A Small Farm in Georgia

A Couple with a Dream
Hometown, GA

Consulting visit June 3, 2016

1)Stocking strategies and planning for pasture production and utilization
2) Development of flexible grazing system for the farm

prepared by

Jim Gerrish
American GrazingLands Services LLC
2222 Pahsimeroi Road
May, Idaho
E-mail JRGerrish@custertel.net Tele: 208-876-4067

Table of Contents

Background information:

A Special Farm is a startup pasture-based operation located near Hometown GA being developed by A Couple with a Dream. The basic family goal is to provide an environment where the family can live and work together, have the children learn basic responsibility and business, and generate a profit in the process. They would like the farm to be providing a significant portion of the family income in a few years. Neither Jacob nor Jennifer have any farming or ranching experience, but both understand basic business principles.

The current farm has just 50 acres of open pastureland. There are no exterior or interior fences on the property, no stock water development other than a pond and a relatively low-output well, and no livestock handling facilities. While this may be disadvantageous from the standpoint of the need to make capital improvements to the properties, it is also beneficial from the standpoint of being able to create the infrastructure you would really to have rather than being constrained by existing developments.

The three critical areas of capital improvement the farm requires are 1) stockwater development and distribution, 2) perimeter fencing, and 3) handling facilities.

Stockwater distribution is essential to managed grazing, particularly in a hot, humid climate like Georgia. On a small acreage, this cost is generally higher per acre than on a larger property. Costs also tend to be higher on long, narrow properties compared to more square shaped properties.

Perimeter fencing is particularly necessary where your property joins extensive forest tracts and non-agricultural neighbors. Losing cattle in a forest is no fun, nor is having cattle in the neighbor's flower gardens. Perimeter fence should meet the minimum legal requirements for your county/state and be the most affordable installation that meets your goals. Once again the shape of your property becomes a factor in overall cost as long narrow properties require much more perimeter per acre enclosed than do more nearly square properties.

Basic handling facilities are needed for animal care when needed, but more importantly in your case for weighing animals on a regular basis so you know how close they are to finish and what level of performance they are achieving under your management regime. Because of the limited carrying capacity of your property, facility cost needs to be kept minimal. Every development on your farm must be paid for by animal product so bottom line cost must be closely watched.

Because of the close similarity between Greendale Farm and two other small operations with similar goals and resources I am including some materials I prepared for them as part of this report. One of the key questions asked by another couple was how could they earn $1000/acre. They have 60 pasture acres. While you did not specifically ask this question, it does get the heart of what you are trying to accomplish.

1) How do we make $1000/acre?

There is no guarantee that it is even possible to earn $1000/acre from the land resource you own in the environment where you live. There are, however, certain paramount principles that can help get you closer to that goal. First and foremost is you will need to produce food, not a commodity, on the property. Secondly, it will be easier to generate the target income level from more layered enterprises rather than just one. Thirdly, production costs must be kept strictly under control. Fourth, the product(s) must be marketed effectively.

As farmers and ranchers have increasingly become commodity producers, their share of the consumer's food dollar has dramatically shrunk. Much of the movement of farmers and ranchers back into direct food production and marketing has been an effort to regain a larger share of the food dollar. Locally produced foods with a guarantee of minimal pesticide and pharmaceutical use is bringing premium prices. Nowhere is this more apparent than in the meat sector. Organic and/or natural foods is the fastest growing sector of the food industry in the US (and much of the rest of the industrial world) and meats are the fastest growing component of that sector. Organic beef consumption increased 34% in 2006 making it the fastest growing segment of the organic market. The records are not as definite for 'natural grass-fed' due to the looseness of definition, but all indicators suggest it is growing at least as rapidly.

There are excellent opportunities for natural meats and your location being near a major metropolitan area is definitely in your favor.

Because natural food production relies more on ecosystem processes than does industrial food production, it is best to mimic nature in your production system. In nature there are very few plant communities remotely close to being monocultures and there are no environments completely dominated by a single animal species. There are a lot of advantages to running multiple livestock enterprises, preferably ones that are highly complementary, not competitive.

I will present two examples. In the Southeast, much of the pre-settlement plant community was a mixture of tall grass prairies and hardwood timber. Ecologically, this is what the landscape wants to be. We fight to keep it open grassland but trees continually want to encroach. A combination of grazing livestock (cattle) and browsing livestock (goats) will better maintain the balance between grass and trees without relying on either mechanical or chemical means to combat brush encroachment. If the problem is more herbaceous weeds, sheep would be a better fit. Pasture-finished lamb is commanding even higher prices than beef.

In the warm, humid Southeastern environment, livestock face numerous parasite and pest problems. In natural systems, large flocks of birds are present that cleanse manure of eggs and larvae of various pests. Where we are looking for salable animal products, poultry fit well into the system as a natural pest management tool and another income generating enterprise. This could be either a layer or meat operation or both. Genuine free range eggs are commanding prices in the $2-$5/dozen prices, depending on location and marketing strategies.

Several layered enterprises will generate more income per acre than will a single enterprise.

Even with potential premium prices for your products, tightly managing production, processing, and marketing costs is critical to profitability. In order to manage costs, you need to know what they are. Detailed production records and cost accounting are absolutely necessary. We find QuickBooks by Quicken to be a very good, easy to use accounting package that allows you to separate and allocate costs to several enterprises.

Minimizing equipment purchases and use and relying more on biological management is a first big step toward cost management. Understanding how plants grow and how animals graze and how both affect the soil is very important for being a low-cost business. Much of industrial agriculture is built around treating symptoms, not dealing with problems. Natural systems must operate without a lot of technological crutches. Learn to identify problems and find solutions.

Manage for what you want, not against what you don't want.

Developing a marketing plan for your local market is outside my realm of expertise. I recommend you attend several direct marketing seminars and get to know some successful direct meat marketers. Pirate every good idea you come across (except product names, logos, etc.). The Special Farm name has a pleasant ring to it, but you may need to add product names that capture the imagination of your potential customers.

An analysis of pasture-finishing enterprises by David Pratt of Ranch Management Consultants, Inc. found that most producers made money up to the point of producing the finished product but lost their advantage through high costs in processing and marketing. Just as it is critical to keep production costs under control, it is equally important to manage post-production costs.

Setting a goal of earning $1000/acre is not unreasonable but will be highly challenging. If you choose to do only the pasture-finished beef, it will be extremely difficult to achieve. Producing 500 lb/acre of finished beef may be achievable. You would need a net profit margin of $2/lb of marketed beef to achieve this target. That is equivalent to about 1000-1200 lb of liveweight gain/acre, depending on retail cut out.

Sheep or goats, on the other hand, can generate more salable product per acre. When we were on our farm in Missouri, we never produced over 500 lb of beef/acre but we could do 1000 lb of lamb/acre. The big difference comes from a ewe or nanny being able to produce over 100% her body weight in progeny in a single year while a cow has difficult time achieving 50%. Sheep also have a lower basal metabolic rate than do cattle when they are not lactating, thus as a percent of body weight sheep require less forage for maintenance than do bovines.

On smaller properties the key to profitability is to minimize feed resources going for maintenance and maximize utilization for salable products.

Where you have a very limited land base, the more forage resource you put into directly salable products, the more likely you are to be profitable.

Stocking policy and rate:

At the time of my visit, we used an Excel spreadsheet to estimate the potential carrying capacity of your farm. We looked at a couple different scenarios with beef finishing as the centerpiece enterprise. On the following pages are printouts from that calculator showing three different stocking scenarios. All of the scenarios are based on 50 acres available for grazing, pasture yield of 8000 lb/acres, and intensive management.

We can use these examples to illustrate some of the principles I presented in the first section.

Scenario 1 shows the potential stocking rate if you were to have a cow herd and finish all the calves out of that herd, excluding replacement heifers. Because of the year around presence of the cows and their relatively high maintenance requirement, you could only run about 16 cows and their progeny on a year around basis. About 70% of the forage resource is consumed by the cows and only 30% by the yearlings in the finishing phase of the operation Forgetting replacement heifers for the moment, 15 yearlings finished at 1100 lb/hd gives a total salable meat yield from the property of 16,500 lb annually or about 330 lb/acre. If that has an on-the-hoof value in the natural grass-finished market of $2.50/lb, the value of the product is $41,250. Looking at the labor side of the operation, you have a small group of cows there 365 days of the year to mess with.

Scenario 2 illustrate a strictly finishing operation bringing cattle to the farm in late winter or early spring and having them finished by mid-November. With 100% of the forage resource going to the yearlings, the carrying capacity jumps up to 41 head. Even though this would be over 40000 lb of cattle at sale time, because you purchased animals at a light weight and sold them at some higher weight, the only weight we can count as being produced on your farm is gain while they were there. If they gain 2lb/day for 240 days, that is 480 lb/head. With 41 hd on the place, the salable meat yield is 19,680 lb (394 lb/acre) or 19% more salable meat than running the conception to slaughter operation. Using the same $2.50/lb live value, the farm product is now worth $49,200. In addition, the original animals would likely be purchased on the commodity market, but sold on a premium finished meat market, so value has been added to the original purchase weight. If 41 head were purchased at $1.25/lb and sold at $2.50/lb, the farm has earned an additional $31,775 by being in the finishing business. Total farm income is now $80,975 or nearly twice what the cow-calf to harvest scenario produced. On the labor side, you only have one herd to mess with and they are only there about 8 months. More income for less labor is usually a good thing.

Scenario 3 consists of a yearling finishing herd and a year around ewe-lamb operation with grass-finished lambs marketed the same year they are born. I allocated 70% of the forage to the cattle and 30% to the sheep. This allows 34 beeves and a flock of 54 ewes. The 34 beeves generate 16,320 lb of beef worth $2.50/lb or $40,800 in salable product. If we assume slightly better than 150% lamb crop, we could expect 80 lambs at 110 /lb apiece or 8800 lb of lamb. This is a combined total of 502 lb of meat per acre. Assigning an on-the-hoof live value for direct market pasture-finished lamb of $3.00/lb, the lamb could be worth $26,350. Adjusting for the added value to the originally purchased stockers, the combined value of beef and lamb is $95,550. This is why I say diversified enterprises can generate more from a small property than a single enterprise. Including the sheep component will also likely help with weed control and leave a low nutrient requiring animal on the farm at the end of the growing season to clean up residual forage.

The beef and lamb values I used in this example are well within the bounds of what other producers are receiving. They are not the upper end prices and they are not the lowest you might receive, they are realistic. You can do all kinds of mix and match scenarios to try to figure out where you want to be.

You may wonder why the total meat production shown in these examples hit a maximum of just over 500 lb when I said we could produce 1000 lb of lamb/acre when we were in MO. The pasture yield was set at 4 ton/acre in the spreadsheet. This is a fairly conservative yield estimate for your environment. As pasture forage yield goes up, obviously animal output will also increase, as long as your management is effectively capturing the increased forage production. In the first years of pasture establishment and improvement, your yield may not be over 4 T/A. In very dry years, the yield is likely to be lower. You may not manage grazing as effectively in the first few years of operation and you will not capture all the grazing potential. As time goes by, the pastures will improve, there will be years of abundant rainfall, and your management skills will improve. When these factors fall into place, animal output from your pastures, and potential profitability, will increase.

We had briefly discussed how to get started in the grazing business. Because meat market development will take a little time, you should not plan on producing only finished beef or lamb from the outset. Gaining grazing experience with livestock classes having lower performance targets is a good idea. A couple enterprises to consider are custom grazing or quick turn-around ugly cows.

The best way to get started in custom grazing is find some other operators who are in the custom grazing business and try to either sub-contract some of the cattle they are running or persuade them to share some of their contacts. Preferably, try to hook up with a medium to large scale operator. Your 50 acres will be less threatening to them compared to another small scale farmer. Spending time at a couple of the local livestock auction markets is a good place to meet those people. It will also begin to give you a feel for the market and what trades well in your area. Even though you may not have any stock to buy or sell, spending time there is not a waste. It is market research.

The ideal custom graze scenario is where you are being paid per head on a daily or monthly basis. If you enter into a contract with payment based on livestock performance and you fail to meet the targets, you will most likely lose money. As a beginner, getting paid on a time basis rather than performance is almost always advantageous. Once you have made the necessary water and fence developments, we can calculate your daily overhead cost to help determine what your pay rate needs to be to make a profit. Other costs such as mineral supplementation and labor need to be included also.

If you want to own cattle quickly and not work on a custom basis, consider buying and selling older off-color cows. Part of your market research should be to find what sells for the lowest price as well as what brings top dollar. Very often if you buy the low market animals on an individual or a couple at a time and then resell them as a group, the marginal increase in value is much higher than trading prime animals. It obviously takes less up front investment to buy low market value animals.

Getting started is the toughest time in the livestock business. Avoid spending too much trying to buy the best animals for your beginning year. Think in terms of minimizing losses.

Scenario 1: Conception to slaughter - beef only

	Explanation of terminology and units
Animal weight	Enter the animal liveweight in pounds. Use the average weight for the time period they are expected to be on pasture.
Intake target	Enter intake target as % of the animal's liveweight. Typical intake ranges are 2.2 to 2.8% for beef cows; 3.8 to 4.2% for dairy cows; 2.5 to 3% for stockers; sheep or goats at maintenance may be as low as 1.6% while at peak lactation they may exceed 4%
ADG target	Enter the expected average daily expected for the total grazing season
% of diet from pasture	Enter the % of the diet the livestock need to get from the pasture.
Daily forage consumption	Animal weight X intake target X % of diet from pasture. This is the lbs of dry matter the animal should consume from pasture
Available acres	How many acres are available for grazing
Calendar days of grazing	How many days do the animals need to be on this pasture.
% for this animal class	What % of these acres or of the total annual production are to be used for this class of livestock
Stocking rate	Calculated from the acres available and how many animals it should support at the entered value
Gain / acre	Calculated from ADG x stocking rate x calendar days of grazing

Beef or Dairy Cows		**Yearling cattle**		**Sheep or goats**	
Animal weight	1200	**Animal weight**	950	**Animal weight**	130
		ADG target	2.0		
Intake target	2.8%	**Intake target**	2.8%	**Intake target**	3.2%
% of diet from pasture	100.0%	**% of diet from pasture**	100.0%	**% of diet from pasture**	100.0%
Daily forage consumption	33.6	**Daily consumption**	26.3	**Daily consumption**	4.16
Available acres	50	**Available acres**	50	**Available acres**	50
Calendar days of grazing	365	**Calendar days of grazing**	210	**Calendar days of grazing**	365
% for this animal class	70%	**% of crop for this animal class**	30%	**% of crop for this animal class**	0%
		Stocking rate at 1-2 day rotation	0.3		
		Gain/acre at 1-2 rotation	124		

Grazing Management	Hay yield (lb/a)	Hay dry matter	Expected Utilization	AUD/A	Total stock days	Cow days	# of cows	Yearling days	# of yearlings	Sheep days	# of sheep
Set stock	8000	85%	40%	124	6182	4048	8	5172	7	32692	0
Bi-weekly rotation	8000	85%	50%	155	7727	5060	10	6465	9	40865	0
Weekly rotation	8000	85%	60%	185	9273	6071	12	7758	11	49038	0
3-4 day rotation	8000	85%	70%	216	10818	7083	14	9051	13	57212	0
1-2 day rotation	8000	85%	80%	247	12364	8095	16	10345	15	65385	0

Scenario 2: Beef finishing only with purchased yearlings.

	Explanation of terminology and units
Animal weight	Enter the animal liveweight in pounds. Use the average weight for the time period they are expected to be on pasture.
Intake target	Enter intake target as % of the animal's liveweight. Typical intake ranges are 2.2 to 2.8% for beef cows; 3.8 to 4.2% for dairy cows; 2.5 to 3% for stockers; sheep or goats at maintenance may be as low as 1.6% while at peak lactation they may exceed 4%
ADG target	Enter the expected average daily expected for the total grazing season
% of diet from pasture	Enter the % of the diet the livestock need to get from the pasture.
Daily forage consumption	Animal weight X intake target X % of diet from pasture. This is the lbs of dry matter the animal should consume from pasture
Available acres	How many acres are available for grazing
Calendar days of grazing	How many days do the animals need to be on this pasture.
% for this animal class	What % of these acres or of the total annual production are to be used for this class of livestock
Stocking rate	Calculated from the acres available and how many animals it should support at the entered value
Gain / acre	Calculated from ADG x stocking rate x calendar days of grazing

Beef or Dairy Cows		**Yearling cattle**		**Sheep or goats**	
Animal weight	1200	**Animal weight**	1000	**Animal weight**	130
		ADG target	2.0		
Intake target	2.8%	**Intake target**	2.8%	**Intake target**	3.2%
% of diet from pasture	100.0%	**% of diet from pasture**	100.0%	**% of diet from pasture**	100.0%
Daily forage consumption	33.6	**Daily consumption**	27.7	**Daily consumption**	4.16
Available acres	50	**Available acres**	50	**Available acres**	50
Calendar days of grazing	365	**Calendar days of grazing**	240	**Calendar days of grazing**	365
% for this animal class	0%	**% for this animal class**	100%	**% for this animal class**	0%
		Stocking rate at 1-2 day rotation	0.8		
		Gain/acre at 1-2 rotation	393		

Grazing Management	Hay yield (lb/a)	Hay dry matter	Expected Utilization	AUD/A	Total stock days	Cow days	# of cows	Yearling days	# of yearlings	Sheep days	# of sheep
Set stock	8000	85%	40%	124	6182	4048	0	4914	20	32692	0
Bi-weekly rotation	8000	85%	50%	155	7727	5060	0	6142	26	40865	0
Weekly rotation	8000	85%	60%	185	9273	6071	0	7370	31	49038	0
3-4 day rotation	8000	85%	70%	216	10818	7083	0	8599	36	57212	0
1-2 day rotation	8000	85%	80%	247	12364	8095	0	9827	41	65385	0

Scenario 3: Beef finishing with ewe/lamb to slaughter

	Explanation of terminology and units
Animal weight	Enter the animal liveweight in pounds. Use the average weight for the time period they are expected to be on pasture.
Intake target	Enter intake target as % of the animal's liveweight. Typical intake ranges are 2.2 to 2.8% for beef cows; 3.8 to 4.2% for dairy cows; 2.5 to 3% for stockers; sheep or goats at maintenance may be as low as 1.6% while at peak lactation they may exceed 4%
ADG target	Enter the expected average daily expected for the total grazing season
% of diet from pasture	Enter the % of the diet the livestock need to get from the pasture.
Daily forage consumption	Animal weight X intake target X % of diet from pasture. This is the lbs of dry matter the animal should consume from pasture
Available acres	How many acres are available for grazing
Calendar days of grazing	How many days do the animals need to be on this pasture.
% for this animal class	What % of these acres or of the total annual production are to be used for this class of livestock
Stocking rate	Calculated from the acres available and how many animals it should support at the entered value
Gain / acre	Calculated from ADG x stocking rate x calendar days of grazing

Beef or Dairy Cows		**Yearling cattle**		**Sheep or goats**	
Animal weight	1200	**Animal weight**	950	**Animal weight**	130
		ADG target	2.0		
Intake target	2.8%	**Intake target**	2.8%	**Intake target**	3.2%
% of diet from pasture	100.0%	**% of diet from pasture**	100.0%	**% of diet from pasture**	100.0%
Daily forage consumption	33.6	**Daily consumption**	26.3	**Daily consumption**	4.16
Available acres	50	**Available acres**	50	**Available acres**	50
Calendar days of grazing	365	**Calendar days of grazing**	210	**Calendar days of grazing**	365
% for this animal class	0%	**% for this animal class**	70%	**% for this animal class**	30%
		Stocking rate at 1-2 day rotation	0.7		
		Gain/acre at 1-2 rotation	290		

Grazing Management	Hay yield (lb/a)	Hay dry matter	Expected Utilization	AUD/A	Total stock days	Cow days	# of cows	Yearling days	# of yearlings	Sheep days	# of sheep
Set stock	8000	85%	40%	124	6182	4048	0	5172	17	32692	27
Bi-weekly rotation	8000	85%	50%	155	7727	5060	0	6465	22	40865	34
Weekly rotation	8000	85%	60%	185	9273	6071	0	7758	26	49038	40
3-4 day rotation	8000	85%	70%	216	10818	7083	0	9051	30	57212	47
1-2 day rotation	8000	85%	80%	247	12364	8095	0	10345	34	65385	54

What type or breeds of livestock should you use?

Animal type is usually more important than breed. Within almost every breed, you can find functional animals that will perform in your environment. However, there are just as many animals in that breed that will not get the job done. Breed selection can be important for adaptation to local climatic conditions, but phenological type ends up being more important than breed, per se.

As a general rule, the English breeds are earlier maturing and have more desirable carcass traits for pasture finishing than do the continental breeds or Brahman-based breeds. Brahman influence can be a desirable trait in the Southeast due to their greater heat tolerance and insect and parasite resistance. Red hided cattle are more heat tolerant than are black cattle. With these parameters in mind, the English breeds that come to mind are Red Angus, Red Devon, Red Poll, and Hereford. Additionally, Senepol is an English-based breed developed on Ste. Croix that has excellent heat tolerance and moderate carcass traits. Brahman-English composites with desirable carcass traits include Barzona, Beefmaster, Red Brangus, and Brafords. More recent composite breed developments include the South Poll developed in Alabama as a pasture-finished animal adapted to Southern heat and humidity.

Within any of these breeds, you would then look for moderate framed, deep bodied animals. Selecting your stock from herds where the cows maintain good body condition year-around is good indicator of their ability to finish on pasture. A short, shiny haircoat most of the year is another excellent indicator of the animals ability to perform year around on pasture.

My own order of preference for your region would be South Poll, Barzona-Red Angus or Barzona-Red Devon cross. Red Devon are extremely popular with many pasture-finished beef producers right now. I think a lot of that is due to an exceptionally good sales job as I have seen a number of Devons that had no appeal to me at all. Excessive haircoat has been what bothered me about them. In New England or the Intermountain region that may not be so bad, but it would definitely limit performance in the Southeast. If you choose to go with a Devon cross, you will want to look at the cow herd they are coming out of in late spring or early summer to assess hair conditions on the cows. If the cows are slicked off, their calves should be good performers. If they are still rough haired 30-60 days into the grazing season, I would be very hesitant of purchasing animals form that source.

Regarding sheep breeds, you will definitely want to go with a hair breed rather than wooled sheep due to the potential heat stress at your location. Ste. Croix are probably the best choice based on their potential finish size and carcass quality, heat tolerance, and parasite tolerance. I know operations in east Texas running either Dorper or Katahdin crosses and getting along fairly well with those breeds. Dorpers bring a little better performance and carcass traits to the flock compared to Ste. Croix, but I believe they don't have as much parasite tolerance. Lambing percentage is similar across these three breeds.

Animal type and conformation is more important than just selecting a particular breed. When buying yearlings for finishing, always try to look at the mama cows. They will tell you whether their calves will finish easily on pasture.

Stock water development:

The primary stock water source can be the pond below your house with the existing well to the north as a supplemental source. The pump in the well house should be able to draw water from either the pond or the well. It is simply a matter of a T with one valve to draw from the pond and one from the well. I don't think it is possible to set it up to draw from both simultaneously with a single pump. The pond can be used as the primary water source as long is there is adequate water depth and water quality is good. During the summer months, algal growth and temperature may make the pond less desirable and you can switch to the well. My only concern with the well is maintaining adequate water volume in the summer months.

I have sized the pipeline to accommodate up to 90 hd of 1000 lb finishing animals on a day with maximum air temperature of 100F. Any stock water system should be designed to meet the livestock demand in a worse case scenario, not average conditions. The 90 hd is more than you would be likely to run on the 50 acres until all of your pastures are fully established and fertility issues are dealt with. There are likely to be only a few weeks in the summer where daily temperature exceeds 100F.

Figure 1 is the output from the Clemson U. Stock Water Calculator. It says given the conditions outlined above, the pipeline should be 1 1/4" diameter. The intake line running from the pond to the well house and pump should be a minimum of 1 ½".

Livestock Watering System Calculator

Print Results | Return to Livestock Selection Screen | Need more info? Click here! | Back up 1 screen | Exit Program

Calculation Results

Inputs:

Herd Type	Beef Heifers /Steers	
Herd Size	90	head
Water need per day per head	20.5	gallons
Total Herd Daily water need	1845	gallons
Animal drinking rate		gpm
% of Daily Water need withdrawn at any one watering	0	%
Max Ave. Daily Temp	100	deg F
Pressure needed at water	10	psi
Elevation from pump to trough	40	feet
Length of pipe	2700	feet
Number of herds watered at once on the system	1	

Results:

Trough size	185	gallons
Refill Flow rate	7.69	gpm
Time to refill trough	24.1	minutes
Time to water herd		minutes
# of animals at trough drinking at once	4.	
Feet of trough edge needed	6.4	feet
Daily pump run time	4.0	hours

PR160 PVC pipe (c=150)

	Option 1	Option 2	Option 3
Pipe Size (inch)	0.75	1	1.25
Pressure required at well/pump (psi)	120.39	53.62	34.68
Press. loss due to pipe friction (psi)	92.56	26.11	7.29
Pressure loss due to elevation (psi)	17.33	17.33	17.33
Flow velocity in pipe (ft/sec)	4.04	2.40	1.42

Figure 1. Output from Clemson U Stock Water Calculator showing required pipe size and well head pressure.

Whether to use rigid PVC or rolled polyethylene pipe depends on price and installation method. As a general rule, PVC pipe runs about 1/3 the price of HDPE pipe. If the pipe is to be buried, HDPE pipe can easily be ripped in with a shank pipe layer. PVC pipe is usually trenched. The laying cost is usually much greater for PVC pipe, particularly on larger diameter pipe. Working with 1 1/4" pipe, PVC may actually be more expensive to install due to higher installation cost. You will need to check with a local contractor to determine what the local charges for trenching vs. ripping are likely to be.

Burying the pipe keeps drinking water cooler in the summertime and has most of your water system out of harm's way. An above ground installation requires high-density polyethylene pipe (HDPE) due to its ultraviolet resistance and ability to expand and contract if water in the pipe freezes. Based on long term weather records for Hometown GA, the likelihood of serious freezing is minimal (Table 1), but HDPE pipe would still be the preferred material for above ground use.

Table 1. Historic weather records for Hometown GA

	Mean		Record		Mean
Month	**High**	**Low**	**High**	**Low**	**Precip**
	(°F)				*(in.)*
Jan	52	32	80	-4	5.15
Feb	58	34	81	5	4.52
Mar	65	41	88	11	5.26
Apr	74	46	93	26	3.64
May	81	57	97	37	3.99
Jun	88	65	104	45	3.92
Jul	91	69	104	55	4.05
Aug	89	68	107	54	4.04
Sep	84	62	99	36	4.12
Oct	74	50	98	24	3.18
Nov	65	42	86	7	4.12
Dec	55	34	79	2	4.02
		Total annual precipitation:			**50.01**

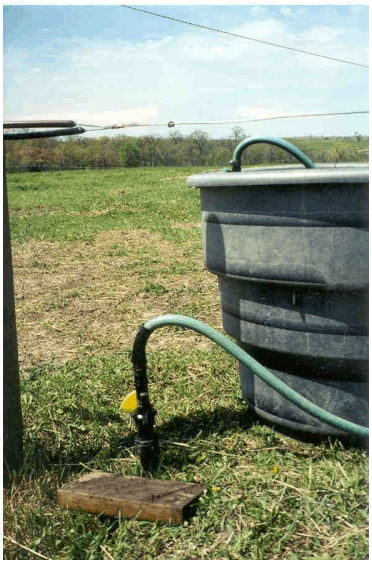

Figure 2 shows where to run the pipeline to provide optimal grazing distribution and minimal interference with road crossings. A Plasson Quick Coupler valve (illustrated at right) is located approximately every 200 ft to provide water access using a movable tank. This valve system can be used with either buried or above ground systems. In an above ground system, the valve is usually located near a line post in the fence and secured to the post so it is easy to find and less likely to ever be damaged. In a buried system the valve is located in a 8" diameter PVC well with the top of the valve located 6-8" below ground level. In colder climates we put the valves lower in the well but in GA, they should be fine just below soil level. Each valve costs about $15 for the pipe T, QC valve, and hose clamps. You will need to run a hose across the road to serve paddocks on the opposite of the road from the valve. Running the hose through a piece of steel pipe that you move from site to site will protect the hose from traffic damage

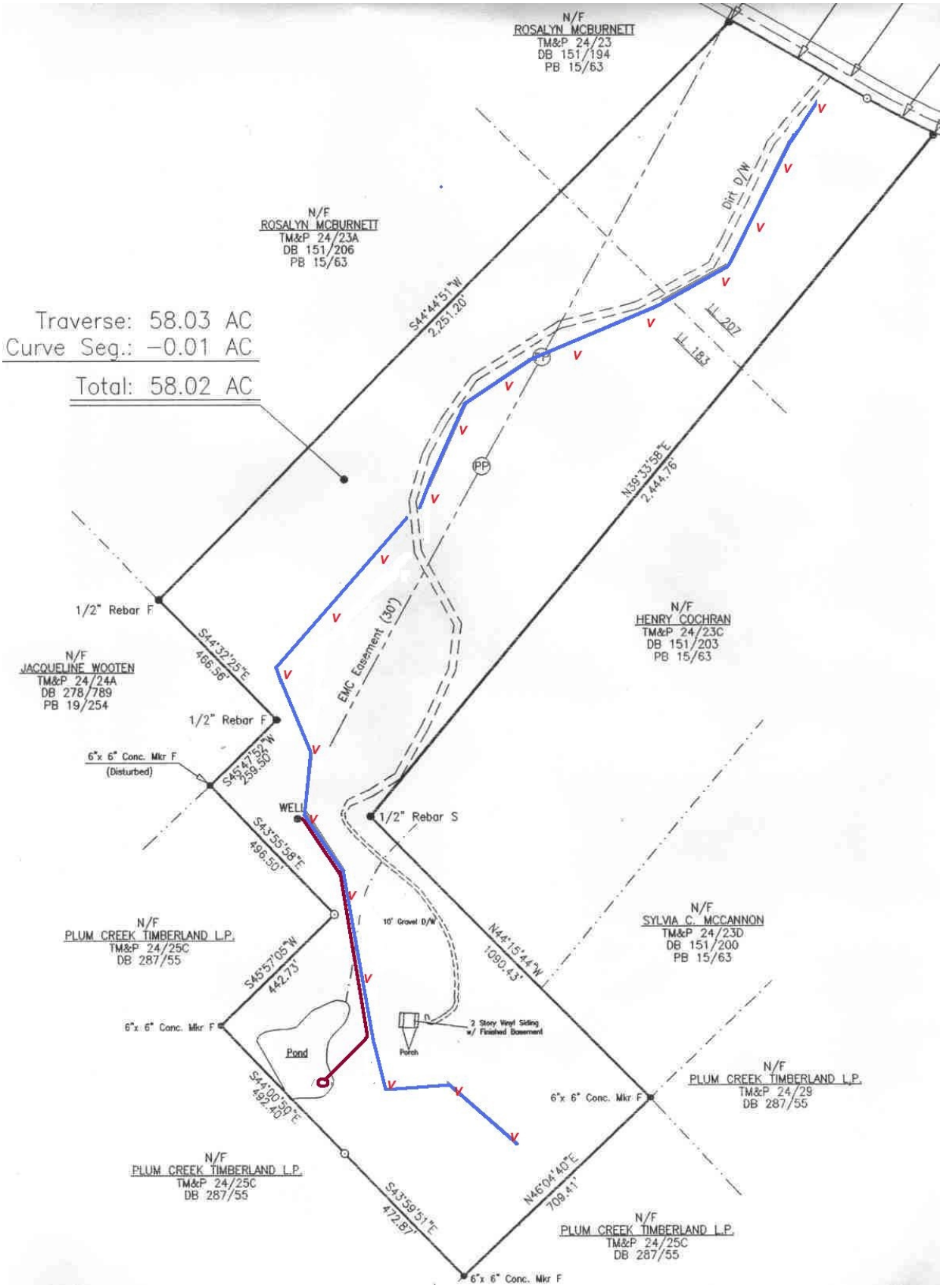

Figure 2. Proposed layout of stock water development at A Special Farm.

Perimeter fencing:

We had a brief discussion of the necessity of perimeter fencing when I visited the farm in December. You had wondered if it would be feasible to run the operation with entirely temporary fence and avoid the expense of installing permanent perimeter fence. Because of the large forest tracts near you and the transition of the community from an agricultural area to a 'country living' area, I highly recommend you install permanent perimeter fence to protect you from excessive liability issues if your livestock stray from the farm and either cause an accident on the road or damage someone's landscaping. Also, having livestock disappear into the forest is not much fun.

If you were to only run cattle on the property, you could go with a minimalist approach designed to only meet the minimal requirements for a legal fence in your location. In most cases where an electric fence has been defined as a legal fence, the minimum allowed is four electrified wires with a post spacing not exceeding 30 ft. The specifics may be different in Madison County or the state of Georgia. You should check with the county commission office to see if there is a legal standard for your location.

If you choose to run sheep or goats as well as cattle, then a more substantial fence may be needed. A 4-wire perimeter will probably keep 90% of sheep in goats contained 90% of the time. It becomes a question of how many stray animal headaches you are willing to accept. A 4-wire fence will also likely deter 90% of the potential predator threats, but the 10% entering the property could be disastrous for sheep or goats (or poultry).

The more substantial perimeter fence that would provide 99% animal containment and 99% predator exclusion could either be more strands of hi-tensile wire (up to 8) or and electrified net wire.

The cost of these three perimeter options along with temporary fence costs for either cattle only or cattle+sheep are shown in table 2. The portable fence options include six sets of reels, polywire, and step-in posts to accommodate two cattle herds and nine rolls of 165ft electric netting for one flock of sheep. It may be possible to manage the sheep paddocks with only six rolls of netting, but I have put in the higher estimate to cover unforeseen challenges. You may also only plan to ever run one herd of cattle, but the likelihood of needing to split them at some time is fairly high.

Table 2. Cost comparison for three types of perimeter fence (9124 ft to enclose property).

	Energizer		Material		Labor		Total Cost	
Fence type	Total	per ft	Total	per ft	Total	per ft	Total	per ft
4-wire hi-tensile	$420	4.6¢	$3675	40.3¢	$5858	64.2¢	$9953	$1.09
8-wire hi-tensile	$420	4.6¢	$6000	65.8¢	$10475	$1.15	$16895	$1.85
Hi-tensile net wire	$757	8.3¢	$7750	84.9¢	$15738	$1.72	$24245	$2.66
Temporary (cattle only)			$800					
Temporary (cattle & sheep)			$1700					

It is clear the minimalist approach of using just four hi-tensile wires is by far the lowest cost option. This fence should effectively contain 99% of your cattle 99% of the time. It will be much less effective for sheep or goats. It is built to the legal standards required in most states.

The 8-wire fence will most likely contain 99% of the sheep 99% of the time. It will likely deter 99% of the predators 95% of the time. If dogs or coyotes come through the fence , they will not want to go back out and will likely need to be shot.

The electrified hi-tensile net wire with two single hi-tensile wires on top (one hot-one ground) will likely contain 100% of your livestock 99% of the time. It will take a very fierce storm or pack of wild dogs to get any stock to cross this fence. It is unlikely they ever will, but the possibility always exists. Clipped wing layers would also be well contained by this fence. The net wire fence in this configuration will likely keep 100% of the predators out 99% of the time. There may be one sly coyote, fox, or dog that gets inside the fence and they will most likely not want to get out again.

The net wire fence costs approximately $15,000 more than the minimal 4-wire fence. While this sounds like a substantial difference, one thing to consider is the potential income comparison we made on page 4. The difference in annual income between the cattle finishing only and the combined cattle and sheep scenario was approximately $15,000. No, not all of that difference may be available to pay for the fence, but a portion of it should be. I believe the added income generated from being able to run sheep on the property will pay for the extra fencing fairly quickly.

We would need to run complete enterprise analyses on the two scenarios to determine how other costs change as sheep are brought onto the farm. Another benefit with the net wire fence is you would likely have zero conflict with the neighbors on any stray animal issues or even them questioning whether anything would ever get out. It is a formidable fence. Once again, if you were in a more rural area, I would not be so concerned about the adequacy of the perimeter.

If you want to go with just multi-wire hi-tensile configuration and were planning to start with just cattle, you could install the 4-wire fence this spring. If you plan to add sheep later, you could add more wires to the fence at that time. For example, the 4-wire cattle fence would have wire heights of 12-24-36-48 inches. Adding three wires later could give a good sheep fence with wire heights at 4-8-12-18-24-36-48 inches. This would allow you to make the fence investment in stages rather than all up front. The only change in construction detail of the 4-wire fence would be to install a longer brace member at each end and corner (9 ft vs 6 ft) and put the line posts at 25 ft rather than 30 ft.

The calculations for each type of fence are included on the resource CD in the file ASF Fence cost calculator.xls.

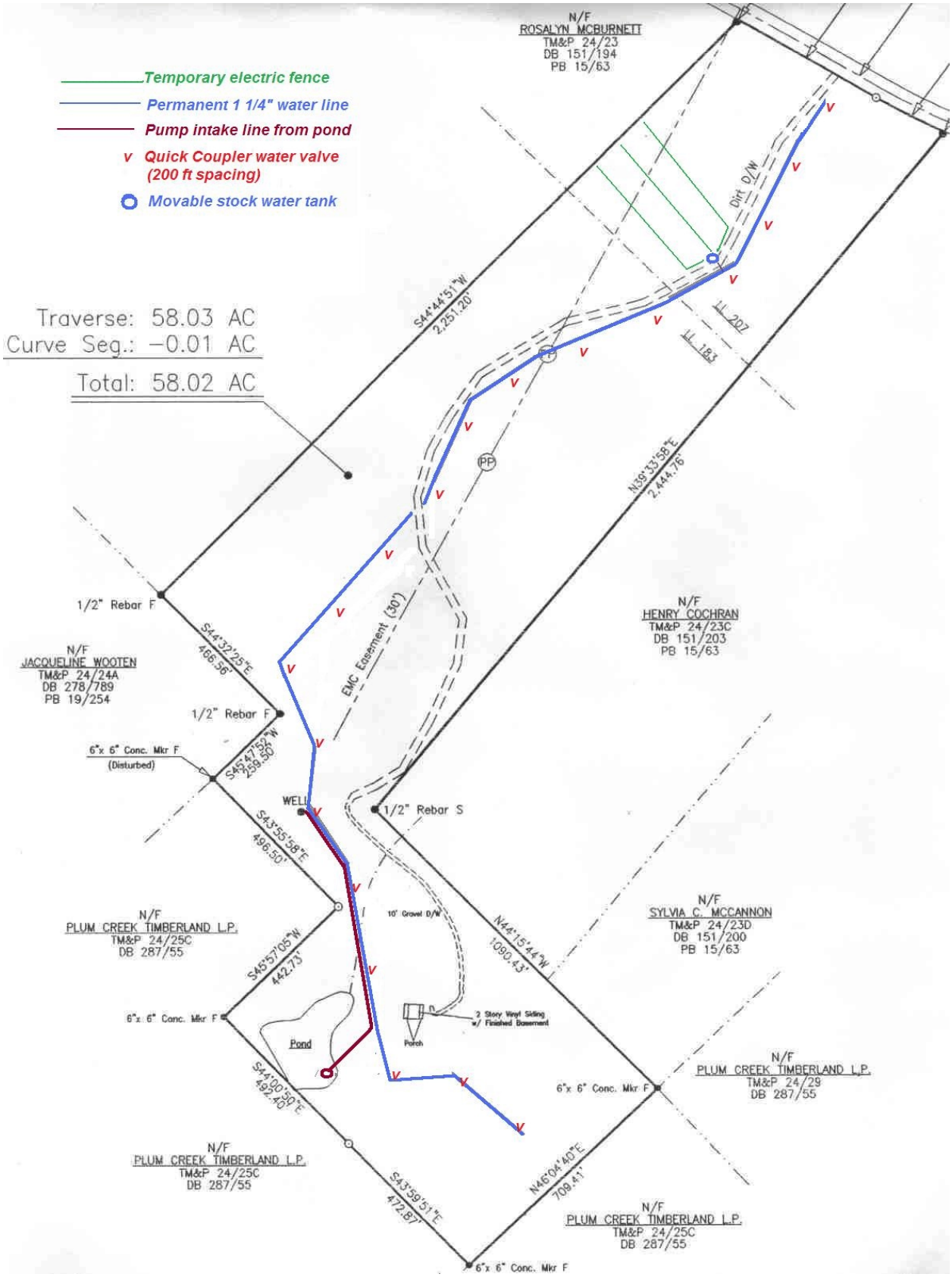

Figure 3. Illustration of how portable fence would be used to create paddocks while keeping the driveway clear of fence.

Stock handling facilities:

You do not need to have fancy or expensive cattle handling facilities. They just need to be effective and conveniently located. Convenient location is where you have electricity. This means either near your homestead or near the well house where the pump will be installed. The facilities should be located on relatively high ground to minimize mud problems as well as reduce the amount of grading work that needs to be done for site preparation.

The facility basically needs to include a holding pen, an alley and chute area, and a couple of sorting pens. I have included a publication from University of Kentucky that does a good job of outlining and detailing handling facility requirements and various designs. There is a range of drawings covering everything from little to big herds. While you will not likely exactly reproduce one of these layouts on your farm, this publication provides all the needed information for designing your facility.