COMPREHENSIVE PLAN

VILLAGE OF BEE CAVE

PREPARED BY STUDENTS IN THE COMMUNITY AND

REGIONAL PLANNING PROGRAM

SCHOOL OF ARCHITECTURE

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COMPREHENSIVE PLAN: VILLAGE OF BEE CAVE

Contents

Foreword

> "The concept of the public welfare is broad and inclusive. The values it represents are spiritual as well as physical, aesthetic as well as monetary. It is within the power of the legislature to determine that the community should be beautiful as well as healthy, spacious as well as clean, well balanced as well as carefully patrolled."
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> *United States Supreme Court, 1954 Berman vs. Parker, 348 us 26, 75 Supreme Court 98, Ed. 27 (1954)*

Municipal governance is not only the operation of a public business. It is also the means by which a community can create and protect the values it favors. The elected officials should bear in mind that although their tenure is temporary, the community remains long after they have presided over its future. Citizens who must deal with the decisions made in the past will not only note the economic consequences of their decisions, they will also have to deal with the physical environment which has resulted from thoses earlier decisions. Aesthetic ansd spiritual comfort within the community is important. Just as health and safety standards must be met, long term residents and users of the municipal assets should feel at ease in the community created for them.

It is important, therefore, to prepare a comprehensive plan with a picture of the ultimate environment to be achieved in qualitative as well as quantitative terms. This is not easy. It may involve conflicts and controversy, but as long as there is a citizen community, the government must be sure that the community participates in setting future values in order to create a satisfied community.

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Bob Hocking	-Former Mayor
William Gorasuch	-Cornerstone Developments
Don Walden	-Riata Corporation
Ronald Earle	-Chairman of the Bee Cave Land Use Commission
Gressler	-Consultant Engineer
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Introduction

The project developed out of a meeting with the mayor of Bee Cave, Bob Hocking, Don Walden of Riata Associates and Bill Gorasuch of Cornerstone Developments, who sought an organized planning position in and around Bee Cave where developments under their authority were evolving. It seemed wise to prepare a "game plan" and strategies where certain standards could be implemeted for the future benefit of the community in the local region. The Homestead, the Uplands and the Bohls Ranch are major developments which will have enormous impact on Bee Cave, and will constitute - with other future urban projects in the vicinity - a large market which could be served by the commercial and entertainment facilities in the village. Although Bee Cave has an unusual boundary with a large proportion of its area assigned to commercial uses, the proposal for a planning project posed a significant educational experience for planning and architecture students.

A zoning ordinance was urgently requested, but zoning must be based on a reasonable comprehensive plan. In order to develop a comprehensive plan, an inventory of existing uses and environmental character was necessary. During the Fall semester of 1987 the Land Use map was prepared and a set of maps was developed to indicate drainage, soils and geology, slope and vegetation. This effort continued throughout the spring of 1988 with an investigation into what this inventory posed in the way of limitations to the village.

Students visited agencies and institutions to gather information on such matters as highway plans, sanitary laws, water quality, vegetation and wildlife, local development proposals, historic sites and model land regulation ordinances.

A brief text and map set was produced and presented at a town meeting at the end of the Fall semester, and we agreed to proceed with a draft plan and model zoning ordinance for Village approval. The work was completed during the Spring semester. In addition, a model of Bee Cave was built to illustrate how the topography affects planning decisions in the area. Slides of any maps produced can be projected on to the model to illustrate how the information affects the environment. While the model is not a "planning tool" in and of itself, it is an effective way to convey information about the village and its development. The model can be used by the commissioners when discussing both land use and zoning issues.

In addition to the Goals and Policy Report, the Spring semester class proposed a model zoning ordinance based on the policies outlined (author David Patton). A paper devoted to political aspects of the transfer of powers from the County and other agencies to a newly incorporated village has also been prepared (author David Simpson). A further document is also in progress. The document is a thesis topic which explores water and wastewater options for Bee Cave as development pressures intensify and environmental impacts accumulate (author Tom Leaf). The expected completion date for this document is December 1988.

Class members reviewed numerous documents, from goals definition to planning diagrams, to illustrate how policies can be explained. Much of this analysis has been simplified and summarized in this report. Many are examples of urban development policies in place in other communities and can be used in the Village if adopted. The policies reflect similar goals to those identified for Bee Cave; namely the protection and enhancement of the qualities desired by the community as well as the support of

positive economic opportunities for landowners and residents.

The Bee Cave Comprehensive Plan and associated documents are presented to the people and Village Commissioners in the belief that it can benefit the community economically, aesthetically and qualitatively if future development is dealt with from a community standpoint. The Village can develop an image which is indistinguishable from any other strip development, or it can provide a significant difference based on community character which is an attraction from those strips to Bee Cave as a desirable place to visit.

The Bee Cave Comprehensive Plan

The Comprehensive Plan is an advisory document which states how the Village wishes to grow and what activities it wishes to advocate. The plan is linked on a set of goals which must be identified before any regulations can be decided upon. The Comprehensive Plan is not a legal document, nor does it spell out the means for implementing its parts. The procedures for implementation, once the Village has decided on the policies it wishes to adopt, are spelled out in detail in regulations which include zoning and subdivision ordinances, building codes and standards, guidelines to suggest how to meet the required policies, and in any other regulations the community might require to meet its goals. For example: floodplain protection, drainage, landscape, roadway and other ordinances might be required to meet the special needs of the village. These ordinances must be consistent with the underlying philosophy expressed in the Comprehensive Plan. They must be non- discriminatory, and applied to ensure equity. If they are "frivolous", citizens can protest their enforcement.

Some local functions are governed by State or County laws regulating health, hazards, traffic and drainage, in addition to water and air pollution. The Village will be expected to meet the minimum requirements of such laws. In many cases County, State and Federal regulations must be satisfied before development may proceed. These regulations are not set out in the Comprehensive Plan. The implementation of the plan and enforcement through ordinances and regulations drawn up to meet the Village goals must be carried out within the framework of the legislation designed by the Village Commissioners and the higher agencies of government.

This Comprehensive Plan consists primarily of a statement of goals and a catalog of recommended policies in support of those goals. The recommendations in this report may appear more extensive than is needed, but they have been developed from the goals statements originally outlined. The community may therefore wish to modify or simplify the details of the planning policies. Regardless of how this is accomplished, the government of the Village has a responsibility to state, and to receive community acceptance of, what the goals are and what must be done in order to achieve them. The long term welfare of the community at large is in the hands of the elected officials and each citizen has a stake in its success.

Whatever plan is finally adopted for Bee Cave, it is important to make decisions regarding the future on the basis of comprehensive information, and on the basis of what alternatives are available and the associated policy implications. Economic and social equity are inherent in any plan for the future, and the Village Commission can develop the means, through a comprehensive plan, to assure this in the future.

The Comprehensive Plan and the Village Economy

Since the Village has a stake in promoting a sound economic base in the form of sales taxes, the primary task involves the development of criteria and subsequent regulations that would make Bee Cave a more desireable place to be in and spend time in, more so than any of the other commercial locations in the area. For this reason it is important that the Village study what forms of commercial complexes will attract customers, and what kinds of uses will encourage the greatest production of sales tax revenue, without distracting from the desirable qualities sought in the plan itself.

Significantly, aesthetic, environmental and qualitative features will prove more critical than the mere provision of commercial acres. Zoning land for commercial uses in itself will not result in the most beneficial economic return. Creating a noteworthy, desireable development within the commercial areas will assure a continuing and increasing use of facilities as populations expand in to the surrounding region. Bee Cave, as the focus of a Highway 71 corridor, and in which people would prefer to stop, shop, eat and find entertainment, will prove to be economically beneficial.

Given the inevitable competition of commercial areas along Highway 71, FM 2244 and FM 620, Bee Cave should seek to attract a large market by providing the best, and therefore the most profitable, commercial development in the region.

The concept of a Bee Cave village center, where a low key, rural atmosphere creates a special place different from the nearby, growing, strip developments in the vicinity, and which provides a wide variety of visual change and shopping choices, with

landscaped, safe and attractive facilities, could be the ultimate goal which supersedes zoning and building regulation. The community can create a place where people can obtain what they want in a setting they prefer.

.Bee Cave could be a landmark center at the intersection of three major highways in a growing area of Travis County. It could become a gateway to Hamilton's Pool, Pace Bend and other Hill Country attractions.It will take imagination and cooperation, but other towns such as Wimberley have created a special image and have attracted recurrent activities which benefit the local economy. Bee Cave could become the Hill Country suburban village __ a place to visit because it is DIFFERENT from everything else on the highway.

Socio-Economic Characteristics

A Comprehensive Plan, by custom, includes a statement about the socio-economic characteristics of the community and some discussion of projected growth rates. We have not done this for Bee Cave. The available statistics for census tracts, which embrace areas much larger than the village, the unpredictable growth patterns in the region and the impending developments of Bohls Ranch and The Uplands makes any prediction of growth over the next few years virtually impossible for a small community like Bee Cave.

The slow down in the general economy in the past four years and the large numbers of housing and business foreclosures suggest that profitable development may take some years to mature. However, a market analysis for Bohls Ranch, made as recently as 1986, predicts a demand in the area for suburban housing. The Bohls Ranch and The Uplands developments are proceeding despite local economic circumstances. Bee Cave is in the path of outward development beyond these projects toward the Hill Country. It is also on a major access road in to Austin, and can exploit its location at the intersection of the three major traffic routes in the area.

With a total population of only 250 people of all ages, developing significant statistics on births and deaths is impractical. Population growth in the Village will be largely by in-migration as development occurs. Thus, economic change will come about through migrants, bringing their incomes and capital with them.

A large increase in population will put pressure on local facilities: schools, parks, health centers and other community functions, whether or not the facilities are in

Bee Cave. Fire, police and municipal utilities will need consideration. Increased well draw-off and increasing sewage needs may necessitate planning for piped services, supply and disposal. Increased runoff arising from development will cause environmental and pollution problems in and downstream of the Village. The Village will have to deal with these and other problems in due course. State and Federal laws will be involved. They should prepare to deal with them administratively, technically and fiscally as population increases and age and income changes occur.

Planning Goals

The Village of Bee Cave, incorporated as recently as 1987, has begun the major task of preparing a comprehensive plan, zoning and subdivision ordinances in order to establish an effective means of protecting the rural quality of the area. It is also important to improve the economic opportunities available in the village. In order to do this the future development of commercial properties should be planned so that they are attractive to a wider population in the region. Factors which contribute to this attraction are identified in this report. These factors relate to the visual quality of the development which takes place and to the means by which highway frontages are designed and co-ordinated with one another. They could be generally identified as "urban design" policies which might be implemented under the overall goal of improving economic opportunity in the community.

Discussion with officials of Bee Cave and site observations of existing and proposed developments helped us identify five major goals for the community.

1. To protect the rural character of the village.
2. To maintain a low density pattern in the development.
3. To promote the safety and convenience of highway related developments
4. To prevent surface and sub-surface water pollution in the Barton Creek watershed and to protect the natural amenities.
5. To promote economic development and increase village revenues

All the suggested policies and recommendations in this report are based on these five goals. Implementing the goals will involve consideration of many issues, from alternative sanitation options to convenience and quality of parking lots. Access from main highways and protecting aesthetic and heritage features in the village will also require attention.

The list is not exhaustive. Residents may develop further possible policies to augment and satisfy the goals they set for themselves. Other goals may be modified or omitted as the community consensus evolves. It is important for the comunity to be aware of the means they have to see their goals implemented and to enact ordinances which facilitate their goals.

The Village must attempt to deal with the many issues in a comprehensive way, given that piecemeal or ad hoc judgements which do not deal with the community goals could defeat the purpose of incorporation. The potential result of a poorly planned environment would discourage economic growth as it does not offer any greater benefit to buyers who have the option of patronizing other uncontrolled strip development along our highways. Completion of highway improvements will bring further competitive strip developments. If the village officials have an image of a "center" for shopping and entertainment they can promote planning which supports that image and draws people from far afield.

Planning Concerns relative to Goals

Rural Character and Economic Growth: Competing or Compatible Goals

Two goals which seem to be in opposition to each other are *the desire to increase sales tax revenue* and *the desire to preserve rural character*. However, the principal purpose of a comprehensive plan is to achieve the goals set for the community. In order to do this Bee Cave should pursue policies which identify how these apparently mutually exclusive goals can be integrated. By setting up land use regulations which deal with building coverage and building heights while protecting and planting native vegetation in open places, parking lots, and along lot boundaries, the rural low-density, character can be perpetuated. Also, by specifying how parking lots are distributed, the general character of building materials and layout, and the location of signs and their location, the overall quality of the village commercial sites can be kept high . Shoppers will prefer to use these places because of their character and attractiveness. The two goals are not necessarily mutually exclusive. Businessmen, residents and outside users will all benefit, and sales tax revenues will be supported.

Adherence to a "plan" will draw businesses that prefer the security and added profit of a well organised commercial center. Planned developments have proven to be more marketable, and Bee Cave should take advantage of this situation, by using planning principles in residential as well as commercial areas. Attention to the features which attract people and using design and planning features which encourage customers, will enhance and sustain the economy of the community

It will be noted that this statement suggests the Village should become involved in controlling random and incompatible commercial development within its

boundaries. While this is regulation of private land decisions, it is also the means by which a well designed and planned community can support its character and quality. This will always be a controversial problem, but citizen desire to promote a permanently beneficial economy should be discussed and the merits of such protective regulations made known. Effective community planning requires an overall understanding of the intent of the plan and the purpose of its regulatory controls, which are established to protect the economy and quality of the community.

Visual Character: Signs and Views

The Village should restrict the height, color, lettering size and location of all commercial and private signs. The policy to protect the rural nature of the area and make it also attractive economically can be met by asking that signs be constructed of local and "indigenous" materials. Also, by protecting views of characteristic places such as stands of trees, valley slopes, horizon lines, historic and unusual features the character of Bee Cave can be protected and reinforced even though development takes place. The heights of buildings and their bulk should be of concern if the goals are to be implemented.

Signs:

1. To protect the safety of motorists and pedestrians against danger and distraction because of inappropriate signs
2. To construct signs which meet the intent of the goals and are in harmony with the surroundings
3. Locate and design signs so that the important characteristic of the Village, its rural. Hill Country image , is protected
4. To make the Village attractive to visitors to trade and enjoy their entertainment there

5. To ensure that the Village remains attractive in the future

Views:

Avisual survey of the Village suggested that the natural beauty of the area is best represented in the landscape south of Highway 71, as seen from the higher land to the west of the highway and from heights in surrounding areas. Therefore protective policies should:

1. Protect the value to Bee Cave of the natural environment, which can establish its identity as a commercial attraction

2. Preserve and enhance the traditional rural character of the Village

3. Require review of development plans to assess whether they will have negative impacts on the intent of the Village goals

4. Develop guidelines for building heights and bulk, and encourage development compatible with the community goals

Conservation, Historic Preservation and Rural Character

This comprehensive plan and its associated reports underscore the primary necessity to protect the surrounding natural environment from pollution and damage. Another goal has been the promotion of the rural character, which is a far less objective task. The reasons cited for the protection of the natural environment are many and varied. These include preventing class action law suits which the state, county and city of Austin could potentially bring to bear against Bee Cave, should the community fail to implement proper measures that protect water quality in Barton Creek or adversely affect endangered species and other wildlife. This report also attempts to show the value of the natural environment and its unique presence in the village as a potential attraction to commercial clientele and development.

Criteria for the maintenance and protection of the rural character of the town are not so objective or as easily prescribed as the above criteria regarding protection of water resources and the "micro-climate" of the region. The two objectives are related inasmuch as the protection of the fragile environment mandates lower densities of development in both commercial and residential areas.

Locating and targeting potential commercial users and markets is of major concern to the economic viability of any development. It may therefore be assumed that this market has consciously chosen to live outside the more centralized developments of Austin, and opted to locate in an environment that is, for all intents and purposes, rural in nature. This intent is reflected in the planned residential developments that surround the community, the deed restrictions which limit the amount of residential development on already exisiting tracts of land; and the interviews and feedback with

and from current residents of the city.

Some strategies for protecting this rural quality have already been outlined in sections of the comprehensive plan, yet other steps may be taken by the private sector. These steps include the recognition and preservation of structures with historic significance. One approach to preservation most approproate for community consideration is adaptive-use. This approach is a form of preservation involving a new use for the building, and hence may allow for modifications and alterations to the building.

Major Texas cities during the 60's and 70's established a landmark commission placed under the purview of their planning department whose task it was to designate properties that should be considered landmarks. Criteria for such a status were along the lines of the building's association with a person or event of the city's history as a cultural or ethnis group; a building which exhibited architectural innovation, or engineering feat; a site which is likely to contribute to the ambience of the city or neighborhood; or an archaelogical site or place of significance to the city. Yet historically, should an owner not wish to attain such a status, the planning department has respected the wishes of the individual.

Ad Valorum tax incentives can be one means by which the city can promote a preservation effort. In such instances policing action available to the city is then instituted through the issuance of the building permit, which is a necessity to build, demolish or move a structure. Zoning for an historic site is typically demarcated as R.H. or C.H.; that is, residential historic or commercial historic, respectively. In the private sector, a deed restriction can be placed on the structure and its maintenance.

Such restrictions cannot be removed by the current or future owner of the property. From the federal government standpoint, an investment tax credit has been established which allows developers and investors to credit back a portion of the investment places into the building. This 10% credit does apply to buildings not on the National Register (or as much as 20% for registered buildings) with a certified rehabilitation of any structure over 50 years old.

The Texas Main Street Project is also available to aid the town with the design "image". Its major emphases are signage, window display and arrangements of building's interiors, architectural aid, and is primarily involved with façade rehabilitaiton. This office and its staff can provide a town with conceptual drawings of façade design and architectural advice to owners of historic properties.

This report recognizes several buildings within the Bee Cave city limits which may be considered for adaptive-use or more intensive preservation efforts. This statement can remind and inform Bee Cave citizens that the older buildings and sites of the community all of which have a local history, should be considered as magnets which draw the public from surrounding communities to commercial developments, and further, are a patrimony of the city worth preserving through public or private measures and incentives.

Preservation of Historic Sites:

1. To protect and enhance unique characteristics of the Village, thereby increasing its attraciton to surrounding developments
2. To preserve the elements of the community which serve as reminders of the Village's historical beginnings

3. To make certain sites in the Village eligible for possible grant programs and tax benefits
4. To attract more tourist-related and commuter trade by creating a Village Center interesting enough to entice motorists to halt

The Village of Bee Cave should advocate designaiton of historical sites by encouraging owners of those properties to apply for listing in the Naitonal Register of Historic Places and/or for site designation through the placement of Texas Historical Markers. Although both programs operate on a case-by-case method for review, each follows different criteria for evaluation of basic eligibility.

Ai) Criteria for Nomination to the National Register of Historic Places:

1. Property must possess "significance" in American history, architecture, archaeology, and culture" AND
2. Property must possess "integrity of location, design setting, materials, workmanship, feeling and association" AND
3. The historical event which occured on the property must have made a significant contribution to history, OR be associated with a person significant in history OR represent distinctive characteristics or high artistic values OR yield important historical information

Aii) Ineligibility for Inclusion:

Some sites are not eligible for inclusion in these descriptions because they are already accounted for under other laws and programs of the various government agencies. For example:

1. Cemeteries, birthplaces, or graves of historical figures

2. Structures that are no longer on their original site

3. Reconstructed buildings

4. Commemorative properties

5. Structures with unsympathetic modifications

6. Structures whose significance was reached less than 50 years ago

Bi) Designation of a Recorded Texas Historic Landmark:

1. Structures must be significant in history and preservaiton

2. Proposed landmark must be in good repair

3. Individuals are eligible 20 years after their death and only on their own merit

4. Events are eligble after 30 years if they changed the course of history

5. Institutions must be at least 100 years old OR 2/3 the age of the community

Bii) The folowing items may make buildings ineligible for designation:

1. Sanblasting

2. Removal of architectural features

3. Inappropriate signage

4. Destruction of archaeological resources

5. Later additions that detract from the original plan

6. Innapropriate roofing or window shutters

7. Inappropriate windows

8. Aluminum windows

9. Inappropriate porch reconstruction

10. Alteration of steps, skirting or porch

11. Unsympathetic replacement of mortar

12. Unsympathetic removal of paint

13. Imitation of an earlier style

Land Use, Residential Densities and Sanitary Restrictions

Densities:

Since economic constraints will eliminate the possibility of municipal sewage and water systems in Bee Cave for the next decade, the limits of present day sewage and water systems must be examined. At present, the residential stock of Bee Cave is exclusively single-family residential housing. These houses use septic tanks and well water. The use of these systems prescribes the lot size for each dwelling, so that the systems can operate effectively and safely. Due to these conditions, Bee Cave must establish density limits based on sewage and water system capacity.

Problems associated with the the present water supply conditions include falling water levels of wells, and the necessity to utilize bottled water for drinking purposes due to high coliform bacterial counts.

As Bee Cave approves more residential subdivision plats for development, residential density will increase In 1987, the density level for single-family residential housing was 2.5 acres per unit. In 1988, with the approval of 400 single-family housing units on 320 acres (0.8 units per acre), the residential density begins to approach one unit per acre.. This lot size limits the placement of well and septic fields within each lot. Bee Cave officials should limit lot size so that septic fields from neighboring lots or subdivisions do not overextend the capacity of the soil to filter wastes and will not contaminate well water or water runoff toward creek beds. A limit of 1.5 units per acre, with stringent subdivision review concerning the sewage and water limitations, is suggested to retain Bee Cave's present residential and environmental quality. (County lot area requirements follow this section.)

Funded by private means, some subdivision developments accommodate their increased sewage and water demands by providing evapo-transpiration fields and piped water supply systems for the subdivision. In this way, density limits can be modified if the engineering for the subdivision shows an ability to control intake and output. Bee Cave should explore ways to form partnerships with such private interests to ease sewage and water constraints in the Village.

In 1987, the first multi-family residential housing development was proposed in Bee Cave. Multi-family developments have unique sewage and water problems since the developments usually do not own land of sufficient size to implement septic fields and wells to service this greater residential density. Since municipal sewer and water systems will not be built in Bee Cave in the near future, multi-family developments, which usually require such systems, should be discouraged, since they add an infrastructure load to the rural sewage and water systems found presently in Bee Cave.

If multi-family developments plan to use sewage and water systems that work on a community basis, then, after a review for sanitary and environmental impact is made, the multi-family restriction can be lifted and Bee Cave can explore ways to cooperate in this privately funded system.

Sanitary Restrictions:

The village of Bee Cave must enact sanitation regulations that set minimum requirements for lot sizes, otherwise County standards must be met to protect the

health of the residents. Septic tanks require stricter restrictions when the site is not served by a public water system.

County Standards for Residential Lots where No Public Water System Exists.

1. Lots not less than one acre
2. Not less than 1/2 acre of contiguous land on each one acre lot must be under 15% slope
3. Not less than 3/4 acre of contiguous land on each one acre lot must be under 25% slope

County Standards for Residential Lots Serviced by Public Water Supply.

1. Lots not less than 1/2 acre
2. Maximum slope requirements are the same as for no public water supply (see above)

Commercial lot sizes will be determined by the size of the sewage unit. If the impervious cover exceeds 20% of the lot, a detention pond must be put in place on commercial properties. The County will be reluctant to permit land uses which will consume large quantities of water. Establishments such as car washes and washeterias may not be allowed if they remain on septic tanks.

Exempted Lots- Those subdivisions that were platted before January, 1988 under a less strict set of requirements will be allowed, even if the approved lot sites are smaller, provided that the lots will be supplied with water from a public water system.

Densities of Land Uses in Bee Cave:

EXISTING LAND USES	LOT SIZE OR LAND COMMITMENT
Single Family Residential	2.5 Acres/Lot (74 units on 185 AC)
Multi Family Residential	None
Commercial	3.2 Acres/Lot (28 units on 90 AC)

Commercial Acreage in Bee Cave

Although policies in Bee Cave are predicated on favoring commercial development in order to support sales taxes, the Village Officials should be alert to the large imbalance of commercial to residential land. Figures indicate that about 900 of the 1600 acres in Bee Cave are either committed to commercial uses or are intended to be commercial. Many smaller communities in the past have allocated large percentages of land to potential commercial use. Much of it remains poorly used or unused. It is not sufficient simply to zone land for commercial use. This does not mean that businesses will automatically prosper. Many overzoned areas show banktruptcies, sub-standard buildings and signs and poor maintenance. Lack of funds causes deterioration. Shoppers other than the "locals" go elsewhere for a more positive experience.

Nine hundred acres exceeds the area of the central business district of Austin. The Village should support quality residential development in keeping with the densities already approved in recent plans. There will then be an increasing, active and identifiable Bee Cave community and image and residents will support a more compact, well patronised and attractive Bee Cave Center.

It is recommended that the Village should control massive commercial zoning in order to achieve a more balanced growth, with citizens and businessmen and women equally satisfied with the community they have created.

As stated elsewhere in this report good urban design and co-ordinated planning layouts will, in the long run, prove more viable than simply allocating large areas to commercial uses and strip development.

Protecting Sensitive Areas

Bee Cave is located within the highly sensitive Barton Creek Watershed. Drainage within the village boundaries discharges into the principal runoff areas that feed Barton Creek. Four relatively large tributary draws contribute to the Edwards Aquifer Recharge, converging with little Barton Creek along the southern boundary of Bee Cave and flowing into Barton Creek immediately east of the Village boundary. These small creeks are extremely fragile and are considered to be part of the floodplain habitat. Unique vegetation characteristics with a relatively large canopy closure provides protection for many diversified wildlife species within the watersheds. In fact, the Golden Cheeked Warbler and the Black Caped Vireo are two endangered birds which have been reported in these areas.

While over time much of the land has been altered for commercial, residential and agricultural uses (cleared of Juniper breaks and brush, cutting and filling for site preparation, etc›), the hollows, ravines, bluffs, and fault areas are relatively undisturbed.

<u>Runoff and Drainage</u>

Because of the locally impervious nature of the substrates, if future development does not respect these natural drainage systems, the potential is high for flooding. Erosion and sedimentation and the degradation of Barton Creek are probable. Two extremes of runoff from developments are of ecological concern to the village of Bee Cave (1). Short intense rainfall events which wash pollutants from road surfaces, parking lots, etc. but are not of enough volume to dilute toxic concentration levels

and (2). a large storm with a significant volume of precipitation resulting in increased scouring, erosion, loss of vegetation and sedimentation. The following is a list of runoff control measures reccommended for the Village in its development processes:

1. Use the results of this study and other available information to determine a density of commercial and residential development for any individual tract or land that would not significantly alter existing drainage patterns such that overland and natural drainage would reach critical levels. This natural drainage system should maintain the existing balance between rainfall infiltration, overland flow, and channelized runoff to the maximum extent feasible and practicable.
2. Avoid making streets and street rights of way the central drainage network unless this is unavoidable. Sould the streets or street right of way and interconnected storm drainage systems interrupt natural flow, it should be for minimum distances only, returning the interrupted flow to the natural system with minimum distruption. Should the alteration of the natural (existing) drainage system be required, density of the proposed development may require reduction.
3. Design elements of urban development such as structures, streets, parking areas, etc. such that the existing drainage system will be utilized with a minimum of change. Avoid cutting new channels or relocating or enlarging existing channels to reduce flood prone areas.
4. For large commercial developments fronting the highways, from which there is an expected significant increase in storm water quantity and degradation of the downstream water quality of little Barton Creek, the following additional controls should be considered:

A. Utilize the city of Austin drainage criteria manual to analyze drainage plans for planned development sites both hydraulically and hydrologically

B. If appropriate, incorporate storm water retention areas, possibly with filtering devices into the drainage system

C. Allow runoff to spread into open areas for infiltration (filtering)

D. Use porous pavement (interlocking paving bricks) whenever possible

3. Provide adequate control of runoff and accompanying erosion and sediment from construction sites. The folowing suggestions can aid in the development of guidelines for future construciton areas:

A. Adapt development plans to the topography and soils to minimize erosion

B. Plant permanent post-construction vegetation as soon as possible during or after construciton

C. Expose the smallest practical land area at any one time during construciton period

D. Minimize time that land is exposed during construction

E. Protect exposed areas with temporary dikes, ditches, mulching or hay bales during construction

F. Build and maintain temporary sedimentation basins to prevent runoff from leaving the construction site

Ecological Considerations:

1. It is essential that the recharge to small springs and seep areas should be

maintained in their present state as far as possible. The alteration of sensitive drainage areas will adversely affect the infiltration and recharge process of minor aquifers resulting in cessation or decreased flow from springs or seeps.

2. The perennial pools and springs of little Barton Creek require protection from pollution especially during dry periods of the year to preserve the aquatic and terrestrial organisms dependent upon them
3. Existing native vegetation should be preserved to the greatest extent possible because it is optimally adapted to the existing environment and creates much of the scenic beauty of the area. When clearing is necessary for construction purposes, revegetation using native plants should be encouraged. Retention of native vegetation in and adjacent to sensitive areas and in wildlife corridors is particularly important.
4. Moderate development restrictions should be imposed on land with dense juniper woodlands and juniper liveoak savannas. These vegetation zones are rare bird habitats for the golden cheeked worbler and the black capped vireo and therefore are designated as environmentally sensitive areas which deserve high priority consideration for protection and preservation. These zones as well as the sensitive creek bed areas may be effectively protected by clustering development in areas of less environmental sensitivity.

Environmental Policies and Economic Liability

If the community wishes to attract stable commercial enterprises, realistically attainable policies must be implemented that recognize the value of the natural environment as a community resource worth protecting.

Major environmental protective measures result from the necessity to deal with the following:

1. Alleviation of flood damage to village and landscape
2. Alleviation of erosion and sedimentation due to poor drainage practices
3. Protection of water quality and natural resources
4. Protection of native plants and animals
5. Reduction or removal of ground cover to a minimum consistent with planning needs

These measures are derived from the following concerns:

1. Density of units per acre (see Goal Two)
2. Open space ratios and floor to area ratios
3. Impervious surface ratios
4. Landscape or vegetation guidelines

The above measures all have direct impact on runoff and flooding, water quality, vegetation and wildlife, and the natural resources of the village.

If measures are not taken to place stringent controls on the Barton Creek headwaters,

it is certain that both the city and state regulations will be enforced upon the Village. Bee Cave not only must be protective of its own vital resource, underground water, but also must ensure that surface waters and environmental quality are not permitted to deteriorate to the point where downstream users will protest. This is especially true if flood hazards are increased as a result of rapid runoff, erosion and sedimentation. It is in the public interest to use caution in dealing with the fragile ecology of the creek beds and catchments, which are described as the most sensitive areas in the Barton Creek watershed. The village could be economically liable for downstream impacts attributed to actions within the Village boundary.

Goals and Policies for Bee Cave Comprehensive Plan

Goal One: Protect the Rural Character of the Village.
Therefore, institute policies which:

1. Require large lots
2. Require deep setbacks from street
3. Retain septic tank systems
4. Keep maximum building heights to two storys
5. Locate drive-in facilities so they do not dominate sightline and road frontage
6. Protect trees and ground cover, minimize surface clearing
7. Avoid large, bare parking lots
8. Minimize cut and fill, retain natural slopes
9. Protect natural drainage ways and land forms
10. Omit curbs and gutters, reduce right of way on minor streets to 40'
11. Protect historic buildings and heritage sites in the village
12. Establish rural character for signs with regard to materials, color, form and size
13. Establish rural character for buildings: guidelines for material, color, form. fencing, artificial lighting, etc.
14. Control the location and appearance of utility poles
15. Discourage "high-tech" contruction materials and the indiscriminate use of reflective glass
16. Review and encourage quality mixed use planned unit projects for suitability in the rural setting

Items 11 to 16 are Urban Design criteria. The Village will have to develop such criteria if it wishes to protect its visual image and rural character.

The policies appropriate to perpetuate a rural character can be extended from the above items. They suggest that zoning and land use regulations must be established. Building and development codes, open space and landscape guidelines, safety

standards and roadway standards must be considered if this goal is to be achieved.

Goal Two: Maintain a Low Density Character in the Development
Therefore, institute policies which:

1. Control residential and commercial lot size
2. Control percentage of lot covered by buildings
3. Locate non-rural buildings off prominent sight lines
4. Restrict heights to keep sight lines open
5. Regulate setback, side spaces and bulk of buildings
6. Retain septic systems and water supply wells if desired
7. Create buffer zones between different land use designations
8. Encourage planting along road easements
9. Require indigenous planting in large open areas
10. Regulate building facades to create smaller scale of building frontage
11. Do not overextend the capacity of the thin soils to filter runoff and to serve septic fields
12. Discourage multi-family developments, pending review of density of buildings for effective sanitation

Some of the above policies are the same, or similar to, those stated under goal one. The purpose in both cases, however, is different. Goal one seeks to protect an "image", while goal two prevents a greater density than is thought to be desirable for the nature of the community. A rural character can still be of relatively high density. It is the nature of the building design and the surrounding spaces which illustrate a "rural" image, whereas it is the distribution and placement of buildings and their size which affect density. A rural character must be defined, and can vary depending on the values used to identify it. Low density can be measured relative to

other towns, and density can therefore be prescribed.

Some design techniques, however, can be used to create an appearance of low density even if the community accepts a higher than normal density in new developments. In this case, building design guidelines can be defined as might be done in protecting the rural character under goal one. Further, density controls should be directly related to the sewage capacity of the site, the amount of impervious coverage, and anticipated frequency of use.

Goal Three : Promote the Safety and Convenience of Highway Related Developments Therefore, institute policies which:

1. Locate warning signs
2. Locate pedestrian operated traffic signals
3. Provide adequate lighting of pedestrian and traffic routes
4. Minimize curb cuts by creating common vehicular entry and exit to parking and shopping
5. Limit access at lot frontages on main roads
6. Employ landscape berms and vegetation to prevent uncontrolled pedestrian crossing and water runoff
7. Locate lighting, telephone lines and poles and signs away from curbs
8. Require speed bumps in all parking lots and access roads
9. Provide left turn lanes on major highways
10. Locate all signs to avoid obstruction of driver's sightlines
11. Minimize the impact of direct access of drive-through commercial establishments by locating them off highways
12. Provide adequate parking facilities to avoid backup of traffic on to highways
13. Designate pedestrian right of way in parking lots through the

use of surface treatment or planting

14. Provide protective safety barriers along highway edges

15. Encourage the co-development of bicycle ways and pedestrian paths with the implementation of new roadways

16. Prevent glare and reflection of lit signs near major traffic

17. Prevent on-street and shoulder pull-off and parking on highways

18. De-emphasize through-traffic

19. Facilitate public access to commercial and recreational venues

20. Establish goods and servicec delivery time restrictions for delivery to commercial locations

21. Provide and promote safe public service and emergency vehicle access

22. Facilitate barrier free access and handicapped parking for the mobility impaired

23. Provide guidelines for the placement and location of dumpsters

All visitors and commuters will approach Bee Cave in automobiles. Their perception of the quality of the development will be greatly influenced by that experience. It will become critical when other competitive developments spread along the approach roads to the Village. Since a major goal is to encourage use of the local facilities, they should be attractive from the highways. The future economy of the Village may be largely dependent on the successful planning and design of the road frontages. They must be both safe and inviting for all prospective visitors. The first impression should be a lasting and positive one.

Goal Four: Prevent Surface and Sub-surface Water Pollution in the Barton Creek Watershed and Protect the Natural Amentities of the Village Therefore, institute policies which:

1. Manage and regulate extensive land clearing

2. Establish impervious surface ratios for lots

3. Establish percentages of parking lots which must be landscaped

4. Prevent spilling of materials from construction sites on to adjacent areas

5. Contain and control erosion and sedimentation from construction sites

6. Promote landscaping on all road right of way, open spaces and the perimenter of buildings

7. Implement detention and retention ponds for stormwater runoff, septic drainage, and evapo-transpiration alternatives

8. Investigate non-polluting sanitation alternatives

9. Periodically test water quality of Barton Creek and subsurface water in any drilled wells

10. Accommodate wildlife and rare species in all open areas and developments

11. Establish conservation belts along storm drainage wasy and creek beds

12. Preserve existing natural flood plains

13. Discourage burning of leaves or refuse

14. Control dumping of wastes and trash within the village

15. Prevent polution from dust, chemicals, noise, vibration, etc.

16. Prevent activities which contribute to all forms of water and air pollution

17. Avoid placement of sewer lines in close proximity to creek beds and flood plains

18. Require environmental impact statement for all major developments

19. Prohibit commencement of construction before approval of plans by the Village

20. Develop landscape policy for open space improvement

21. Control unpaved dirt roadways and driveways

22. Prevent negative impact of traffic and its related development upon the natural environment

23. Prevent water pollution from car washes, laundries, etc.

Air and water pollution or degradation of the environment create a negative image in the minds of visitors and customers as well as residents. Without doubt the negative effects of a poor environment spread beyond the Village boundaries. The community has a desire to protect its visual assets and should therefore carefully consider how to put environmental policies in place. Poorly managed private and public land and buildings will discourage new customers and residents, and a mistreated natural environment is as discouraging. it may be a crucial goal to ensure that the natural attributes of the community are protected.

Polluted water and air will affect areas beyond the control of the Village. The commissioners should implement policies which create a high level of respect in adjoining residential areas and jurisdictions. It will greatly benefit Bee Cave to be seen as a desireable place by other communities. Environmental issues result in frequent litigation. A good record in this area is valuable and less costly than arguments in court.

GOAL FIVE: Encourage economic development and increase village revenues. Therefore, institute policies which:

1. Discourage large-scale, uncoordinated allocation of commercial lots which can cause unsound competition

2. Encourage activities with high sales turnover

3. Ensure attractive quality of site development and structures

4. Locate commercial activities convenient to pedestrian access

from parking. Clustering of small shops, galleries, boardwalks and access walks to keep functions close to vehicles.

5. Intensify planting of vegetation and natural materials around pedestrian routes and parking area perimeters

6. Control and enhance visual quality of the village through appropriate sign regulations regarding size, location, materials and color

7. Encourage location of activities which will draw customers from a large region

8. Support major, economically stable developers whether residential or commercial

9. Encourage distribution of commercial uses so as to mix parking, natural areas and buildings to create variety in shopping experiences

10. Seek alternatives and additional revenue through systems such as user fees, inspections and donations of real estate

11. Consider future property taxes to support municipal obligations which the Village has not yet undertaken

12. Protect and encourage rehabilitation and reuse of older buildings as part of the overall opportunity to enhance visual variety in commercial uses

13. Support commercial opportunities for residents of Bee Cave (encourage "mom and pop" stores)

Throughout this report the emphasis has been on the essential economic opportunities which must be available in developing areas. All the goals are inter-related with this purpose. A clean, safe, attractive experience will encourage customers to return. Development does, however, create demands for municipal services. Utilities, street maintenance, trash cleanup, policing and other needs will grow with population.In order to maintain the quality of the Village future taxes may be necessary. These will be compensated for by the improved economy as time goes on.

However at this time, with the desire to retain a low density and rural character, the Village should encourage residents and incoming merchants and businessmen to provide smaller, friendly and compatible services which match the overall nature of the present character of Bee Cave.

VILLAGE OF BEE CAVE: ENVIRONMENTAL STUDY

INTRODUCTION.

The Village of Bee Cave was incorporated in 1987. Settlers have lived here since the 1830's, where Indians had established a long history of occupation before them. Water was plentiful and game abundant. Today Bee Cave faces a new form of settlement. Urban growth,spreading outward from Austin, has reached the community in the form of land speculation, subdivisions, commercial expansion and increasing pressure on the rural lifestyle and simple amenities of the settlement.

Not only is the Village stretched out on Highway 71, it is located between two critically important drainage basins. Lake Austin is the water supply for over half a million people and Little Barton Creek is part of the sensitive drainage basin for Barton Springs, the well-known recreation center. The creek and springs are especially valued and protected. Change of land uses in Bee Cave will have a significant impact on the water quality discharging in to both basins

This study has gathered information on the environmental character of the area so that wise judgements can be made about future land uses and building densities which will not bring deterioration on the village or result in future economic burdens on the community. Ill-considered actions now could result in increased costs of municipal services later.

The information gathered for this report is all available in various agencies and offices which deal with our State's natural resources. The sources of information have been noted so that further examination of the materials can be made if the Village makes further studies.

Current land uses have been assessed from field surveys carried out by the student team. More specific information, upgrading and updating can be made by Village officials from time to time as development occurs. Appraisals have not been recorded. They are available from the Travis County Appraisal District office. These values would be an asset to the Village in helping to decide land uses relative to values. Land cost alone should not be a deciding factor, however, in determining use.

Standards and criteria for planning and land use should be those in place for the City of Austin. The Village and its potential Extra-territorial Jurisdiction lie entirely within the ETJ of Austin.The City would expect the area to be planned to conform with its own regulations.

The successful future of Bee Cave Village will depend to a large extent on how well the administration can deal with the protection of the environment and lifestyle sought by the residents. The major concerns would appear to be the manner in which water and wastewater are handled, including surface runoff, and on how development on the highway frontage is treated. Uncontrolled septic tanks and package treatment plants can result in pollution in streams, ponds and wells . Uncontrolled subdivision and access on Highways 71, 620 and 2244 will produce safety hazards, random parking, and possibly inappropriate uses and signposts.

It is in the best interests of the Village to have goals about what it wishes to be: the lifestyle and environmental character and quality the people would like to provide. This study, while it does not make recommendations about such matters, does outline the basis for some choices about the future. It can help the village government to prepare for future growth. Despite the slow economy in the Austin area, growth will inevitably occur. The voters should be aware of the choices they have and the consequences of ignoring the implications of growth on their future and on their lifestyle

The community can take pride in the fact that it has recognized this and has created the Village Commission and its committees of responsible citizens, so that they can participate in deciding their own future. Economic success and community satisfaction will depend on these citizens.

GEOLOGY

Rocks exposed in the Bee Cave area are marine limestone and clay of Cretaceous age and alluvial gravel, sand, silt, and clay of Quaternary age. Cretaceous units generally strike northeast and dip gently eastward.

Glen Rose Formation

The Glen Rose Formation is the oldest and most extensive rock unit. Most of the outcrops in Bee Cave are Glen Rose. The formation consists of about 700 feet of mostly thinly interbedded hard and soft limestone, dolomite, and marl. The beds vary in their resistance to erosion, forming a distinctive stair-step topography. Five informal units have been mapped, primarily on the relative abundance of thin dolomite beds. The upper and middle members are highly dolomitic and the others much less so. The oldest member outcrops in the steep ravines leading to the Colorado River, and younger members occupy successively higher toographic levels.

Member 1: gray to tan, nodular to thin-bedded, burrowed limestone, marly limestone and marl.

Member 2: gray to tan, thin to thick interbeds of fine to medium grained limestone, sandy limestone, burrowed noduar limestone and marl.

Member 3: thin to medium bedded, nodular weathering, fine-grained gray-brown dolomite and dolomitic limestone, and burrowed, gray to tan limestone and marly limestone.

Member 4: gray to tan, thin to thick-bedded, fine to medium-grained limestone limestone and marly limestone.

Member 5: thin-bedded, gray-brown, fine-grained, porous dolomite and burrowed dolomitic limestone.

Soils developed on the Glen Rose are mostly thin, brownish-gray, calcareous, gravelly clay loams (Brackett soils), with lessor amounts of mostly thin, brownish, calcareous and noncalcareous clays (Crawford and Tarrant soils).

The Glen Rose supports growths of oak, juniper, hackberry, and other trees. Oaks are more abyundant on the more permeable beds, junipers more abundant on clayey, less permeable limestones.

Walnut Formation

The Walnut Formation consists of oyster shell marls and marly limestones that overlay the Glen Rose Formation. The Walnut Formation has been divided into five

members, two of which outcrop in the Bee Cave study area. These are the Bull Creek and the Bee Cave.

Bull Creek Member: hard, resistant, thin to thick-bedded, gray to tan, fine to medium-grained, commonly burrowed limestone. This unit forms topographic highs.

Bee Cave Member: soft, gray to tan, extensively burrowed, mostly nodular, fine-grained limestone, marly limestone, and marl.

Walnut soils are dark brown to brownish-gray, shallow to deep, calcareous clay to clay loam (Brackett and Tarrant soils).

Alluvium

This unit includes frequently flooded, unconsolidated gravel, sand, and silt in the modern channels of the tributary streams of the Colorado River.

SOILS

Soils developed in the Bee Cave area can be characterized as shallow, calcareous, and moderatly alkaline. The majority of the soil is made up of the Brackett and Tarrant Series.

Brackett Series (B1D)(BoF): The Brackett series consists of shallow, well-drained soils with a mostly gravelly surface layer. These soils develope over interbedded limestone and marl, and occupy large areas of gently rolling to steep topography. Slope ranges from 5 to 30 percent. Soil depth ranges from 10 to 20 inches. About 20 percent of the mapping unit consists of rock outcrop and most of the soils are benched. Broken limestone fragments cover up to 75 percent of the surface. The texture of the surface layer is gravelly clay loam, gravelly loam, loam, or clay loam. A large part of the annual rainfall is lost through runoff and seepage from the limestone outcrops. Permeability is moderately slow, and the available water capacity is low. The soils are not suited for crops. They are better suited to range or wildlife habitat.

Tarrant Series (TaD)(TcA)(TdF): The Tarrant series consists of shallow to very shallow, well-drained, stony, clayey soils overlying limestone. Large limestone rocks cover 25 to 85 percent of the surface. These soils occupy nearly level to gently sloping ridges, rolling side slopes, and steep, hilly breaks. Slopes are complex and range from 1 to 40 percent. Soil depth ranges from 4 to 14 inches. Texture ranges from clay loam or silty clay loam to clay or silty clay. Tarrant soils are moderately slowly permeable, and

the available water capacity is low. This soil is not suitable for crops. They are suitable for native grass range ar wildlife habitat.

Volente complex (VoD): This soil complex consists of deep, well-drained soils that developed in slope alluvium, mainly in long valleys. Slopes are concave and dominantly 2 to 7 percent. The thickness of the soil ranges from 34 to 50 inches. Volente soils are moderately slowly permeable, and the available water capacity is high. The soil is only marginally suitable for crops because the erosion factor is severe. Better uses are improved pasture or range.

Mixed alluvial land (Md): Mixed alluvial land is a miscellaneous land type that occurs on flood plains of creeks and rivers. It consists of gravelly alluvium, beds of gravel, and exposed limestone beds and boulders randomly interspersed with moderately deep to deep, calcareous alluvial materials. Slopes range up to 7 percent. Soil depth ranges from 2 to 4 feet. It is best suited to range or wildlife.

Purves silty clay (PuC): This soil is shallow, well-drained and developes on interbedded limestone and marl. Slopes are 1 to 5 percent. Soil depth ranges from 10 to 20 inches. These soils are on small knolls where the weathered limestone has been exposed in plowing. It is best suited to improved pasture, hay or range.

Speck stoney clay loam (SsC): This is a shallow, well-drained soil overlying limestone. This soil occupies smooth, gently undulating topograghy. Slopes are 1 to 5 percent. Soil depth ranges from 14 to 18 inches. It is slowly permeable, and the available water capacity is low. This soil is best suited to native grass range.

Crawford clay (CrB): This soil is a well-drained, moderately deep, noncalcareous, clay soil that developed over hard limestone. Slopes are smooth, only 1 to 2 percent. Soil depth ranges from 24 to 32 inches. Crawford clay cracks when dry and is very slowly permeable when wet. Available water capacity is high. This soil is well suited to range. It is also well suited to crops, improved pasture, or hay.

Bee Cave Environmental Inventory:
Hydrology and Water Quality

Hydrology

Description

The greater Bee Cave area lies within three of Travis County's major watersheds; the Lake Austin Watershed, the Little Barton Creek Watershed, and the Barton Creek Watershed. All of the overland run-off within the Bee Cave city limits, however, drains into Little Barton Creek and Barton Creek. Barton Creek is a small stream approximately 50.1 miles in length from its headwaters in western Hays County to its confluence with Town Lake in Austin. The stream is perrenial except for a seven mile stretch over the Edward's Aquifer recharge zone, where water infiltrates into the subsurface.

Stream Flow

The average streamflow at the test site was 0.3465 m^3/second. This is one of the highest recorded streamflows along the entire length of the creek. The mean stream width along this area of Barton Creek is from 12.6-15.9 meters.

Surface Water Quality

Standards and Test Data

The following are parameters and criteria adopted by the Texas Water Commission in1985 to control water quality and usage in Barton Creek. The criteria are compared to actual data collected in 1986 from a test site at Barton Creek and State Highway 71.

Parameter	Criteria	Actual Data
Dissolved Oxygen	Not < 5.0 mg/l	8.0 mg/l
pH	Between 6.5 and 9.0	7.5
Temperature	Not > 32.1° C	24.6° C
Chloride	Avg. not > 40 mg/l	16 mg/l
Sulfate	Avg. not > 40 mg/l	23 mg/l
Total Dissolved Solids	Avg not > 500 mg/l	252 mg/l
Fecal Coliform	30 day geometric mean not > 200/100 mL	110/100 mL

The data describe a very high quality water coming from the drainage area. The test station is downstream from Little Barton Creek and encompasses all but one drainage sub-basin affected by the Village of Bee Cave.

The narrow range between dissolved oxygen maxima and minima indicates stability in water quality and reflects the low primary productivity of the stream. Due to the high water quality, food availability is low for macroinvertebrate sustenance, thus species diversity and the number of species living in the water is low. In summary, the low macrobenthic community structure indicates that biological health is excellent throughout this area of Barton Creek (TWC, 1986).

The results deem this area of Barton Creek desirable for contact recreation uses and high quality aquatic life. However, these numerical data are not applicable in mixing zones nor when the stream flow is intermittent, effluent dominated, or less than the low flow criterion (TWC 1986).

Conclusion

The Barton Creek and Little Barton Creek Watersheds are estimated to experience a considerable amount of growth over the next 25 years. At the moment, all wastewater is disposed of by methods other than direct discharge, and the water quality data presented here indicate that no impacts to the Creek are resulting from these other methods. Individual septic systems will have an impact on surface and ground water quality in this area as development proceeds. Given the dynamics of individual septic systems, and the extremely thin soils associated with the Texas Hill Country, professional analysis should be obtained before implementation.

Groundwater

Groundwater data and interpretation will be presented in a future report.

SLOPE MAP

The slope categories follow standards of the City of Austin. In general, the angles considered "safe" by environmental standards for various types of development are :

- 0 to 5% - considered the optimum slope for house sites and factory sites. It is the maximum slope category for construction of playgrounds, parking lots, and roads where vehicles travel at 60 MPH or faster.
- 5 to 15% - this category is considered the maximum slope for septic drainfields, sidewalks, and for all streets and roads.
- 15 to 25% - this classification is considered the optimum slope for public stairs. It is the maximum considered for house sites and mowed lawns.
- Greater than 25% - public stairs should have a maximum slope of 50%.

Development on slopes greater than the maximum slope category for a certain type will require land fills or other techniques to decrease the slope on the site.

The categories chosen by the City of Austin could be used by the Village of Bee Cave, and the slope map shows where the critical building constraints would be should the Village decide to use Austin's standards.

BEE CAVE VEGETATION

An analysis of the vegetation in the Bee Cave study area was conducted from numerous field surveys and with the use of aerial photography. Because of the diverse geographic conditions in the region (i.e., topography, water resources, soils, etc.), there is an abundance of varying species. Six principle categories were used to classify vegetation characteristics: lowland woods, dense mixed woodlands, dense juniper woodlands, juniper-live oak savanna, managed grasslands, and sparse juniper woodlands. A brief description of each is listed below.

Lowland Woods

This type occurs in long narrow valleys or near stream beds where slope alluvium has accumulated, representing volente-like soils. Most areas occur along drainages that empty into Lake Austin or Barton Creek. Trees are predominantly elm, sycamore, pecan and cottonwoods.

Dense Mixed Woodland

Juniper and mixed hardwoods in 50/50 mix 20% (DBH = 4" to 24") is characteristic of this category. Hardwoods include Texas oak, live oak, shin oak, Texas ash, cedar elm, sumac, Texas persimmon, rusty blackhaw, mountain laurel, eastern red bud and black cherry with canopy closure of greater than 60%. In creek beds, occasional sycamore occurs. This upland type occurs on moderate slopes and in the tops of drainages where soils are slightly deeper and have slightly more water available than dense juniper woodland areas. Low on slopes and adjacent to creek beds some slope alluvium is present.

Dense Juniper Woodland

Species composition is primarily juniper (DBH = 4" to 24") with up to 30% hardwoods with greater than 60% canopy closure. Hardwoods are typically Texas oak, live oak, shin oak and Texas ash. This upland class occurs on moderate to steep dry slopes, benches, plateaus and breaks. Soils are mostly steep Brackett and steep Tarrant soils.

Juniper - Live Oak Savanna

This type occurs on relatively deep, well-drained soils which are gently sloping. Clusters of spanish oak, live oak and juniper with DBHs from 4" to 27" predominate over grassy understory and tree canopy closure is less than 50%. Most areas are disturbed, and mid- and tall grasses have been replaced with herbaceous invader species.

Managed Grasslands

Managed grasslands are defined as areas that have been generally cleared of native vegetation and are used primarily for grazing purposes. Sparse native grasses and erosion areas are usually over-seeded with improved species of bermudagrass. Grasslands often include large specimens (DBH = 12" to 27") of live oak, spanish oak, sycamore, soapberry, cedar elm and occasional post oak. Soils are of varying depths and include gravelly clay loam, clay and gravely sandy loam.

Sparse Juniper

Less than 90% of overstory vegetation is juniper and is less than 10' tall (DBH = 4" to 8") with crown closure <50%. Two situations exist: (1) very shallow, gravelly soils with greater than 50% exposed limestone on plateaus and ridges. These soils resemble Tarrant and Speck soils, 0 to 2% slopes. Herbaceous ground cover is less than 20%. On these sites juniper is very slow growing and appear somewhat stunted. In the second situation the site has generally more potential than (1). Soils are deeper and less gravelly. There is little exposed limestone and herbaceous ground cover is greater than 60% Here juniper grows more quickly and will reach much larger stature than in the first situation.

ROADWAYS MAP

Bee Cave, Texas is at the intersection of several major roads in western Travis County. These roads include R.M. 2244, R.M. 620, and S.H. 71. Another smaller, although important road is R.M. 3238. Together, these roads form the city's primary roadway network. The City of Bee Cave is fortunate in that all of its major roadways are operated and maintained by the State of Texas. Thus, the City of relieved from financial responsibility for these facilities.

Two additional roads, Arterial #11 and State Highway 45 (S.H. 45) have been proposed that would run through Bee Cave. Arterial #11 is adopted in the Austin Metropolitan Area Roadway Plan (AMARP) as a 4-lane minor arterial. It would connect R.M. 620 to the north to U.S. 290 to the south. The Austin Transportation Study (ATS), however, has not adopted Arterial #11 in its Transportation Plan.

State Highway 45 (S.H. 45) better known as the "Outer Loop", is recommended by the Austin Transportation Study (ATS) as a 2-4 lane roadway for the year 2000 and 4-lane Parkway for the year 2020. The Austin City Council on August 13, 1987 decided not to include western portions of proposed S.H. 45 in the AMARP from I.H. 35 to U.S. 183 north. The Texas Department of Highways and Public Transportation, however, is continuing to plan for the eventual construction of this facility.

R.M. 2244 is currently being expanded with construction of 2 additional lanes and a flush median. R.M. 620 is also being expanded with 2 additional lanes and a flush median. R.M. 3238 is scheduled to be extended to connect with RM 12 in November of 1988.

1987-92 ROADWAY IMPROVEMENT PROGRAM: BEE CAVE, TEXAS

PROJECT	LIMITS AND DESCRIPTION	IMPLEMENTING AGENCY	WORK PHASE	DAILY TRAFFIC VOLUME 1980	1986	%CHAN	ATS TRANSPORTATION PLAN MID-TERM	LONG-TERM
SH 45	Quinlan Park Rd. to SH 71 Construct 4 Lane Parkway	State	Preliminary R.O.W.	540	NA		4-Lane Arterial	4-Lane Parkway
SH 45	SH 71 to RM 1826 Construct 2 Lane Roadway	State	Preliminary R.O.W.	0	0	0	2-Lane Arterial	4-Lane Parkway
RM 620	Debba Lane to SH 71 Construct 2 additional lanes and flush median	State	R.O.W. Construction	4270	8300	49	4-Lane Arterial	4-Lane Arterial
RM 2244	SH 71 to St. Stephens Rd. Construct 2 additional lanes and flush median	State	R.O.W. Construction	5260	10800	51	4-Lane Arterial	6-Lane Arterial

Land Use

The land use pattern of Bee Cave has been sub-divided into 6 primary categories. These are residential; Commercial, which is retail stores, restaurants, and service stations; Public, which are facilities owned by a government entity; Quasi-Public, which are churches and other cultural facilities; Industrial, which are facilities engaged in any type of primary manufacturing; and industrial/Utility, which are facilities engaged in providing utility services to the area.

Residential and Commercial are the two dominant land use types. In several instances residential units have been converted to commercial usage or serve both types of use. Much of the residential building stock consists of older wood frame structures scattered along Hwy. 71 or prefabricated trailer homes concentrated along R.R. 620 or in the Bee Caves West subdivision, located in the extreme western portion of the city and accessed from Hamilton Pool Road.

The commercial structures vary in age from very recent to very old, few of which are of a distinctive character. As would be expected, most of the commercial structures front on Hwy. 71, the main road along which the city straddles. They concentrate at the three main intersections which occur within the city limits; R.R. 2244 at Hwy. 71, R.R. 620 at Hwy. 71, and Hamilton Pool Road at Hwy. 71. R.R. 620 is the only cross road which also has some commercial structures.

The type of commercial is also varied and ranges from restaurants, convenience stores, service stations, a hardware store, as well as numerous other small businesses, some of which are vacant.

The other types of uses are not near so numerous but are distributed randomly throughout. There were two Public facilities readily identifiable, a County Road Service facility along Hamilton Pool Road and a County Trash Compactor along R.R. 620.

The Quasi-Public facilities are concentrated on R.R. 620 and consist of a church at the intersection with Hwy. 71 and an American Legion Hall .

Industrial Facilities are located along Hwy. 71 intermixed with the commercial and residential. These consisted of a small cement plant, a welding shop, and customizing window shop. The Industrial/Utility facilities are a Southwestern Bell substation along Hwy. 71 at R.R 620 and a Water Treatment plant along R.R. 2244.

There were several indications of gravel pits but the current usage of these is unclear. As well, while there were some ploughed areas, notably along R.R. 2244 at Hwy. 71, agricultural uses did not seem to be a significant land use. Much of the "un-used" land along the Highways appeared to be just that, unused land.

Surrounding developments which will impact Bee Caves are The Homestead, directly South, Barton Creek Bluffs, further south along Hwy. 71, The Uplands, which occurs still further south (off the map) along Hwy. 71, Bohls Ranch, just east along R.R. 2244, Lakeway East, north along R.R 620 and Cherry Mountain II also north along R.R. 620. All of these, like Bee Cave, are early in their development, their future still yet to be determined.