

SITE PLAN for the Gateway Ag Field

Approved by the Earthaven Forestry and Agriculture Committee (FAC)
Presented June 16, 2005; Updated June 2006

Description of lease parcel

General: The lease parcel referred to as the Gateway Agricultural Field shall include all land owned by the Earthaven Association between Taylor Creek, Mailbox Creek, and Full Circle Trail. The land is largely flat (with a slight slope toward the south, steepest on the N side), and the average elevation is just above the surface of the creeks. It is currently forested, the predominant tree species being tulip poplar, followed by red maple, southern yellow shortleaf pine, Virginia pine, black birch, black locust, red oak, eastern hemlock, black cherry, and white oak. The forest has been thinned due to selective logging; the stumps of some former trees will require removal. The lease parcel has excellent access to sun, water, and roadsides. The major expected challenges to cultivation are economical land preparation, specifically including but not limited to utilization/processing of existing biomass and removal of rocks.

Existing infrastructure: The parcel is divided by a gravel road constructed by the FC, which was intended to lead to the New Lumberyard. It is our intention to maintain this road for use by automobiles and agricultural equipment, and (following the construction of a bridge) as a way to access the New Lumberyard field, whether the area is used for timber processing, agriculture, or both, as well as the Forest Garden.

Invasives: The field has a large infestation of poison ivy, particularly on the W side. There are also stands of *Microstegum* and *Miscanthus* forming along skid trails from EH's previous selective logging.

Qualified persons

Brian Love and Chris Farmer are currently employed as builders at EH, working out of our solar-powered box truck (a mobile job-site system we designed and created, which includes a high-capacity photovoltaic electrical system with biodiesel backup, extensive inventory of tools, and office). We work in all realms of construction, from initial design to project management, framing to finish carpentry, masonry to earthen plastering, and creation of everything from custom cabinets to off-grid utility systems. Our building practices concentrate on local and natural materials, passive solar design, and wise utilization of resources. We share an interest in the synergetic fusion of forestry, building, fuel production, and agriculture. Both have residential siteholdings in the Gateway neighborhood, and (between the two of us) we have been envisioning a farm on the Gateway Ag Field for nearly a decade.

Brian Love: Though young in years, Brian has consistently demonstrated his energy, work ethic, knowledge, responsibility, and array of practical skills. He is a full, active member of Earthaven in good standing who serves on the Strategic Planning Committee and as the focalizer of the Forestry and Agriculture Committee. He has experience growing vegetables and herbs, as well as raising goats, chickens, and ducks for food. He is passionate about (among other things) renewable sources of liquid fuel, animal husbandry, value-added food processing, village-scale enterprise, and human evolution.

Chris Farmer: His energy and vision augmented by years of experience in farming, forestry, and building, Farmer brings wisdom, humility, and thoughtfulness to the project. He is a full member of Earthaven in good standing who has previously served on many of its committees and as the Firekeeper. He has owned and operated an organic farm in Washington state, and was a driving

force behind the Forestry and Building Cooperative. He is passionate about (among other things) generation of electricity from biomass, sustainable forestry, the utilization of technology as a book of magical spells, seed saving, and the open-source mythology of The Clueless Honky.

Land preparation

Preliminary: [Note: as of June 2006, this stage has been completed.] Because the Gateway Ag Field is still forested, extensive work must be done before the area can be leased for agricultural production. We intend to undertake the task of clearing the field in late winter of 2005-2006. Before the machine work begins, we will conduct a walk-through to identify rare plants and ecologically sensitive areas. We will then hold a community-wide ceremony in the field to give thanks to the forest for all that it has done to heal and protect the soil, to apologize to the multitudinous lifeforms that will be destroyed or displaced in the clearing process, to pray for the safety of those clearing the field, and to ask for the fertility and wisdom of the land to help sustain our community and our descendants into the indefinite future.

Clearing: [Note: as of June 2006, this stage has been completed.] A trackhoe will be used to push trees over, thereby pulling the stumps out of the ground at the same time as the timber is brought down. Chainsaw operators will then buck and limb the trees, while a bulldozer moves debris (including the stumps) to the margins of the field. The resulting "brush berm" will prevent erosion of soil into the creeks and provide fertility for perennials as it decomposes. The machines will also be used to excavate a pad and footers for a barn (located on the N side of field with its back toward Full Circle Trail, near the Gateway neighborhood driveway), and to construct a 1/4 - 1/3 acre pond in the SE corner.

Timber: [Note: as of June 2006, this stage has been completed.] We intend to purchase all the timber from EH with our credit from clearing the field, and pay for it to be processed according to the following utilization strategy. All the pine, locust, and about 1/3 of the poplar (low quality upper logs) will remain here and be milled using a portable sawmill into material for construction of the barn (excepting about half the poplar, which will be milled into "utility lumber" for use on the farm or sale to members of EH). The remainder of the logs will be removed by a logging truck and delivered to a local sawmill, where they will be milled into random width 4/4 stock. This green material will be trucked to a dry kiln, and then to a finish mill where it will be turned into flooring, trim, ceiling boards, etc. We will dry-stack the kilned wood on the second story of the barn, for use in building projects for members of EH, for our own housing, or for sale. When selling the lumber, priority will be given to customers in the following order: EH members who have invested in the project, non-EH member investors, EH members who are not investors, other residents of the watershed, and then other markets (local cabinet shops, contractors from the NC Green Building Council, the Iwanna, etc.)

Soil fortification: [Note: as of June 2006, the summer cover crop stage has been completed.] Once the machine work is completed and the raw logs removed, we will spread as much composted manure as we can obtain, along with lime, colloidal phosphate, and greensand on the field; the soil will be disked, harrowed, and planted to a summer green manure cover crop of soybeans and pearl millet. In the fall, the cover crop will be disked into the soil, and the field will be planted to a perennial mix of grass and clover (suitable for pasture). We will eventually plant food-producing trees, shrubs, and vines to establish a perennial no-till riparian buffer zone no less than 25 feet in width, in place of the brushpiles, to utilize their nutrients and stabilize the stream banks.

Cultivation strategy

Vision: Though perpetuation of small-scale organic farming is our primary aim, the Gateway vision encompasses far more than just growing food to eat. Our ambition is to create an integrated system where logging, milling, and building residues provide power for biofuel production (ethanol distillation, oil-to-biodiesel processing, butanol fermentation, or any combination thereof); the wastes from these processes are used as high-protein feed supplements for pasture-raised livestock; and the animals fertilize the field in preparation for vegetable cultivation. The goals embedded in this strategy include the following:

- Provision of food security for the residents of the Gateway neighborhood and EH
- Demonstration of a sustainable land utilization model that could be implemented and refined in village-scale economies elsewhere;
- Intelligent utilization of forest resources and fertilization of depleted soils;
- Preservation of biodiversity, practical human knowledge, and appropriate technology;
- Satisfaction of the lessees existential need to take responsibility for the sources of their existence;
- Creation of an economic system based in the sustainable harvest of solar energy; and
- Manifestation of a more intimate relationship between the living landscape and the humans that inhabit it.

Economy: The Gateway farm may import corn, wheat, sorghum, vegetable oil, soybeans or other crops (as feedstocks for fuel production), hay, straw, amendments, and building materials on an ongoing basis, at least in the near future. It will export fruit, vegetables, nuts, herbs, mushrooms, and animal products (fresh/dried/value-added), kiln-dried finish wood, inedible agricultural products, seedstock (including seeds, tubers, bulbs, and cuttings), wool, leather, biomass-based fuels, glycerine, acetone, or any combination of the above.

Tours and classes may be offered to disseminate information, attract new members, and provide revenue for the operation of the farm.

We plan to employ members of Earthaven (other than ourselves and our family members) whenever it is practical for us to do so. Additionally, we will have WWOOFers, WEXers, and/or apprentices in the warmer months, and possibly throughout the year.

Our belief is that this project will benefit Earthaven in many ways, particularly by encouraging the growth and diversification of its economy. For example, money that currently leaves the land (to buy food and fuel) would stay here and circulate within the community instead. On-land employment will be increased. Furthermore, we will create infrastructure (see below) for irrigation as well food storage, processing, and preservation that could be utilized by more than just the Gateway lessees.

Fauna: Animals on the field will be managed through an intensive rotational grazing strategy, with forage supplemented by the high-protein waste products of fuel production. For this reason, fuel production will be limited by available pasture; i.e. there must be enough land area available to sustainably support the numbers of animals required to consume the waste from an ethanol distillery. The species on pasture may include chickens, turkeys, sheep, goats, pigs, and cows. We plan to use multiple species in the rotation to maximize the amount of animal biomass per unit of area while still improving the soil. We intend to prioritize raising rare and endangered breeds to actively address (while also raising awareness of) the perils posed by factory farming (particularly overdomestication and the consequent loss of genetic diversity). Furthermore, these breeds are generally hardier, more interesting, and better suited to our environment than many conventional types.

Bees may be incorporated into the pasture at some point. We are likely to have a dog in order to protect livestock from predators and vegetable crops from pests. Cats may be used to control rodent populations, particularly in the vicinity of the barn.

Animals in the pond may include ducks, as well as sunfish, bass, pickerel, bullheads, and carp. Because these fish species are adapted to much warmer and less oxygenated conditions

than are found in our creeks, they should not pose a threat to indigenous stream ecology. Rabbit hutches or duck houses may be used over the water to provide fertilizer, and freshwater mussels will help maintain water quality, while also providing food for sunfish.

Flora: For the near future, we plan to keep the field largely in pasture for the purpose of soil improvement. As it becomes more fertile, and other areas are cleared (into which we may rotate our animals), we will grow increasingly more annual vegetables, vine crops, and herbs for food, seed, and domestic uses (again, with a focus on rare, endangered, and heirloom varieties). These may include salad greens, brassicas, nightshades, cucurbits (particularly melons, winter squash, and gourds), alliums, legumes (peas, beans, and peanuts), root crops for storage (potatoes, sweet potatoes, beets, carrots, parsnips, turnips, etc.), chard, corn, cereal grains, sunflowers, and any other annual food crop appropriate to our climate and soil type; aromatic flowers and herbs to discourage pests and for sale to customers; herbs with culinary and/or medicinal properties (including tobacco and other “unscheduled” plants for smoking); grasses, legumes, and buckwheat as cover crops and bee fodder; as well as the fruit- and nut-bearing perennials planted in the riparian buffer zone.

Waste: Our ideal is the creation of an agricultural ecosystem so seamlessly integrated that all waste products will be valuable and useful to the perpetuation of the farm. For example, the spent distillers grain (waste from ethanol distillation) will provide a nutritious feed supplement to animals; leftover water containing vitamins, lime, and other minerals will be used for irrigation or as drinking water for livestock. Excess whey from cheesemaking can be added to the fermentation vats to increase ethanol yield, or used instead of water when making sauerkraut, kim chi, etc. Wood chips from the clearing will be used to conserve soil moisture, protect perennials, and especially for animal bedding in winter. If dry corn is added to the bedding periodically, pigs will turn and aerate the bedding in order to find it, accelerating the decomposition of manure and wood waste. Pigs can also be fed damaged or spoiled produce, eggs, dairy, meat, and other organic wastes, converting them to delicious meat products and valuable manure. Bedding, excrement, stems, and innumerable other organic agricultural residues will be composted in windrows and used to fertilize the soil. Waste paper products, logging/milling residues, and building materials can be burned or gasified to provide energy for the farm; the ashes will be applied directly to the field as fertilizer or added to compost.

Terms of Lease

We are seeking a 20-year lease on the entire Gateway Agricultural Field, with the option to annex the New Lumberyard Field at a later date.

We agree to follow all existing Land Use and Common Rights Agreements (LUCRA) and FAC Guidelines.

INFRASTRUCTURE PLAN for the Gateway Aq Field

PERMANENT INFRASTRUCTURE: Except where otherwise noted, permanent infrastructure will be built on the smaller triangular portion of the lease parcel separated from the bulk of the field by the New Lumberyard road (which runs along this portion's SE side).

Immediate future (FAC approved):

Pond: 1/4 to 1/3 of an acre in area, with a clay lining. We will install plumbing to supply creek water and roof catchment overflow, as well as systems for drainage and aeration system. Pond will be used for aquaculture (both fish and plants), as a source of cooling water for the ethanol distillery, and for extinguishing fire (should the need arise; hopefully it will not).

Water system: to supply agricultural and residential areas in Gateway and on Main Street. This will consist of a high-pressure storage tank on the Hidden Valley ridge, 12,000 of lower-pressure storage below the saddle (for irrigation), buried water lines, standpipes, and pumping equipment (to move water from the Hidden Valley spring, and the creek if necessary).

Barn: Two-story building with a 24' x 60' footprint. The long axis runs E>W, and the N side is bermed in (up against Full Circle Trail). The first level is accessible from the New Lumberyard Road and/or the field; it will be used as space for the "alternative energy wing" (distillery, biodiesel processor, gasifier, etc.), for storing equipment, and for livestock (housing breeding stock in the winter, starting chicks/poults, etc.). The second level is accessible from Full Circle Trail; it is being used to store finished lumber from the field clearing, and will later be used for curing, drying, and storage of hay, seed, feed, amendments, building materials, food, and medicine (wild and cultivated, harvested from Gateway and/or agricultural areas throughout EH). Parts of the barn may also be used for the following purposes, which are not yet specifically located in the design and include (but are not limited to) the following: produce washing/packaging area, roadside stand (for sale of products [fresh and value-added] from Gateway, as well as other farms and homesteads), refrigeration area, butchering area, fueling station, utility room (with power system), office, mechanical shop, machine shop, and laboratory.

Fencing: Permanent woven wire as a perimeter fence, with temporary electric fencing and/or cattle panels for grazing paddocks.

Later future (to be presented for discussion and approval by FAC at a later time):

Bridge: To span Taylor's creek and provide vehicle access to the New Lumberyard field, root cellars, and Forest Garden via New Lumberyard road.

Permanent greenhouse(s): Constructed of glass, to be used for growing salad greens in winter, seedlings in the spring, and heat-loving crops in the summer; also to possibly dry out wood chips for use as fuel in a wood gasifier.

Root cellars: To be located in the coolest possible location on the N-facing slope between Hidden Valley and the New Lumberyard Field. We imagine multiple chambers with different climates appropriate for different uses, including (but not limited to) short-term storage of produce (eggs, dairy, fresh fruits and vegetables), longer-term storage areas with various humidity levels for different crops (low humidity for seed saving, medium humidity for vine crops and some fruits, high humidity for root crops), a fermentation/culture room, and a "cheese cave" (NOTE: Cost to lease this infrastructure may be shared between multiple agricultural lease parcels and/or individual members of the community).

Small barn: Less weatherproof than large barn, for housing sheep and/or goats on a sacrifice area of pasture in the winter (location indeterminate at this time).

Smokehouse: For preservation, curing, and adding flavor/value to fish, meat products, cheese, and ingredients for condiments (location indeterminate at this time).

TEMPORARY INFRASTRUCTURE

Near future (FAC approved):

Power system: 24V battery bank, solar panels [most likely mounted on tool shed in Gateway neighborhood], inverter; to be used for many on-farm purposes, including construction of the barn.

Temporary fencing: To encourage intensive grazing of small areas and facilitate a rapid rotation.

Eggmobile(s): Mobile chicken houses providing protection from predators at night and allowing access to pasture during the day.

Movable sheds: We may use open-air sheds (essentially sturdy roof systems mounted on skids) to cover stacks of building materials, protect animal bedding, provide shade for livestock, etc.

Perennials: Vines, shrubs, and dwarfing trees planted in the riparian buffer zone to provide food and medicine, protect creek banks, etc.

Later future (to be presented for discussion and approval by FAC at a later time)

Irrigation system

Refrigeration

Pigpen

Gasifier

Ethanol distillery

Biodiesel processor

Butanol/acetone/ethanol fermenter

Methane digester

Algae farm

Fuel tanks and pumps

Beehives

ECONOMIC PLAN for the Gateway Aq Field

While we acknowledge that what we intend to do will be difficult, expensive, and perhaps impossible, we feel compelled to attempt it nonetheless. What follows is our plan for making this quest financially feasible.

In order to pay the initial costs (clearing the field, processing the wood, building the barn), we plan to pre-sell as much of the finish wood as we can and take on loans. We plan to pay back as many of the loans as we can through sales of the finish lumber, and the rest through our construction business. We will propose to Finance (and Council if necessary) that, in order to reimburse our investment, Earthaven sell us the timber and mulch for a portion of our credit, accept some of our expenditures as payment toward our site fees, and allow us to pay for the lease on the field with our remaining credit until it has been exhausted. In this way, Earthaven would be able to fund the farm and own the infrastructure without ever paying any money out of its annual budget.

In order to develop other aspects of the Gateway project (in the longer term), we will cover our living expenses through neighborhood income sharing. In this arrangement, several people would be working in different areas; hours spent on our jobsite(s), farm, neighborhood, and research would all carry a specific value; and the total income (primarily from jobsites, at least at first) would be distributed amongst members of the team in proportion to their total contribution, thereby subsidizing the development of the farm. Conversely, overhead costs, capital investments, and debt would be shared equally.

Once the farm is up and running, we intend to make it viable through synergetic vertical integration of its different components, efficient utilization of resources, wastes and labor, and a focus on high-value agricultural products. Organic produce, particularly meat, eggs, and dairy, carries a premium price in the market (as it should) due to increasing public awareness of how different agricultural methods affect health (both personal and environmental). By creating a code-approved kitchen in our neighborhood we can make value-added foods (smoked cheese, maple-cured ham, salsa, ketchup, jam, sauerkraut, etc.) and keep the revenue from both production and processing of the raw ingredients within the farm. Pick-your-own fruit farming by the creek will provide an enjoyable experience and affordable food to customers, while keeping our labor available for other work during the busiest months of the year. Seed saving and growing salad greens under glass in the cold season are both enterprises yielding a high amount of revenue per unit of area that we will incorporate into our operation. Perhaps most importantly, with the farm situated at the intersection of Full Circle Trail and Another Way, we will be able to sell the freshest possible produce direct to our customers with virtually no transportation or marketing costs.

We would like to fund the fuel production and alternative energy aspect of the farm as much as possible through donations and grants from the USDA, DOE, and NGOs, but are prepared for the possibility of financing it ourselves. Once our systems are established, we may offer tours and classes to earn money for the farm as well, though we do not expect our economy to be supported by visitors, nor do we want to be dependent on their money; our intention is to demonstrate a working, financially viable model and disseminate useful information to develop sustainable technology and help create ecovillages in other locations. As petroleum supplies diminish, fuel prices will increase, making ethanol and biodiesel competitive and potentially profitable. We will use them to power as many of the following as possible: tractor(s), tiller(s), excavator, chipper, sawmill, DC generators (to back up domestic solar systems), cement mixer, personal vehicles, etc. At some point, our fuel production system may require an ethanol-powered fleet of vehicles as a market; this fleet could be managed as a cooperative business by Gateway, Earthaven, or private individuals.

Through intelligent design and diligent work, along with the support of our friends, neighbors, community, and environment, we should be able to earn a living by providing high-quality food, fuel, and other goods from local resources, equitably compensated labor, and life-enhancing agricultural technology.