton series occur only on nearly level areas and therefore are not limited by the slope factor.

The 16 selected uses of soil and the properties considered important in evaluating soils for each use are given below:

Cropping is based on the capability of the soils, when properly managed, to sustain cropping without risks of serious soil damage. It is affected by factors such as soil texture, depth, permeability, available water holding capacity, flooding or ponding hazards, salinity and alkalinity, slopes and erosion hazard.

Road and Street Location is affected by depth to seasonal high water table, flooding hazard, load-bearing capacity, frost action potential, stoniness, depth to bedrock and topography.

Foundations for Low Buildings with Basements are affected by soil properties and other related factors such as soil texture and density of the subsoil and substratum, flooding or ponding hazards, seasonal high water table, slopes as related to cuts and fills, depth to bedrock and differential settling of moved material. This soil interpretation does not take into consideration the use of on-site sewage disposal systems.

Lawns and Landscaping are influenced by soil properties such as texture, depth to seasonal high water table, flooding hazard, depth to bedrock, stoniness, salinity or alkalinity of the surface 12 inches.

Parking Areas are affected by properties such as depth to seasonal high water table, flooding hazard, load-bearing capacity, frost action potential, stoniness, depth to bedrock and topography.

Camp Areas for recreation are subject to heavy foot and some vehicular traffic during the camping season. Soil properties and related factors of importance are depth to seasonal high water table, flooding or ponding hazards, permeability, slope, soil texture, stoniness, and degree of rockiness.

Picnic Areas for recreation are subject to heavy foot traffic. It is assumed that most vehicular traffic will be confined to access roads. Soil properties and other related factors of importance are depth to seasonal high water table, flooding hazard, slope, soil texture, stoniness and degree of rockiness.

Playgrounds for recreation are subject to heavy foot traffic. Soil properties and other related factors of importance are soil texture, depth to seasonal high water table, flooding or ponding hazards, depth to bedrock, stoniness and topography.

Septic Tank Filter Fields are influenced by the ease of movement of effluent through the soil. Related factors are seasonal high water table, flooding hazard, slope, depth to bedrock, hydraulic conductivity and ground water contimination hazard.

Sewage Lagoons are rated on the adequacy of the soil material to prevent water seepage from the lagoon. Soil characteristics affecting sewage lagoons are hydraulic conductivity, slope, depth to bedrock, coarse fragments, stoniness, soil texture and organic matter.

Sanitary Land Fills are designed to operate without contaminating water supplies or causing health hazards. Important soil related factors are texture, seasonal high water table, depth to bedrock and topography.

Cemeteries are affected by soil properties and other related factors such as seasonal high water table, flooding hazard, depth to hard rock, slope, stoniness and soil texture.

Pond Reservoir Area is rated on the adequacy of the soil material to prevent water seepage from the reservoir. Soil properties most important are hydraulic conductivity and seepage rate, depth to water table, and organic matter content.

Fill Material Other than Embankment is rated on the basis that the material is removed and transported to another location to be used as fill material. Important factors are texture, stoniness, soil depth, seasonal high water table, frost action potential, salinity and alkalinity.

Pond Embankment Materials are those features of disturbed soils that affect their suitability for constructing earth fills. These include compaction characteristics, compacted permeability, susceptibility to piping, salinity and alkalinity and organic matter content.

Topsoil is rated on soil properties such as texture, thickness of the surface layer, presence of coarse fragments, organic matter content, wetness of the surface layer, salinity and alkalinity.

Limiting Soil Properties and Hazards Indicated by Number in Table 1

1. Frequency of flooding or surface ponding

2. Seasonal ground water table within 3 feet

3. Slope percentage:

   a. Less than 2
   b. 2 to 5
   c. 5 to 9
   d. Less than 9
   e. More than 9
   f. 9 to 15
   g. More than 15

4. Relief

5. Load bearing capacity

6. Hydraulic conductivity (inches per hour):

   a. 0.20 to 0.63
   b. 0.63 to 2.00
   c. More than 2.00

7. Susceptibility to piping:

   a. Moderate
   b. High

8. High organic matter content

9. Frost action potential:

   a. Moderate
   b. High

10. Salinity and alkalinity

11. Ground water pollution

12. Coarse fragments (gravel, cobble or stones)

13. Depth to loose sand or sand and gravel

14. Soil texture

15. Depth to bedrock (less than 40 inches)

NOTE: These interpretations are for general planning. On-site investigation is needed for specific design and construction.

DEVELOPMENT PLAN

The basic objective of the development plan is to provide a guide for future growth within the Bear Canyon Zoning District. The plans must take into account the natural conditions and limitations of the area as well as the development opportunities.

The plan for the Bear Canyon Zoning District should be guided by two major ideas:

1) The majority of the people residing in the area either farm or reside there because they prefer a rural farm-oriented lifestyle.

2) The area's natural environment places many limitations on most types of development.

In working with these two major factors, it must be emphasized that legal restrictions are placed on county government through state statute for use of zoning and enabling legislation. The zoning statute used to develop this plan does not provide for specific environmental protection measures. In fact, it prohibits the regulation of lands used for grazing, horticulture, agriculture, or for the growing of timber. Nonetheless, it is important to carry out to the fullest extent the provisions of state law for zoning and for protecting agricultural interests, even as they extend to development.

Agriculture is the predominant activity in the district. The goal of regulation should be to preserve the integrity of the farm, and also to recognize adverse economic conditions that often confront the agricultural community. The plan suggests flexibility when decisions are made on the area's land use that will serve the farm's interests.

This plan, then, recognizes the following influences and limitations on the zoning district.

1. The Bear Canyon area is a prime agricultural area of Gallatin County. Its setting, location, and farm orientation contribute to Gallatin Valley's scenic qualities, and make it an attractive possibility for future residential, and other, growth.

2. Farming is the prime occupation in the district, but the family farm must have development options if the farm cannot remain economically viable.

3. Development should be encouraged in the district, in ways that encourage the viability of the family farm, and that are not unnecessarily restrictive in this regard.

4. The area is marked with significant physical limitations resulting from the Bear Creek floodplain. High water table in many areas will also limit development, as will a steep slope on the east.

5. Although not cause enough to prohibit development, the fault line bisecting the district should be recognized by any activity in the immediate vicinity.

6. There are limitations placed on development by county, state and federal legislation concerning floodplains.

Summarizing ideas throughout this plan, it can be concluded that Farming is the over-riding influence within the Bear Canyon Zoning District and its viability is in direct proportion to development in the area. In formulating the contents of this plan, information contained within the various sections in the forepart of the report was considered as well as the above general ideas. The plan tries to allow a level of development without a great deal of review and regulation hoping to permit a realistic economic return on private land but still maintaining environmental quality. The plan also provides for maximum development of land through proper environmental studies and designs, and proper review by local governing officials.

ELEMENTS OF DEVELOPMENT PLAN

In looking at the elements within the development plan, one must again remember the over-riding farming influence on the area. Generally it is expected that only two and maybe three general uses of land will occur within the district. The major use is residential, with a smaller chance for commercial, and perhaps a third use of light manufacturing. Schools and public institutions are provided for, but will most likely remain at their existing sites. The designated land uses zones are shown on the accompanying map.

RESIDENTIAL

The most probable type of development to occur within the zoning district will be that of residential. Residential units will consist primarily of single family dwellings. There is a possibility of some multi-family dwellings, condominium projects, and mobile homes. To provide a use by right, the plan designates the majority of the zoning district for residential use. Every acre in the district carries with it one development right. The density by right is one residential unit per acre, or one per five acres (see map). It is anticipated that state regulations on subdivision of land and on location of septic disposal systems will prevent the location of residential buildings on wetland, floodplain and on areas with an excessive gradient.

It is also the intent of this plan that private land owners will understand the environmental qualities and environmental constraints of the area, and instead of using large tract development, will cluster development using proper planning techniques. To encourage them to do so in residential developments, a provision is made (see Cluster Development Section of Ordinance) to allow maximum development or densities with proper studies on environmental conditions and proper review by local governing officials.

MOBILE HOMES, PARKS

It is felt that the free use of mobile home parks within the Bear Canyon Zoning District would detract from the aesthetic qualities of the district. On this basis the plan allows mobile homes provided that they meet general housing construction standards, and that parks meet given standards as a conditional use.

NEIGHBORHOOD COMMERCIAL

Because of its proximity to an interstate interchange and population concentration, commercial facilities should be recognized as a legitimate use. Care should be taken to screen commercial activities from nearby residences, and the types of commercial uses should be compatible with residential. Commercial development should be concentrated close to the highway, and located in areas otherwise unsuitable for residential development.

CLUSTER DEVELOPMENT

It is the intent of this plan that any significant development will be through the use of the cluster development concept which provides for maximum development based on environmental studies and public review. Density within the cluster development should generally not exceed four units per acre. Cluster development proposals should take into account and be judged by the application of current understanding of land use planning, soils mechanics, geology, hydrology, environmental and architectural design, and environmental control. Such application should include, but not be limited to:

1) planning of the development to fit the topography, soils, geology, hydrology, and other conditions existing on the proposed site;

2) orienting development sites so that grading and other site preparation is kept to a minimum;

3) allocating adequate and sufficient open space and recreational opportunities;

4) clustering and placing structures to compliment one another and the natural landscape;

5) demonstrating concern for view of the hillsides as well as use from the hillsides;

6) use of a variety of housing types in residential areas to permit steep slopes, wooded areas, and areas of special scenic beauty to be preserved; and

7) minimizing disruption of existing plant and animal communities.

SIGNS

Signs should be allowed in the district, provided that they do not conflict with other uses or disrupt the district's scenic resources. Commercial businesses should be allowed on-site signs to properly identify and locate their places of establishment. Major developments and subdivisions should also have adequate signing to locate established areas. All roads and streets need to be signed. Farms and residences should be permitted signs for sale of produce produced on-site. Off-premise signs advertising businesses miles away should only be permitted in a restricted area adjacent to the interstate.

Amendment Procedure

This Plan may be amended whenever the public interest and the general welfare require such amendment and according to the following procedure.

A. The petition of one or more land owners of property affected by the proposed amendment, which petition shall be signed by petitioning land owners and shall be filed with the Subdivision Review Department and shall be accompanied by a fee of $125.00 payable to the County of Gallatin, no part which shall be returnable to the petitioner; or by

B. Resolution of intention of the Board of County Commissioners; or

C. Resolution of intention of the Bear Canyon Planning and Zoning Commission.

Notice of Hearing: Whenever an application for a plan amendment is filed, a public hearing thereon shall be held within sixty (60) calendar days after the filing of the application. At least fifteen (15) days before such hearing, the Planning and Zoning Commission shall:

A. Mail notice to all persons owning property within 300 feet of the exterior boundaries of the area occupied or to be occupied by the use for which the permit is sought, or

B. Give notice by publishing notice of hearing in the newspaper of general circulation in this County.

Decision: After completion of the public hearing, the Bear Canyon Planning and Zoning Commission shall make its decision in writing, which decision shall include findings of fact.

CONCLUSION

This Bear Canyon Plan is intended to guide those involved in the development process in the Bear Canyon Zoning District, including interested citizens, developers, and those who make land use decisions. A policy direction is set forth in this document which reflects the special needs of the Bear Canyon area. As these needs change, it will be necessary to update this plan. Until that time, adherence to the concepts of the plan will be necessary to assure development consistent with the desires of those residing in the Bear Canyon Zoning District.

DATED this 28TH day of May, 1987.

BEAR CANYON PLANNING AND ZONING COMMISSION

Jane Jelinski
JANE JELINSKI, CHAIRMAN

Wilbur Visser
WILBUR VISSER, MEMBER

Ramon S White
RAMON S. WHITE, MEMBER

Gerald Wine
GERALD WINE, MEMBER

Arletta Derleth
ARLETTA DERLETH, MEMBER