MERGING NEEDS, EMERGING FUTURE:

ECOVILLAGE THEORY AND DESIGN

by

CHERYL BRITTON BROWN

(Under the Direction of Marianne Cramer)

ABSTRACT

For many individual there is a growing desire to live a life more connected with the natural rhythms of the earth and also with each other. This desire manifests itself in small self-sufficient intentional communities called ecovillages which base their designs on permaculture concepts and integration with natural processes. This thesis examines components of existing ecovillages and the technologies associated with them, ultimately presenting the design of a theoretical ecovillage in Pickens County, South Carolina.

INDEX WORDS: Ecovillage, Intentional Community, Alternative Community,

Environmental Education, Permaculture

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CHERYL BRITTON BROWN

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B.S., Clemson University, 2001

Major Professor: Marianne Cramer

Committee: Henry Parker
Dawn Robinson
John d'Azzo

Electronic Version Approved:

Maureen Grasso
Dean of the Graduate School
University of Georgia
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CHAPTER I - INTRODUCTION

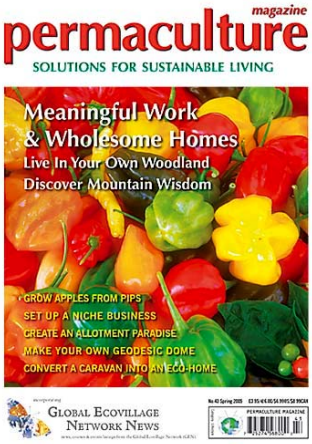
The concept of environmentally sustainable intentional communities, otherwise known as ecovillages, is of great importance to today's society. Our fast paced modern lives, the bombardment of media, and the separation from natural cycles have left us as a society with an emptiness that we desperately try to fill by purchasing consumer goods such as the latest model car or new designer jeans. Children tend grow up disconnected from the Earth; many assume that carrots are two inches long and come from the grocery section of the Super Wal-Mart. The media's elusive promise of satisfaction through consumerism not only creates cyclical patterns of consuming and discarding, but in doing so, socially and economically degrades the Earth and the peoples of the world. More and more people are choosing to peacefully rebel against the norms of modern society by lightening their ecological footprint through life as an ecovillager, which provides a small self-sufficient community based environment.

These communities, called ecovillages, offer a holistic approach to life for their members, providing space for living, working and recreation. Ecovillages are similar to the numerous separatist colonies of the past, and to CoHousing (See Appendix C), but they have one important difference. While numerous intentional communities were solely concerned with the health and wellbeing of their immediate, internal community, ecovillages are founded on the desire to improve the health of the larger community, even the global community. Equally important to the foundation of the ecovillage movement is the concept of systems thinking: an understanding of the interconnectedness of all organisms and systems, and an understanding that every action and decision has a great impact, visible or not. These concepts are the roots of the environmental

movement that gained ground in the 1970's and they make up the core values of those who chose to live their life in an ecovillage.

This thesis, as a requirement of a Master's degree in Landscape Architecture, investigates not only theory and history of the ecovillage movement, but also offers an example of ecovillage design by developing a site in Pickens County, South Carolina. It explores the newly emerging role of Landscape Architect as ecovillage designer and questions not only what is involved in designing an ecovillage, but also how an outside professional can affect the process and ultimate outcome. The applied component is prepared with the knowledge that the conception, design and execution of an actual ecovillage is best evolved through collaboration among the individuals who intend to inhabit the future community. In this thesis, the consensus of the theoretical client group will be hypothetical and the design will respond to their needs, in addition to the selected site and its constraints. The program that is developed allows for numerous occupations of the residents and provides the opportunity for multiple sources of economic income through flexible building design. The future ecovillagers are diverse in age, gender and ethnicity, but are all committed to developing the ecovillage in as sustainable a manner as possible. This includes conscious site design that provides space to live, work and play, and green technology suited for the region, and specifically, the site.

Chapter two investigates the intentional communities by exploring the reasons behind their existence and the components that help to define them. The history of the ecovillage movement is explored from its Danish CoHousing roots to the current proliferation of ecovillages worldwide. Chapter two also attempts to understand the reason for the wide range of communities which align themselves with the ecovillage movement.



The third chapter explores the principles of permaculture, a body of scientific theory that is considered to embody the goals of sustainable living, and therefore, ecovillage design. The Global Ecovillage Network, the global leader of the ecovillage movement, uses *Permaculture Magazine: Solutions for Sustainable Living* to communicate seasonal news. Environmental design, as it is generally understood in the design world, is contrasted with permaculture design.

To better understand the spatial, social, environmental, and economic aspects of ecovillages in modern and local settings, case studies of three ecovillages are detailed in Chapter four. Visits to, and interviews at, the ecovillages within the southeastern bioregion offered insight into what spatial arrangements, farm size, public and private spaces, and economic income are employed and which are successful. The regional application of green technologies, such as solar income, composting toilets (See Appendix C), green construction and grey water reuse, are also detailed. This chapter also discusses the relevance of each of the three case studies to the site in Pickens County.

Chapter five begins by revealing the history of land use and the current uses of the site. The inventory and analysis occur in this chapter and include: site location, watershed boundaries, soils associations, historical structures on site, existing conditions and structures, slope analysis, slope aspect and soil inventory. Ultimately, observations and analysis are explained.

The next to last chapter discusses the guiding principles of ecovillage design, as revealed through the research and case studies. A vision statement and goals are created for the ecovillage and the master plan is explained through a plan, with sketches and text. Planting

suggestions are listed, and general management goals are outlined. Ultimately, the implications of ecovillage design and the possibility for contribution to this field by landscape architects and environmental designers concludes this thesis in chapter seven.

CHAPTER II - INTENTIONAL COMMUNITIES AND ECOVILLAGES

This chapter examines the roots of the ecovillage movement through its intentional community background. Following the environmental movement of the 1970's, a growing number of individuals desiring to make drastic changes to their lifestyles, wished to leave a healthier environment for future generations, and began creating ecovillages.

From Intentional Communities to Ecovillages

During the latter part of the 1980's the Ecovillage Movement arose in northern Europe. The process included a transition from CoHousing, which developed in Denmark during 1964, to a building of communities that have sustainability as a focus. By the mid-nineties, numerous intentional communities were redefining themselves as ecovillages, and communities were forming with an initial desire to be an ecovillage. However, neither ecovillages nor intentional communities are new or unique.

The concept of intentional communities is ancient: Transcendental utopias, cooperative living, communal societies, utopian colonies, countercultural communes—many names are used for the common idea of "a vision of a better world, and a commitment to live in a way where everyday actions reflect the stated goals" (Kozeny 2). Numerous types of separatist colonies have formed in response to the separation between dissenters and the larger society. As early as the 6th Century BC the followers of Buddha began to live in "sanghas," or communities, called ashrams which were "communities intentionally designed to foster an orderly, productive, spiritual life" (Kozeny 2). One can even look to the colonists that landed in the New World as a

group of people intentionally separating themselves from the larger society, in this case England, and starting life anew with their own values, beliefs and goals guiding them. From the Buddhist ashrams to the Kubbutz and on to the modern manifestations of intentional communities, all can be considered "structured manifestations of alternative lifestyles" (Sutton 132), as well as "peaceful dissent from the social and political order" (Bouvard 28). Any intentional community can be regarded as a strong expression of a group's core values, whatever those values may be (Abrams & McCulloch).

The two words that make up the term "intentional community" are both equally important to the concept. That they are intentional is vital to their success; these communities are founded as purposeful and conscious acts by those that hold similar beliefs and who wish to create their own alternative way of life. The idea of community is equally important to the concept, as it suggests a close physical proximity of living and a shared way of life. Barry Shenker, author of *Intentional Communities: Ideology and Alienation in Communal Societies*, has developed ten conditions which he feels must be met by any group wishing to call itself an intentional community:

1. It was founded as a conscious and purposive act.
2. Membership is voluntary and based on a conscious act.
3. The group sees itself as separate from and different to its environment and relates as a group to (or withdraws as a group from) its environment.
4. The community is relatively self-contained—most members can potentially live their entire lives in it (or for the period during which they are members).
5. Sharing is part of the community's ideology.
6. The community has collective goals and needs and expects members to work towards their satisfaction.

7. The ideology claims that the goals of the community, even if orientated to the benefit of the individual, can only be obtained in a collective framework.

8. Ultimately, the community, or the people appointed by the community, not the individual, is the source of authority.

9. The general way of life of the community is considered to be inherently good, i.e. is an end itself over and above its instrumental value.

10. The community's existence has a moral value and purpose which transcends the time-span of individual membership.

Just as Marguerite Bouvard foreshadowed in her 1975 book, *The Intentional Community Movement*, the ecovillages of today have formed world wide in response to a social, economic and political climate that is viewed as unhealthy for both humans and the earth. These groups have a deep respect for living in harmony with the land and also reject material goods and consumerism (Bouvard). "The deep motivation for ecovillages or intentional communities is the need to reverse the gradual disintegration of supportive social-cultural structures and the upsurge of destructive environmental practices on our planet" (Svensson, 10). The concept strikes a chord with those who are concerned about the globalization, "consumerization," and "corporatization" of the world. It is a commonly held belief that the current economic model, which externalizes the negative social and environmental effects of production, will eventually collapse, leaving the world stunned and in need of a local, healthy, sustainable social and economic model for existence. This is where ecovillages are vital: they are positioned to fill the void that will be left when the current model collapses.

Ecovillages Defined

So with all of this considered, what is an ecovillage? According to Ross Jackson, a co-founder of the Global Ecovillage Network:

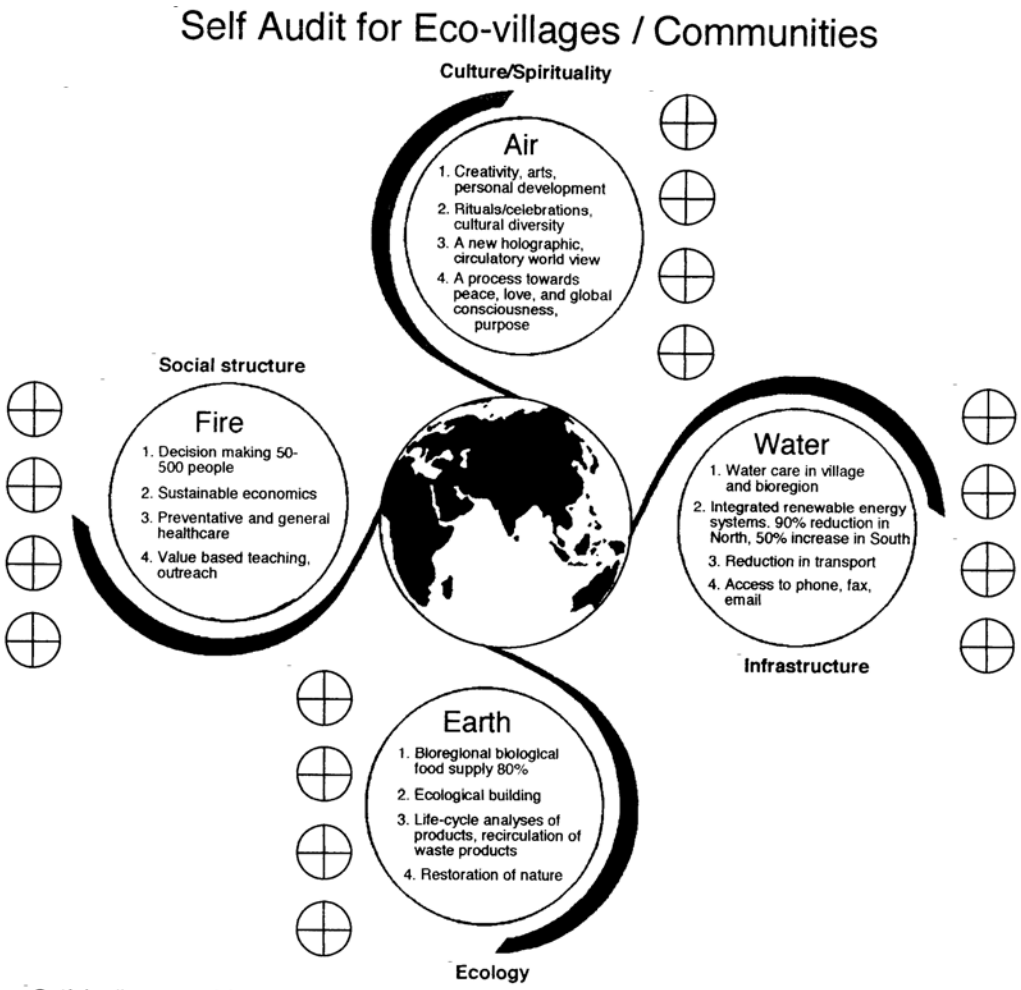
> An ecovillage is, ideally speaking, a microcosm of the macrocosm, as it represents in a very small area — typically with 50-400 people — all the elements and all the problems present in the greater society, while providing visible solutions to these problems, whether it be living sustainably, resolving conflicts peacefully, creating jobs, raising children, providing relevant education, or simply enjoying and celebrating life (Jackson, R., 2).

As defined by the Global Ecovillage Network:

> Ecovillages are human-scale settlements, rural or urban, in the North or in the South, that strive to create models for sustainable living. They emerge according to the characteristics of their own bio-regions and typically embrace four dimensions: the social, the ecological, the cultural and the spiritual combined into a systemic, holistic approach that encourages community and personal development. (Global Ecovillage Network)

Although these definitions give a general picture, there will always be variations and differences of focus from ecovillage to ecovillage. The degree of environmental friendliness that a village possesses also varies and there is no doctrine to govern ecovillages, although the Global Ecovillage Network has set forth a suggested simplified self audit (See Figure 2.1) that helps to evaluate the components of a community. A much more thorough "Community Sustainability Assessment" is also available (See Appendix A).

Figure 2.1



Self Audit user guide

1. Colour 0-4 quarters in the circles above according to the following scheme:

- No colour means: No interest in this topic in the eco-village.
- One quarter coloured: Interest in the topic, but have done very little.
- Two quarters: Quite interested. Have come half way.
- Three quarters: Very interested. Almost there - but still room for improvement.
- Four quarters: Main area of concern. No room for improvement.

2. Add up your scores. Number of quarters that it is possible to colour ranges from 0 - 64. Notice where you can still improve. Scores above a certain level, which will have to be agreed upon eg. 48 points and higher would be a qualified eco-village, with at least 2 of the points in each element.

This is the self audit of:

.....**points**.....

Before we go any further, we must investigate the modern buzz-word, sustainability. It is often over used and under executed, but the central theme of sustainability is a much needed concept due to the exponential growth that our globalized world is experiencing. As defined by Robert L. Thayer, Jr. in his book, Grey World, Green Heart, sustainability is "a characteristic of a process or state that can be maintained indefinitely" (Thayer, 235). Continuing, he views sustainable development as "improving the quality of human life while living within the carrying capacity of supporting ecosystems" and sustainable landscape as "a physical place where human communities, resource uses, and the carrying capacities of surrounding ecosystems can all be perpetually maintained" (Thayer, 235). At the core of the ecovillage movement is the desire to create a sustainable landscape, as defined by Thayer.

Regarding the individual degree of sustainability that an ecovillage possess, there seems to exist a gradient along which any community, intentional community, or ecovillage can be placed. The gradient ranges from the completely self-sufficient, socially healthy ecovillage on the left, to suburban sprawl on the right (See Figure 2.2).

Figure 2.2

The gradient of sustainability

The placement along this gradient is determined by a community's vision, goals and execution thereof, as well as the way of life that a place creates—intentional or not. Scale, reliance on outside inputs, development and building techniques, and awareness of micro and macro linkages to the rest of the world, all influence a community's placement along this gradient. The more an ecovillage works to be sustainable and perpetually self-sufficient, the further to the left it would be placed. This judgment is also based on the degree of *voluntary simplicity* that a group of ecovillagers exhibits. Voluntary simplicity is the conscious act of reducing one's need for purchased services and goods, thereby reducing the need to sell one's time for money.

Components of an Ecovillage

The major components that separate ecovillages from other intentional communities lie in three areas: the social, the ecological and the spiritual. The community component provides individuals a sense of belonging where they feel support and at the same time a sense of responsibility. Neither the group nor the individual is more important than the other; the goal is to balance the sense of togetherness and of individuality. The communities are small enough to allow all to be heard and to have a voice in the collective decision making, as all decisions affect all members. Resources and meaningful work are shared by everyone; "Generally, ecovillages are able to foster a balance between personal freedom and one's responsibility to others, creating free and purposeful human beings who learn to identify and meet their own needs as well as those of the society they live in" (Svensson, 11). Diversity is celebrated: just as in modern cultures there are numerous occupations, backgrounds, ages and degrees of participation; the

ecovillage represents a microcosm of this. Finally, the ecovillage is a place for continual education and life skill development.

The ecological aspect of ecovillages allows people to commune daily with earth and to find rhythm in the natural processes. Striving for self-sufficiency and avoiding outside inputs into the energy cycle on site is an optimistic, but common, goal for an ecovillage that desires to be truly sustainable. By living McDonough's the metaphor that "Waste Equals Food", the entire cycle of existence becomes reevaluated and byproducts are not seen as expendable. Of course, human systems are very rarely a closed cycle, but producing food, wood, compost and energy on-site reduces the load and energy output from other sites, thus lessening the global impact of existence. Ecological processes off-site and the total cost of goods and services should be considered; the whole cycle must be taken into account. Some of the more common goals among ecovillages in regards to ecology are: producing as much organic food as possible, using renewable energy systems, building with local, natural materials and techniques, following ecological business principles, preserving the health of the soil, water and air, protecting biodiversity and natural processes, minimizing the overall impact of development by employing strategies of permaculture design.

The spiritual components of ecovillage life are vital to the holistic approach to health. This means respecting all spiritual beliefs and celebrating the diversity of cultures and backgrounds. Spirituality can be manifested through creativity and the arts, as well as through ritual and celebration of the natural cycles. Ecovillages attempt to foster personal and inner growth through an open and caring environment that respects multiple forms of expression and manifestation of spirituality.

Ecovillages can have any of the aforementioned foci in any combination or degree. The focuses of the ecovillage will determine the design pattern that emerges. The ecological focus desires to create the least impact on the natural surroundings that is possible and tends to use permaculture design principles as the basis of the site layout. Socially motivated ecovillages tend to focus on the arrangement of the public and private structures and the interface thereof. Culturally focused groups may draw on a certain aspect of their culture and center the ecovillage design around some physical manifestation of it. Spiritually centered ecovillages may look to energy lines, the chakra system or centers of spiritual growth for the design and layout of their ecovillage. Again, most ecovillages strive to create a balanced existence which encompasses all of these components.

Ecovillage Evolution

Gaia Trust, "a Danish-based charitable association founded in 1987 on the initiative of Ross and Hildur Jackson, with the intention of supporting the transition to a sustainable and more spiritual future society through grants and proactive initiatives" (Gaia Trust), was formed in order to support the movements that encourage a transition to a sustainable society. In 1991, a team was charged by the Gaia Trust to document ecologically sound intentional communities, but the results from the team's research were that no comprehensive, full-scale "ecovillage" yet existed, although components were found in many interesting intentional communities worldwide. From there, Ross and Hildur Jackson decided that "the world needed good examples of what it means to live in harmony with nature in a sustainable and spiritually satisfying way in a technologically advanced society" (Jackson & Jackson, 2004); they began to build Ecovillage Fjordvang in Western Denmark.

A 1995 conference at Findhorn, a very old intentional community in Scotland, entitled "Ecovillages and Sustainable Communities for the 21st Century" drew a record breaking crowd and sparked the widespread adoption of the term "ecovillage" among existing intentional communities worldwide. During the same year the Global Ecovillage Network (GEN) was formed with 25 representatives from countries across the world; initial funding came from Gaia Trust. The stated mission of the Global Ecovillage Network is:

> We are creating a sustainable future by identifying, assisting and coordinating the efforts of communities to acquire social, spiritual, economic and ecological harmony. We encourage a culture of mutual acceptance and respect, solidarity and love, open communications, cross-cultural outreach, and education by example. We serve as a catalyst to bring the highest aspirations of humanity into a practical reality. GEN contributes to the worldwide transformation toward sustainability, by supporting ecovillages, joining with like-minded partners, and expanding education and demonstration programs in sustainable living.

This group has provided international aid for groups desiring to create ecologically sustainable and socially and spiritually fulfilling communities. Global Ecovillage Network continues to attend international meetings and is a member of the UN Economic and Social Council. The number of ecovillages currently ranges between 4000 and 5000 worldwide, depending on the stringency of the definition of ecovillage that is considered.

Many intentional communities throughout the world are realigning their focus and adapting their goals and values to become a part of the ecovillage movement. At the same time new communities are forming explicitly as ecovillages. For a growing number of people worldwide, ecovillages are an answer to a growing concern for the stability of the world in the future. These ecovillages meet basic human needs, provide healthy social structures and create a way of life that does not compromise the environment or the needs of future generations.

Ecovillages versus Current Development Trends

As previously noted, ecovillages are a very distinct, intentional development type, unlike what is seen in most of the western world. Their intentionality and environmentalism set them apart, as well as the members' practice of voluntary simplicity. As was noted in Figure 2.2, the starkest comparison is drawn between an ecovillage and a new development on the fringe of suburban sprawl in the well known town of Anywhere, USA. The sprawl subdivision is most likely second to fourth growth forest and old agricultural land before it is clear-cut to reduce costs of development. The future residents of the subdivision have no say so in how they envision their future neighborhood or home. Connectivity is lacking: a car will be needed to go to work and to obtain any of the numerous goods and services associated with the modern lifestyle.

Ecovillages are developed with as little impact on the surrounding environment as possible, they work to restore, not destroy, natural systems. Community members are vitally involved with the development of the community and most of the work is done by community members, unless specialists are needed. The ecovillage provides sources of recreation and livelihood, making it autonomous physically, but the technology of the internet allows it to remain globally connected, virtually.

CHAPTER III – PERMACULTURE STRATEGIES FOR ECOVILLAGE DESIGN

The concepts of permaculture provide a firm ecological grounding for creating sustainable human settlements. As noted in Chapter 2, many ecovillages use permaculture design techniques when developing their site. It is a holistic approach which focuses on sustainable agriculture and integrated design of all components necessary for human settlements.

Introduction to Permaculture

The encompassing design strategy for environmentally friendly, holistic land use development is a technique called *Permaculture*. It is a term that was coined by Bill Mollison and David Holmgren in the 1970's, and is derived from the idea of creating sustainable human settlements, or *perma*nent agri*culture*. In their own words, "Permaculture is a word we have coined for an integrated, evolving system of perennial or self-perpetuating plant and animal species useful to man" (Mollison & Holmgren, 1). The objective of permaculture is to create a highly productive system by integrating soil, water management, plants, animals, microclimates and human needs into a symbiotic system. The goal is to create a system that sustains itself into the indefinite future. "The idea is one of cooperation with nature and each other, of caring for the earth and people and presenting an approach to designing environments that have the diversity, stability and resilience of natural ecosystems, to regenerate damaged land and preserve environments which are still intact. Permaculture is right design based on right ethics" (Bang,

18-19). Through this statement Bang commends the ideology of permaculture and praises its ethical basis.

Permaculture has much in common with the concept of ecological design, as it is applied in landscape architecture to residential or community design. In landscape architecture, the term ecological design can be abused, just as the term ecovillage can be misused within the intentional community movement. In both instances, these buzz words evoke a sense of virtuousness, but can, unfortunately, be used as nothing more than a marketing technique that neglects the true ecological functions below the surface. In other instances, the term ecological design can mean a sole focus on the flora and fauna without consideration of human needs. However, there is a push for ecological design to combine the desires of humans with healthy ecological processes across multiple scales and disciplines (Van der Ryn & Cowan).

There is one major difference between the typical ecological design as defined by the practice of landscape architecture and permaculture design. Ecological design does not necessarily take into account the *self-sufficiency* of *human* settlements. While it may work to reduce the impacts of human existence on the environment, it does not always fully integrate humans into the system. Permaculture is a specific branch of ecological design where human livelihood is sustainable and derived from the land itself and not from outside sources or with many outside inputs.

Permaculture is characterized by intensive land use that supports a great diversity of species and habitats, as well as the humans who cultivate it. The combination of no-till techniques and sheet mulching allow for complex, living soils, while the diversity of flora creates numerous microclimates. In order to be sustainable, production is based on perennial crops; the evolutionary process of growth and succession is continual in permaculture. The greatest input

to the permaculture system is human labor during the establishment period and during harvesting. The greatest savings come from no yearly replanting, as well as in transport, packaging and marketing. This technique of permaculture is a stark contrast to the cultural and agricultural systems that are currently in use.

The current trend in agriculture is of large scale production of goods in one region for consumption in another region. The growth of the agribusiness monoculture has paralleled the increase in pesticides, herbicides, hormones, antibiotics, and synthetic fertilizers, all detrimental to the larger systems involved. The exponential growth in food production per acre has been made possible by cheap fossil fuels from abroad which power the ever evolving technology of mechanization. The growth of agricultural production quantities over the last half century are so tied to the availability of fossil fuels, that a serious reduction or loss of reliable and cheap energy sources would drastically reduce the capacity for production and according to Holmgren, would cause widespread famine (Holmgren, 188). In the future the decline of fossil fuels will reveal the damage that has been caused by years of unsustainable agriculture and development. The bigger they are, the harder they fall.

There are many differences between our current industrialized society and the sustainable culture that relies on the values of permaculture; the major differences are in scale and organization, energy sources, and material flows. Sustainable society models are small in scale and function independently within a distributed network. The flows of materials and renewable energy are both cyclical. Our current industrial model has developed around large centralized production with widespread distribution networks that consume non-renewable energy and have a liner material flows that do not utilize byproducts (Holmgren, xxviii). The dangers of the large

centralized system have been shown in instances such as the Pine Beetle Epidemic that so severely damaged the pine monocultures throughout the southeast.

Principles of Permaculture

The ethical principles of permaculture have been encompassed by the four tenets: Care for the earth, care for people, reduce and distribute. David Holmgren, one of the co-creators of the permaculture concept, has outlined the twelve permaculture design principles in his 2002 book, Permaculture: Principles and Pathways Beyond Sustainability. These twelve principles are summarized below, with a focus on the ecological aspects of each.

Principle One: Observe and interact

Pre-industrial agriculture was very labor intensive, while our current methods are very energy intensive. Permaculture based systems attempt to reduce both labor and energy through intelligent observation and smart design. Understanding the piece of land that is being developed is vital to this design process and this understanding takes time. Once information is gathered through observation, then the data and findings must be investigated, patterns must be found and the whole of the information must be distilled so that the information can be easily used. The McHargian method of overlaying site information is a suggested approach to analyzing an environment. Slope, hydrology, vegetation, wildlife, agriculture, soils, drainage, existing land-use, geology, are all valuable considerations for the site analysis of a permaculture design or a future ecovillage. Observation is considered the most critical element in developing a good permaculture design.

Interaction is also a vital and delicate part of the process of understanding and working with a site. One of the maxims of permaculture design is that effective design solutions are often very simple. The uncontrollable and often incomprehensible complexity of natural organisms and systems are doing most of the work. Adding layers of human complexity or intervention to solve one problem can often disrupt other functions and systems that are performing properly.

Principle two: Catch and store energy

We are currently at a point in today's society in which we could use our current wealth to invest in natural and human capital for future generations. However, the conventional concepts of economics rarely include social and environmental investment. The current state of readily available, large quantities of energy has created a false perception that there is no need to be concerned about its availability now or in the future. The second principle acknowledges the need to reduce or eliminate our dependence on non-renewable energy sources and turn to those sources that are free and widely available. This is a vital consideration if we are to create a sustainable society for future generations.

Solar energy, wind energy, hydroelectric and biomass energy are all sources that can be continually managed into the future without depletion. The concept of renewable energy sources works symbiotically with the sixth principle: produce no waste. One of the simplest methods for reducing waste is to build up natural capital which includes water, living soil, trees and seeds. Water collection and retention reduces erosion, thus retaining the fertile topsoil layer. This simple theory builds water, nutrient, and biomass capital. These forms of natural capital are, for the most part, self maintaining, if not increasing, on their own. Not only does natural capital have a low depreciation rate, but it is resistant to monopolization and theft. Also, natural capital has proven over thousands of years that it is simple to utilize without the need for technology.

Principle three: Obtain a yield

The goal of permaculture is to provide for human needs while upholding and encouraging healthy ecosystem functions. Permaculture design, as theorized, performs many functions; this is especially true in the context of ecovillage design. Plants that not only produce food for human consumption, but also serve other valuable functions in the ecosystem such as acting as host plants for beneficial insects or fixing nitrogen. Planting edible, medicinal or fiber plants not only yields useful harvests, but at the same time functions to create an ecologically and anthropocentrically balanced environment.

Principle four: Apply self-regulation and accept feedback

The ultimate goal of permaculture is to create a self-regulating and self-maintaining system—a condition which is never actually achieved, but always attempted. "Much of the ecologically dysfunctional aspects of our systems result from this denial of the need for self-regulation and feedback systems that control inappropriate behavior by simply delivering the consequences of that behavior back to us" (Holmgren, 71). Both negative and positive feedback systems are necessary for the balanced functioning of an ecosystem and taking personal responsibility for one's needs puts one in direct connection with these feedback loops. Self-awareness of needs, desires, responsibilities and abilities help one to limit inappropriate actions if there is knowledge of how these things impact energy and material flow. Small continual adjustments to the systems, social or ecological, reduce the need for abrupt, drastic change once a problem has gotten out of control.

Principle five: Use and value renewable resources and services

"Renewable resources are those which are renewed and replaced by natural processes over reasonable periods without the need for major non-renewable inputs" (Holmgren, 93). Renewable services are those we gain without the resource being consumed in the process. For example, a deciduous tree with deep roots brings deeply deposited minerals and nutrients up through its roots and returns them to the upper layer of the earth when its leaves drop. This distribution of nutrients and minerals is a service that does not consume the resource. "Permaculture design should make best use of non-consuming natural services to minimize our consumptive demands on resources and emphasize the harmonious possibilities of interaction between humans and nature" (Holmgren, 93). We must consider the ability of renewable resources to be sustainable—we must not deplete the capacity for continued yields into the future. Also in considering renewable resources, the entire process for production and the byproducts should be taken into account.

Principle six: Produce no waste

This principle discusses the ideas of caring for material goods, reducing pollution and using waste as a resource. Primarily, the ideas of waste minimization are explored through the concept of "refuse, reduce, reuse, repair and recycle." Durable products coupled with a strong maintenance ethic prolong the life of almost any good and is a stark contrast to our current societal desire for disposability. Much of what modern western society sees as waste, a permaculturist sees as opportunity. From grass clippings to human excretions, all organic matter has the ability to be reused in another system.

Principle seven: Design from patterns to detail

Natural and social patterns help us not only to understand what we see and experience, but also allow us a common language that we can apply in multiple contexts and scales. Physical, functional, temporal and spatial scales all influence the complex interactions that surround us. A thorough understanding of the influences of these scales on the evolution of systems allows us to better comprehend the idea of true sustainability and to better see the multi-scaled patterns that exist. A typical pattern of use in permaculture design utilizes zones, generally radiating outward from a home site. These zones define the intensity of maintenance needed by the activities that occur within them. Sectors divide the concentric zones into segments, similar to pie shapes, which show the influence of external energies, such as solar, wind and fire on the site. Ecovillage design is a more complex form of permaculture design as it focuses on the location of and interactions between multiple homesteads and common buildings. Modeling design after patterns found in natural ecosystems is considered to be a wise design choice.

Principle eight: Integrate rather than segregate

As in systems ecology, the whole is greater than the sum of the parts. In permaculture, there is a focus on interaction between web-like connections of co-dependent parts. "The ability of the designer to create systems that are closely integrated depends on a broad view of the range of jigsaw-like lock-and-key relationships that characterize ecological and social communities. As well as deliberate design, we need to foresee and allow for effective ecological and social relationships that develop from self-organization and growth" (Holmgren, 155). Within self reliant systems and within permaculture, there are two vital concepts: each element performs

many functions and each important function is supported by many elements. As found in nature, there are a number of relationships that are vital to the functioning of a healthy ecosystem:

- Predatory relationships
- Parasitic relationships
- Competitive relationships
- Avoidance relationships
- Mutualism relationships
- Symbiotic relationships

This ecologically based principle of integration and interconnectedness is applied to social functions and community design as well, all of which is considered permaculture design.

Principle nine: Use small and slow solutions

According to Holmgren, "Systems should be designed to perform functions at the smallest scale that is practical and energy-efficient for that function" (Holmgren, 181). The focus of permaculture is on human scale design, although the principles can be applied, in the form of an integrated system, to larger contexts, such as ecovillages. Even in ecovillage design, the scale is human and multiple home sites, small cottage based business spaces and communal buildings form in interconnected whole, which of course, is greater than the sum of the parts. There is also the belief that the speed of movement of people and materials should be slowed. This allows for an overall reduction of energy and the ability to focus more on self-reliance and waste reduction.

Principle ten: Use and value diversity

"The great diversity of forms, functions and interactions in nature and humanity are the source for evolved systemic complexity" (Holmgren, 203). Polyculture, the cultivation of numerous plants and animal species within an integrated system, is a common application of this

principle. Dynamic, complex systems have been proven over millennia to be the healthiest systems. "Diversity of structures, both living and built, is an important aspect of this principle, as is the diversity within species and populations, including human communities" (Holmgren 203). Permaculture counters the often stated belief that humans' demands for productivity work against nature's desire for diversity. Permaculture functions on the premise that diverse, integrated systems are the most productive for the longest time period without external inputs.

Principle eleven: Use edges and value the marginal

Life teems at "edges." Organisms from two or more distinct ecosystems exist in these zones, as well as species that evolved specifically in these confluences of realms. This phenomena creates a zone called an ecotone, "an edge between two bioregions where the distribution of species from both regions overlaps, creating greater biodiversity than in either of the respective regions" (Holmgren, 224). Creating edge in permaculture is an acceptable design technique that can be applied on a scale as small as planting configuration.

Principle twelve: Creatively use and respond to change

This twofold principle encourages that permaculture design and management make use of change. For example, encouraging succession through design and plant selection or creatively responding to large scale changes that are beyond our control. A characteristic of good permaculture design is the systems resiliency to change, but flexibility and acceptance of change are necessary. Succession is a source of constant change in ecosystems and it is encouraged in permaculture design. For example, pioneer plants that are marginally productive develop their environment for future, more valuable and longer lived plants. Permaculture uses the pulsing

model of ecological succession which sees catastrophic events at the organism level to be positive occurrences for the larger ecosystem. Again, it is all about scale. "Pulsing ecosystems typically develop a pattern of long, slow accumulation of biomass (production) followed by a short intense pulse of consumption where total biomass falls rapidly and nutrients are recycled" (Holmgren, 248). Management practices such as controlled burnings, grazing or external influences of floods or insect plagues are all occurrences that have pulsing effects on ecosystems.

Application of principles in ecovillage design

The principles of the permaculture movement are virtually identical to values of the ecovillage movement. Using the principles of permaculture to design ecovillages creates functional and sustainable settlements. Commitment to long term, sustainable management using the principles of permaculture as the guiding principles of the ecovillage would be a key factor of success. Both the permaculture and the ecovillage movements have a holistic view of the interconnectedness of organisms, elements and ecosystems: both believe that a major shift in dependence and societal structure must occur to continue to sustain life on this planet.

Of all the principles, the observation stage is the most vital portion of both traditional and permaculture design, allowing the designer to examine the complex layers and interactions that are overlaid on a given landscape (Lindegger). Needs, desires, internal constraints, and outside influences are all weighed and the outcome, or design, is derived with the goal of arranging the most ideal patterns of needed elements to serve the necessary functions. The ultimate goal is to work with nature and not against it to meet the needs of the people with the least amount of input on the least amount of land possible. The goal preserves as much energy and wilderness as possible.

CHAPTER IV – CASE STUDIES

This chapter examines three ecovillages in the southeastern United States through research, site visits and photographs. Selection of ecovillages was based on the Global Ecovillage Network list of participating ecovillages as well as personal knowledge of the Orange Twin Conservation Community in Athens, Georgia. Earthaven Ecovillage and Enota Spiritual Retreat Center and Ecovillage were both listed on the Global Ecovillage Network website.

Earthaven Ecovillage

Figure 4.1 - *View towards south-facing slope near Hut Hamlet—The lowlands are reserved for cultivation*

In the mountains of North Carolina, ten miles south of Black Mountain, a neo-tribal ecovillage, Earthaven, is growing. The initial group of interested members began searching for the most suitable property in 1991, and has, within the last year, finally paid off the mortgage on their land. In 1994 Earthaven became incorporated as a homeowner's association. Therefore, the land is owned collectively by the community, and those using the association's property must be members. Currently there are about sixty full members, but their projected growth will top out at 150 members and around 50 residential units.

The main focus of the first ten years of development was to create housing and infrastructure. The members of Earthaven consider themselves fortunate, in that they have been able to purchase their own food through personal funds while the thrust of their work has been on infrastructure development. There is a move to drastically increase the agricultural production, as currently only a small fraction of the food consumed comes from the community. Many plots are cultivated in the cooperative garden, where all members have the right to a space. The Imani Farm is the first agricultural project undertaken at Earthaven, and it is still in its infancy. A forest garden (See Appendix C) is being developed to produce non-traditional agricultural crops, and orchards are becoming well established on the northern slopes.

There are many components to Earthaven's infrastructure. The straw bale kitchen, root cellar, shower house, composting toilets (Figure 4.2), sauna and meditation house make up the core of the "Hut Hamlet," an area where members may live as they develop their neighborhood site and while the Village Center is still under construction. Throughout the Hamlet, small cottages, yurts, domes and travel trailers surround these public areas, and all members have access to the public amenities, as well as to the gardens, orchard and constructed wetlands which are located in this area. There is the Earthship root cellar, constructed out of old automobile

Figure 4.2 - *Composting Toilet*

Figure 4.3 - *Council Hall*

tires, the trading post for small grocery needs, "The White Owl" for social gatherings, and the Council Hall in the Village Center (Figure 4.3). Even the Village School, a cooperative home-school, is up and running.

The public infrastructure is continually growing in the village center as well as in the self organizing "neighborhoods," of which eleven are expected, that organically radiate out from this central core. The community design is based on the Permaculture Site Plan, which keeps flat

Figure 4.4 - *Home on the South facing slope*

Figure 4.5 - *Co-housing apartment style residence*

bottom agricultural lands in cultivation, development areas compact and on south-facing slopes (Figure 4.4), and wild lands preserved. Many neighborhood clusters are centered around common spaces, such as kitchens, composting toilets and occasional solar showers. There is an array of housing styles: single-family, duplexes, compound, and co-housing (Figure 4.5). The building techniques at Earthaven range from traditional, to conventional, to very experimental, but all buildings are constructed with energy efficient designs, as well as local and natural building materials.

Most structures combine a number of natural building methods (See Appendix C). These multi-use techniques have been derived through experiments and experience. All buildings, public or private, are constructed on south-facing slopes and many cut into the earth which

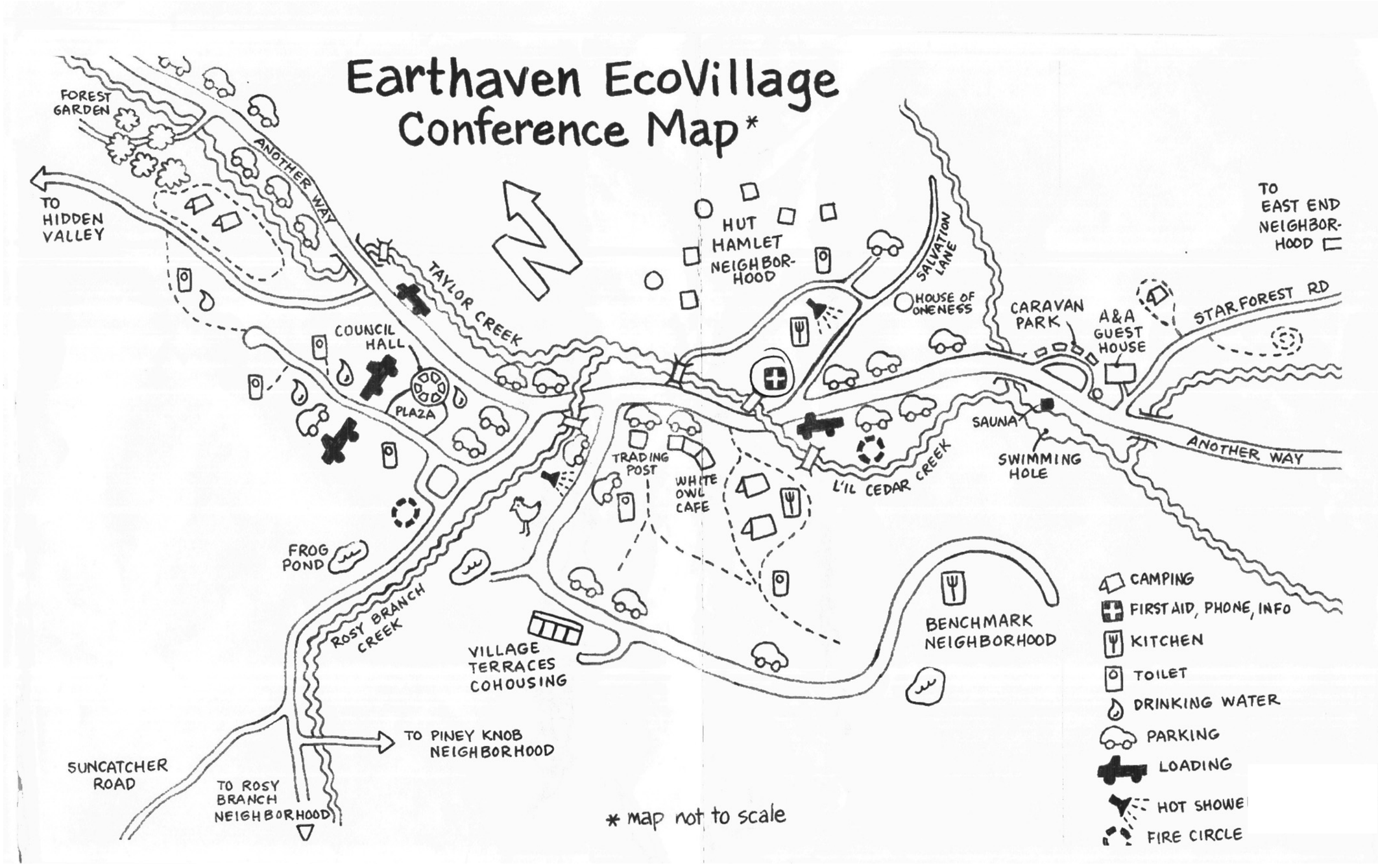
creates a northern wall that is partially earthen. The community buildings tend to have the following combination of materials and techniques: The south-facing side is constructed out of cob with many windows, often out of large, empty jugs. The cob does not insulate, but it collects heat and slowly releases it throughout the night. The western side is constructed out of slipstraw hay walls which are created using recycled plywood forms and have more ability to insulate than the cob. The northern wall is made of very insulating hay bail construction and the eastern side is constructed of waddle and daub.

Renewable energy is the only form of energy throughout the ecovillage. Currently it is up to each individual household to provide its own electricity, but the association plans to create a micro-grid that could provide metered renewable electricity throughout the village. The most widely used source of energy is solar, as hydroelectric generation is restricted due to the sensitivity of stream environments. One micro-hydroelectric station utilizes small engine design to provide electricity for a small number of buildings. However, the possibility for hydroelectric power is excellent with 14 springs and six streams on the property. There is the potential for six stations without negative impacts on the stream ecology.

Numerous environmentally sound cottage industries are run out of Earthaven which support the members economically. Authors, educators, healers, sculptors, herbalists, permaculture designers and consultants, and others operate from either their homes or other small business centers in the village. Numerous seminars and workshops which are available to the public provide income for some residents. In addition, interns and student volunteers are often there to provide work in exchange for room and board; hosting guests in the village is another source of income for some.

The Earthaven Forestry Cooperative is one of the many businesses operated by the members of Earthaven. Cooperative members believe and practice sustainable forestry and natural building by using selective logging and low-impact methods. They strive to create sustainable human habitat without compromising the health and biodiversity of the local natural environments. With their own lumber mill they offer "tree lot management**,** selective logging, standard and custom building design, portable sawmilling, unique post-and-beam joinery, natural insulations, and earth plasters..." (Earthaven Forestry Commission).

Overall, my research about and visit to Earthaven provided me with valuable information on the actualities of ecovillage development and life. The biggest shock was the minimal amount of food that is produced on site. I had expected a much higher level of self-sufficiency, but as I learned, Earthaven ecovillagers know that their ecovillage, like all others is aspiring. A site map of Earthaven Ecovillage, Figure 4.6, is found on page 32.


Earthaven EcoVillage
Conference Map*
FOREST GARDEN
ANOTHER WAY
TO HIDDEN VALLEY
TAYLOR CREEK
COUNCIL HALL
PLAZA
HUT HAMLET NEIGHBOR-HOOD
SALVATION LANE
HOUSE OF ONENESS
CARAVAN PARK
A&A GUEST HOUSE
STAR FOREST RD
TO EAST END NEIGHBOR-HOOD
TRADING POST
WHITE OWL CAFE
L'IL CEDAR CREEK
SAUNA
SWIMMING HOLE
ANOTHER WAY
FROG POND
ROSY BRANCH CREEK
VILLAGE TERRACES COHOUSING
BENCHMARK NEIGHBORHOOD
TO PINEY KNOB NEIGHBORHOOD
SUNCATCHER ROAD
TO ROSY BRANCH NEIGHBORHOOD
* map not to scale
CAMPING
FIRST AID, PHONE, INFO
KITCHEN
TOILET
DRINKING WATER
PARKING
LOADING
HOT SHOWE
FIRE CIRCLE

Enota Spiritual Retreat Center and Ecovillage

Figure 4.7 - *Entrance sign*

Figure 4.8 - *Enota Lodge*

Enota is located on the site of an old YMCA campground in the mountains of north Georgia between Helen and Hiawassee. It is surrounded by the Chattahoochee National Forest and sits just below Brasstown Bald (Figure 4.9). Four waterfalls and five streams traverse the 60 acre property, and the developed area is somewhat compact.

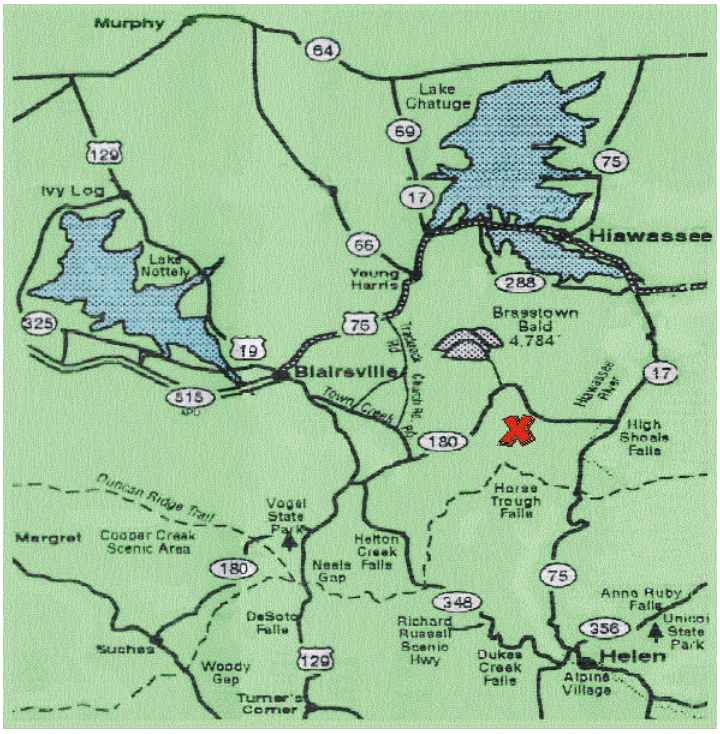


Figure 4.9—*Location map of Enota*

Enota formed in 1999 when an old YMCA campground was purchased by a group of concerned citizens who did not want to see the land overdeveloped. It was developed as a not-for-profit group, and a land trust was established. It has developed into a mountain retreat center offering camping, cabins and RV spaces for rent as the source of income.

Figure 4.10 – *Boxwoods and individual RV areas*

Figure 4.11 – *RV parking pads with electricity*

The retreat center is run by both resident and non-resident volunteers. However, only about five to seven people reside at Enota in the off-season, and these people are not necessarily permanent residents, as they may or may not remain until the next season. Those that do claim residency can exchange work for food and lodging.

Enota is currently running all of their electricity from the grid. One hydro-electric power plant, capable of producing 30kW per hour, is on site, but it is not currently functioning due to

Figure 4.12 – *Hydro Plant*

Figure 4.13 – *Hydro Plant*

restrictions from the Forest Service (Figures 4.12, 4.13). When functioning, it utilizes a 200 foot waterfall for energy. There are no solar panels currently in operation, however, according to the website, there are plans to install both solar and wind generators. In addition, the website states that Enota is in the process of creating a teaching facility to educate about alternative energy.

Many of the buildings, such as the lodge, some cabins and restrooms, were built during the period when Enota was the YMCA camp. There is no sign of, nor recognition of, the use of natural or local building material in the construction of any new buildings.

There is no sense of community, at least not during the off season when I visited Enota. It appears to be a recreational facility for short-term, paying guests. The centralized lodge, which contains offices, a meeting room and a dining area functions more as a gift shop and registration location than as a community center. Calling Enota an ecovillage is misleading. Although Enota is listed with the Global Ecovillage Network as an ecovillage, it actually appears to be more of a camping retreat destination that is using the term "ecovillage" as a marketing technique. A site map of Enota, Figure 4.14, is found on page 36.

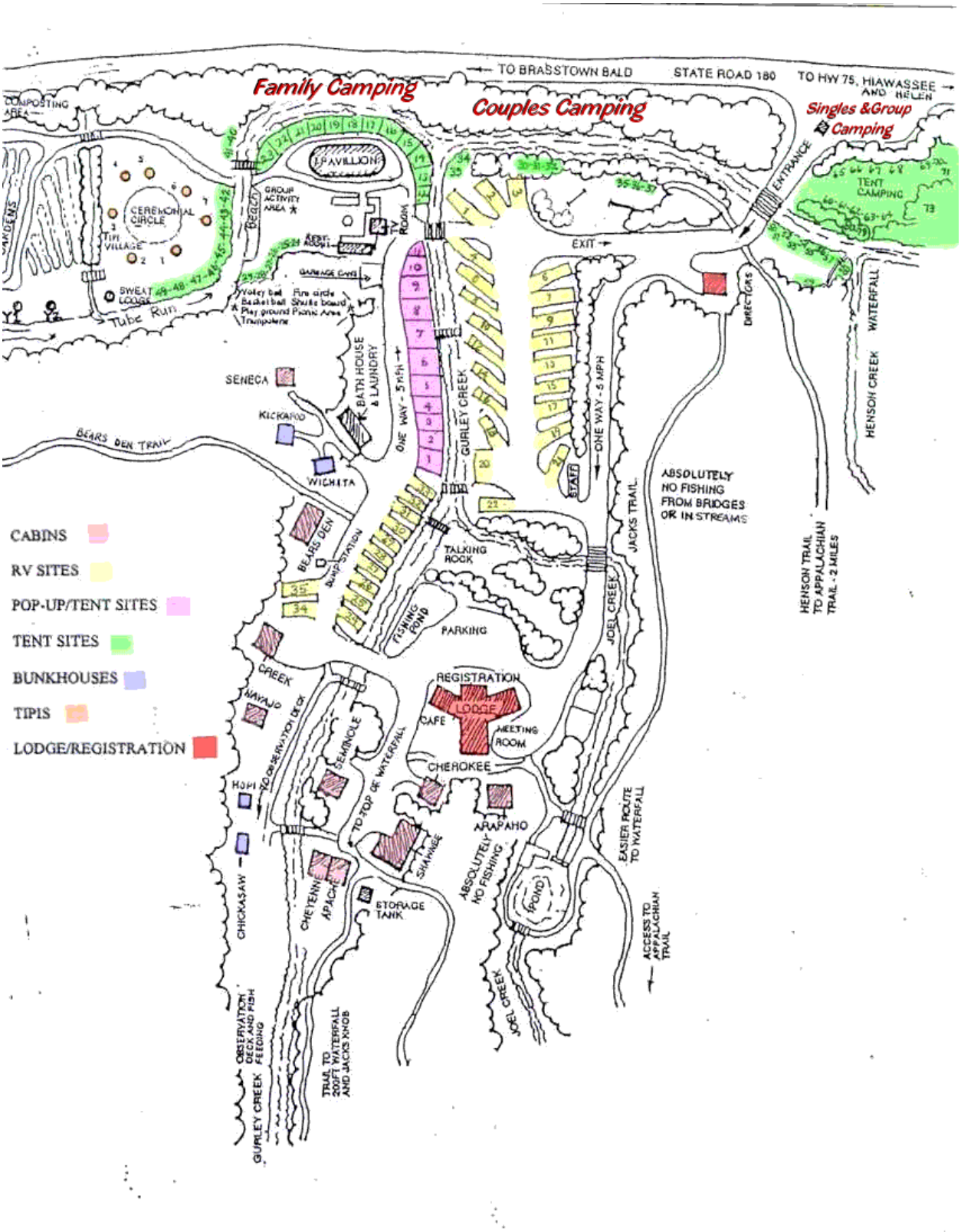


Figure 4.14 – *Enota Site Map*

Orange Twin Conservation Community

Five miles from downtown Athens, plans are being developed for an ecovillage of approximately 135 individuals. Orange Twin Conservation Community, LLC, has purchased one hundred fifty five acres of land, twenty-five of which sit in the floodplain. The area served as cotton farms until the bole weevil devastated the area in the early 1930s. Following this, the land was used as a Girl Scout Camp until the 1960s, after which it remained unused until it was purchased in 2000.

Figure 4.15 – *Entrance Sign*

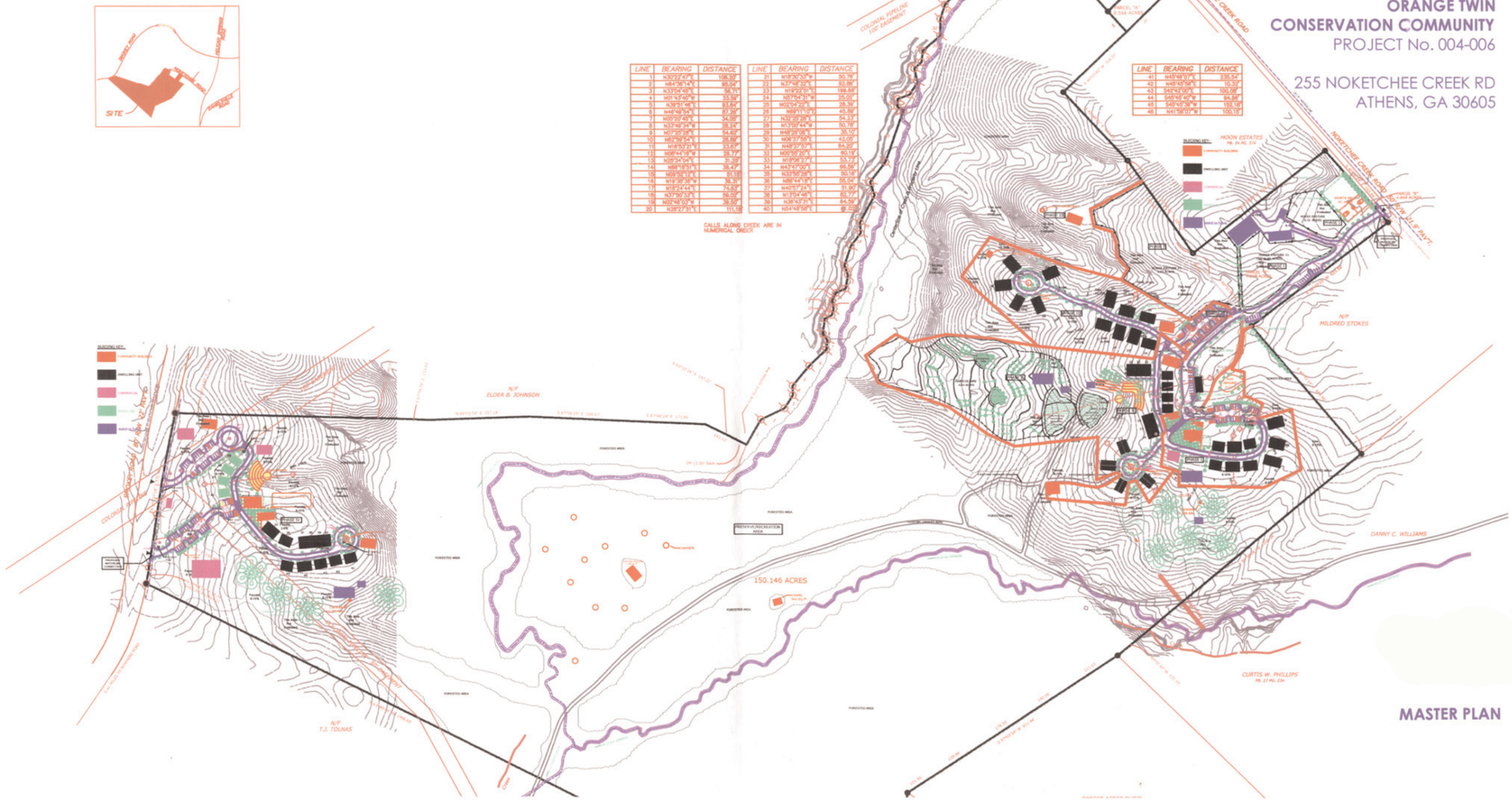
Figure 4.16 – *View to future agricultural fields/pasture*

Orange Twin Conservation Community, LLC, was established in 2000 and development began in the western portion of the property. In 2001, with an additional purchase of five and a half acres, the community gained a second vital access point to the long strip of property. With this additional point of entry, the progress of the larger of the two village nodes can proceed. Ultimately, the larger eastern node would be home to approximately 100 inhabitants, with closer to 30 people living in the more public western area. Sixty membership shares were originally available, and twenty five have been sold.

The village plans to treat its wastewater on site, most likely using group septic. Treating wastewater for reuse is a desire, but permitting for this process does not allow reuse, only discharge into a nearby stream—not allowing a closed cycle. Although multiple cisterns will

collect rainwater for agricultural uses, the community will be on the grid for water. Solar is planned as the primary energy source, but the community will be connected to the grid for back-up electricity and for the possibility of selling electricity back to the grid. Phone and Internet connections will be available.

There is a limit of one car per household. Parking will be in pods of eight cars; each pod will have solar panels above to shade the cars while collecting energy. The pods are designed to have alternative uses while cars are not parked in them. A bus, most likely run on biodiesel, will shuttle people to and from town twice a day to reduce reliance on individual transportation. There is the goal of providing multiple jobs on site for the members of the community, although future occupations of the members are not currently known. Spatial opportunity for entrepreneurial businesses is available on site. The proximity to downtown Athens will allow members to work in town, especially with the daily bus transportation. A site map of Orange Twin is figure 4.17, found on page 39.


ORANGE TWIN
CONSERVATION COMMUNITY
PROJECT No. 004-006
255 NOKETCHEE CREEK RD
ATHENS, GA 30605
N
S
E
W
SITE
NOKETCHEE CREEK ROAD
COLONIAL PIPELINE 100' EASEMENT
MOON ESTATES
N/F MILDRED STOKES
N/F ELDER B. JOHNSON
N/F T.J. TOLNAS
DANNY C. WILLIAMS
CURTIS W. PHILLIPS
150.146 ACRES
MASTER PLAN

Relevant Attributes of the case studies

There is much to be learned through studying the work of others. By examining real life examples of ecovillages in the southeast, positive and negative aspects of design concepts can be revealed. In relation to the Pickens County Ecovillage, there are many aspects of each of the case studies that can be utilized in the design. The permaculture design principles, used in the Earthaven and Orange Twin designs, will be an excellent starting point for the design portion of this thesis.

Other informative concepts are to centrally locate the public buildings, either over the whole design or within nodes of development, and to reuse existing buildings and design where possible. The flattest lands should be reserved for the most intensive agriculture, while slopes can accommodate houses and orchards. Wilderness should be preserved, and efforts made to rehabilitate the degraded components of the land.

The many types of buildings encountered in this research proved quite inspiring. Public buildings should be flexible in usage and spaces for multiple types of income producing activities should be provided within them. The incubator concept for small businesses, in which individuals share expenses and office space, could be applied here. Providing public spaces and activities for the external population is a positive connection to the larger society. It is vital to provide enough variation and recreation for community members within the village.

Solar energy income is the only viable option for the Pickens County Ecovillage. Remaining connected to the grid, since the property is already connected, seems to be a wise option for both backup generation and for the possibility of selling energy back to the grid. Passive solar orientation should also be utilized. Bioremediation would be the best alternative, as the property has very limited areas for leach fields with the density of the development. By

using the Orange Twin, Earthaven and Enota as functioning examples of the various possibilities for creating sustainable human settlements, the Pickens County Ecovillage can be a more informed design. See pages 42 and 43 for comparisons of the three communities.

	Components	Spatial Arrangement	Energy	Building Materials	Income
Earthaven *Uses the permaculture design principles.*	Council hall Multiple Neighborhoods Trading Post Store White Owl Café IMANI organic farm Community gardens A & A Guest House cohousing Tent camping Cooperative kitchens Fire Circles Composting toilets Solar showers	Public spaces centrally located. Ease of access to these buildings, amenities and gardens. Home sites placed in the periphery on south-facing slopes. Flat lands reserved for cultivation. Slopes exceeding 18 percent should be wilderness or used for orchards and forest gardens. Place fruit trees on north slopes.	Individual solar power generation for each family Utilize passive solar energy Micro-hydroelectric station for energy to public buildings (6 stations planned)	Cob Hay Bail Slipstraw Waddle and Daub timber; traditional construction Lathe instead of plywood Tin roofing for rainwater collection Sandbags Rubbish Tires	Red Moon Herbs Permaculture Activist Newsletter and book sales Authors Cottage industry crafts and goods Educators Massage therapists General store Café Classes Visitor accommodations

	Components	Spatial Arrangement	Energy	Building Materials	Income
Enota *Reused existing YMCA camp ground instead of developing in an untouched area.*	Lodge—kitchen, offices, meeting room, gift shop Livestock area Garden area Tent and Tipi camping R V camping Cabins Modern bathhouse Sweat lodge Sacred circle Covered pavilion TV Room Laundry	Temporary visiting sites mostly centrally located—cabins and some tent camping peripherally located. Public spaces—lodge, gardens and pavilion located in the periphery. Steep slopes left as wilderness. Some flat lands for cultivation and pasture. Preserved a significant buffer on most sides by keeping development areas compact. Each RV space with individual deck and electrical hook-ups	Completely run off the grid at the present time. Hydroelectric station for energy currently contested by US Forest Service.	Traditional timber construction; no recognition of natural building materials or techniques.	Tourism Gift shop

	Components	Spatial Arrangement	Energy	Building Materials	Income
Orange Twin *Still in the planning phase; will continue to utilize principles of permaculture design throughout development* *Note that all non-starred elements are planned, not yet in existence.*	Community center Linear and pod neighborhoods Community gardens Community Supported Agriculture farm Constructed wetlands Café Retail space Recording studio Art gallery Swimming hole Yoga center Sports fields Amphitheatre* Meditation hut Playgrounds 1,500 gallon water tank*	Two major nodes of development are close to roads and flank approximately 100 acres of centralized, preserved land. Public spaces for larger community use near periphery—sports fields, playgrounds, retail, art gallery, recording studio. Village public spaces are centrally located Steep slopes left for orchards and wilderness Gently sloped lands are used for buildings, cultivation and pasture. Walking paths to home sites are designed with minimal grade change. Driving and parking are limited.	Solar energy production, grid backup. East-West axis orientation for passive solar heating for buildings. Micro-grid possibility in consideration.	No regulations on building material usage	Community Supported Agriculture Farm Retail Farmer's Market Recording studio Various cottage industry Bed and Breakfast Residential rental units Primitive campsites Chapel for ceremonies/events Pavilion for receptions/events Amphitheatre for events

CHAPTER V – INVENTORY AND ANALYSIS

Explanation of Inventory and Site Analysis

Chapter Five explores both the history and the existing conditions of the Pickens County ecovillage site. This chapter utilizes visual maps, photographs and text to convey the components of the site. The findings herein, combined with the conceptual contributions of the case studies, will guide the design of the theoretical ecovillage found in the Chapter Six. Site inventories found in this chapter include: context, site history, existing conditions, topography, soils, hydrology, and vegetation.

General Site Context

The site, which will be converted into the theoretical ecovillage, is located at 220 Edinburg Lane in Pickens County, South Carolina. It is in the foothills of the northwestern corner of South Carolina (See Figure 5.1) and is within the Shoal Creek Watershed (See figure 5.2). It is in the uplands of the piedmont and is of the Cecil-Hiawassee-Madison soil association having well-drained, sloping soils of clay subsoil (See figure 5.3). The property is currently 23 acres of family land still occupied by my paternal grandmother and is surrounded by single family residences and woodland. It is the land on which my father and his siblings grew up.

The site is located in what Howard Odum termed "Carolina Cotton Piedmont," which is located in rolling hills of clay soils with swift streams cutting in to form river valleys (Coggeshall, 3). The soil has below average fertility due to leaching of nutrients during rain events and this, combined with unsustainable farming practices after the Civil War, led to the

ultimate demise of cotton farming (Coggeshall, 4). The piedmont region in which the site is located is dominated by second, third or fourth growth forest with oak (*Quercus spp.*) and hickory(*Carya spp.*) predominating, where loblolly pines (*Pinus taeda*) have not been planted for timber. The primary conifer in the woodlands is the shortleaf pine (*Pinus echinata*).

Historical and Existing Conditions

In 1919 Walter Whitten Brown purchased 98.3 acres of land from the Halcombe family; the house, which is over 100 years old, was built by the Halcombe family prior to the purchase. Walter Whitten and his family lived in the house until his death in 1936. After which, his son, Ernest Westfield Brown, and his wife, Elizabeth Hayes, moved in on Christmas day, 1942 with their three children and Ernest's mother, Hettie Irene Brown. In 1960 the family moved to anther homestead for approximately six years. In early 1962 the 98.3 acres were sold to Perry Jeral and Avis F. Williams. In October of 1966, Ernest Brown repurchased the northern 23 acres of the original land from the Williams' and moved with his family back to the homestead. In August of 1980, one of Ernest and Elizabeth's children, Wilma Elaine Brown, purchased 3.0 acres of the family land. A house and stable have since been built on this northwestern portion of the land.

The original homestead remains; old fields surround it and second growth forest continues to mature on the north and northeast acres of the land. The pastures are bush hogged once a year to keep the forest from closing in on the house. Five pecan (*Carya illinionensis*) and three black walnut (*Juglans nigra*) trees still stand in the northern field, and both barns remain intact.

When farming was the income for the family, corn and cotton were the main cash crops rotated in the southern most field, but wheat, soybeans, and hay were all grown as well. This field, or hill, was cleared by Walter Whitten in 1919 when the property was purchased. Cotton was the main crop grown in the field west of the road and the family vegetable garden stretched from the horse barn to the fence adjoining the Springfield property. The mules were kept in the horse barn until the tractor became the main means of plowing. The corn crib was also located on the western side of the property.

On the east side of the road, an apple orchard (*Malus spp.* varieties unknown) grew to the south of the house and a peach orchard (*Prunus spp.*varieties unknown) stood to northeast of the homestead. The combine shed and workshop have been converted into a modern two car garage with workshop. The gas pump has been removed, but the tank remains underground next to the garage. The original well is no longer marked, but existing well, dug over 40 years ago, still has a pump house marking it, although the pump no longer functions. Just outside of the backdoor to the house was the smoke house, but like the two chicken houses, it has since been torn down.

In the northeastern fields that slope down to the creek, hay was grown and the hog pen stood north of the cow barn. There was always one milk cow and a few beef cattle for slaughter and sale. Other sources of income were the two rental houses that were rented prior to the repurchase of the land in 1966. One house stood north of the peach orchard and another is the current residence of the Springfield family. (See Historical Structures, figure 5.4 and Existing Conditions, figure 5.5)

Topography

The rolling topography of the area is a defining characteristic of the piedmont region. The site has a total elevation change of just over 112 feet from the crest of the road to the creek in the valley below. For the purposes of designing this ecovillage, there are three slope ranges: 0% to 5% slope, 5.1% to 15% slope and > 15% slope. The first range is best suited for intensive agricultural development, the midrange is suited for buildings and perennial agriculture, and the steepest slopes are best left as woodlands or supplemented as forest gardens. Over half of the site contains slopes steeper than 15%, in some places the slope exceeds 80%. Approximately four acres are in the range suitable for agriculture, 0% to 5% slope (See Slope Analysis, figure 5.6 and Slope Aspect, figure 5.7)

Soils

There are four soil types on the property. On either side of the road the soils are Cecil clay loam, 2 to 6 percent slope, severely eroded. Wrapping around the western side of the property is the same Cecil series, but with slopes from 6 to 10 percent. A central swath of the property contains Pacolet clay loam, 10 to 25 percent slope, severely eroded. The final soil type is contained in the northern and eastern woodland area, which contains the creek. The soils here are Pacolet fine sandy loam, 10 to 25 percent slope, eroded. This analysis confirms that the previous clear cutting of the land and the subsequent farming techniques had a huge impact on the soil stability. (See figure 5.8)

According to the USDA Soil Conservation Service:

> The Cecil-Madison-Pacolet association is mainly on complex side slopes of the uplands adjacent to major drainageways. Cecil soils are well drained, sloping soils on uplands. Typically the surface layer is reddish brown sandy clay loam 5 inches thick. The subsoil is red clay and clay loam that extends to a depth of

about 48 inches. Below this is saprolite of weathered gneiss that extends to a depth of 65 inches or more.

Pacolet soils are well drained, moderately steep soils on uplands. Typically, the surface layer is dark grayish brown sandy loam about 6 inches thick. The upper few inches of the subsoil is yellowish red sandy clay loam. The middle part of the subsoil is red clay, and the lower part is red sandy clay loam that extends to a depth of 30 inches. Below this to a depth of 60 inches is mottled yellowish red and yellow saprolite that crushes to fine sandy loam.

This association has low potential for most locally grown row crops because of steep slopes and the erosion hazard. The potential for pasture grasses and legumes is medium. Crops on the major soils respond well to proper fertilization.

The major soils in this association have medium to moderately high potential for loblolly pine, Virginia pine, yellow-poplar, and red oak. Erosion hazard, equipment limitations, and seedling mortality are limitations of the soils that have medium potential.

The soils in this association have medium to very low potential for most urban uses. Slope, slow permeability, and low strength are some of the limiting features. Potential is low for most recreational uses. (USDA Soil Conservation Service, 4-5)

Hydrology

The road, a ridge, divides the property into two watersheds. The western portion of the property contains a gentle slope westward into the adjacent woodland. The eastern portion of the property contains a spring with a low flow, and no flow during extremely hot and dry summers. Severe erosion has occurred over the last few decades, drastically altering the stream bank. Stormwater management will be a vital component of the design, as the hydrology of the property needs drastic improvements.

The most sever erosion has occurred just south of the cow barn. A swale can be seen on the slope analysis map, figure 5.6, but the severity of the erosion in this area is not apparent. This swale collects water from most of the open land on the property east of the road. The clear

cutting of large hill to the south in 1919 has added 85 years of intensified stormwater runoff to this already steep swale. Large washouts have occurred from just below the barn all the way down to the stream bank which has seven foot deep gullies of exposed red clay.

Vegetation

The property is fairly evenly divided between open land and wooded slopes. The areas around the home sites are lawns composed of volunteer grasses and low growing forbes. The lawn areas have never been seeded or laid with sod. The pastures consist mainly of Broomsedge (*Andropogon virginicus)* with some other successional grasses and invasive weeds. Management of the pastures prevented forest encroachment through biannual cutting with a bush hog. Cedar (*Juniperus virginicus*), Shortleaf Pine, and some hardwoods have grown up along fence lines where they could not be cut.

The woodlands are mixed hardwood forests, with most trees 40 to 60 years old. Red maple (*Acer rubrum*), Southern Red Oak (*Quercus falcata*), White Oak (*Quercus alba*), Scarlet Oak (*Quercus coccinea*), Water Oak (*Quercus nigra*), Pignut Hickory (*Carya glabra*) , Mockernut Hickory (*Carya alba*), Beech (*Fagus americana)*, Sycamore (*Platanus occidentalis*), Sweet Gum (*Liquidambar styraciflua*), Tulip Poplar(*Liriodendron tulipifera*) and Winged Elm (*Ulmus alata*) predominately make up the overstory canopy. Shortleaf Pine, American Holly (*Ilex opaca*) and Sassafras (*Sassafrass albidum*) are the main components of the understory. Christmas Ferns (*Polystichum acrostichoides*) are quite abundant throughout the woodland area. The shrub layer is generally lacking, except in the case of the invasive exotic Chinese Privet (*Ligustrum sinense*).

Privet and Blackberries (*Rubus fructicosus*) compete for edge habitat, while Japanese Honeysuckle (*Lonicera japonica*) climbs towards openings in the canopy throughout a sizeable portion of the woodland area. All three invasive species have encroached around the eastern barn, creating an impenetrable bramble at the edge. Privet has also invaded the northern and southern ends of the stream, but is still limited enough to control through proactive management.

Utilities

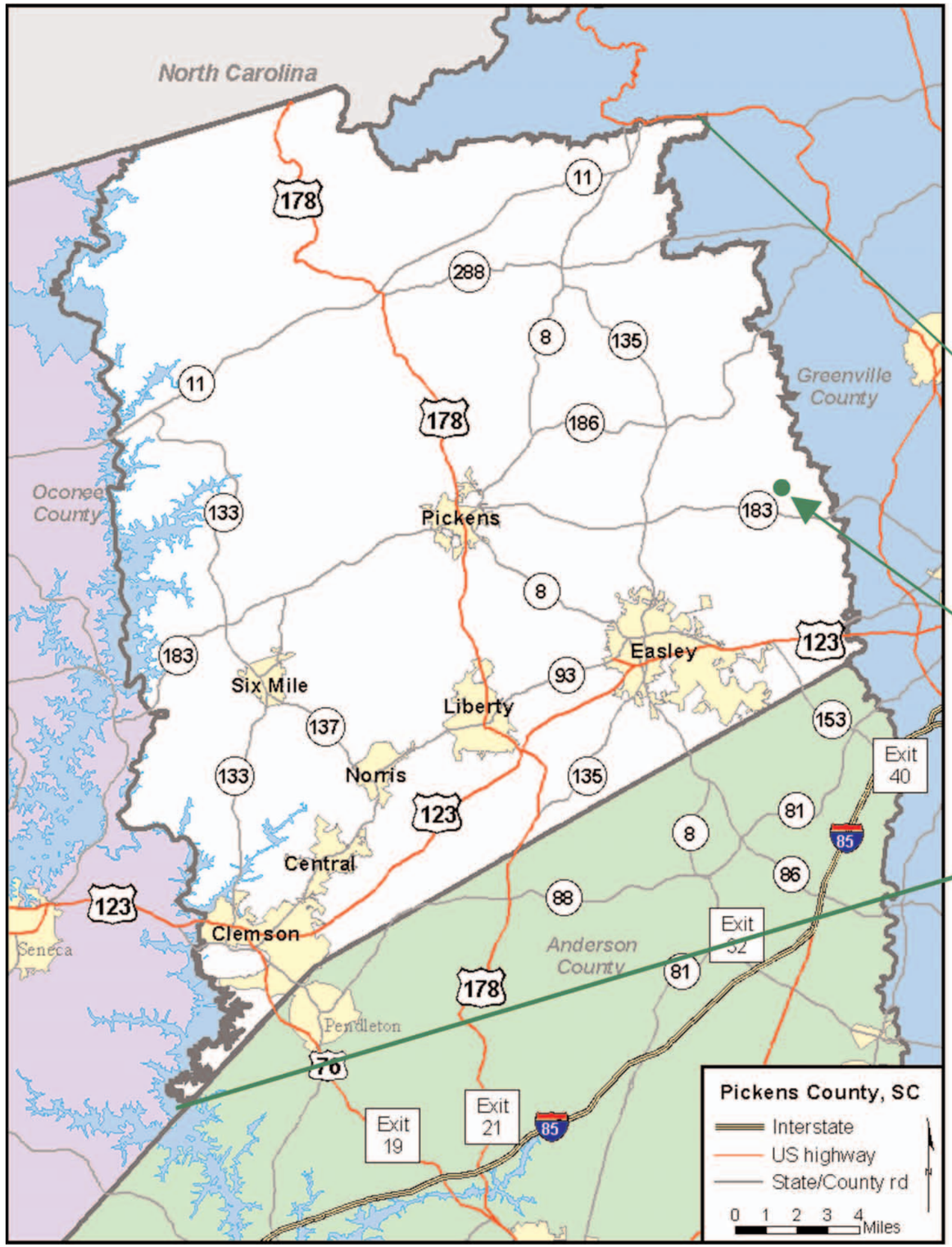
Bell South communication lines and the water lines connect to the home sites underground, but in areas that would hinder design options. Some electrical lines run overhead. One line bisects the western pasture near the mule barn, but from there the line follows the underground utility line to the house. The overhead line to the original homestead follows the road and then crosses the yard and connects to the house. The water lines for both houses run perpendicular to the road. The previously used well still exists just outside of the original homestead, but for it to function the pump must be replaced.

Observations and Analysis

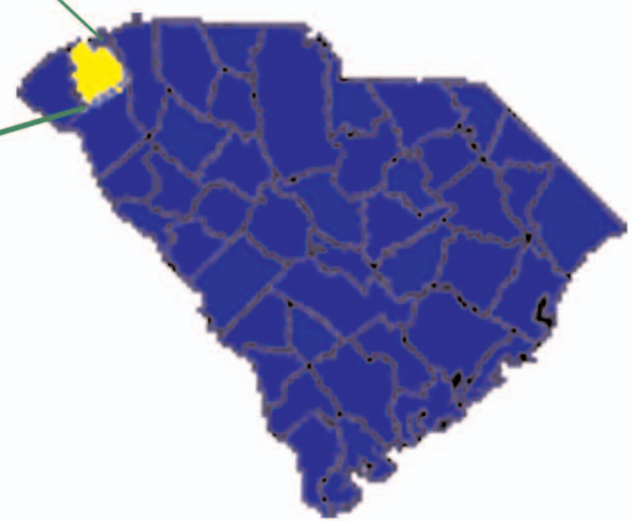
The property has potential for a well developed ecovillage. The greatest lacking component is availability of south facing slopes for situating homesteads. However, there is abundant open land and the placement of home sites may still allow for sufficient passive solar gain. The generally perceived negative aspects of the soil association, such as the low potential for row crops and urban uses, adds to the suitability of the site for an ecovillage. This is due to the ecovillage adoption of permaculture's approach, which utilizes marginal land to create vibrant results (Mollison & Holmgren).

The road that divides the property has positive and negative aspects. There is a break in the flow of the village, as well as a safety concern for pedestrians. However, the road allows for ease of access for incoming and outgoing flow and gives the space a public interface.

Another constraint is the lack of land with a slope of less than 2%; contouring the land for the more intensive agricultural practices may be necessary to prevent adding to the erosion problem. Proper planting and erosion control techniques should be able to mitigate the current erosion problem on the eastern portion of the property. The addition of orchards and other perennial crops will help to stabilize the steeper slopes that are currently open. The severely eroded areas in the woodlands may need a quicker more labor intensive approach, such as check dams, level spreaders (See Appendix C) or the addition of vegetation.

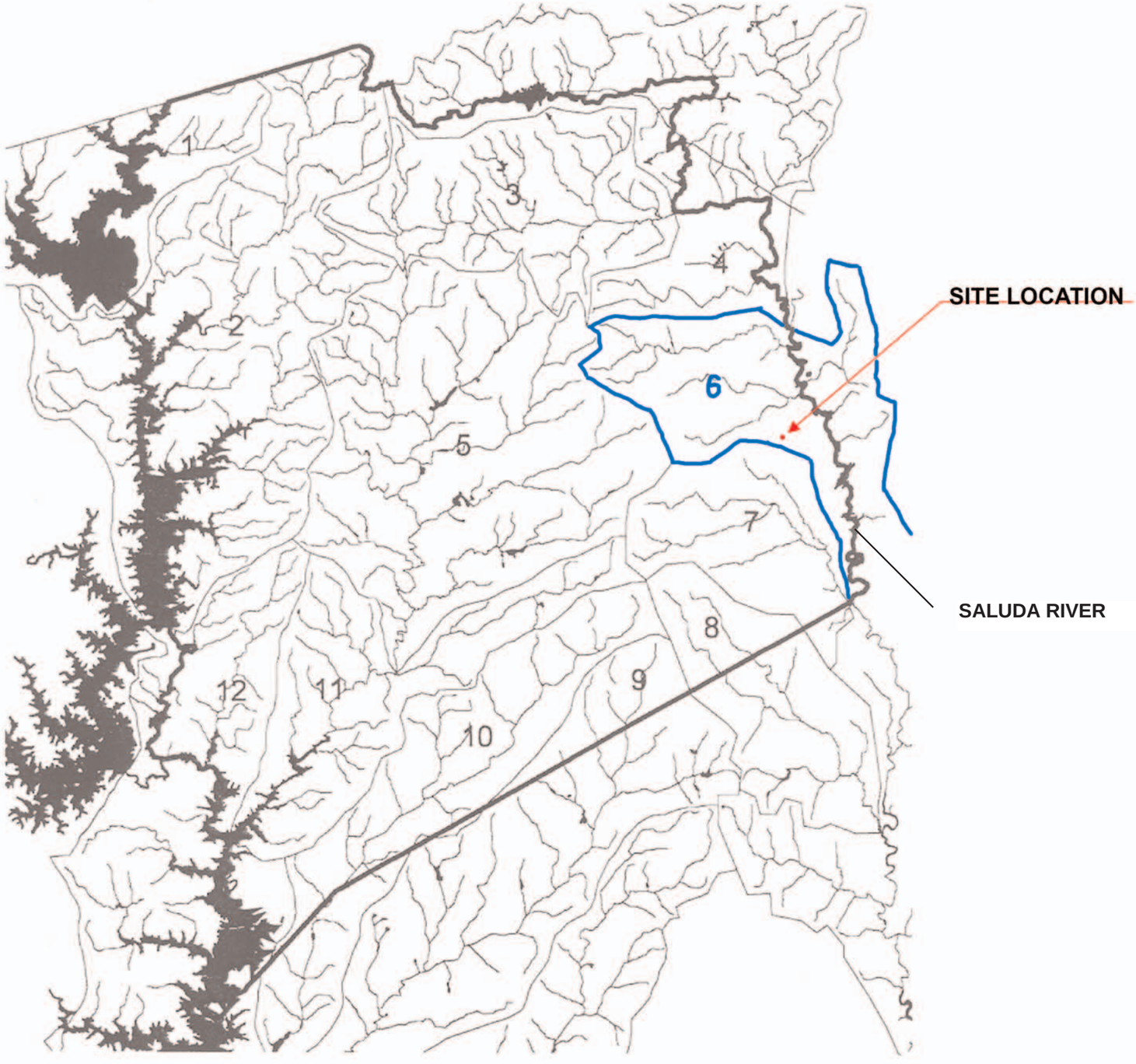


SITE LOCATION



SOUTH CAROLINA

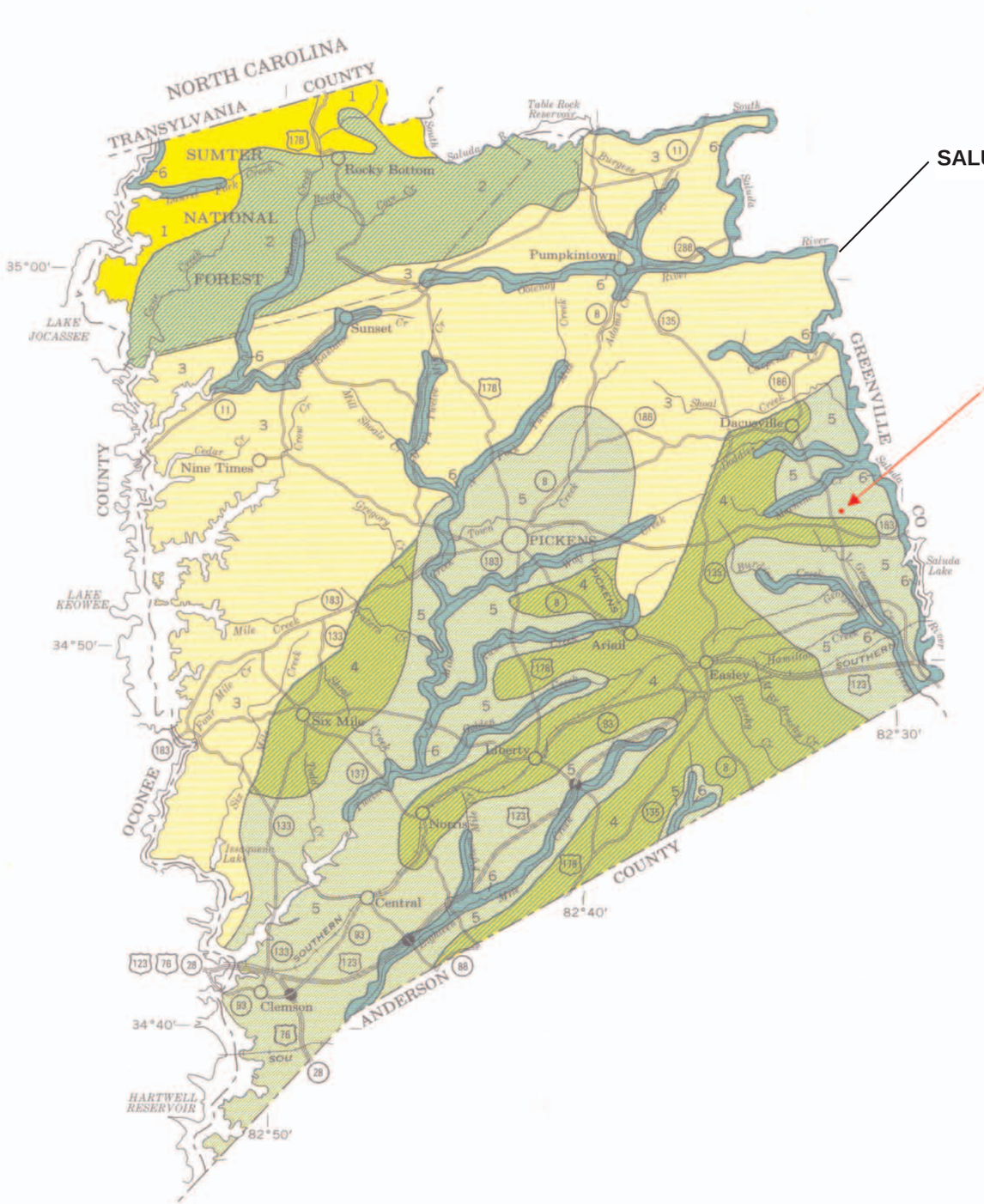
SITE LOCATION figure 5.1



Pickens County Watersheds

1. Laurel Fork Creek
2. Estatoe Creek
3. Oolenoy Creek
4. South Saluda River
5. Upper 12 Mile Creek
6. Shoal Creek
7. Georges Creek
8. Brushy Creek
9. 3&20 Creek
10. 18 Mile Creek
11. Lower 12 Mile Creek
12. Six Mile Creek

WATERSHED LOCATION figure 5.2



SALUDA RIVER

SITE LOCATION

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SOIL ASSOCIATIONS

1 Edneyville-Porters-Hayesville association: Well-drained, strongly sloping to very steep soils that have a loamy subsoil and are moderately deep or deep to weathered rock; on mountains

2 Ashe-Saluda-Stony land association: Excessively drained to well-drained, strongly sloping to very steep soils that have a loamy subsoil and are moderately deep or shallow to weathered rock; on mountains

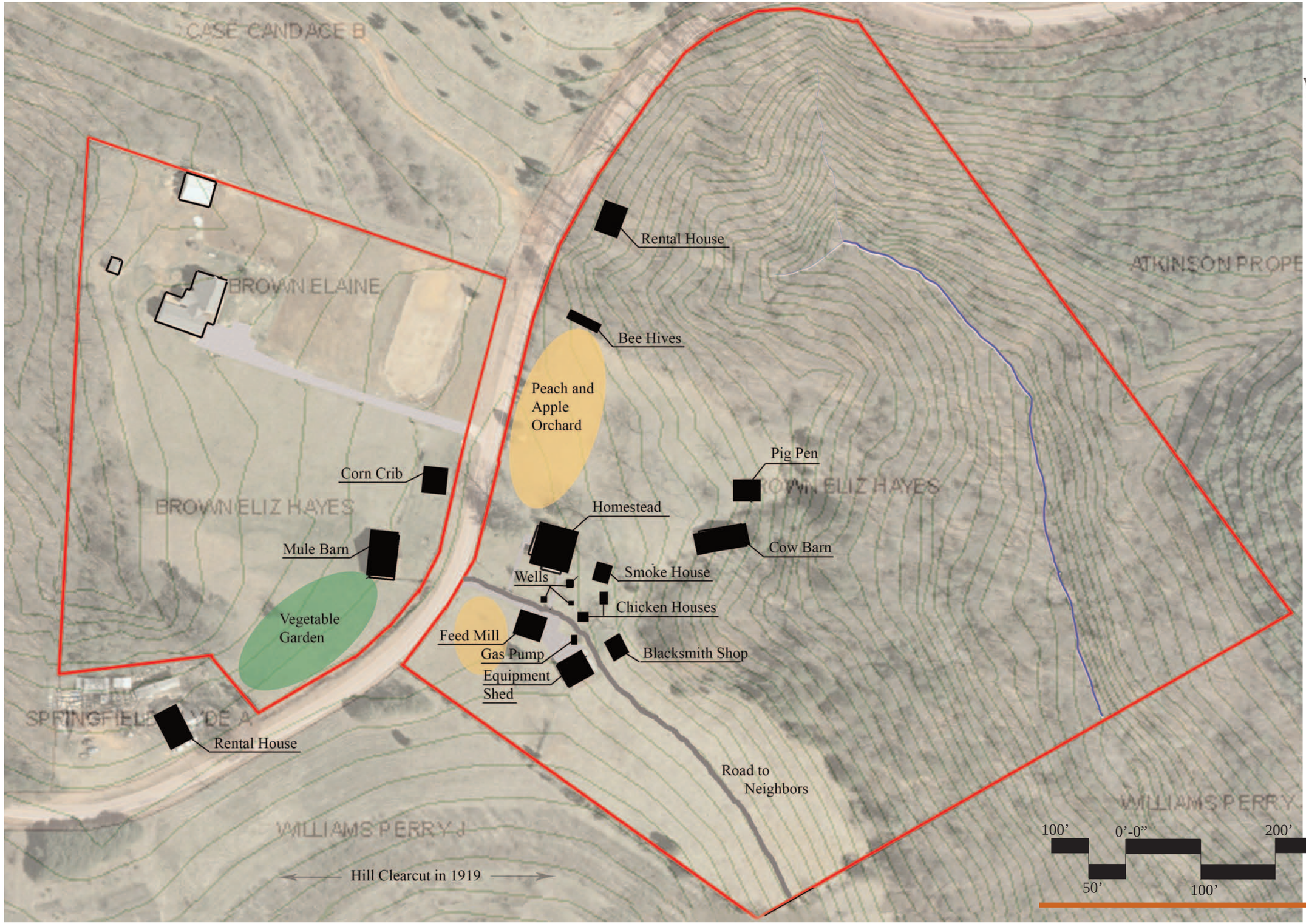
3 Pacolet-Grover-Hiwassee association: Well-drained, moderately steep or steep soils that have a dominantly clayey subsoil and are moderately deep or deep to weathered rock; on uplands

4 Cecil-Hiwassee-Madison association: Well-drained, dominantly sloping soils that have a dominantly clayey subsoil and are moderately deep or deep to weathered rock; on uplands

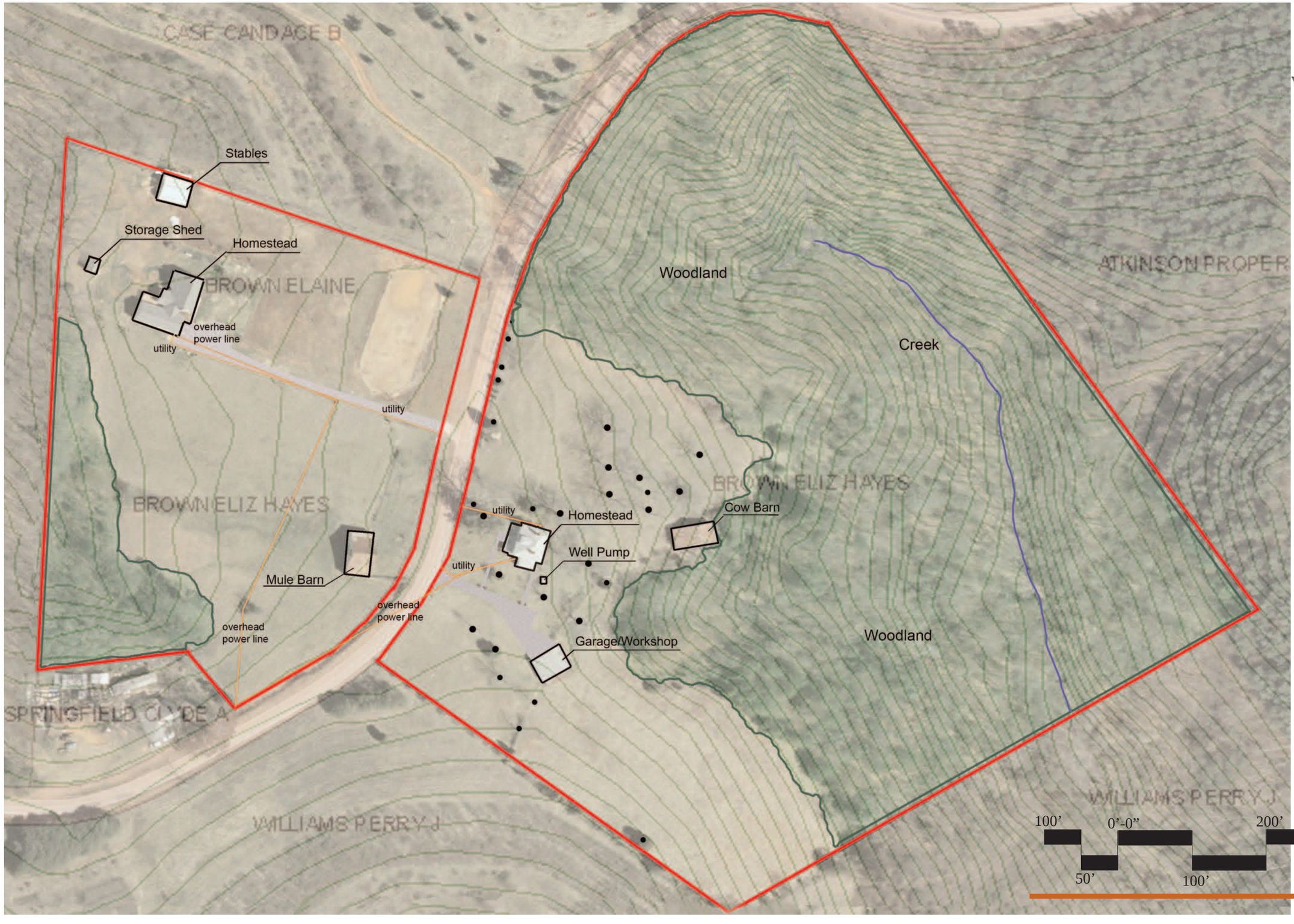
5 Cecil-Madison-Pacolet association: Well-drained, strongly sloping to steep soils that have a dominantly clayey subsoil and are moderately deep or deep to weathered rock; on uplands

6 Toccoa-Chewacla association: Well-drained to somewhat poorly drained, nearly level soils that are dominantly loamy throughout and are subject to flooding; on bottom lands

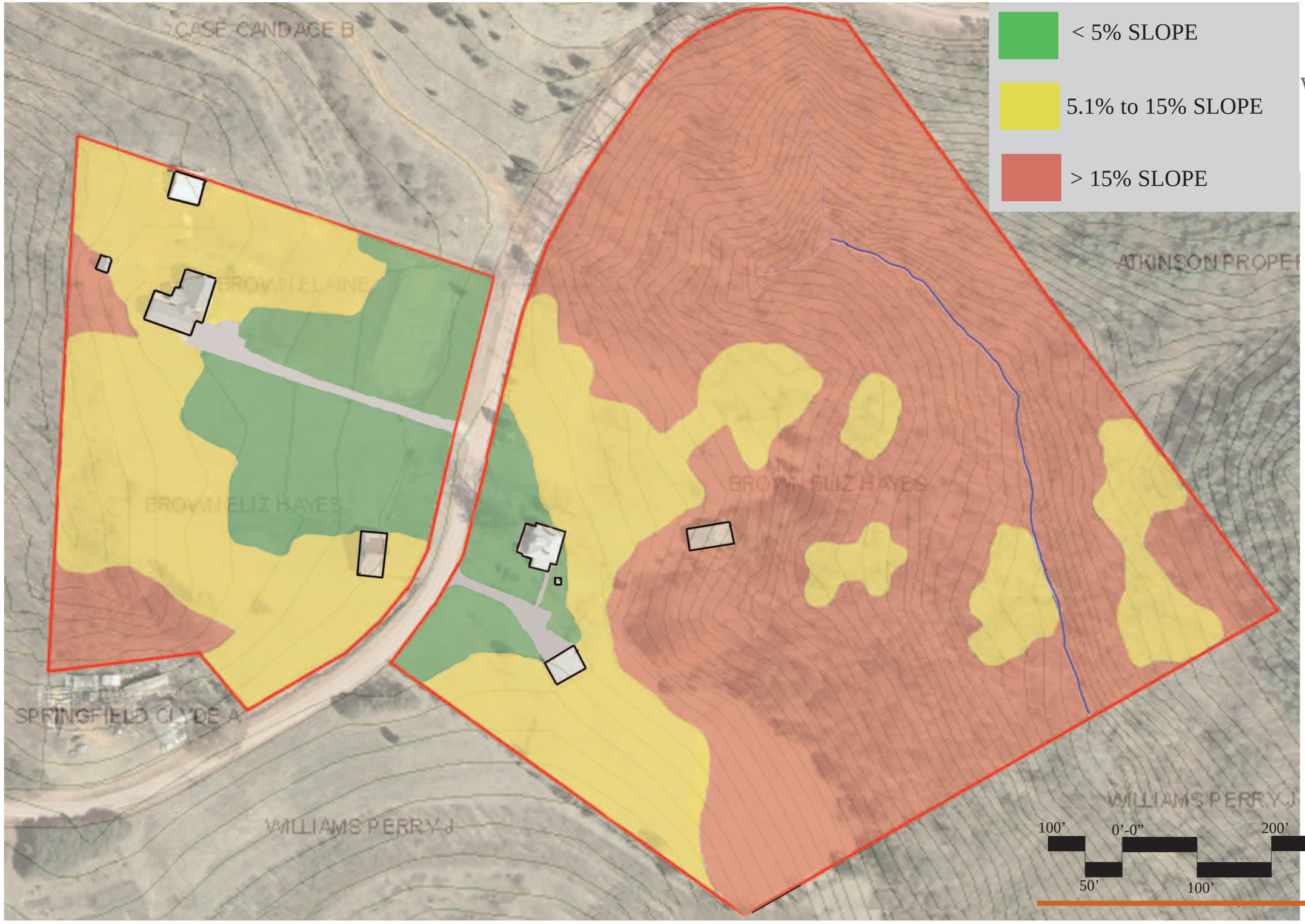
SOIL ASSOCIATIONS figure 5.3



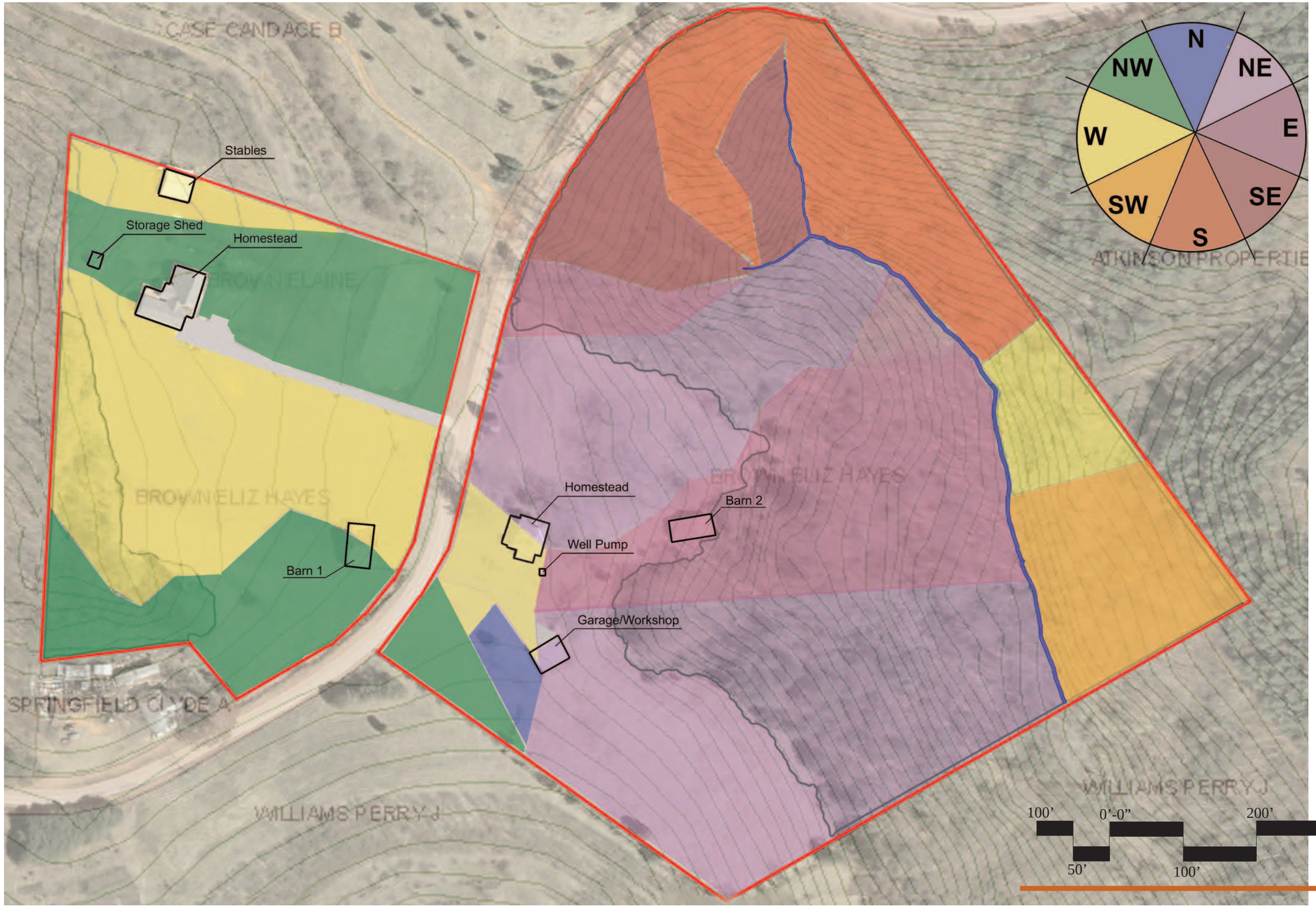
HISTORICAL STRUCTURES figure 5.4



EXISTING CONDITIONS figure 5.5



SLOPE ANALYSIS figure 5.6



SLOPE ASPECT figure 5.7

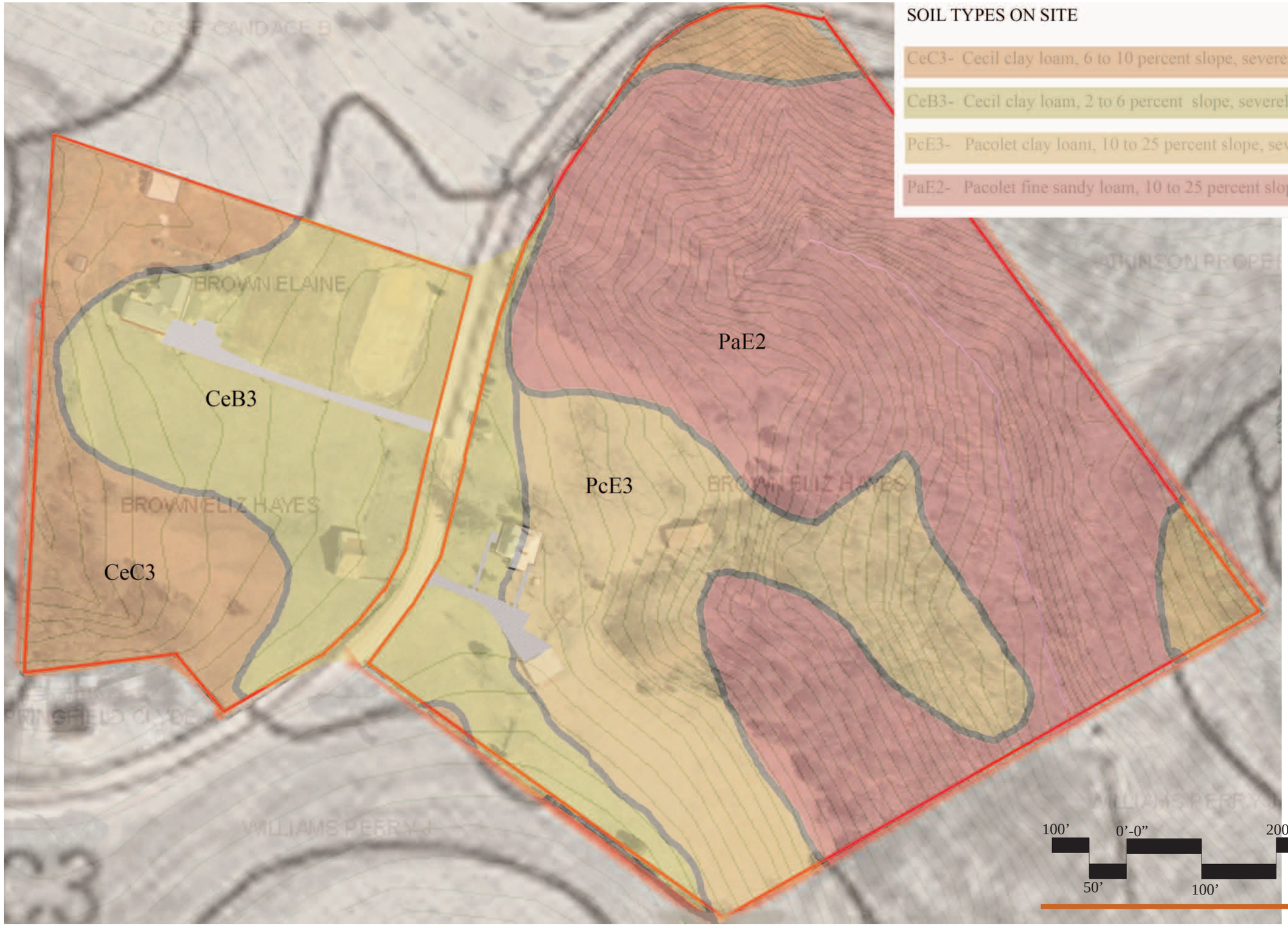
SOIL TYPES ON SITE

CeC3- Cecil clay loam, 6 to 10 percent slope, severely eroded

CeB3- Cecil clay loam, 2 to 6 percent slope, severely eroded

PcE3- Pacolet clay loam, 10 to 25 percent slope, severely eroded

PaE2- Pacolet fine sandy loam, 10 to 25 percent slope, eroded



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100’ 0’-0” 200’

50’ 100’ 300’

SOIL TYPES figure 5.8

< 5% SLOPE

5.1% to 15% SLOPE

> 15% SLOPE

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Previously developed area suitable for more compact growth

Flattest lands needed for intensive agriculture

area along drive has access to utilities

Steeper slope shaded by trees to the west

shaded gathering area

Flattest lands needed for intensive agriculture

Public interface

Terracing needed for intensive ag. Perennial agriculture or orchards more suitable

Steep slope could be stabalized by adding vegetation

Forest garden with perennial crops to stabalize slope

Steeper slopes suitable for housing or orchards

Suitable for development, but under canopy

Steeply sloping woodland areas to be preserved, protected and revitalized through land management program

Highly visible area

Flattest lands needed for intensive agriculture

Centralized area with existing development suitable for community core

Slope needs stablization. Gulley erosion downslope.

High point on property. Suitable for housing complex

Orchard would help to stabalize north slope

Forest garden with perennial crops to stabalize slope

100’ 0’-0” 200’

50’ 100’ 300’

COMPOSITE ANALYSIS figure 5.9

CHAPTER VI – DESIGN AND MANAGEMENT

Guiding Principles of Ecovillage Design

The integration of livelihood, recreation, provisions and community in an environmentally sensitive manner is the goal of this ecovillage design. The proposal uses a multidisciplinary approach combining the newest innovations in the fields of agriculture, architecture, ecology, planning, landscape architecture, and sociology to create a self-sustaining community that heals the earth and the individuals who are involved with it. This holistic, integrative process attempts to create ecovillages that are working examples of sustainable lifestyles. This type of design is accomplished through utilization of the permaculture principles set forth in Chapter Three, as well as the theories of ecological design.

As a guide set forth by the leading institution on ecovillages, I have used the Global Ecovillage Network's Community Sustainability Assessment found in Appendix A to help direct the design process. This document divides community sustainability into three main areas, ecological, social and spiritual, as shown in the lists below, and thoroughly investigates the following sub-categories:

Ecological
Sense of Place - community location & scale; restoration & preservation of nature
Food Availability, Production & Distribution
Physical Infrastructure, Buildings & Transportation - materials, methods, designs
Consumption Patterns & Solid Waste Management
Water - sources, quality & use patterns
Waste Water & Water Pollution Management
Energy Sources & Uses

Social
Openness, Trust & Safety; Communal Space
Communication - the flow of ideas & information

Networking Outreach & Services - resource exchange internal/external
Social Sustainability - diversity & tolerance; decision-making; conflict resolution
Education
Health Care
Sustainable Economics - healthy local economy

Spiritual
Cultural Sustainability
Arts & Leisure
Spiritual Sustainability
Community Glue
Community Resilience
A New Holographic, Circulatory World View
Peace & Global Consciousness

(Community Sustainability Assessment, 2)

Each of the subcategories listed above are further broken down into specific components which create a better understanding of how to create a balanced community life.

The design of an ecovillage can influence practically all of the ecological components discussed in the Community Sustainability Assessment, but design also affects the social and spiritual aspects of sustainability. The following social goals are affected by the spaces created in the design of the ecovillage:

- Spaces and systems are available that support and maximize communication, relationships and productivity.
- There are adequate opportunities/technologies for communication within the community and for connecting as is appropriate with the world wide community.
- Personal growth, learning and creativity are valued and nurtured; opportunities for teaching and learning are available to all age groups through a variety of educational forms.
- Options for restoring, maintaining or improving health (physical, mental, emotional and spiritual) are available and affordable, including natural remedies and alternative health practices – such as meditation and body work.

(Community Sustainability Assessment, 21)

Providing adequate opportunity for the following components, which create a balanced spiritual aspect of community life, is within the designer's capability:

- Cultural vitality is sustained through artistic and other cultural activities and celebrations.
- Creativity and the arts are seen as an expression of unity and interrelationship to our universe, and are encouraged and supported through various forms of artistic expression, artful living and through preservation and sharing of beauty and aesthetic values.
- A sense of joy and belonging is fostered through rituals and celebrations.

(Community Sustainability Assessment, 32)

Using the Community Sustainability Assessment to evaluate the design while it is in process adds another layer of design consciousness to the ultimate product. The design should follow the guiding principles previously set forth in this chapter and Chapter 3, while remaining sensitive to the vision statement and goals of the community.

Vision Statement

The Pickens County Ecovillage is an intentional community designed to foster interaction and connection between individuals and between individuals and the earth. The community affords people the ability to live in a sustainable manner in which the deep quality of life is high and this quality is not compromised, but instead perpetuated, for future generations. Education and recreation are provided for all in an open, loving community that promotes diversity and generosity. These opportunities are extended to the larger community in which the ecovillage is located.

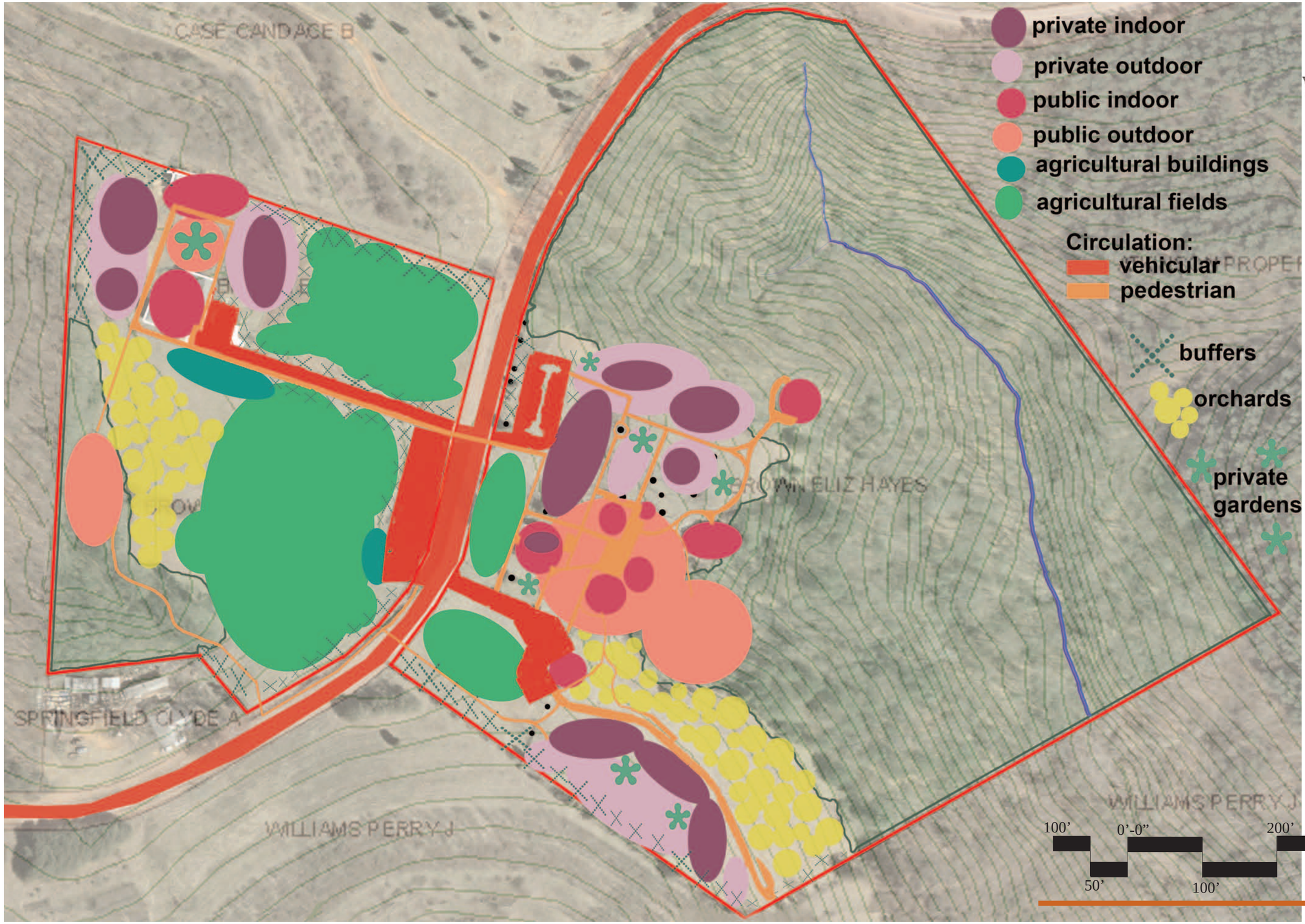
Goals

The overriding goals of the ecovillage are to be conscious of and to minimize the negative impacts occurring because of our existence, and at the same time, to provide a healthy, safe, and creative environment in which people can grow. In doing so, the more specific goals are to:

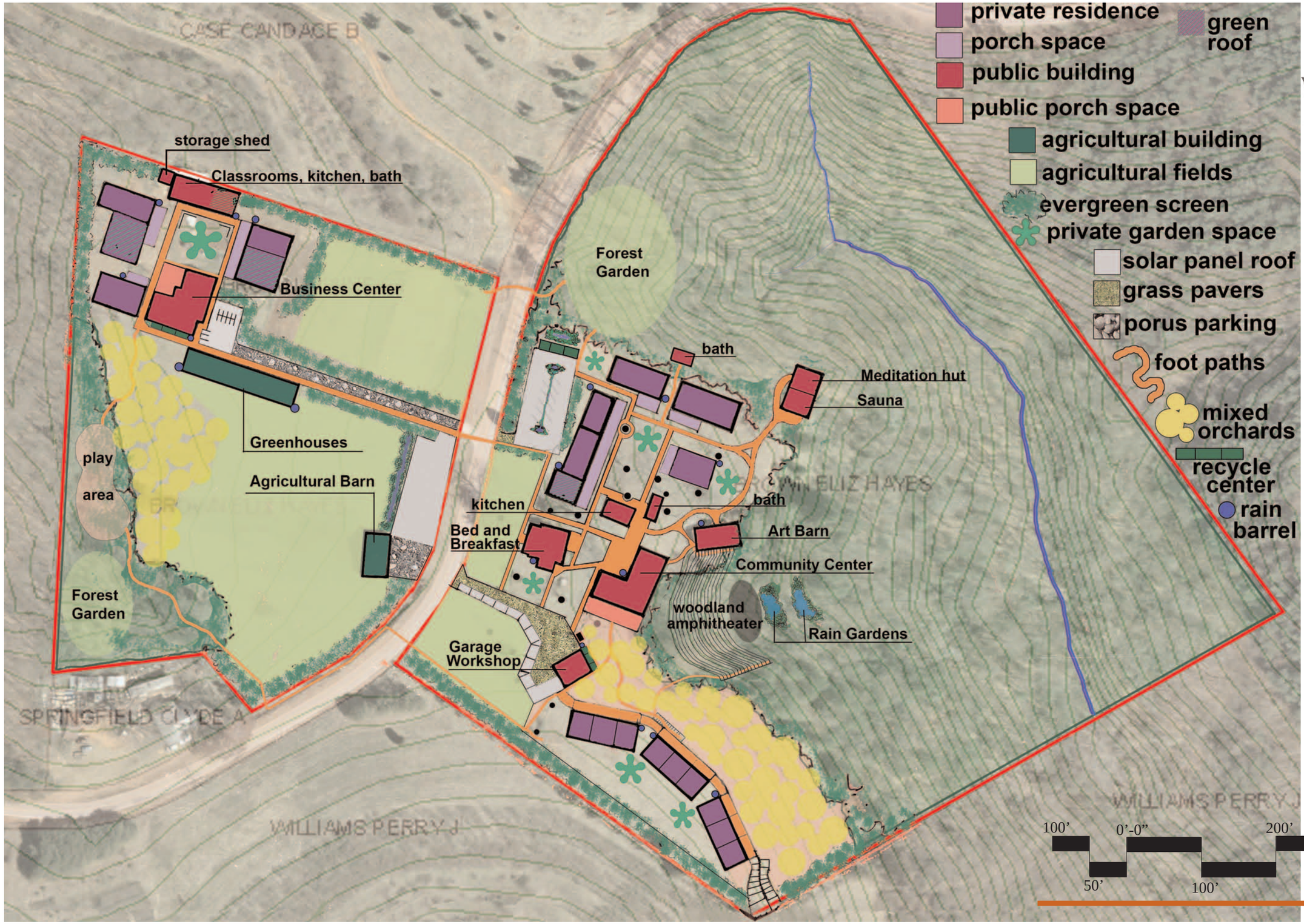
- Preserve and restore the integrity of the native Piedmont woodland habitat in the areas unsuitable for building and cultivation.
- Provide adequate and balanced private and public spaces for living, working, gathering, learning and celebrating, using local and natural building materials and techniques.
- Minimize consumption and waste generation, while providing clean, renewable energy sources.
- Recognize that waste equals food. In doing so, dispose of waste properly, allowing it to benefit the overall system and be utilized on site, if possible.
- Cultivate as much food on site for the immediate and surrounding community as feasible; provide necessities from local producers on site as needed.
- Manage to increase biodiversity.
- Educate people from the ecovillage and from the greater community about sustainability, permaculture, organic farming and conservation.

Functional Diagram (Figure 6.1)

The functional diagram, Figure 6.1, conceptually explores the arrangement of public to private space, agricultural to woodland space and circulation. It is a step in the process of developing the master plan, Figure 6.2.



FUNCTIONAL DIGAGRAM figure 6.1



MASTER PLAN figure 6.2

Master Plan (Figure 6.2)

The Pickens County ecovillage, located on 23 acres of agricultural land and woodlands, has compact development areas on roughly 12 acres, leaving the 11 existing woodland acres to be preserved and restored. The ecovillage provides eleven single family dwelling units and three cohousing units, with space for three families in each unit. Maximizing individuals within each unit would provide homes for approximately 100 people, but 63 to 84 individuals are actually expected when the all units in the village are filled. The ecovillage has the potential to provide over fifteen types of employment on site, with almost limitless possibility for combining part time jobs, fulfilling needs through bartering with neighbors and voluntary simplicity.

Public infrastructure in the heart of the village includes the Community Center, which contains a café, a small needs store, the council hall, internet access and indoor composting toilet facilities. The Guest House, which is the original homestead, has potential for housing sixteen guests, a permanent Guest House manager, a community kitchen, indoor toilet and bathing facilities, a washing facility for members, two large community rooms, a front porch and a shaded patio. Old pecan trees shade the public green space surrounding these buildings. The nearby garage and workshop house the common tools for general and car maintenance, and the biodiesel pump is located just outside, where the old gas tank was located.

Northeast of these buildings is the Barn of Artistic Creation, or Art Barn for short. It is the old cow barn, remodeled to create individual and group workspaces for various forms of artistic endeavors. It is directly adjacent to the Woodland Amphitheatre, which is carved into an existing swale. The amphitheatre serves not only the ecovillage and the larger community, seating 1200 at capacity, but also works to collect the first flush of rainstorms through the use of modified check dams as retaining walls between the levels of vegetated seating (Figure 6.3).

Below the stage, more water collection, infiltration and purification occurs in the two terraced rain gardens. Additional level spreaders can be located further down slope if needed.

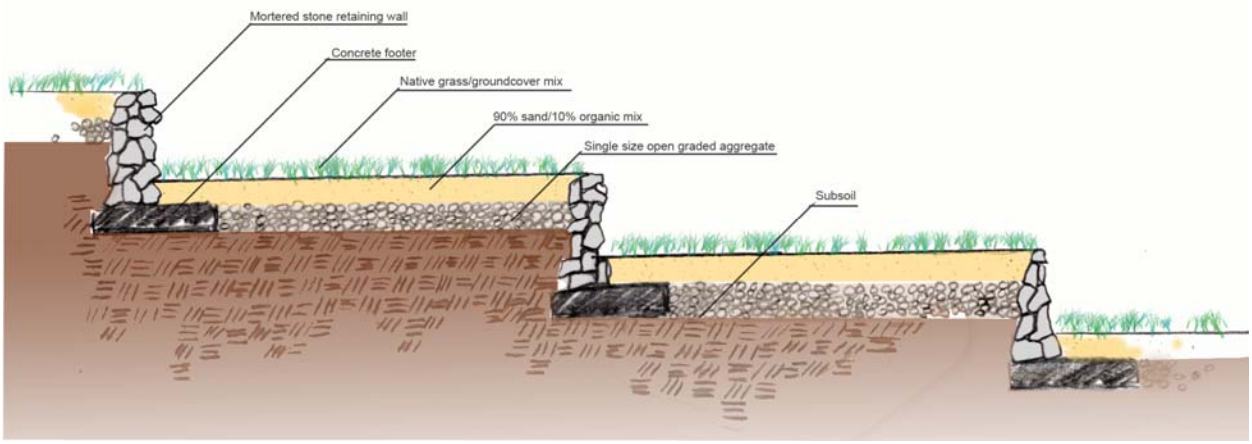


Figure 6.3

Along the southern edge of the property private housing occurs in the form of three, two story cohousing units (Figure 6.4). Fill dirt from the amphitheatre and other excavations creates a plateau atop which these buildings sit; an eight foot stone retaining wall separates the cohousing units from the mixed orchard below. Each building can accommodate three family units with private living quarters above a group kitchen, bathrooms, and living space on the first floor. Sun rooms stretch along the shared level and allow an open view out into the community space.

Group homes such as these are ideal for families with children or seniors. There is level access to the units from the nearby solar panel-covered parking area under a covered walk. Community space, including gardens, picnic and play areas, is located between the units and the southern property line, which is screened with evergreen vegetation.

Still on the eastern portion of the property, the northern housing node contains six single family units, a community kitchen and gathering area, two bathhouses, community gardens, public green space, play areas and the sauna/meditation hut tucked into the woods.

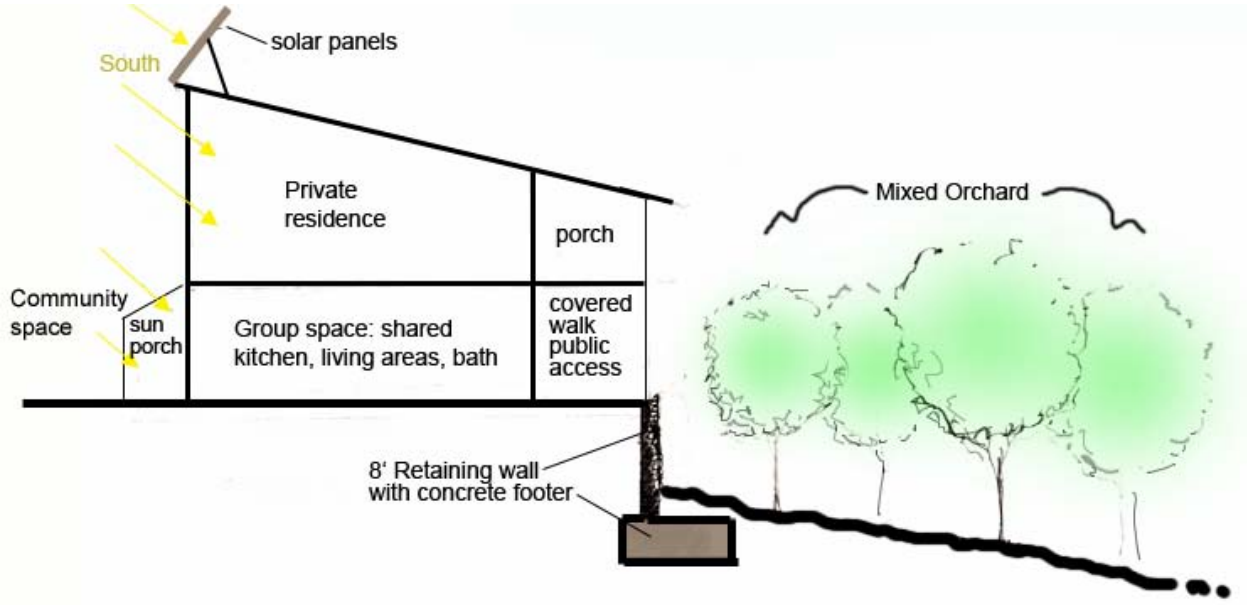


Figure 6.4

Grass pavers minimize the use of impervious paving material and soften the appearance of the parking area. A central swale and rain garden collect runoff from the solar panels which shade the cars (Figure 6.5) and an additional rain garden is situated just north of the parking area for overflow capacity. Evergreen screens minimize the views on either side of the parking area.

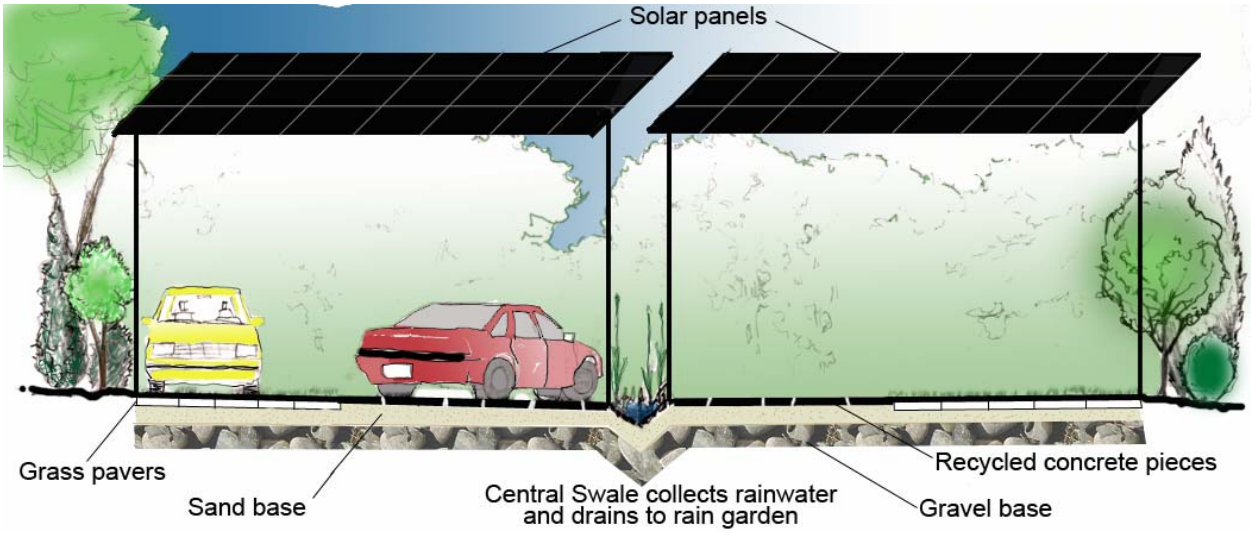


Figure 6.5

Across Edinburgh Lane, on the western side of the property, the most intensive agriculture occurs and one neighborhood node is situated around two important public buildings. Five single family dwelling units surround the Business Center, a public building containing various size office units for rent by ecovillage and outside community members. The incubator office setup would allow small or fledgling businesses to share resources and employ a full-time office manager. The second public building would be the existing stables, converted into classroom space with an addition of a kitchen and bath area for neighborhood use. This flexible building could house home-school classes, group yoga or meditation classes, or other various courses taught by community members or outside guests. The existing storage shed has been moved adjacent to the classroom building.

Intensive agriculture occurs to the south and east of this neighborhood, on the least sloping land on the property. A long greenhouse face abuts driveway and has easy access to water and electricity. The agricultural lands are cultivated with mixed annual and perennial crops, with the annuals in rotation. A mixed orchard grows next to the southwestern wood line and closer to the agricultural fields low woody plants, such as blueberries, are planted. Both of these permanent crop selections help deter erosion that may occur due to the intensive agriculture upslope. The mule barn near the road serves as storage, cooler, and CSA headquarters. Its proximity to the road will allow for easy transport of crops and farm needs. Some agriculture would occur on the eastern portion of the property, specifically the herb and flower garden surrounding the Guest House. Forest Gardens produce specialty crops in the northern and southwestern woodland areas.

General Comments on the Ecovillage

Solar energy is main form of energy for the ecovillage. Each house is oriented East-West for maximum passive solar gain, and each home and public building utilize solar panels for individual energy generation. The connection to the grid remains as a back-up source of energy in addition to batteries. This allows the ecovillage the opportunity to sell energy back to the grid. All parking areas are covered with solar panels. This serves multiple purposes by collecting energy, shading the cars and providing shelter in the rain.

A maximum of one car per household is allowed. Biodiesel (See Appendix C) converted cars are encouraged and biodiesel is available onsite. A community biodiesel van functions as shuttle for members to access the nearby city of Greenville. The van is also used to shuttle guests in for classes or other activities at the Ecovillage and to shuttle CSA produce to a pick-up point in town (reducing overall fossil fuel use for CSA members). All trash and recycling stations are located near parking areas for easy transport off the property when needed.

For families with a car, the parking areas on the eastern side of the property utilize the previously-existing driveway concrete, broken up and placed as stones on sand and gravel beds for maximum infiltration. The driveways to these parking areas consist of grass pavers, not only to allow for additional infiltration, but to help deter guests from entering member parking areas. Guest parking occurs on the western portion of the property near the barn and directly adjacent to the road. This parking area is also covered by solar panels, and it consists of a sand base with gravel on top, signaling to visitors that it is a parking zone. A linear rain garden containing filter plants buffers runoff to the agricultural area down slope.

Natural building techniques, such as hay-bail, slipstraw, waddle and daub, sustainably harvested timber and local stone are employed when building any additional public buildings.

These techniques are encouraged for all private buildings as well. Each building has a cistern to collect water for irrigation. Numerous community garden plots are available for personal use throughout the ecovillage, but members may also join the Community Supported Agriculture project to supplement their food income.

The numerous public buildings provide various opportunities for employment in the village. Multiple farmers are needed to oversee and operate the Community Supported Agriculture component of the ecovillage. This is a major source of income and food for the community. Another farming option is the production of organic specialty crops, herbs and flowers to sell to high-end restaurants in the growing metropolis of Greenville, South Carolina.

The Business center allows a number of independent operations to function from a central, shared location. Internet, phone and fax provide the needed resources for telecommuting and therefore provide for numerous occupations with minimal space. Other occupations such as herbalists, healers, and massage therapists could work out of the business center or from their own homes. With the possibility of numerous children in the village, a cooperative home-school could provide education for villagers as well as children from the outside community. Other group classes could be taught regularly and special seminars or events could be scheduled using the facilities. Numerous types of teachers and instructors could be employed by teaching from the educational center. Courses to educate the greater community on the working of an ecovillage, on permaculture, on alternative energy or on numerous other topics could be taught throughout the year.

The Guest House could employ a permanent resident or family to oversee the comings and goings of guests and volunteers at the ecovillage. The Community Center could employ a handful of members to run the café, store and information base for the ecovillage, while

numerous artists could use the Art Barn studio space. Artists could sell their goods in the Community Center or in nearby cities, as well as teach classes. The garage could support a mechanic and a biodiesel provider.

Planting Recommendations

There are two general types of plants that are appropriate for adding to the landscape of an ecovillage. The plants should either be native or produce useful products for the community, such as food, medicine or fiber. The best choices of vegetation would be natives that have a useful component. The plants listed are perennials or woody specimens. Natives are starred in the first two lists.

FRUIT AND NUT TREES:
Annona squamosa (Custard Apple)
Asimina triloba (Paw-Paw)*
Caray Illinoinensis (Pecan)*
Diospyros virginiana (Persimmon)*
Eriobotrya japonica (Loquat)
Ficus carica (Fig)
Juglans nigra (Black Walnut)*
Malus spp. (Apple)
Morus nigra (Black Mullberry)
Prunus spp. (Plum)
Pyrus communis (Southern Pear)
Sassafrass albidum (Sassafras)*

FRUITING SHRUBS AND VINES:
Cydonia oblonga (Quince)
Fragaria vesca (Strawberry)
Ribus nigrum (Black Current)
Rubus fructicosus (Blackberry)*
Vaccinium corymbosum (Highbush Blueberry)*
Vitus rotundifolia (Muscadine Grape)*
Hamamelis virginiana (Witchhazel)*
Sambucus canadensis (Elderberry)

NATIVE MEDICINAL PERENNIALS AND HERBACEOUS (Hutchens)
Achillea millefolium (Yarrow)

Arum triphyllum (Jack-in-the-Pulpit)
Asarum canadense (Wild Ginger)
Asclepias spp. (Milkweed)
Baptisia tinctoria (Wild Indigo)
Chelone glabra (Turtle Head)
Cimicifuga racemosa (Black Cohosh)
Datura stramonium (Jimson Weed)
Dioscorea villosa (Wild Yam)
Echinacea angustifolia (Purple Coneflower)
Epiphegus americanus (Beech Drops)
Eryngium aquaticum (Rattlesnake Master)
Galium aparine (Bedstraw)
Geranium maculatum (Wild Geranium)
Heuchera Americana (Alum Root)
Iris versicolor (Blue Flag Iris)
Potentilla tormentilla (Cinquefoil)
Rhus glabra (Smooth Sumac)
Sanguinaria Canadensis (Blood Root)
Solidago Canadensis (Goldenrod)
Verbena spp. (Vervain)
Veronia spp. (Iron Weed)

NATIVE EVERGREEN SCREENING MATERIAL
Juniperus verginicus (Eastern Red Cedar)
Ilex opaca (American Holly)
Agarista populifolia (Florida leucothoe)
*Smilax smallii (*Jacksonbriar)

Management considerations

Creating successful ecovillages is much more than developing an environmentally sensitive and well intentioned community. Equally if not more important is the willingness of the investing members—those putting in time, money, love and dedication—to follow through with perpetual consideration regarding the sustainable management of the land. Ecosystem and human health, biodiversity, and the ability to improve the quality of life for those immediately and globally related to the ecovillage, are the components that help to measure the success of the management strategy. While the purpose of this thesis is not to delve into a specific

management plan for the site, it is to look at some general management principles that could be applied to not only the Pickens County ecovillage, but to ecovillages throughout the southeast.

Management Team

The continued management of the ecovillage landscape cannot be left to chance. Landscape management is a serious job with deep reaching and often subtle implications. It requires continual monitoring, feedback, and decision making that responds to changes in the landscape. The Mission Statement and Guiding Principles will help to focus and direct the management decisions made by the management team. The management committee should be made up of dedicated individuals with experience in land planning, environmental studies, land management or other related and applicable fields. Members of the ecovillage interested, but without experience, should gain familiarity with the processes and goals of landscape management prior to becoming a decision-making member of the committee. The process for electing members to the management committee should be derived by the members of the ecovillage. Outside consultants and specialists should be consulted for any issues requiring special skills or knowledge outside the scope of the committee's knowledge base. Outside evaluations, even when no special problem has arisen, can help to prevent future problems and explore innovative new techniques of land management.

Mission Statement

To sustain, with minimal energy inputs, a productive and changing landscape in which the health, the biodiversity and the ability to meet human needs now and in the future are not compromised.

Guiding Principles

The guiding principles of the landscape management of the ecovillage serve to guide and direct all management decisions made regarding the property. All future decisions will be based on following the guiding principles. The guiding principles for the Pickens County Ecovillage are:

Manage for human and environmental sustainability into the indefinite future.

Use nature as a guide for future design and planting.

Work with, not against, the successional tendencies of the land.

Creatively use and respond to landscape changes; adapt management goals accordingly.

Utilize renewable resources and locally available materials in all undertakings.

Management Goals

Improve the soils' A-horizon.

Reduce stormwater runoff and erosion to the creek.

Restore woodland health and diversity through preservation and creation of biodiversity.

Provide sufficient food for community members.

Continually reduce dependence on non-renewable materials and energy.

Involve all community members in the management of their landscape.

Management Objectives

Increase biodiversity through planting in multiple layers.

Terrace land with intensive agricultural uses.

Use mesh to stabilize degraded or exposed slopes.

Collect rainwater from roofs in cisterns.

Install vegetated swales, check dams, level spreaders and rain gardens (See Appendix C) to prevent further gulley erosion to creek and to allow infiltration and groundwater recharge.

Replace turf with diverse, mulched understory.

Remove invasive exotics and replant with natives.

Maintain pest free food crops through biological control and integrated pest management.

Continue an open dialogue with community members about the goals and objectives of the landscape management team.

Teach all community members, youth and adult, how to observe and interact with the landscape in such a way that furthers the mission, goals and objectives of management of the land.

Involve community members in group projects, such as workdays or native plant propagation programs, to accomplish the stated goals.

Management Strategy

The Pickens County Ecovillage will need to be managed differently in each of the three major zones—natural, cultivated and developed. The Guiding Principles will remain constant throughout, with certain goals and objectives being more applicable to specific zones. The woodland zone would have goals and objectives such as the following: Use nature as a guide for designing and planting. Regarding invasive exotic removal, work from the healthiest areas into the areas most in need of restoration. In these areas, suppress or eradicate invasive exotic species. Be aware of keystone species, pioneer species and patterns of natural succession. Recreate lost niche habitats. Mitigate destructive factors throughout the ecovillage, such as

erosion, pollution, and caustic land use, which would affect the health of the woodland area. Assure that changes to species composition of the woodlands are planned.

The sustainable land use objectives for the cultivated zones would include eliminating the use of chemical pesticides, fertilizers and herbicides by employing IPM, natural/organic fertilizer and natural weed suppression techniques, such as manual removal and mulching. Terracing the intensively cultivated areas to reduce erosion is important to the overall health of the property as is using crop rotation and cover crops to restore nutrients in the soil. The management of developed zones would include monitoring soil compaction and erosion in heavily traversed areas. Continual assessment of tree health is important to prevent disease and damage from limb fall.

Criteria for Evaluation

There are multiple documents that have been created to help ecovillages evaluate their success from environmental, social and cultural/spiritual standpoints. However, as it has been discussed previously, the success of an ecovillage is dependent on the vision and goals that it was founded on. Some ecovillages do not intend or attempt to be completely self-sufficient, and therefore cannot be evaluated by the same criteria as ecovillages with self-sufficiency as the overall vision. Success is when an ecovillage continually meets its stated goals and its vision is being worked towards on a daily basis.

CHAPTER VII – CONCLUSION

Implications in the field

This thesis serves as an introduction to ecovillages, looking at what they are, where they came from and the theories on which their designs are based. It attempts to explore the major components, such as environmental goals, social structure and economic viability through the lens of the designer. It attempts to show that landscape architects can easily become ecovillage designers, as the complex task of ecovillage design is much like that of a landscape architect's job in general, coordinating numerous specialized components to accomplish the overall vision or design.

A single thesis is not likely to change the sprawling development that is occurring across the globe. However, the actions taken by groups of motivated and committed individuals to restructure their lives, as well as that of their immediate community, into a simplified, sustainable and fulfilling existence is a small but powerful message being repeated throughout the world. Ecovillages do not attempt widespread environmental revolution, but focus on the local ability to make a difference, to prove success, to set an example for others to follow. These communities "think globally, act locally" and are gaining momentum as alternative development strategies within the increasingly monotonous and destructive globalized society around them.

The goal of this thesis is to synthesize the numerous aspects of ecovillages into realistic components that can be applied across numerous development situations. This goes beyond the stormwater retention basin and the native planting plans of ecological design. This type of thinking and design crosses disciplines and questions the norms in architecture, agriculture,

development, landscape architecture, engineering, sociology and anthropology. Ecovillage design merges with permaculture and holistic thinking which both consider ecology and human needs; these concepts consider the now and consider the future.

Landscape architects are rarely involved in the design of "ecovillages"; however, they are often called upon in the early stages of land development to evaluate and develop large tracks for future use—often residential. As the modern concepts of mixed use, walking neighborhoods, traditional neighborhood development and urban infill have begun to offer alternatives to the destruction and fragmentation of sprawl, why could the design professionals not continue to push the boundaries of development strategies? People across the globe are beginning to desire a major shift in how they live their lives, but currently their options are limited. This begs the question: "If we build it, will they come?"

One must realize that the phenomenon of ecovillage living, with its ancient roots, appears to be a new way of life in the Twenty-first Century. The concept of an ecovillage is barely thirty years old. It is a manifestation of the desire to not only talk about interdisciplinary threads, but also to live connected to them. It is an ultimate merger and somehow, simplifies everything from economics to social structure to environmentalism.

Because of the recent debut of the ecovillage onto the world stage, there are still many questions regarding the possibility of widespread occurrence and acceptance of true and functioning ecovillages. Some areas that will need to be monitored over the years to come include: The vitality of ecovillages that employ a professional designer versus ecovillages that make all design decisions through group consensus. The ability of ecovillages to succeed if the core group of individuals who began the project leave the ecovillage should be monitored—are these ecovillages truly self-sustaining? Will the ecovillage hybridize with some other forms of

conservation development? What implications will such a merger have? If these new options are available will the market pressure follow? All of these questions and more can only be answered with time. There are three main paths that the ecovillage movement may take in the future: it may die out, it may hybridize or be taken up in another movement, or it may become a successful lifestyle movement. I believe that what sets the ecovillage movement apart from other intentional community movements of the past, and what will allow it to become a successful movement, is that it is a worldwide phenomenon in which expressing cultural identity and designing adaptive economical and environmental systems are encouraged. The thread that ties ecovillages across the world together is the belief in land stewardship for perpetual sustainability and acceptance of others' beliefs in a loving, supportive society.

The trends and demands of today's consumptive culture vitally affect the world and society in which we are engaged and asked to shape through design. But, I believe there is a shift occurring, a consciousness awakening, in which there is a realization of the dire need to change the way we live and consume. I would like to conclude by saying that while conducting this research, the future looked brighter than it has in quite some time. I think if we build it, they *will* come.

COMMUNITY SUSTAINABILITY ASSESSMENT

Developed by the Global Ecovillage Network

www.gaia.org

Contact Person: Linda Joseph • linda@ecovillage.org
Ecovillage Network of the Americas
64001 County Road DD • Moffat, CO 81143 • USA
www.ecovillage.org

Community Sustainability Assessment

Table of Contents

How Sustainable is Your Community?

Introduction

The Community Sustainability Assessment is a comprehensive checklist that anyone can complete to get a basic idea of how sustainable their community is. This assessment tool is applicable to any community. While it requires good knowledge of the life-styles, practices and features of the community, it does not require research, calculation and detailed quantification. This assessment takes about two-three hours for an individual to complete, or several times that if done as a group experience by community members.

General Instructions

The Community Sustainability Assessment (CSA) was developed to assist communities in assessing their accomplishments and charting directions toward ever increasing sustainability. Like a Three Legged Stool, overall sustainability of a community (the seat) is upheld when each of the three legs is strong and balanced. In the CSA the three legs, each as important as the other, are the Ecological, Social and Spiritual aspects of community.

The CSA is a subjective tool. This means that the person(s) completing it make their best judgments, and on some items guesses, as to what is true for their community. To get the most out of this exercise, community members may meet as a group and work through the CSA together. This offers a meaningful review of the community's accomplishments and areas for improvement. Low scoring items may be selected for community focus and action to improve sustainability, providing direction for the community's future. It is expected that communities actively planning and pursuing sustainability will score high, however, there is always room for improvement - from a high to a perfect score.

To maximize the accuracy of scores, rate items based on the community's current actions NOT intentions. Repeating the CSA periodically allows communities to monitor their progress over time.

The CSA was designed to be universal, as useful as possible to a wide variety of communities. It is to be expected that the nature of any one community will lead to low scores in some areas and high scores in others. If any items do not apply to your community, do not score them. Many of the questions in the Assessment offer an *Other* option for your answer. Please use these and the Comments sections to tell about other ways your community achieves sustainability. Overall, scores should offer an informative picture of the community's sustainability.

After filling out these pages for your community, please mail a complete copy to the Ecovillage Network of the Americas Coordinating Office:

c/o Linda Joseph
64001 County Road DD
Moffat, CO 81143 USA

A file copy will be sent to the network office for your region.

Please feel free to pass copies of these pages to other interested communities, organizations or individuals. Your participation is appreciated!

Scoring Information

Name of the community: _____

Age of the community (number of years in existence): _____

Name of person completing the Assessment/Contact Person: _____

Address: _____

_____

Phone #: _____ Fax #: _____

eMail address: _____ Web address: _____

Please indicate how much time it took to complete this Assessment: _____

How many people in your community participated in completing the CSA? _____

Use additional pages as necessary, to share your comments about the CSA and your experience in using it. Please indicate the section and item number you are commenting on. Your input is greatly appreciated!

For each item in this questionnaire, check the box(es) that you believe most closely describe the truth for your community. After each answer that you selected, there is a number in parens - that is your score for that item. At the end of each section, there is a space to add up your total score for that section. Insert your scores for each section of the CSA (below and next page), to calculate your overall score.

333+	**Indicates excellent progress toward sustainability**
166-332	**Indicates a good start toward sustainability**
0-165	**Indicates actions are needed to undertake sustainability**

Ecological section:

1. Sense of Place Total: _____
2. Food Availability, Production & Distribution Total: _____
3. Physical Infrastructure, Buildings & Transportation Total: _____
4. Consumption Patterns & Solid Waste Management Total: _____
5. Water - sources, quality & use patterns Total: _____
6. Waste Water & Water Pollution Management Total: _____
7. Energy Sources & Uses Total: _____

Total points for the Ecological section: _____

Social section:

1. Openness, Trust & Safety; Communal Space Total: _____
2. Communication - the flow of ideas & information Total: _____
3. Networking Outreach & Services Total: _____
4. Social Sustainability Total: _____
5. Education Total: _____
6. Health Care Total: _____
7. Sustainable Economics - healthy local economy Total: _____

Total points for the Social section: _____

Spiritual section:

1. Cultural Sustainability Total: _____
2. Arts & Leisure Total: _____
3. Spiritual Sustainability Total: _____
4. Community Glue Total: _____
5. Community Resilience Total: _____
6. A New Holographic, Circulatory World View Total: _____
7. Peace & Global Consciousness Total: _____

Total points for the Spiritual section: _____

Overall CSA Score:

Ecological Checklist: _____

Social Checklist: _____

Spiritual Checklist: _____

TOTAL SCORE: _____

999+	**Indicates excellent progress toward sustainability**
500-998	**Indicates a good start toward sustainability**
0-449	**Indicates actions are needed to undertake sustainability**

ECOLOGICAL

The Ecological aspects of community life are balanced when...

People are deeply connected to the place in which they live. Its boundaries, strengths, weaknesses and rhythms are clear and human beings live in synchrony and harmony within the ecological system of which they are a part.

Natural life, its systems and processes are respected; wildlife and botanical habitat is preserved.

Human life-styles regenerate, rather than diminish the integrity of the environment.

Food comes primarily from local or bioregional sources, is organic - free of contaminants - and provides nutritional balance.

Structures are designed to blend with and complement the natural environment, using natural, bioregional and ecologically sound (renewable, non-toxic) materials and methods of construction.

Conservation is practiced in transportation systems and methods.

Consumption and generation of waste is minimized.

A clean, renewable water supply is available. The community is aware of its water source - respecting, protecting and conserving it.

Human waste and waste water is used and/or disposed of to the benefit of the environment and community.

Renewable, non-toxic energy sources are used to heat and power the community. Innovative technologies are neither exploited, nor suppressed, but applied for the common good.

Ecological Checklist 1

1. Sense of Place - community location and scale; restoration & preservation of nature

A. How many people in the community would you describe as being connected with and living harmoniously within the place in which they live:

☐ all - very few exceptions (5) ☐ most (3) ☐ some (1) ☐ few/none (-1)

B. Size - Number of people belonging to the community (sole or major place of residence):

☐ 0-5 (0) ☐ 5-19 (1) ☐ 20-49 (2) ☐ 50-500 (4)
☐ 501-1000 (2) ☐ 1001-2000 (1) ☐ 2001+ (0)

C. An estimate of how many people in the community knowledgeable of native plants and wildlife is:

☐ majority (5) ☐ some (3) ☐ minority (1) ☐ few or none (0)

D. Native plant and wildlife habitat in the area:

are actively supported/enhanced -
☐ often (4) ☐ sometimes (2) ☐ rarely (0) ☐ never (-1)

are protected -
☐ often (4) ☐ sometimes (2) ☐ rarely (0) ☐ never (-1)

are reclaimed when disturbed by human activity -
☐ often (4) ☐ sometimes (2) ☐ rarely (0) ☐ never (-1)

E. The depth of humus is increasing yearly: Check as many as apply -

☐ throughout bioregion (5)
☐ on most land within the community (3)
☐ in food production areas - only (1)
☐ No increase (0)
☐ Net decrease (-1)

F. Diversity of appropriate species in the community is:

flora ☐ increasing (4) ☐ unchanging (1) ☐ decreasing (-1)
fauna ☐ increasing (4) ☐ unchanging (1) ☐ decreasing (-1)

G. Change in the health of the general environment over the last year:

Soil Quality ☐ worse (-1) ☐ same (0) ☐ better (3)
Water Quality ☐ worse (-1) ☐ same (0) ☐ better (3)
Air Quality ☐ worse (-1) ☐ same (0) ☐ better (3)

H. The extent to which the natural environment of the community is disturbed by:

Noise Pollution (unpleasant sound generated by human activity and disrupting the natural quiet)
☐ frequently (-1) ☐ sometimes (0) ☐ rarely (2) ☐ not at all (4)

Light Pollution (bright light sources unpleasant to neighbors and/or obscuring viewing of the stars)
☐ frequently (-1) ☐ sometimes (0) ☐ rarely (2) ☐ not at all (4)

Litter (human trash, improperly discarded)
☐ frequently (-1) ☐ sometimes (0) ☐ rarely (2) ☐ not at all (4)

I. The extent to which the community actively plans conservation of dwindling natural resources in consideration of the needs and enjoyment of future generations:

☐ frequently (4) ☐ sometimes (2) ☐ rarely (1) ☐ not at all (-1)

J. The extent to which community members actively participate in environmental conservation and restoration activities (tree planting, non-native species removal, etc.):

☐ frequently (4) ☐ sometimes (2) ☐ rarely (1) ☐ not at all (-1)

Add up the numbers in parentheses behind each item above that you checked.

1. Sense of Place Total: _____

50+	**Indicates excellent progress toward sustainability**
25-49	**Indicates a good start toward sustainability**
0-24	**Indicates actions are needed to undertake sustainability**

Comments:

Ecological Checklist 2

2. Food Availability, Production & Distribution

A. Sufficient food, providing adequate nutritional balance is: Check as many as apply -

☐ available locally (3) ☐ easily accessible (3) ☐ affordable (3)

B. Food is - estimated % (points) - (If less than the lowest %, count as 0 points)

produced within community
☐ 12% (1) ☐ 13-25% (3) ☐ 26-40% or more (5)

obtained from local/bioregional food producers, outside of the community
☐ 25% (1) ☐ 40% (3) ☐ 55% (5)

organically grown:
☐ 25% (1) ☐ 50% (3) ☐ 65% or more (5)

from bioregional/traditional/indigenous crops:
☐ 25% (1) ☐ 50% (3) ☐ 65% or more (5)

C. Surplus food is produced: Check as many as apply -

☐ within the community (12)
☐ within bioregion (6)
☐ No surplus is produced (0)
☐ Food must be brought in from outside the bioregion for adequate nutrition. (-1)

Surplus food is: Check as many as apply -
☐ stored for future use (1) ☐ sold (1) ☐ donated (1)
☐ fed to animals (1) ☐ composted (1) ☐ discarded as trash (-3)

D. Food scraps are: Check as many as apply -

☐ donated (2) ☐ fed to animals (2) ☐ composted (2) ☐ discarded as trash (-3)

E. The extent to which greenhouse and/or roof or window gardens are used for year round food production:

☐ great (6) ☐ some (3) ☐ little (2) ☐ none (0)
☐ not needed - outdoor food production is sufficient (4)

F. Pesticides, herbicides, chemical fertilizers are used in the community's food production:

☐ commonly (-3) ☐ some (-1) ☐ minimally (1) ☐ never (6)

G. Seeds used in food production are: Check as many as apply -

☐ open pollinated seeds (6) (varieties that produce seed and preserve biodiversity, locally cultivated and exchanged)

☐ hybrid seeds (-2) (seeds sold by commercial corporations which will not breed true and therefore cannot be saved for next year's crops)

Add up the numbers in parentheses behind each item above that you checked.

2. Food Availability, Production & Distribution Total: _____

50+	**Indicates excellent progress toward sustainability**
25-49	**Indicates a good start toward sustainability**
0-24	**Indicates actions are needed to undertake sustainability**

Comments:

Ecological Checklist 3

3. Physical Infrastructure, Buildings & Transportation - ecological materials, methods & designs

A. Sufficient housing, providing adequate shelter is: Check as many as apply -

☐ available locally (4) ☐ affordable (4)

B. The extent to which building materials used are :

natural / recyclable	☐ most (2)	☐ some (1)	☐ few/none (0)
recycled/reusable materials	☐ most (2)	☐ some (1)	☐ few/none (0)
from your own bioregion	☐ most (2)	☐ some (1)	☐ few/none (0)

C. Buildings are designed to minimize energy needs and harmonize with the natural environment using: Check as many as apply -

Shared spaces (common buildings, shared houses, etc.)
☐ most (3) ☐ some (1) ☐ few/none (0)

Locally appropriate insulation standards
☐ most (3) ☐ some (1) ☐ few/none (0)

Natural/non-toxic insulation materials
☐ most (3) ☐ some (1) ☐ few/none (0)

Orientation of buildings (for light and temperature control)
☐ most (3) ☐ some (1) ☐ few/none (0)

Creation of favorable outdoor microclimates (planting to regulate indoor temperatures for comfort)
☐ most (3) ☐ some (1) ☐ few/none (0)

Design to blend with the environment (colors, materials, site selection, etc.)
☐ most (3) ☐ some (1) ☐ few/none (0)

Design and construction planning for long life and/or renewability
☐ most (3) ☐ some (1) ☐ few/none (0)

☐ Other (1 point for each) - describe:

D. The extent to which pre-existing buildings are retrofitted for sustainability/aesthetics:

☐ most (6) ☐ some (3) ☐ few/none (0)

E. Some form of honoring the Earth, or attuning to it, is used to connect with the natural environment during community design, any excavating or rearrangement of the landscape, infrastructure development and community activities:

☐ often (4) ☐ sometimes (2) ☐ rarely (0) ☐ never (-1)

F. The extent to which community design (buildings, other infrastructure, landscaping and activity areas) is done with a Permaculture or other whole system approach, that respects and includes the needs of the Earth, local flora and fauna, as well as the needs of humans:

☐ often (4) ☐ sometimes (2) ☐ rarely (0) ☐ never (-1)

G. How well the community is designed to minimize motor vehicle use inside the community (for example, clustering of buildings):

☐ very well (4) ☐ adequately (2) ☐ minimally (1) ☐ inadequately (-1)

H. How frequently community members must travel outside of the community for their needs:

☐ often (-2) ☐ sometimes (1) ☐ rarely (2) ☐ never (4)

I. The extent to which transportation conservation methods are used:

Trail systems (walking, bike, horse, etc.)
☐ often (2) ☐ sometimes (1) ☐ rarely (0) ☐ never (-1)

Use of vehicles powered by clean, renewable energy sources (solar)
☐ often (2) ☐ sometimes (1) ☐ rarely (0) ☐ never (-1)

Car-pooling
☐ often (2) ☐ sometimes (1) ☐ rarely (0) ☐ never (-1)

Sharing of vehicles
☐ often (2) ☐ sometimes (1) ☐ rarely (0) ☐ never (-1)

Mass transit availability for longer distance travel (train/bus/air)
☐ often (2) ☐ sometimes (1) ☐ rarely (0) ☐ none (-1)

☐ Other sustainable method (1 point for each) - describe:

J. Opportunities are sought to work at home vs. leaving the community to work:

☐ often (4) ☐ sometimes (2) ☐ rarely (0) ☐ never (-1)

Add up the numbers in parentheses behind each item above that you checked.

3. Physical Infrastructure, Buildings & Transportation Total: _____

50+	**Indicates excellent progress toward sustainability**
25-49	**Indicates a good start toward sustainability**
0-24	**Indicates actions are needed to undertake sustainability**

Comments:

ECOLOGICAL CHECKLIST 4

4. Consumption Patterns & Solid Waste Management

A. Estimates of how many people in the community use the following methods to reduce consumption of natural resources and generation of solid wastes:

Voluntary simplicity - personal consumption is minimized
☐ all - very few exceptions (10) ☐ most (6) some (3) ☐ few/none (0)

Shared resources - equipment, tools, clothing, etc.
☐ all - very few exceptions (10) ☐ most (6) ☐ some (3) ☐ few/none (0)

Shared facilities - kitchens, storage space, offices, etc.
☐ all - very few exceptions (10) ☐ most (6) ☐ some (3) ☐ few/none (0)

Bulk/cooperative buying
☐ all - very few exceptions (10) ☐ most (6) ☐ some (3) ☐ few/none (0)

☐ Other (1 point for each) Specify:

B. The extent to which the community's needs are met by local marketplaces (shortening the gap between producers and consumers):

☐ great (5) ☐ somewhat (3) ☐ very little (1) ☐ not at all (-1)

C. Indicate which of the following systems are in place and the extent they are used by the community:

☐ Recycling: glass, plastic, aluminum, tin, etc. (2)
☐ often (5) ☐ sometimes (3) ☐ rarely (0) ☐ never (-5)

☐ Reuse (2)
☐ often (5) ☐ sometimes (3) ☐ rarely (0) ☐ never (-5)

☐ Repair or making things (vs. buying new ones) (2)
☐ often (5) ☐ sometimes (3) ☐ rarely (0) ☐ never (-5)

☐ Other (1 point for each) Specify:

D. An estimate of how many people in the community know the location and method of managing trash from the community (garbage removal, landfill site, etc.):

☐ all - very few exceptions (5) ☐ most (3) ☐ some (1) ☐ few/none (0)

Add up the numbers in parentheses behind each item above that you checked.

4. Consumption Patterns & Solid waste Management Total: _____

50+ Indicates excellent progress toward sustainability
25-49 Indicates a good start toward sustainability
0-24 Indicates actions are needed to undertake sustainability

Comments:

Ecological Checklist 5

5. Water - sources, quality & use patterns

A. An estimate of how many people in the community know, respect and protect the water source:

☐ all - very few exceptions (6) ☐ most (3) ☐ some (1) ☐ few/none (-1)

B. Water source and supply is: Check as many as apply -

☐ local and plentiful/renewable (4)
☐ well (1)
☐ catchment (1)
☐ springs or other waterways (1)
☐ piped from great distance, or imported (bottled, tanked in, etc.) (1)
☐ extremely inconvenient (excessively expensive, distant, scarce/rationed) (-1)
☐ from a non-renewable source, or, withdrawal is greater than renewal (-2)

C. Water is: Check as many as apply -

☐ naturally clean - not treated, filtering not required (5)
☐ filtered to remove minor natural impurities (3)
☐ treated with environmental & health friendly additives to balance ph or mineral imbalances (2)
☐ chemically treated with chlorine, bromine, iodine or fluorine (0)
☐ treated with the above chemicals, then filtered/purified (1)

D. Water storage methods are:

☐ clean and healthy (5) ☐ unsanitary, posing contamination and health risks (-5)

E. The extent to which the following water conservation methods are used by the community:

Irrigation methods that conserve water
☐ often (6) ☐ sometimes (3) ☐ rarely (1) ☐ never (-1)

Greywater reuse
☐ often (6) ☐ sometimes (3) ☐ rarely (1) ☐ never (-1)

Minimizing household use
☐ often (6) ☐ sometimes (3) ☐ rarely (1) ☐ never (-1)

Devices reducing the amount of water used (faucet aerators, low flow shower heads, etc.)
☐ often (6) ☐ sometimes (3) ☐ rarely (1) ☐ never (-1)

Xeriscaping (landscaping with drought tolerant native plants requiring minimal maintenance)
☐ often (6) ☐ sometimes (3) ☐ rarely (1) ☐ never (-1)

Use of natural/non-toxic products (cleaning, gardening, household products, etc.)
☐ often (6) ☐ sometimes (3) ☐ rarely (1) ☐ never (-1)

Care and maintenance of plumbing to prevent/repair leaks
☐ often (6) ☐ sometimes (3) ☐ rarely (1) ☐ never (-1)

☐ Other (1 point for each) Specify:

Add up the numbers in parentheses behind each item above that you checked.

5. Water - sources, quality & use patterns Total: _____

50+ Indicates excellent progress toward sustainability
25-49 Indicates a good start toward sustainability
0-24 Indicates actions are needed to undertake sustainability

Comments:

Ecological Checklist 6

6. Waste Water & Water Pollution Management

A. Sewage management systems used in the community: Check as many as apply -

Composting toilets, dry toilets, constructed wetlands or living machine systems
☐ all (7) ☐ most (5) ☐ some (3) ☐ little (1)

Low flush toilets or standard toilets with toilet dams (objects in tank that reduce flush volume)
☐ all (7) ☐ most (5) ☐ some (3) ☐ little (1)

☐ Regular flush toilets, no conservation methods (-1)

☐ Other (1 point for each) - describe:

☐ Sanitation is not adequately managed (contamination threat) (-5)

B. An estimate of how many people in the community know the location and method of sewage treatment used by the community:

☐ all - very few exceptions (6) ☐ most (3) ☐ some (1) ☐ few/none (0)

C. Waste Water side effects/by-products are overall:

☐ positive (e.g. growth of useful plants, aquaculture) (15)
☐ negative (e.g. emission of chemicals or other pollutants) (-5)
☐ neutral (5)

D. The quality of any water leaving the community, as compared with when it entered is:

☐ improved, cleaner (10) ☐ the same, unchanged (0) ☐ decreased, less clean (-5)

If decreased:
does it meet local standards for waste water emissions ☐ yes (2) ☐ no (0)
does it meet local standards for drinking water ☐ yes (3) ☐ no (0)

E. Water Pollution:

☐ Does not exist locally (10)
☐ Exists and is being treated to restore clean water (8)
☐ Exists and is not being addressed (-5)

F. Systems are available locally for proper disposal of toxic substances (paint, oil, batteries, etc.):

☐ yes (8) ☐ no (0)

Community members make use of these:

☐ yes (8) ☐ no (0)

Add up the numbers in parentheses behind each item above that you checked.

6. Waste Water & Water Pollution Management Total: _____

50+	**Indicates excellent progress toward sustainability**
25-49	**Indicates a good start toward sustainability**
0-24	**Indicates actions are needed to undertake sustainability**

Comments:

Ecological Checklist 7

7. Energy Sources & Uses

A. The amount of energy that is generated from renewable energy sources (solar, wind, hydro, biomass or geothermal) located at the community is:

☐ all (7) ☐ most (5) ☐ some (3) ☐ little (1) ☐ none (0)

B. The amount of energy that is brought in from outside the community/bought from a utility provider that is generated from renewable sources:

☐ all (5) ☐ most (3) ☐ some (2) ☐ little/none (1)

C. The amount of energy that is brought in from outside the community/bought from a utility provider that is generated by nuclear or fossil fuel sources:

☐ all (-6) ☐ most (-3) ☐ some (0) ☐ little (1) ☐ none (5)

The extent to which community members are aware that their energy needs are met using non-renewable energy sources:

☐ all - very few exceptions (3) ☐ most (2) ☐ some (1) ☐ few (0) ☐ none (-1)

D. Energy conservation information and education in the community is best described as:

- ☐ programs and information are readily available and used by most community members (7)
- ☐ programs and information are available, but not well utilized by community members (3)
- ☐ programs and information are NOT available to community members (0)

E. Most household needs and activities (clothes washing, food preservation, etc.) are accomplished using:

- ☐ natural, non-electric methods (5)
- ☐ super energy efficient appliances (3)
- ☐ basic energy efficient appliances (2)
- ☐ standard appliances with conservation practices or adaptations (1)
- ☐ standard appliances, no conservation practices or adaptations (-1)
- ☐ other sustainable method (1 point for each) - describe

F. Water heating and space heating or cooling are provided mostly by:

- ☐ solar gain, geothermal, or, sustainable biomass (including wood) from community land (5)
- ☐ natural gas, propane, bioregional wood or biomass, or, heat pump (3)
- ☐ fuel oil, or, electricity from a non-renewable source (0)
- ☐ other sustainable method (1 point for each) - describe

G. Cooking is mostly provided for by:

- ☐ solar, or, sustainable biomass from community land (including wood) (3)
- ☐ propane or natural gas (1)
- ☐ electricity from a non-renewable source (0)
- ☐ other sustainable method (1 point for each) - describe

If wood is a significant source, please indicate how it is renewed:

- ☐ self sustaining tree planting program within the community/bioregion (2)
- ☐ collection of dead wood from within the community/bioregion (2)
- ☐ imported from outside the bioregion from a source that renews via tree planting (1)
- ☐ from a source (local, bioregional or more distant) with no renewal program in place (-2)
- ☐ does not apply (0)

H. Refrigeration is mostly provided for by:

- ☐ seasonal systems or cold boxes/cellars (3)
- ☐ electricity from solar or other renewable source (2)
- ☐ propane or natural gas (1)
- ☐ electricity from a non-renewable source (-2)
- ☐ other sustainable method (1 point for each) - describe

I. Energy conservation is considered in construction of community buildings by: Check as many as apply -

- ☐ building location and orientation for thermal mass, shading, etc. by climate (2)
- ☐ use of appropriate construction materials/methods (super insulation, etc.) (2)
- ☐ energy conservation is not considered in community building construction (-2)
- ☐ other sustainable method (1 point for each) - describe

J. The extent to which the following energy conservation and efficiency methods are used:

Consideration of energy conservation in the design of community buildings

☐ often (2) ☐ sometimes (1) ☐ rarely (0) ☐ never (-1)

Appliances and electronic equipment are shared by community members

☐ often (2) ☐ sometimes (1) ☐ rarely (0) ☐ never (-1)

Community members select energy efficient appliances, equipment and tools

☐ often (2) ☐ sometimes (1) ☐ rarely (0) ☐ never (-1)

On-demand energy systems (only using energy when in use, such as water heaters)

☐ often (2) ☐ sometimes (1) ☐ rarely (0) ☐ never (-1)

Household energy use is minimized through conservation practices and products, such as turning off power when not in use, timing devices, insulation of heat sources, etc.

☐ often (2) ☐ sometimes (1) ☐ rarely (0) ☐ never (-1)

Regular care and maintenance of appliances and equipment

☐ often (2) ☐ sometimes (1) ☐ rarely (0) ☐ never (-1)

Regular care and maintenance of buildings - windows, doors, etc. to prevent loss of heated or cooled air

☐ often (2) ☐ sometimes (1) ☐ rarely (0) ☐ never (-1)

Natural lighting for indoor spaces

☐ often (2) ☐ sometimes (1) ☐ rarely (0) ☐ never (-1)

Use of compact fluorescent lighting

☐ 60% or more of lights (3) ☐ 20-60% (2) ☐ 10-20% (1) ☐ less than 10% of lights (0)

☐ other sustainable method (1 point for each) - describe (on next page)

K. Surplus energy is generated from renewable sources within the community:

☐ yes (2) ☐ no (0)

The surplus energy generated is:

put to new uses within the community	☐ yes (2)	☐ no (0)
provided to neighbors or the grid	☐ yes (2)	☐ no (0)

Add up the numbers in parentheses behind each item above that you checked.

7. Energy Sources & Uses Total: _____

50+	**Indicates excellent progress toward sustainability**
25-49	**Indicates a good start toward sustainability**
0-24	**Indicates actions are needed to undertake sustainability**

Comments:

Please use the Scoring Information pages, to add up your overall Ecological score

Social

The Social aspects of community life are balanced when...

There is a sense of social stability and dynamism in community life; a foundation of safety and trust enables individuals to freely express themselves to the benefit of all.

Spaces and systems are available that support and maximize communication, relationships and productivity.

There are adequate opportunities/technologies for communication within the community and for connecting as is appropriate with the world wide community.

The talents, skills and other resources of the community are shared freely within the community and offered outside of the community to serve the greater good.

Diversity is honored as a source of health, vitality and creativity in the natural environment and in community relations.

Acceptance, inclusivity and transparency fosters understanding of the benefits of diversity, enriches our environmental and social experience and promotes justice.

Personal growth, learning and creativity are valued and nurtured; opportunities for teaching and learning are available to all age groups through a variety of educational forms.

Options for restoring, maintaining or improving health (physical, mental, emotional and spiritual) are available and affordable, including natural remedies and alternative health practices - such as meditation and body work.

The flow of resources - giving and receiving of funds, goods and services - is balanced to meet the community's needs and wishes. Surpluses are shared.

Social Checklist 1

1. Openness, Trust & Safety; Communal Space

A. The extent to which there is a basic sense of safety and trust within the community:

☐ mostly (6) ☐ some (3) ☐ little (0) ☐ not at all (-1)

B. The extent to which the community is a safe environment for women:

☐ completely (6) ☐ mostly (3) ☐ sometimes (0) ☐ not at all (-1)

C. The extent to which the community is a safe environment for children:

☐ completely (6) ☐ mostly (3) ☐ sometimes (0) ☐ not at all (-1)

D. The extent to which people in the community know and relate supportively with their neighbors:

☐ almost always (6) ☐ often (3) ☐ sometimes (0) ☐ not at all (-1)

E. Adult crimes in the community are best described as:

☐ rare (6) ☐ occasional (3) ☐ frequent (-3) ☐ constant (-5)

F. Juvenile crimes in the community are best described as:

☐ rare (6) ☐ occasional (3) ☐ frequent (-3) ☐ constant (-5)

G. Indoor spaces available for communal gatherings and activities are:

☐ excellent (6) ☐ adequate (3) ☐ minimal (1) ☐ inadequate/none (0)

H. Outdoor spaces available for communal gatherings and activities are:

☐ excellent (6) ☐ adequate (3) ☐ minimal (1) ☐ inadequate/none (0)

I. Places available for youth gatherings and wholesome activities are:

☐ excellent (6) ☐ adequate (3) ☐ minimal (1) ☐ inadequate/none (0)

J. The frequency of social gatherings for the whole community: Check as many as apply -

☐ Daily (7) ☐ Weekly (5) ☐ Monthly (3) ☐ Seasonally (2) ☐ Annually (1) ☐ Rarely (-1)

Add up the numbers in parentheses behind each item above that you checked.

1. Openness, Trust & Safety; Communal Space Total: _____

50+	**Indicates excellent progress toward sustainability**
25-49	**Indicates a good start toward sustainability**
0-24	**Indicates actions are needed to undertake sustainability**

Comments:

Social Checklist 2

2. Communication - the flow of ideas & information

A. The community's system to provide members with opportunities to regularly share information, exchange ideas and announce needs is:

☐ excellent (15) ☐ adequate (5) ☐ minimal (1) ☐ inadequate (-5)

Community members make use of this system:

☐ often (10) ☐ sometimes (3) ☐ very little (1) ☐ not at all (0)

B. Communication systems are used and work well in the community for the following: Check as many as apply -

☐ announcing social events (3)
☐ announcing group work activities (3)
☐ encouraging discussion of important community decisions (3)
☐ making information about past community decisions and policies available (3)
☐ providing opportunities to share resources, skills, transportation, etc. (3)
☐ providing personal support at times when a community member is in need (3)
☐ uncensored exchange of ideas and discussion of values and visions (3)
☐ Other (1 point for each) - describe (on next page)

C. There is adequate accessibility for community members to:

Meet and talk face to face: ☐ often (8) ☐ sometimes (4) ☐ rarely (-3)
Phone: ☐ yes (5) ☐ no (-3) Fax: ☐ yes (4) ☐ no (-1)
Regular Mail service ☐ yes (3) ☐ -no (-1) Internet/e-mail: ☐ yes (2) ☐ no (0)
☐ Other (1 point for each) - describe:

Add up the numbers in parentheses behind each item above that you checked.

2. Communication - the flow of ideas & information Total: _____

50+	**Indicates excellent progress toward sustainability**
25-49	**Indicates a good start toward sustainability**
0-24	**Indicates actions are needed to undertake sustainability**

Comments:

Social Checklist 3

3. Networking Outreach & Services - resource exchange (internal/external)

A. Information about the community is available for others (general public) in some form:

☐ yes (7) ☐ no (0)

B. The community offers programs and services in sustainable living methods, technologies and/or businesses:

To community members: ☐ yes (7) ☐ no (0)
To the general public: ☐ yes (7) ☐ no (0)

C. The community provides assistance/service to those in need: Check as many as apply -

☐ within the community (10) ☐ within bioregion (5)
☐ in the country/state (5) ☐ in other parts of the world (5)

D. The extent to which community members engage in service projects: Check as many as apply -

Within the community -
☐ often (5) ☐ sometimes (3) ☐ very little (1) ☐ not at all (-1)

Within the bioregion, (surrounding or nearby community) -
☐ often (5) ☐ sometimes (3) ☐ very little (1) ☐ not at all (-1)

Nationally/internationally -
☐ often (5) ☐ sometimes (3) ☐ very little (1) ☐ not at all (-1)

E. The extent to which there are community service opportunities available for youth:

☐ often (7) ☐ sometimes (3) ☐ very little (1) ☐ not at all (-3)

F. The community builds relations and exchanges information, resources and support with other communities and related organizations:

☐ often (7) ☐ sometimes (3) ☐ very little (1) ☐ not at all (-1)

Add up the numbers in parentheses behind each item above that you checked.

3. Networking Outreach & Services Total: _____

50+	**Indicates excellent progress toward sustainability**
25-49	**Indicates a good start toward sustainability**
0-24	**Indicates actions are needed to undertake sustainability**

Comments:

Social Checklist 4

4. Social Sustainability - diversity & tolerance; decision-making; conflict resolution

A. An estimate of how many community members value diversity and practice tolerance:

Within the community -
☐ all - very few exceptions (3) ☐ most (2) ☐ some (1) ☐ few/none (-1)

Outside of the community -
☐ all - very few exceptions (3) ☐ most (2) ☐ some (1) ☐ few/none (-1)

B. The extent to which the community has the power of self-governance regarding community issues: ☐ completely (4) ☐ mostly (3) ☐ some (1) ☐ little (0) ☐ none (-1)

C. A non-discriminatory method agreeable to the community is used for important community decisions and directions: ☐ yes (4) ☐ in part or sometimes (1) ☐ no (-1)

D. Decision-making is transparent:

Information about decision topics is available to all -
☐ always - very few exceptions (3) ☐ sometimes (2) ☐ rarely/never (-1)

Any member of the community can attend decision making meetings -
☐ always - very few exceptions (3) ☐ sometimes (2) ☐ rarely/never (-1)

E. Decision-making processes are inclusive:

There is a system by which any adult member of the community can have input in the decision making process - ☐ yes (3) ☐ no (-2)

There is a system by which the children of the community can have input in the decision making process, as appropriate - ☐ yes (3) ☐ no (-1)

F. An estimate of how many community members regularly participate in community governance and decision-making is best described as:

☐ all - very few exceptions (4) ☐ most (3) ☐ some (1) ☐ few/none (-1)

G. Information/training is available in decision-making and mutual empowerment skills:

For adult community members ☐ yes (3) ☐ no (-1)

For children in the community ☐ yes (3) ☐ no (-1)

H. An estimate of how many community members would agree that the decision-making system is successful in difficult decisions/situations:

☐ all - very few exceptions (4) ☐ most (3) ☐ some (1) ☐ few/none (-1)

I. Social difficulties and disputes are successfully managed by an agreed upon system that is supportive, not punitive:

☐ almost always (5) ☐ usually (3) ☐ sometimes (1) ☐ rarely/never (-5)

J. Community members have easy access to this conflict resolution system:

☐ yes (4) ☐ no (-2)

K. Information/training is available in non-violent conflict resolution skills:

For adult community members ☐ yes (5) ☐ no (-1)

For children in the community ☐ yes (5) ☐ no (-1)

L. An estimate of how many community members would agree that their conflict resolution system:

is successful in dealing with difficult people/situations
☐ all - very few exceptions (4) ☐ most (3) ☐ some (1) ☐ few/none (-1)

safeguards human rights

☐ all - very few exceptions (4) ☐ most (3) ☐ some (1) ☐ few/none (-1)

promotes equality and social justice

☐ all - very few exceptions (4) ☐ most (3) ☐ some (1) ☐ few/none (-1)

Add up the numbers in parentheses behind each item above that you checked.

4. Social Sustainability Total:_____

50+	**Indicates excellent progress toward sustainability**
25-49	**Indicates a good start toward sustainability**
0-24	**Indicates actions are needed to undertake sustainability**

Comments:

Social Checklist 5

5. Education

A. Education and learning are valued in the community as demonstrated by the following: Check as many as apply -

☐ mentoring, internships and/or apprenticeship offered by those with special skills/expertise (3)
☐ community gatherings for information exchange and group learning (3)
☐ community gatherings to discuss and learn from issues and mistakes and make changes to improve what is not working well (3)
☐ the input and contributions of community elders are sought and respected (3)
☐ including children in work and community activities of all kinds (3)
☐ parent involvement in their children's educational process (3)
☐ learners determining the focus and content of their educational programs (3)
☐ no or low drop out rate of children from their educational system (3)
☐ other (1 point for each) - describe:

B. Educational opportunities (appropriate to the community) are available and accessible within the community or bioregion, including: Check as many as apply -

- ☐ Early education (pre-school learning activities) (2)
- ☐ Basic education (2)
- ☐ Vocational/livelihood skills training (2)
- ☐ Formal/higher education (college) (2)
- ☐ Special interest workshops/seminars/group programs (2)
- ☐ Wholesome programs/activities for youth, outside of school (2)
- ☐ Life experience learning opportunities (2)
- ☐ other (1 point for each) - describe

C. Education opportunities are available to all age groups:

in the community	☐ yes (10)	☐ no (-1)
in the bioregion	☐ yes (5)	☐ no (-5)

D. The extent to which educational systems and teaching methods:

honor and support individual differences of learners (talents, aptitudes, interests & limits, etc.)
☐ great (6) ☐ somewhat (3) ☐ in small part (1) ☐ not at all (-2)

promote individual self-realization
☐ great (6) ☐ somewhat (3) ☐ in small part (1) ☐ not at all (-2)

promote cooperative interdependence and community building skills
☐ great (6) ☐ somewhat (3) ☐ in small part (1) ☐ not at all (-2)

Add up the numbers in parentheses behind each item above that you checked.

5. Education Total: _____

50+	**Indicates excellent progress toward sustainability**
25-49	**Indicates a good start toward sustainability**
0-24	**Indicates actions are needed to undertake sustainability**

Comments:

Social Checklist 6

6. Health Care

A. Basic health care is: Check as many as apply -

☐ available locally (3) ☐ easily accessible (3) ☐ affordable (3)

B. Health care options available within or near the community: Check as many as apply -

☐ Basic health care - conventional medical services (2)
☐ Pre-natal care (2)
☐ Dental care - conventional medical services (2)
☐ Pediatric care (2)
☐ Emergency care (2)
☐ Care & support for the handicapped/disabled (2)
☐ Maternity care (2)
☐ Traditional services (shamanic ceremonies, counseling, etc.) (2)
☐ Elder care (2)
☐ Traditional remedies (herbal, nutritional, etc.) (2)
☐ Care & support for the dying (2)
☐ Preventive care/teaching (diet, exercise) (2)
☐ Homeopathy (2)
☐ Alternative practices (meditation, yoga, etc.) (2)
☐ Alternative/eclectic therapies (body work, hypnosis, biofeedback, energy methods, etc) (2)
☐ Other (1 point for each) - Specify (on next page)

C. How well health needs are met within or near the community:

Physical	☐ well (2)	☐ adequately (1)	☐ poorly (0)	☐ not at all (-2)
Mental-well	☐ well (2)	☐ adequately (1)	☐ poorly (0)	☐ not at all (-2)
Emotional	☐ well (2)	☐ adequately (1)	☐ poorly (0)	☐ not at all (-2)
Spiritual	☐ well (2)	☐ adequately (1)	☐ poorly (0)	☐ not at all (-2)

D. Deaths from preventable causes in the community are:

☐ rare (6) ☐ occasional (3) ☐ common (-1) ☐ frequent (-3)

E. Deaths from suicide/homicide/drug abuse in the community are:

☐ rare (6) ☐ occasional (3) ☐ common (-1) ☐ frequent (-3)

F. The incidence of serious communicable diseases in the community is:

☐ rare (6) ☐ occasional (3) ☐ common (-1) ☐ frequent (-3)

G. The extent to which there is a general commitment to healthy living in the community is:

☐ great (6) ☐ somewhat (3) ☐ in small part (1) ☐ not at all (-3)

Add up the numbers in parentheses behind each item above that you checked.

6. Health Care Total: _____

50+	**Indicates excellent progress toward sustainability**
25-49	**Indicates a good start toward sustainability**
0-24	**Indicates actions are needed to undertake sustainability**

Comments:

Social Checklist 7

7. Sustainable Economics - healthy local economy

A. There is explicit encouragement for community members creating businesses that-

enhance the local economy:	☐ yes (4) ☐ no (0)
do NOT generate pollution:	☐ yes (4) ☐ no (0)
do NOT exploit human resources:	☐ yes (4) ☐ no (0)
do NOT exploit natural resources:	☐ yes (4) ☐ no (0)

B. Local banks lend in support of sustainability projects: ☐ yes (4) ☐ no (0)

C. An estimate of the how many youth leave the community for a livelihood:

☐ majority (-5) ☐ some (0) ☐ minority (3) ☐ few or none (5)

D. The extent to which community members experience unemployment or lack of work for which they receive funds or other exchange is:

☐ rarely (2) ☐ occasionally (1) ☐ often (-1) ☐ frequently (-2)

E. An estimate of how many community members have difficulty providing for their basic needs (food, shelter, clothing, etc.):

☐ most (-6) ☐ some (-1) ☐ few (3) ☐ none (6)

If there are economic inequalities among community members, is there a system for dealing with this: ☐ yes (3) ☐ no (0)

F. Economic systems active in the community: Check as many as apply -

- ☐ self-sufficiency for basic needs (5)
- ☐ ecologically friendly cottage industry (2)
- ☐ sustainable small businesses (2)
- ☐ barter and exchange systems (2)
- ☐ education/programs (2)
- ☐ telecommunications or other work at home (2)
- ☐ volunteerism - work contribution (2)
- ☐ local market days (2)
- ☐ fund raising for modeling sustainable practices (2)
- ☐ voluntary levies within the community for sustainability project development (2)
- ☐ exchange with other ecovillages and sustainable communities (2)
- ☐ fund raising for community operations (0)
- ☐ leaving the community for paid work (-2)
- ☐ Other (1 point for each) Specify:

G. Community members actively engage in economic cooperation:

in their bioregion	☐ yes (2)	☐ no (-2)
in their country/state	☐ yes (1)	☐ no (-1)
with other parts of the world	☐ yes (1)	☐ no (0)

H. An estimate of how many community members would describe their work as meaningful and fulfilling:

☐ all - very few exceptions (4) ☐ most (3) ☐ some (1) ☐ few/none (-2)

I. An estimate of how many community members would say they experience non-monetary abundance/prosperity in their life:

☐ all - very few exceptions (4) ☐ most (3) ☐ some (1) ☐ few/none (-2)

Add up the numbers in parentheses behind each item above that you checked.

7. Sustainable Economics - healthy local economy Total: _____

50+	**Indicates excellent progress toward sustainability**
25-49	**Indicates a good start toward sustainability**
0-24	**Indicates actions are needed to undertake sustainability**

Comments:

Please use the Scoring Information Page, to add up your overall Social Score

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SPIRITUAL

The Spiritual aspects of community life are balanced when...

Cultural vitality is sustained through artistic and other cultural activities and celebrations.

Creativity and the arts are seen as an expression of unity and interrelationship to our universe, and are encouraged and supported through various forms of artistic expression, artful living and through preservation and sharing of beauty and aesthetic values.

Leisure time is valued.

There is respect and support for spirituality manifesting in many ways.

Opportunities are available for the development of the inner self.

A sense of joy and belonging is fostered through rituals and celebrations.

The qualities and commonalities at the heart of a community provide unity and integrity to community life. This may be a common vision and agreements that express commitments; it may be shared cultural beliefs, values and practices that define and express the uniqueness of each community.

There is a capacity for flexibility and successful responsiveness to difficulties that arise.

Whether urban, suburban or rural, developed or not, there is a growing understanding of the interconnectedness and interdependence of all the elements of life on Earth. The community knows its place in and relation to the whole.

The community consciously chooses and contributes to the creation of a peaceful, loving, sustainable world.

Spiritual Checklist 1

1. Cultural Sustainability

A. The common cultural/ethnic heritage of the community is celebrated and preserved through: Check as many as apply -

- ☐ oral transmission or storytelling (5)
- ☐ written records and archives (5)
- ☐ person(s) serving as historian(s) (5)
- ☐ training/apprenticeship in expertise specific to the community (artisanry, indigenous language, folk products, etc.) (5)
- ☐ a shared vision/method for ensuring continuity of the culture in the future (5)
- ☐ ceremonies and celebrations (5)
- ☐ art (photographs, murals, songs, etc.) (5)
- ☐ does not apply (0)

Though community members do not share a common heritage, they do:

- ☐ join in celebrating the heritage(s) of fellow community members (15)
- ☐ value and act to preserve the current community's culture/history by one or more of the methods above (15)

B. Cultural programs, festivals and celebrations, open to anyone, are offered: Check as many as apply -

☐ within the community (10) ☐ within bioregion (5) ☐ none nearby (-5)

C. An estimate of how many community members know the history of the community is:

☐ most (13) ☐ some (6) ☐ few (1) ☐ none (-4)

D. Cycles/transitions of life are acknowledged and shared in celebrations, ceremonies and rites of passage:

☐ always - very few exceptions (13) ☐ usually (6) ☐ occasionally (2) ☐ never (-5)

Add up the numbers in parentheses behind each item above that you checked.

1. Cultural Sustainability Total: _____

50+	**Indicates excellent progress toward sustainability**
25-49	**Indicates a good start toward sustainability**
0-24	**Indicates actions are needed to undertake sustainability**

Comments:

Spiritual Checklist 2

2. Arts & Leisure

A. Opportunities are available for community members to develop artistic talents (classes, apprenticeships, and support for individual artistic pursuits):

☐ almost always (6) ☐ usually (4) ☐ sometimes (2) ☐ rarely (0) ☐ never (-2)

B. These opportunities include: Check as many as apply -

☐ painting (2) ☐ music (2) ☐ creative writing (2)
☐ theater/acting (2) ☐ dancing (2) ☐ textiles (2)
☐ folk crafts (2) ☐ photography (2) ☐ pottery/sculpture (2)
☐ other (1 point for each) - describe

C. The extent to which the community values and encourages the development of local entertainers and entertainment:

☐ great (6) ☐ somewhat (3) ☐ in small part (1) ☐ not at all (-1)

D. The extent to which community members have time for recreational and leisure activities (sports, hobbies, relaxation, etc.) is:

☐ great (6) ☐ somewhat (3) ☐ in small part (1 ☐ not at all (-1)

E. There is group space available for art activities and events:

indoor ☐ yes (6) ☐ no (-1)
outdoor ☐ yes (4) ☐ no (-1)

F. Indicate the frequency of artistic events/celebrations in the community: Check as many as apply -

☐ Daily (5) ☐ Weekly (3) ☐ Monthly (2) ☐ Seasonally (2) ☐ Annually (1) ☐ Never (-5)

G. The design and appearance of the community demonstrates that the community values art, beauty and aesthetic quality:

☐ clearly (6) ☐ somewhat (3) ☐ in small part (1) ☐ not at all (-1)

H. The extent to which the expression and experience of beauty (in - art, ceremonies, poetry, gardens, architecture, etc.) is a natural part of the community's way of life:

☐ great (6) ☐ somewhat (3) ☐ in small part (1) ☐ not at all (-1)

Add up the numbers in parentheses behind each item above that you checked.

2. Arts & Leisure Total: _____

50+	**Indicates excellent progress toward sustainability**
25-49	**Indicates a good start toward sustainability**
0-24	**Indicates actions are needed to undertake sustainability**

Comments:

Spiritual Checklist 3

3. Spiritual Sustainability - rituals & celebrations; support for inner development & spiritual practices

A. Community members are free to worship the creator/creation, and celebrate their connection with the divine, through devotional practices of their choice:

☐ yes (10) ☐ no (-5)

B. Opportunities for contemplation and development of the inner self are available in the community: Check as many as apply -

☐ through individual pursuit (5)
☐ through group programs and activities (5)
☐ no (-5)
☐ other (1 point for each) - describe

C. The topic and experiences of spirituality within the community are best described as:

☐ comfortable, harmonious and contributing to the overall well-being of the community (2)
☐ a source of interpersonal difficulties and unrest or problems within the community (-2)

D. Group spiritual practices conducted within the community, include: Check as many as apply -

- ☐ Meditation (1)
- ☐ Attunement/group centering practices (1)
- ☐ Sacred dancing (1)
- ☐ Talking stick sessions/sharing circles (1)
- ☐ Meal blessings (1)
- ☐ Shared silence (1)
- ☐ Prayer (1)
- ☐ Chanting/devotional singing (1)
- ☐ Invocation of God/Spirit at community activities and events (1)
- ☐ Other (1 point for each) Specify:

E. How often community members come together for spiritual practices that connect them to a deeper level of consciousness within themselves and/or to the Earth:

☐ regularly (5) ☐ occasionally (3 ☐ rarely (1) ☐ never (-1)

F. The extent to which community members wishing to devote themselves to a life of spiritual mastery and selfless service, are encouraged/supported by the community in doing this:

☐ great (5) ☐ somewhat (3) ☐ in small part (1) ☐ not at all (-1)

G. The extent to which the wisdom and spiritual expertise of older community members is seen as a community resource and used as a guide in community matters:

☐ great (5) ☐ somewhat (3) ☐ in small part (1) ☐ not at all (-1)

H. There are spaces available within the community dedicated for spiritual gatherings and practices:

indoor ☐ yes (5) ☐ no (-1)
outdoor ☐ yes (5) ☐ no (-1)

I. An estimate of how many community members appreciate that spirituality manifests in many ways, and respect the ways of others:

☐ most (5) ☐ some (3) ☐ few (1) ☐ none (-1)

Add up the numbers in parentheses behind each item above that you checked.

3. Spiritual Sustainability - rituals & celebrations; support for inner development & spiritual practices Total: _____

50+	**Indicates excellent progress toward sustainability**
25-49	**Indicates a good start toward sustainability**
0-24	**Indicates actions are needed to undertake sustainability**

Comments (on next page):

SPIRITUAL CHECKLIST 4

4. Community Glue

A. Most community members would agree that the quality of life in the community is best described as:
☐ excellent (5) ☐ good (3) ☐ adequate (1) ☐ inadequate (0) ☐ poor (-2)

B. Sharing occurs among community members about beliefs, values and experiences:
☐ frequently (5) ☐ sometimes (3) ☐ rarely (1) ☐ never (-1)

C. The extent to which moral principles (such as respect for oneself and others, responsibility for personal mastery and personal integrity) are part of the community's philosophy and activities:
☐ great (5) ☐ somewhat (3) ☐ little (0) ☐ not at all (-1)

D. The extent to which a common vision or purpose aligns and unites the community:
☐ great (5) ☐ somewhat (3) ☐ little (0) ☐ not at all (-1)

E. Community review and renewal of a shared vision and purpose occurs:
☐ regularly (5) ☐ occasionally (3) ☐ rarely (1) ☐ never (0)

F. The community laughs, plays, relaxes and generally enjoys life together:
☐ regularly (5) ☐ occasionally (3 ☐ rarely (1) ☐ never (0)

G. The level of harmony, caring and support:

Between the women of the community is -
☐ excellent (6) ☐ good (4) ☐ adequate (2) ☐ inadequate (0) ☐ poor (-2)

Between the men of the community is -
☐ excellent (6) ☐ good (4) ☐ adequate (2) ☐ inadequate (0) ☐ poor (-2)

Between men and women of the community is -
☐ excellent (6) ☐ good (4) ☐ adequate (2) ☐ inadequate (0) ☐ poor (-2)

Between the children of the community is -
☐ excellent (6) ☐ good (4) ☐ adequate (2) ☐ inadequate (0) ☐ poor (-2)

Between the various age groups within the community is -
☐ excellent (6) ☐ good (4) ☐ adequate (2) ☐ inadequate (0) ☐ poor (-2)

H. Sexual relationships within the community are best described as:

☐ appropriate (for this community) and contributing to the overall well-being of the community (3)

☐ a source of social difficulties and unrest or problems within the community (-3)

I. The community endeavors to strengthen its internal (community glue) bonds:

☐ regularly (8) ☐ occasionally (4) ☐ rarely (2) ☐ never (-1)

Add up the numbers in parentheses behind each item above that you checked.

4. Community Glue Total: _____

50+	**Indicates excellent progress toward sustainability**
25-49	**Indicates a good start toward sustainability**
0-24	**Indicates actions are needed to undertake sustainability**

Comments:

Spiritual Checklist 5

5. Community Resilience

A. The extent to which the community is able to respond beneficially to community members in crisis:

☐ completely - very few exceptions (14) ☐ mostly (8) ☐ somewhat (5)
☐ little (2) ☐ not at all (-3)

B. The community is able to discern when external expertise is needed to help community members in crisis:

☐ usually (14) ☐ sometimes (5) ☐ rarely (2) ☐ never (-3)

C. How often the community is able to help members facing personal or existential problems, transform the crisis into an opportunity for inner growth and self-realization:

☐ usually (14) ☐ sometimes (5) ☐ rarely (2) ☐ never (-3)

D. The extent to which the community is able to respond supportively to marginalized community members (the poor, ill, dying, troubled, disabled, elderly, etc.):

☐ completely - very few exceptions (14) ☐ mostly (8) ☐ somewhat (5)
☐ little (2) ☐ not at all (-3)

E. The community endeavors to strengthen its ability to successfully handle challenges/crises:

☐ regularly (15) ☐ occasionally (7) ☐ rarely (2) ☐ never (-3)

Add up the numbers in parentheses behind each item above that you checked.

5. Community Resilience Total: _____

50+	**Indicates excellent progress toward sustainability**
25-49	**Indicates a good start toward sustainability**
0-24	**Indicates actions are needed to undertake sustainability**

Comments:

Spiritual Checklist 6

6. A New Holographic, Circulatory World View

A. The extent to which the community values conscious living (personal responsibility, personal growth and caring interaction with others) is best described as:

☐ great (14) ☐ some (10) ☐ a little (5) ☐ not at all (-3)

B. The extent to which diversity (human) is valued and encouraged as important to the overall health and success of the community is:

☐ great (14) ☐ some (10) ☐ a little (5) ☐ not at all (-3)

C. The extent to which there is a shared sense of the community's place in and contribution to the world:

☐ great (14) ☐ some (10) ☐ a little (5) ☐ not at all (-3)

D. The extent to which the concept of sustainability is gaining acceptance and use in the community is:

☐ great (14) ☐ some (10) ☐ a little (5) ☐ not at all (-3)

E. The extent to which there is a shared commitment within the community to a greater purpose - "we are doing this for something greater than us" - for the greater good:

☐ great (14) ☐ some (10) ☐ a little (5) ☐ not at all (-3)

Add up the numbers in parentheses behind each item above that you checked.

6. A New Holographic, Circulatory World View Total: _____

50+	**Indicates excellent progress toward sustainability**
25-49	**Indicates a good start toward sustainability**
0-24	**Indicates actions are needed to undertake sustainability**

Comments:

Spiritual Checklist 7

7. Peace & Global Consciousness

A. The extent to which there is harmony within the diversity, that is, the dynamic tension of people's differences is put to creative uses that benefit the community:

☐ great (14) ☐ some (10) ☐ a little (5) ☐ not at all (-3)

B. The community engages in activities that open the hearts and minds of community members to an experience of being part of a greater whole:

☐ regularly (10) ☐ occasionally (6) ☐ rarely (2) ☐ never (-2)

C. When making important community decisions, the community engages in activities that open the heart to deeper truths and balance mind, body and spirit:

☐ regularly (10) ☐ occasionally (6) ☐ rarely (2) ☐ never (-2)

D. The extent to which community members are aware of and take responsibility for the effects of projecting their emotional and/or mental energy into the collective energy-field of the community:

☐ great (14) ☐ some (10) ☐ a little (5) ☐ not at all (-3)

E. Community members offer selfless service:

within the community
☐ frequently (10) ☐ sometimes (6) ☐ rarely (2) ☐ never (-2)

outside the community
☐ frequently (10) ☐ sometimes (6) ☐ rarely (2) ☐ never (-2)

F. The value the community places on cultivating inner peace is best described as:

☐ great (14) ☐ some (10) ☐ a little (5) ☐ not at all (-3)

Add up the numbers in parentheses behind each item above that you checked.

7. Peace & Global Consciousness Total: _____

50+	**Indicates excellent progress toward sustainability**
25-49	**Indicates a good start toward sustainability**
0-24	**Indicates actions are needed to undertake sustainability**

Comments:

Please use the Scoring Information Page, to add up your overall Spiritual score

APPENDIX B –PHOTOGRAPHS

Photo 1—View from Southern end of property. Edinburgh Lane divides the property. Main homestead in center.

Photo 2—View down driveway to mule barn. Turf dominates.

Photo 3—View from road to mule barn and second homestead in the distance. The flattest lands occur here.

Photo 4—View south of western field. Mule barn and neighboring homestead visible.

Photo 5—View from unpaved drive to second homestead and newly constructed stable on right.

Photo 6—View east from driveway of second home. A fence with Cedars and hardwoods obscures view to field.

Photo 7—View east to same north field as Photo 5, within the fence. Pecans can be seen in the pasture.

Photo 8—View north to wood line from within the north field.

Photo 9—View south from behind the pecan trees in the north field. The cow barn and the homestead can be seen.

Photo 10—View west towards the road from the lowest point in the north field. Slope obscures the view to road.

Photo 11—View north from the south field, one of the highest point on the property.

Photo 12—View of the woodland valley from the northern edge of the property.

Photo 13—View east to the cow barn.

Photo 14—View northeast of the well's pump-house.

Historical Photographs

Photo 15—Front of house, Hemlock and well, 1926.

Photo 16—Family at front porch, 1938.

Photo 17—Kids in front of Smokehouse, 1949.

Photo 18--Old back porch and smokehouse, 1960.

Photo 19—View of homestead, 1967. Hemlocks on sides.

Photo 20—View south across driveway, 1980.

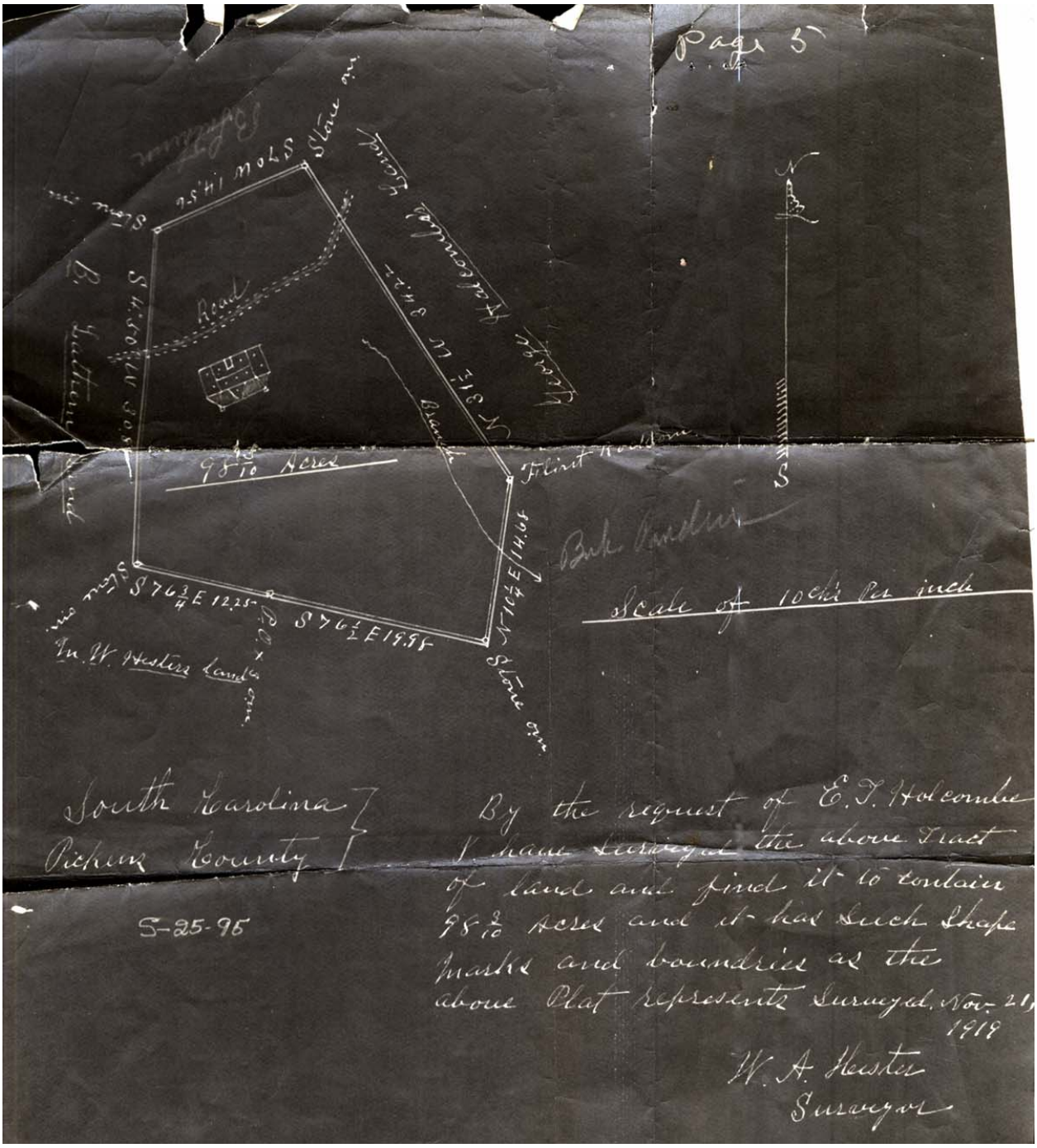
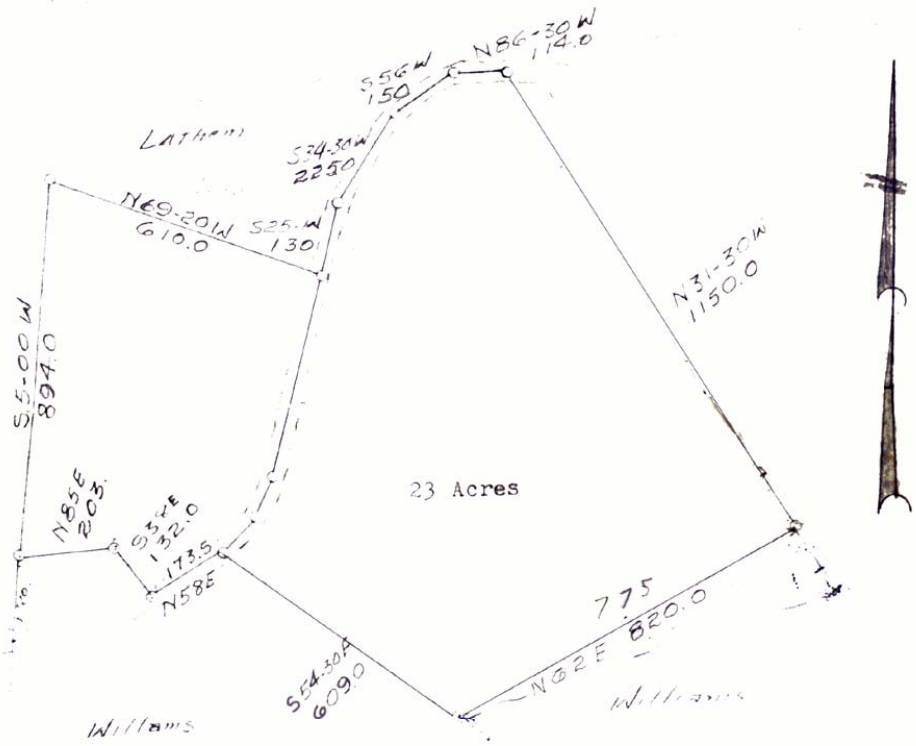


Photo 21—Original deed of the 98 3/10 acres



Property
of
Ernest W. Brown

State of South Carolina
County of Pickens

The above tract of land is located approx. 1.0 mile North of Hester's Store.

Scale: 1" = 300' Date: 10-14-66

Surveyed by: T. Craig Keith Reg. No. 1712 L. S.

T. CRAIG KEITH

Photo 22—Plat from 1966

APPENDIX C – EXPLINATION OF TERMS

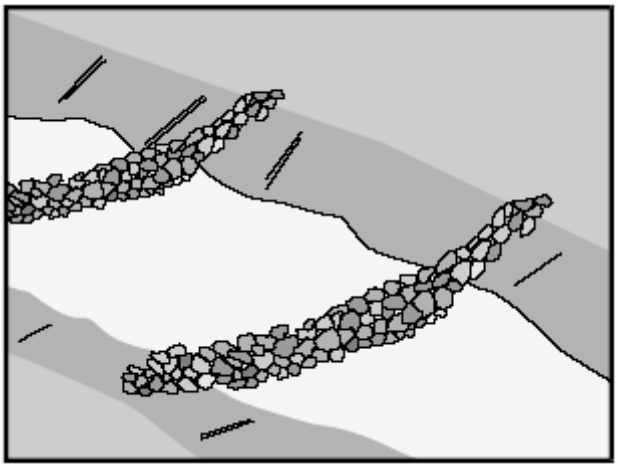
***Biodiesel*--**Biodiesel is the name of a clean burning alternative fuel, produced from domestic, renewable resources. Biodiesel contains no petroleum, but it can be blended at any level with petroleum diesel to create a biodiesel blend. It can be used in compression-ignition (diesel) engines with little or no modifications. Biodiesel is simple to use, biodegradable, nontoxic, and essentially free of sulfur and aromatics.

General Definition—Biodiesel is a domestic, renewable fuel for diesel engines derived from natural oils like soybean oil, and which meets the specifications of ASTM D 6751.

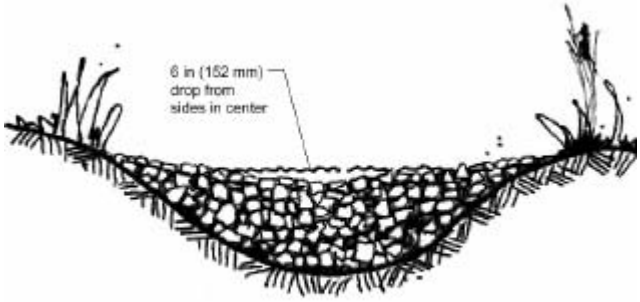
Clarifying language to general definition—Biodiesel can be used in any concentration with petroleum based diesel fuel in existing diesel engines with little or no modification. Biodiesel is not the same thing as raw vegetable oil. It is produced by a chemical process which removes the glycerin from the oil. Biodiesel is typically produced by a reaction of a vegetable oil or animal fat with an alcohol such as methanol or ethanol in the presence of a catalyst to yield mono-alkyl esters and glycerin, which is removed.

Biodiesel is better for the environment because it is made from renewable resources and has lower emissions compared to petroleum diesel. It is less toxic than table salt and biodegrades as fast as sugar. Since it is made in the USA from renewable resources such as soybeans, its use decreases our dependence on foreign oil and contributes to our own economy. **(**http://www.biodiesel.org/resources/definitions/default.shtm)

Check Dam-- A check dam is a small barrier constructed of rock, gravel bags, sandbags, fiber rolls, or reusable products, placed across a constructed swale or drainage ditch. Check dams reduce the effective slope of the channel, thereby reducing the velocity of flowing water, allowing sediment to settle and reducing erosion.



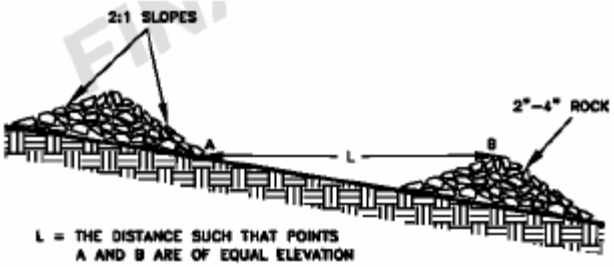
(California Stormwater BMP Handbook)



Rock Check Dam
Section View

(Barr Engineering Co)

Check dams are generally used in concentrated-flow areas, such as vegetated ditches and swales. Check dams are not used in streams or channels. Check dams can either be permanent or temporary barriers that prevent erosion and promote sedimentations by slowing flow velocities and/or to filtering concentrated flows.



(USE Erosion Stormwater Pollution)

Cohousing--Cohousing communities balance the traditional advantages of home ownership with the benefits of shared common facilities and ongoing connections with your neighbors. These cooperative neighborhoods, both intergenerational and for elders, are among the most promising solutions to many of today's most challenging social and environmental concerns. This type of housing began in Denmark in the late 1960s, and spread to North America in the late 1980s. There are now more than a hundred cohousing communities completed or in development across the United States and Canada. (www.cohousing.org)

While there are many similarities between ecovillages and cohousing, the major difference is that with cohousing there is no shared community economy.

CoHousing Communities were "born" in Denmark over 20 years ago out of a desire to create pedestrian oriented, community designed collaborative housing (CoHousing), with amenities for all residents of all ages, that satisfied the needs of changing lifestyles. CoHousing Community developments in Europe range in size from six to eighty households, with the majority between 15 and 33. (http://www.cohousing.co.uk/whatiscoho.htm)

Community Supported Agriculture (CSA)-- Community supported agriculture (CSA) is a new idea in farming, one that has been gaining momentum since its introduction to the United States from Europe in the mid-1980s. The CSA concept originated in the 1960s in Switzerland and Japan, where consumers interested in safe food and farmers seeking stable markets for their crops joined together in economic partnerships. Today, CSA farms in the U.S., known as CSAs, currently number more than 400.

In basic terms, CSA consists of a community of individuals who pledge support to a farm operation so that the farmland becomes, either legally or spiritually, the community's farm, with the growers and consumers providing mutual support and sharing the risks and benefits of food production. Typically, members or "share-holders" of the farm or garden pledge in advance to cover the anticipated costs of the farm operation and farmer's salary. In return, they receive shares in the farm's bounty throughout the growing season, as well as satisfaction gained from reconnecting to the land and participating directly in food production. Members also share in the risks of farming, including poor harvests due to unfavorable weather or pests. By direct sales to community members, who have provided the farmer with working capital in advance, growers receive better prices for their crops, gain some financial security, and are relieved of much of the burden of marketing. (An excerpt from Community Supported Agriculture (CSA): An Annotated Bibliography and Resource Guide**.** Suzanne DeMuth. September 1993.)

Composting Toilet— Composting toilets are toilet systems which treat human waste by composting and dehydration to produce a useable end-product that is a valuable soil additive. They come in a variety of models and brand names as well as different shapes and designs to enhance the natural composting process. They use little or no water, are not connected to expensive sewage systems, cause no environmental damage and produce a valuable resource for gardening. The systems can be broadly divided into two different types:

BATCH SYSTEMS - With the batch systems, a container is filled and then replaced with an empty container. The composting process is completed inside the sealed container.
The system may have a single, replaceable container. Or it may be a carousel system where 3 or 4 containers are mounted on a carousel and a new container is spun into the toilet area when the other is full. After a full cycle is complete, the first container is fully composted and ready for emptying.

CONTINUAL PROCESS SYSTEMS - These systems are in a constant state of composting. "Deposits" are put into the system, composting reduces the volume and moves it downward where it is harvested after 6-12 months as fully composted material.

All systems are designed to treat the "deposits" by composting, worm processing, micro and macro - organism breakdown, and by dehydration and evaporation of moisture.

There are a wide variety of systems including:

- Owner-built, two chamber mouldering systems that are basic, but effective.
- Owner-built from concrete blocks and concrete inclined base. Constructed in with the house foundations.
- Manufactured, large tank, inclined base models suitable for heavy loadings.
- Wide variety of small units which fit into existing bathrooms. Many have dehydration fans and heaters.
- Vacuum flush unit for production of worm castings.
- Full flush systems with centrifugal action to deposit wastes into composting chamber.

BENEFITS TO THE HOUSEHOLDER Water Use Reduction (20 -50%)

A significant savings in water storage will result if the household is not on reticulated water supply. Combine this with wastewater re-utilization in irrigation and other household water reduction techniques and water storage costs can be cut by up to 60%.

Shock Loading Capacity—Loading shock for large gatherings is achieved easily with correctly sized composting toilet systems.

Odor Problems Reduced—The suction air flow in most composting toilets takes toilet and bathroom odor out of the room and acts like a constant extraction fan.

Lower Household Maintenance Costs—Sewage rates and water rates (metered) can be in the order of $500 per year, a significant cost. This will only increase if the demand for sewage system upgrading increases. Other on-site systems have annual maintenance costs that are obligatory. Local authorities will be increasingly paying rebates to households who own composting toilets.

End Product Recycled—While only small in amount, the solid end product is a valuable humic fertilizer that can be utilized around trees and gardens.

Reduced Greywater Loading—Where composting toilets are installed instead of septic and mini-treatment systems, there is a large reduction in the "loading" on the effluent treatment system by the removal of "blackwater". Smaller, less maintenance, greywater systems are possible.

Independence—A household with a composting system is independent from potential problems of the waterborne sewage system. If future water shortage or system backup problems occur with conventional systems, there is not much that you can do personally about it. On-site composting systems are much more flexible, they are easier to fix and have less damage potential if operated incorrectly.

Recycling—The composting toilet possesses the ability to recycle much of your household waste. Food scraps, paper, lawn clippings and grease from you grease traps and greywater systems can be composted back through the toilet. If you choose to put in a reed bed greywater systems, the annual clippings can also be composted. There is no wastage in this system.

Unusual Sites—Composting toilets can be installed in many different situations which would not accommodate other systems. Rocky sites, high water table, no water storage, environmentally sensitive, close to running watercourses, and swampy ground. These difficult site situations can be accommodated with small alterations to the basic system design.

BENEFITS TO THE ENVIRONMENT AND TO THE COMMUNITY WATER USE

A reduction in water use allows the large capital costs of dams and reservoirs to be spread over a greater population. It also enables decentralized water sources to be used.

Reduced Marine Pollution—Nutrient load on streams and rivers is almost negligible. This results in more oxygen being available in the water and a return to improved activity of marine life.

Pollution Detected Quickly—Without sewage systems to flush away wastes, It would be easier to ascertain where toxic wastes are being leaked into watercourses. Industry would be more willing to rectify these problems if it were easier to identify the sources.

Damage limited—Miscalculation in individual composting systems has a much smaller impact than the same mistake in a large centralized system. It is also easier to rectify and return to normal operation.

Flexibility of Planning—Composting toilet systems are built only when the need arises. The high headwork and treatment costs of conventional sewage systems must be borne by the community ahead of development. If development does not go as planned, then money is wasted.

Less Environmental Impact—Compared to sewage systems, on-site composting and greywater treatment has less impact on the environment;

• Large effluent releases into watercourses and oceans are avoided.

• Disruption to soils systems through pipeline installation is eliminated.

• Leakage of raw sewage into groundwater through pipe deterioration and breakage is eliminated.

Flexibility in Estate Planning—By eliminating the planning constraints of the sewage system underground piping and infrastructure, housing developments can be designed with more emphasis on environmental and social considerations, rather than how best to situate the blocks to make pipes run straighter.

(http://www.compostingtoilet.org/explain.cfm.htm)

***Forest Garden*—**A forest garden is a garden modeled after a natural forest. Forest gardens usually have a diverse collection of plants arranged in multiple layers above a deep mulch. These plants produce flowers, food, and other products for human use. The plants function together, along with the insects and other animals that come to inhabit them, as an ecological system (Figure 1). Forest gardening is a term coined by Robert Hart of Shropshire, England. Indigenous peoples throughout the tropics, however, have created similar gardens for centuries. These gardens, known as tropical home gardens, include a diversity of crops arranged in multiple layers, and in many ways mimic the structure and ecological function of the surrounding natural forests. Robert Hart and others have applied the same principles to the design of gardens modeled after temperate deciduous forests.

In a natural forest, plants belong to one or more layers. There are the high canopy trees, and an understory of shorter trees. Beneath the trees is a layer of saplings and shrubs and beneath that a layer of herbaceous plants. Just above the forest floor are groundcovers. Finally there are the vines, which grow up through all the layers. The plant layers in a natural forest are not uniform across space. Different species live on high slopes as opposed to in a river bottom, for example. Forest composition is different at the edge of a clearing from the center of a large wooded patch. Similarly, in a forest garden we design with the environment and according to our specific uses. If one corner of a forest garden is more poorly drained than another, that corner should include plants that can tolerate having "wet feet." A forest garden can be set up like a forest edge, with low growing species to the sunny side and taller plants in the rear. Forest gardens can perform structural functions, such as screening an unpleasant view or cold wind, or, if mostly deciduous, can shade a house in the summer and let the sun in to warm it in the winter.

Natural forests grow magnificently with no human intervention. Forest gardens too seek to provide many, if not most, of their own needs. Sheet mulch will keep the plants moist without the need for much additional irrigation, and, as it breaks down, will furnish the plants with valuable nutrients needed for their growth. To increase the fertility of the system, forest gardens often include nitrogen-fixing plants and plants grown specifically to provide mulch. Forest gardens also often include insectary plants to attract and support beneficial insects that can reduce pest populations. Perennial and self-seeding plants are emphasized in forest gardens because they reduce the need for the annual chores of starting and planting out seedlings. Designs may also include habitat for birds (who spread seeds, provide fertilizer, and eat insects), toads (who eat insects), and snakes (who eat rodent pests).

Like natural forests, forest gardens are, to an extent, self-designing. The gardener may introduce more seeds and plants than will eventually survive. Only those that are well-suited to the environmental conditions present in that place at that moment will thrive. Also, a forest garden is designed to evolve over time. The plants that predominate at the beginning will likely fade away as others grow to take their places. (Excerpts from: Forest Gardening in Ohio. Travis Beck, Department of Horticulture and Crop Science, The Ohio State University and Martin F. Quigley, Department of Horticulture and Crop Science, The Ohio State University. (http://ohioline.osu.edu/hyg-fact/1000/1256.html)

From Forest gardening (http://www.agroforestry.co.uk/forgndg.html):

The primary aims for the system are:

- to be biologically sustainable, able to cope with disturbances such as climate change
- it should be productive, yielding a number (often large) of different products
- it should require low maintenance.

The crops which are produced will often include fruits, nuts, edible leaves, spices, medicinal plant products, poles, fibers for tying, basketry materials, honey, fuelwood, fodder, mulches, game, sap products.

Benefits of forest farming/gardening**:**

- Economic benefits can be significant. Logs can produce shiitake mushrooms worth 5-10 times the value of the logs themselves, and forest-cultivated ginseng averages £122-245 per pound in North America. Other medicinal plants provide a lower but steady supplemental income. Markets for floral decoratives have been steadily increasing.
- Forest farming modifies the forest ecosystem but does not significantly interfere with its crucial contributions of water filtering, soil erosion control, microclimate moderation, and wildlife habitat.
- Forest farming provides opportunities to generate short-term income from existing woodlands, with minimum capital investment. Especially on small family farms, this can contribute significantly to diversification and rural economic development.

(http://www.agroforestry.co.uk/forgndg.html)

In forest farming, high-value specialty crops are cultivated under the protection of a forest canopy that has been modified and managed to provide the appropriate conditions. It is a way of utilizing forests for short-term income while high-quality trees are being grown for wood products. The amount of light in the stands is altered by thinning, pruning, or adding trees; 5-40% crown cover is usually desirable. Existing stands of trees can be intercropped with annual, perennial, or woody plants.

Five main categories of specialty crops in **Forest Gardening** are:

FOODS:

- mushrooms, eg. Shiitake, matsuki (grown on logs, in sawdust/chipped wood beds etc.)
- nuts, eg. hazelnuts, small chestnut species; note that the canopy trees could also be nut producers, eg. walnuts, chestnuts, pecans, pine nuts
- vegetables, eg. radish, beetroot, Swiss chard
- honey from bee plants, eg. plum, black locust
- herbs, eg. mints
- fruits, eg. blueberries, elderberries, blackberries, raspberries, strawberries, currants, gooseberries
- edible flowers, eg. elderflowers
- sap products - eg. maple syrup, birch sap wine etc.

BOTANICAL PRODUCTS: Many medicinal plants are used in herbal medicine and are used to give clinically useful drugs, such as:

- Adonis vernalis (Spring adonis)
- Agrimonia eupatoria (Agrimony)
- Ammi majus (Queen Anne's lace)
- Anisodus tanguticus
- Artemesia annua (Annual wormwood)
- Artemisia maritima (Sea wormwood)
- Atropa belladonna (Belladonna)
- Berberis vulgaris (Barberry)
- Brassica nigra (Blck mustard)
- Colchicum autumnale (Autumn crocus)
- Convallaria majalis (Lily of the valley)
- Coptis japonica
- Cynara scolymus (Globe artichoke)
- Cytisus scoparius (Broom)
- Daphne genkwa
- Digenia simplex (Makuri)

- Digitalis lanata & D. purpurea (Foxgloves)
- Gaultheria procumbens (Wintergreen)
- Ginkgo biloba
- Glaucium flavum (Horned poppy)
- Glycyrrhiza glabra (Liquorice)
- Hemsleya amabilis
- Hydrangea macrophylla
- Hydrastis canadensis (Goldenseal)
- Hyoscyamus niger (Henbane)
- Larrea divaricata
- Lobelia inflata
- Lycoris squamigera
- Mentha spp. (Mints)
- Panax spp. (Ginseng)
- Podophyllum peltatum (May apple)
- Potentilla fragarioides
- Rhododendron molle
- Salix alba (White willow)
- Sambucus spp. (Elders - flowers)
- Sanguinaria canadensis (Bloodroot)
- Silybum marianum (Milk thistle)
- Stephania sinica
- Taxus brevifolia (Pacific yew)
- Thymus vulgaris (Thyme)
- Trichosanthes kirilowii (Snake gourd)
- Urgenia maritima (Squill)
- Valeriana officinalis (Valerian)
- Veratrum album (White hellebore)
- Vinca minor (lesser periwinkle)
- essential oil crops can also be cultivated, eg. Eucalyptus leaves, mints, lemon balm,

DECORATIVES

- floral greenery (mosses, ferns, beargrass, salal, Eucalyptus etc)
- Christmas trees
- dye plants

HANDICRAFTS

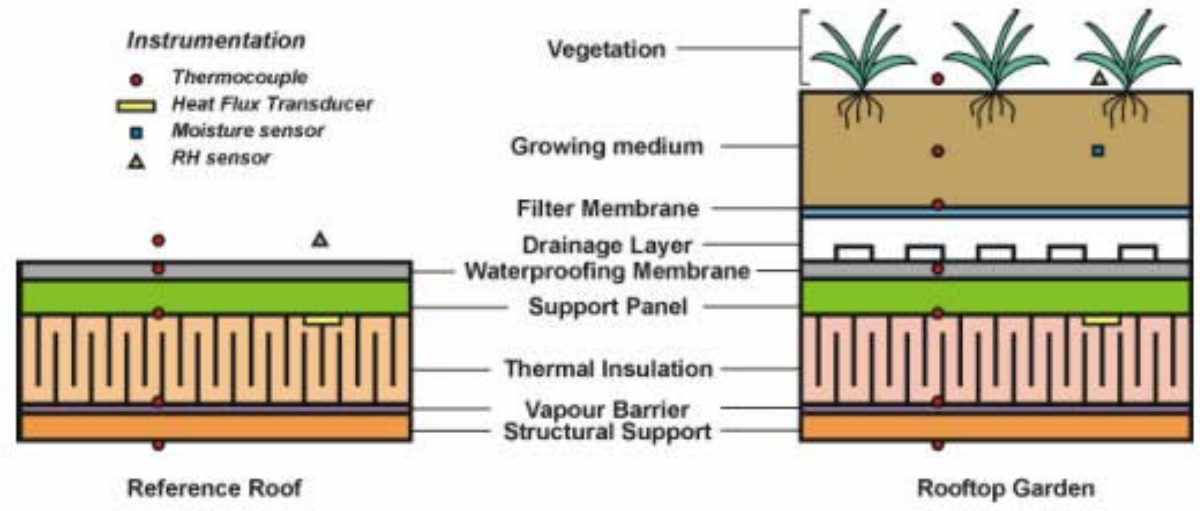
- basketry materials (willows etc.)
- short-term coppice, eg. hazel poles, energy coppice

WOOD PRODUCTS

- charcoal from understory trees
- fuelwood
- special woods, eg. for carving, incense
- garden mulches from chipped wastes & coppice; pine needle mulches (http://www.agroforestry.co.uk/forfarm.html)

Green Roof— A green roof consists of vegetation and soil, or a growing medium, planted over a waterproofing membrane. Additional layers, such as a root barrier and drainage and irrigation systems may also be included. Green roofs can be used in many applications, including industrial facilities, residences, offices, and private residences. They are widely used for their stormwater management and energy savings potential, as well as their aesthetic benefits. Green roofs are an attractive roofing option that can reduce urban heat islands by providing shade and through evapotranspiration, the release of water from plants to the surrounding air. They also:

- Reduce sewage system loads by assimilating large amounts of rainwater.
- Absorb air pollution, collect airborne particulates, and store carbon.
- Protect underlying roof material by eliminating exposure to the sun's ultraviolet (UV) radiation and extreme daily temperature fluctuations.
- Serve as living environments that provide habitats for birds and other small animals.
- Offer an attractive alternative to traditional roofs, addressing growing concerns about urban quality of life.
- Reduce noise transfer from the outdoors.
- Insulate a building from extreme temperatures, mainly by keeping the building interior cool in the summer.



There are two types of green roofs: intensive and extensive. Here are some characteristics of each:

Intensive and Extensive Green Roofs

Characteristic	Intensive Green Roof	Extensive Green Roof
Soil	Requires minimum of one foot of soil depth	Requires only 1 to 5 inches of soil depth
Vegetation	Accommodates large trees, shrubs, and well-maintained gardens	Capable of including many kinds of vegetative ground cover and grasses
Load	Adds 80-150 pounds per square foot of load to building structure	Adds only 12-50 pounds per square foot depending on soil characteristics and the type of substrate
Access	Regular access accomodated and encouraged	Usually not designed for public accessibility
Maintenance	Significant maintenance required	Annual maintenance walks should be performed until plants fill in
Drainage	Includes complex irrigation and drainage systems	Irrigation and drainage systems are simple

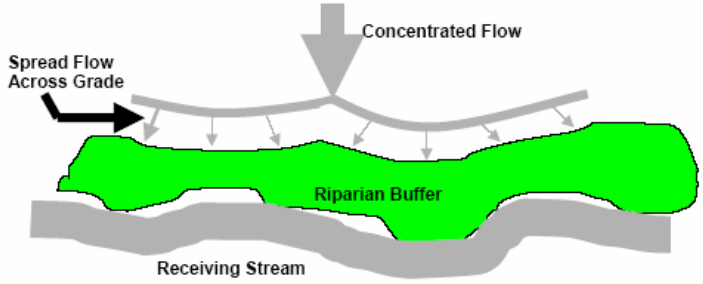
Source: Schloz-Barth, Katrin. 2001. "Green Roofs: Stormwater Management From the Top Down." Environmental Design & Construction. January 15.

(http://www.epa.gov/heatisland/strategies/greenroofs.html)

Level spreaders—Structures that are designed to uniformly distribute concentrated flow over a large area. Level spreaders come in many forms, depending on the peak rate of inflow, the duration of use, the type of pollutant, and the site conditions.

All designs follow the same principle:

1. Concentrated flow enters the spreader through a pipe, ditch or swale.
2. The flow is retarded, energy is dissipated.
3. The flow is distributed throughout a long linear shallow trench or behind a low berm.
4. Water then flows over the berm/ ditch, theoretically, uniformly along the entire length.



(North Carolina State University)

Rock lined Channel Level Spreader

One of the simpler designs, rock-lined channels operate under the assumption that the lower (downslope) lip of the channel is the same elevation. The channel must be dug along an elevation contour, which helps make the downstream lip "level." Rock-lined channel depths and widths tend to be small (6-12") and are flow dependent. The channel does not serve as a detention device.

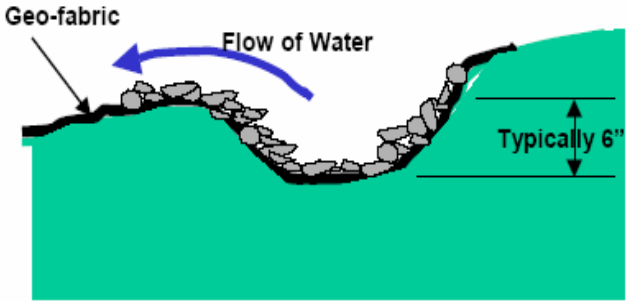


Figure 2. (North Carolina State University)

Standard ABC stone (crusher run) can be used. Geofabric can be used to underlay the channel and protect the downslope lip, as shown in Figure 2. A disadvantage of this type of channel is that it is very hard to get the lip truly level and keep it that way. The crusher run can prevent uniform flow.

Natural Building Techniques—

Cob- Cob is a very old method of building with earth and straw or other fibers. It is quite similar to adobe in that the basic mix of clay and sand is the same, but it usually has a higher percentage of long straw fibers mixed in. Instead of creating uniform blocks to build with, cob is normally applied by hand in large gobs (or cobs) which can be tossed from one person to another during the building process. The traditional way of mixing the clay/sand/straw is with the bare feet; for this reason, it is fairly labor intensive. Some of the process can be mechanized by using a backhoe to do the mixing, but that diminishes the organic nature of it. Because of all the straw, cob can be slightly more insulating than adobe, but it still would not make a very comfortable house in a climate of extreme temperatures. The wonderful thing about cob construction is that it can be a wildly freeform, sculptural affair. I've seen some very charming homes made this way. Cob was a common building material in England in the nineteenth century, and many of those buildings are still standing. (http://www.greenhomebuilding.com/cob.htm)

Slipstraw—Quicker to build and higher in insulative value, slipstraw is a wonderful partner to cob and an excellent addition to the natural building repertoire. After coating loose straw with clay slip (like tossing a salad with dressing), you simply pack the slip-coated straw between forms. As soon as you pack them, the forms can be removed, leaving you with a beautiful, durable, soundproof, nontoxic, fire, rot & rodent-

Slipstraw wall being plastered.

proof wall that quite resembles Japanese handmade paper. Slipstraw is also a great alternative to strawbale construction as it is easier to plaster and handles water vapor well in wet and cold climates. (http://www.kleiwerks.com/materialsandtechniques.php)

Straw bale construction-- Straw-bale construction was pioneered in Nebraska in the early 20th century, in response to the lack of significant amounts of lumber with which to build housing. Straw bale is simple, inexpensive to build and own, made from a renewable resource and involves few synthetic chemicals.

Curvilinear form and creative windows in a straw bale structure.

The straw bale house can either be timber framed or the walls can be load bearing. Once the bales are in place, they are plastered with stucco or are similar finishing substance that usually contains a high lime content for breathability. The walls are typically about 18" thick and can be curvilinear in nature. The windows are generally deeply recessed or creatively made.

Straw-bale houses tend to retain heat very well due to the exceptional insulative value of straw. The theoretical R-value for a 16.5" straw bale was calculated by Joseph McCabe as 52. This is compared with a theoretical R-value for 3.5" of fiberglass (the conventional insulation material used in home construction) of 13. Straw bales are thick and dense enough to keep out many kinds of pests. As well, the outer layer of plaster makes them unattractive or impenetrable

to animals and insects. Finally, because straw contains no nutrient value, it does not attract pests. (http://www.explore-technology.com/agriculture/S/Straw-bale_construction.html)

Wattle and Daub—The technique of weaving branches (wattle) as a support for mud plaster (daub) is perhaps the oldest of earthbuilding techniques and is still used for traditional architecture in many parts of the world. Uncommon in the U.S., it can be used in mild climates to create thin earthen walls, but lacks the thermal mass or insulation desirable in other climates. An intriguing use of wattle and daub is to create interior partition walls.

Waddle and Daub construction

(http://www.strawbalecentral.com/techniques4.html#wattledaub)

***Rain Barrels*—**A closed barrel, also known as a cistern, which is connected directly to a gutter system to collect and store rain water for irrigation purposes. The barrel must have a lid to keep mosquitoes from breeding inside. A valve on the lower portion of the barrel allows for easy access and a hose hook-up. (http://www.epa.gov/reg3esd1/garden/stormwater.htm)

Rain Barrell

Rain Garden –A "rain garden" is a man-made depression in the ground that is used as a landscape tool to improve water quality. The rain garden forms a "bioretention area" by collecting water runoff and storing it, permitting it be filtered and slowly absorbed by the soil. The bioretention concept is based on the hydrologic function of forest habitat, in which the forest produces a spongy litter layer that soaks up water and allows it to slowly penetrate the soil layer. The site for the rain garden should be placed strategically to intercept water runoff.

A nutrient removal or "filtering" process takes place as the water comes in contact with the soil and the roots of the trees, shrubs and vegetation. This process accounts for the improved water quality. The first flush of rain water is ponded in the depression of the rain garden, and contains the highest concentration of materials washed off impervious surfaces such as roofs, roads, and parking lots. (http://www.dof.virginia.gov/rfb/rain-gardens.shtml)

***Voluntary Simplicity*—**People who practice volunteer simplicity act consciously to reduce their need for purchased services or goods and, by extension, their need to sell their time for money. Quite often, this means that people who practice this lifestyle must do many things for themselves, such as gardening and cooking, sewing, and construction or maintaining a home. (http://encyclopedia.thefreedictionary.com/voluntary_simplicity)

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