

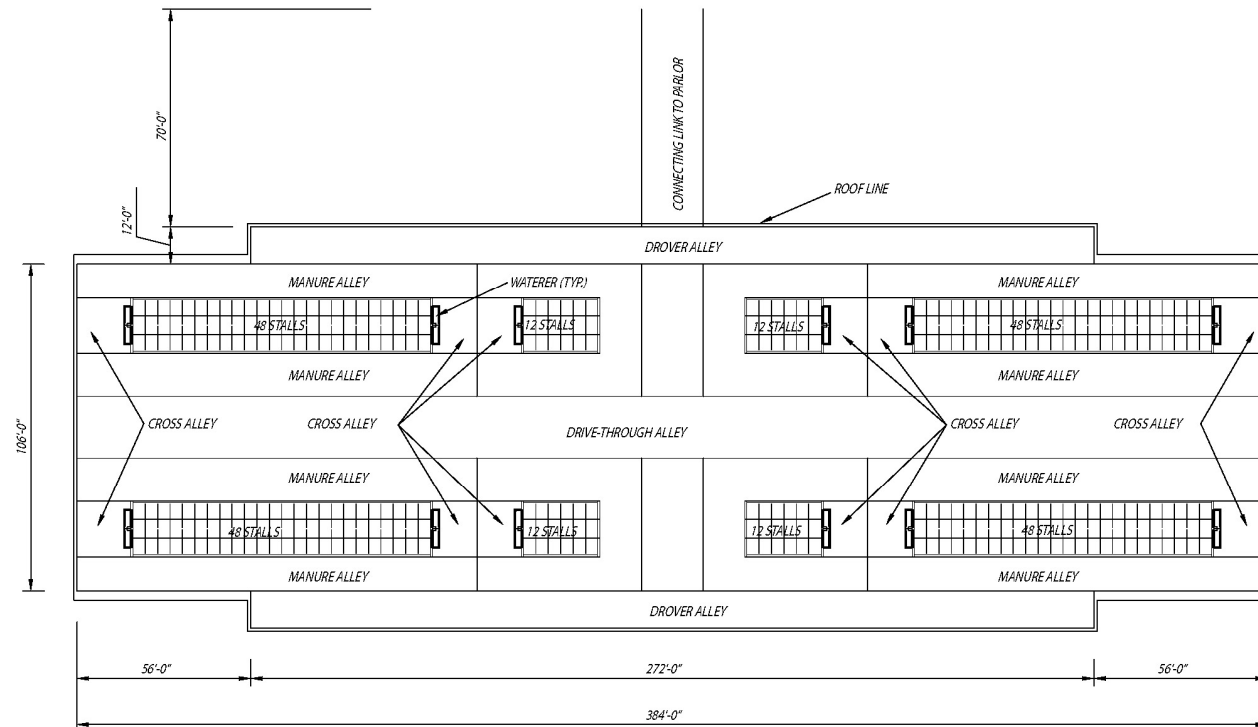
Appendices

Appendix Contents

- Individual Dairy Program Facilities and Key Attributes
- BETR Facility Retrofit Cost
- Meeting minutes
- Environmental Impact Review document
- Teach Facility Brainstorming document from VT

FREESTALL BARN - LACTATING HERD (232 animal spaces)

- 47,232 SF four-row gabled-roof building with open ridge and center drive-through feeding.
- Cows divided for research purposes in 8 different areas of either 48- or 12-cow groups.
- Covered 10-foot wide drover alleys located on each side of building to facilitate movement
- Use supplemental cooling fans to reduce heat stress
- New sand and recycled sand from settling lanes used as bedding.
- Self-locking head gates except one 48-cow area for individual research (American Calan)

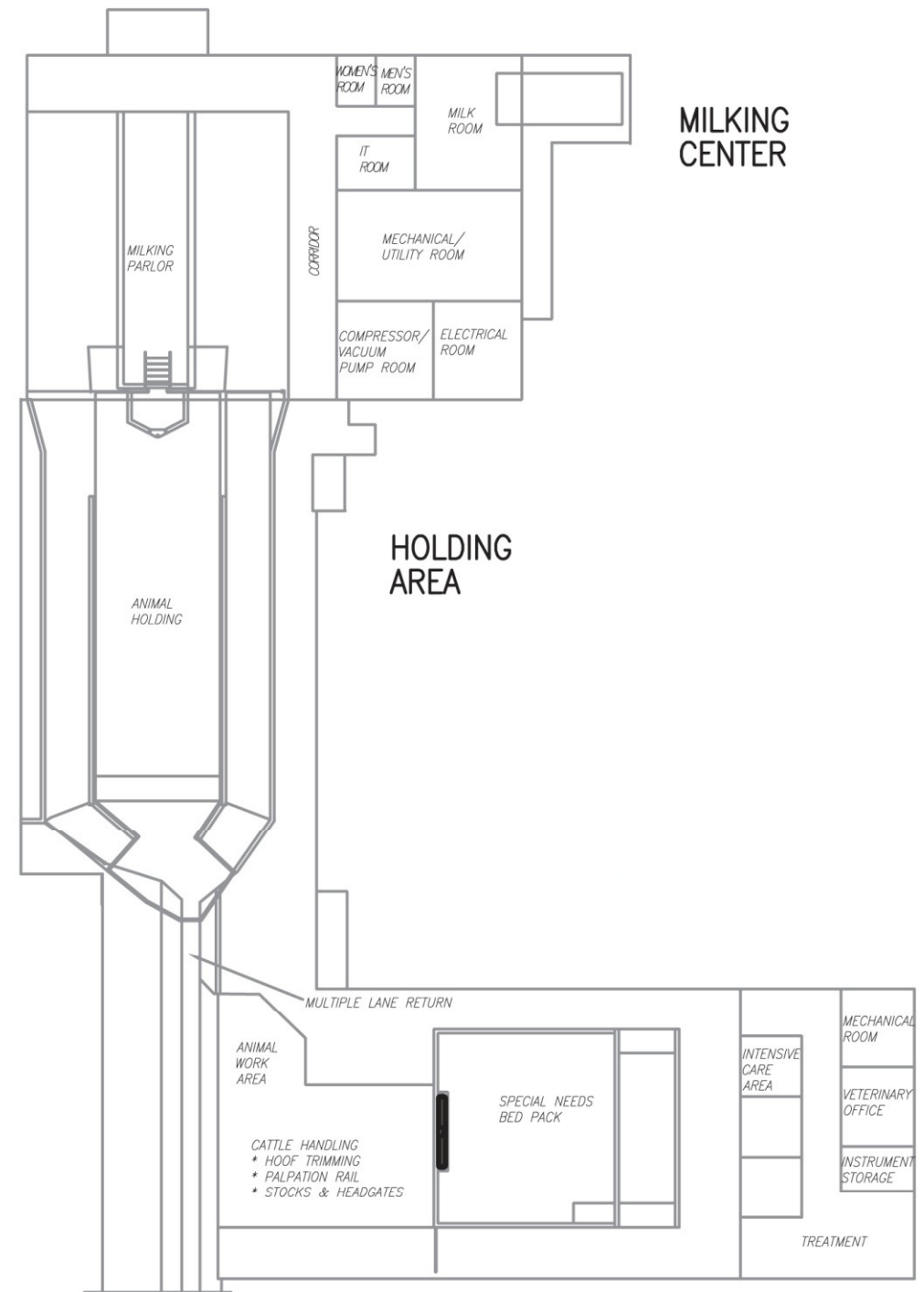


NOTES
 • 240 TOTAL FREESTALLS
 • GROUPS OF 12
 • 48 STALL AREA CAN BE DIVIDED INTO TWO GROUPS OF 24

FREESTALL BARN

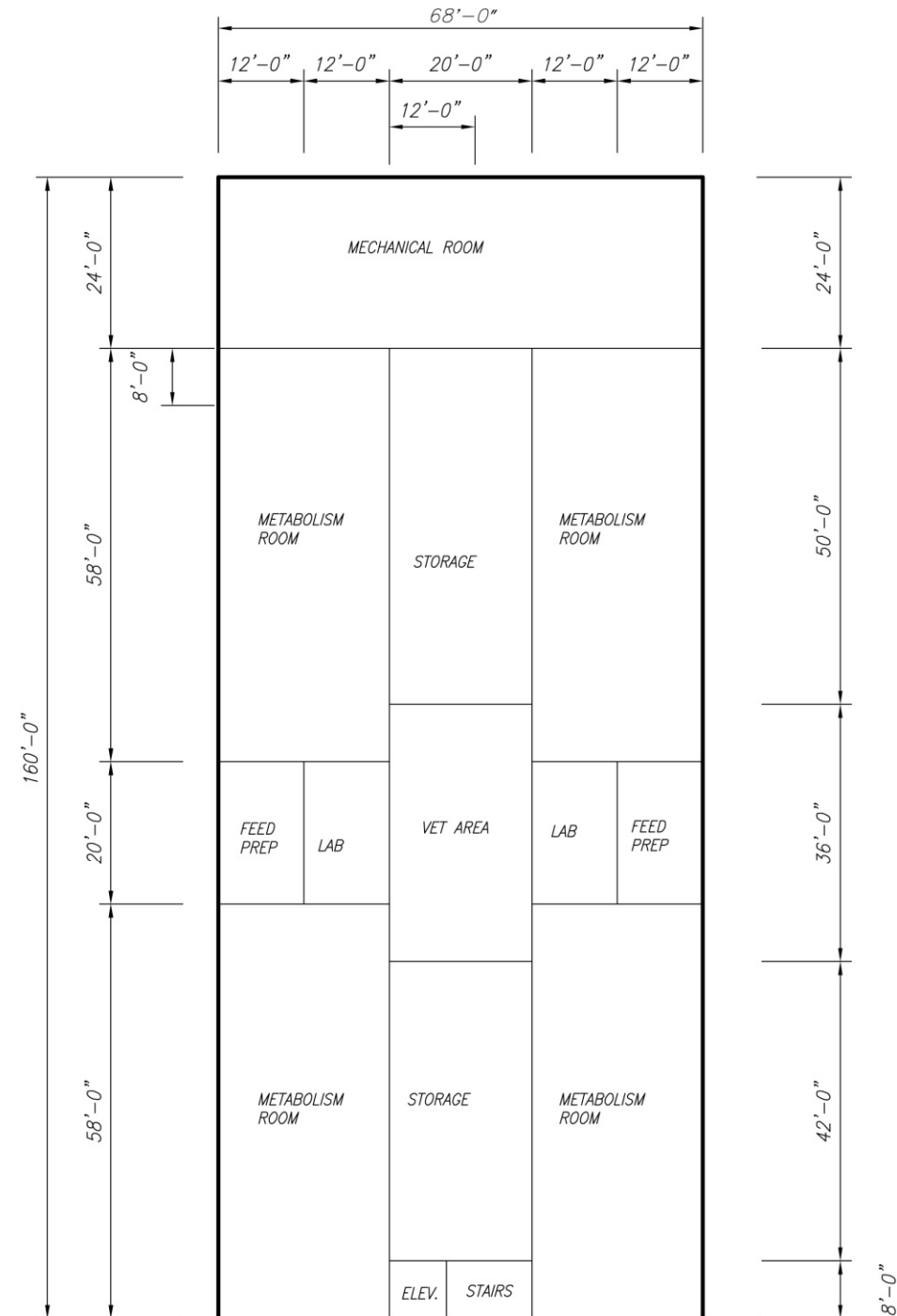
MILKING CENTER

- 7,874 SF masonry building.
- Separation walls between the parlor and the other administrative and operational spaces
- Double-12 herringbone, rapid exit parlor
- No subway system or elevated viewing area
- Automated milking system with all milking units, refrigeration system, plate cooler, vacuum system, compressed air system, control system, cow I.D. system, automatic detachers, automatic back flush, automatic crowd gate, automatic sort gates, milk meters, and herd management system software.
- 3,200-SF natural-ventilated, curtain-sidewall, post-framed holding pen for 60 cows. Supplemental cooling fans to reduce heat. No supplemental heat.
- Plate cooler water used for fresh water flushing of the parlor and holding pen
- Heat from the mechanical milk cooling system will be captured and blown into parlor to temper air.
- Maximum holding pen time of 40 minutes with a total milking time of 2 ½ hours.



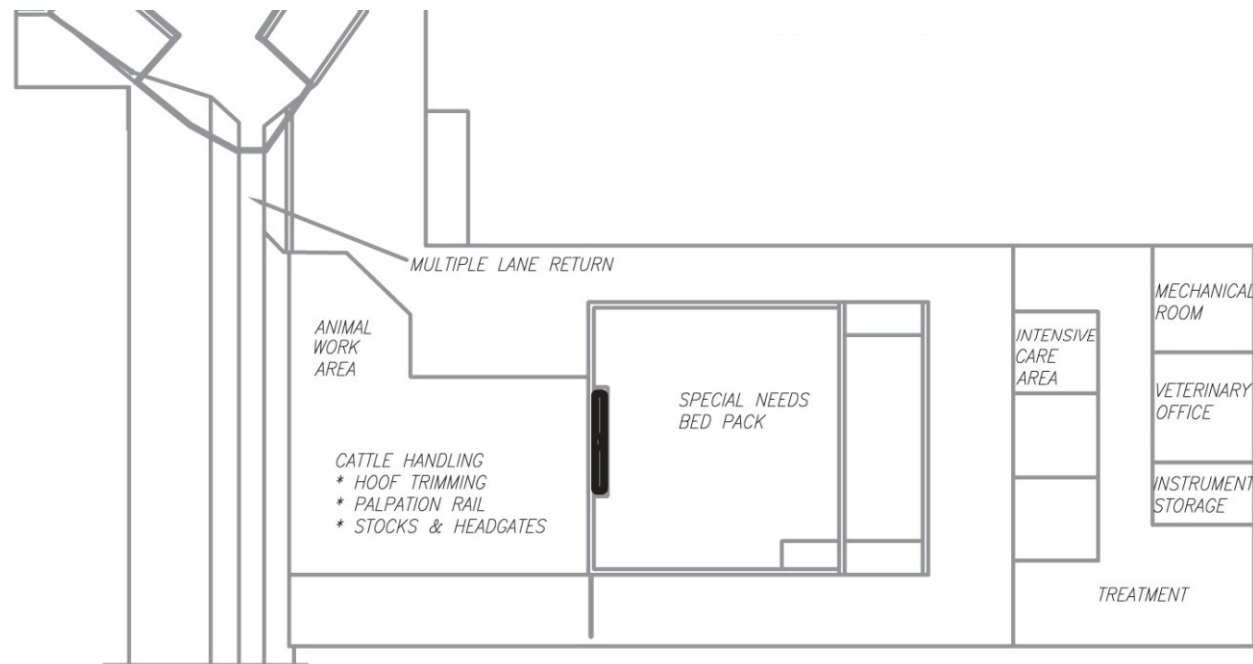
METABOLISM

- 24 animal spaces
- 4,984 SF mechanically-ventilated masonry building with gabled-roof.
- 308 SF sample prep room, and 644 SF feed storage area.
- Maintain 40-60° F during cold weather and within 4-6° F above outdoor temp during warm.
- 24 raised and adjustable metabolism stalls with mesh or slotted floors.
- Manure gutter set up for wash down or to allow manure to go into lower story area.
- Two story building



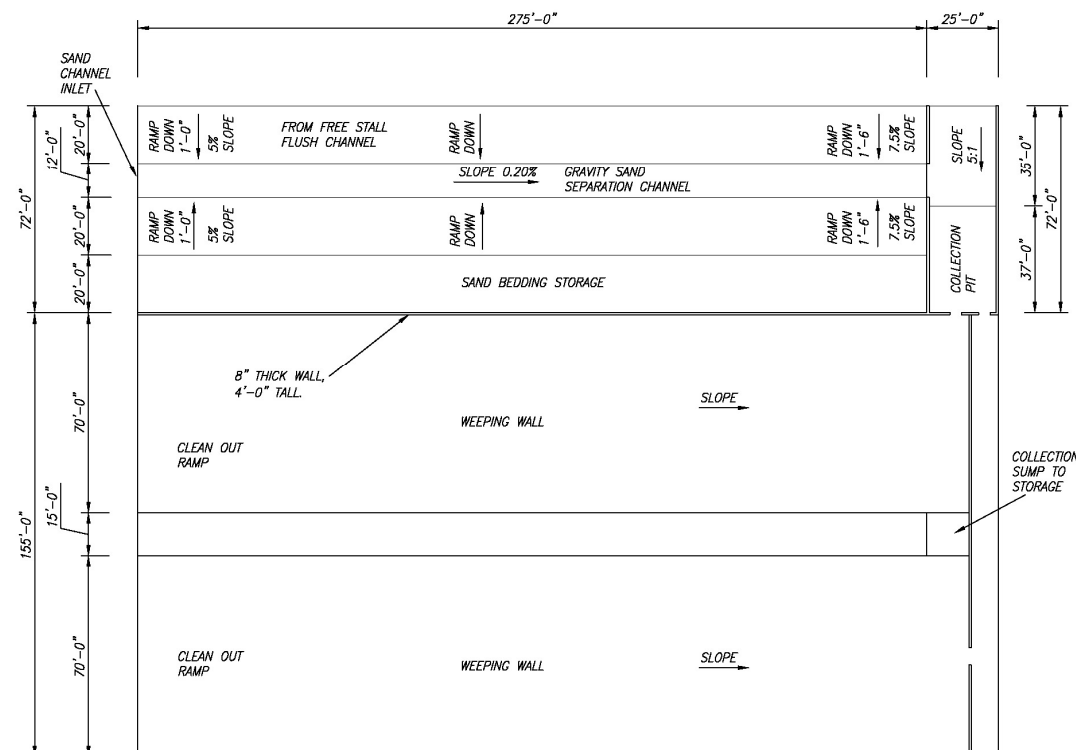
SPECIAL NEEDS FACILITY
(Intensive Care)

- 4,752 SF gabled-roof building with open ridge.
- Animal housing area naturally and mechanically ventilated without supplemental heat.
- House animals on a bedded pack or in intensive care box stalls.
- Working area with chutes, tilt table, and handling equipment for animal health and teaching.
- Manure removed by wash down of the un-bedded floors. Skid loader for bedded pack.
- A vet room/supply storage area with walk-in cooler and walk-in freezer in adjacent room.
- Supplemental heat in working area, intensive box stalls, and vet room/supply storage area.
- Medical treatment of special need cows and routine treatment of all cows. No formal surgery.



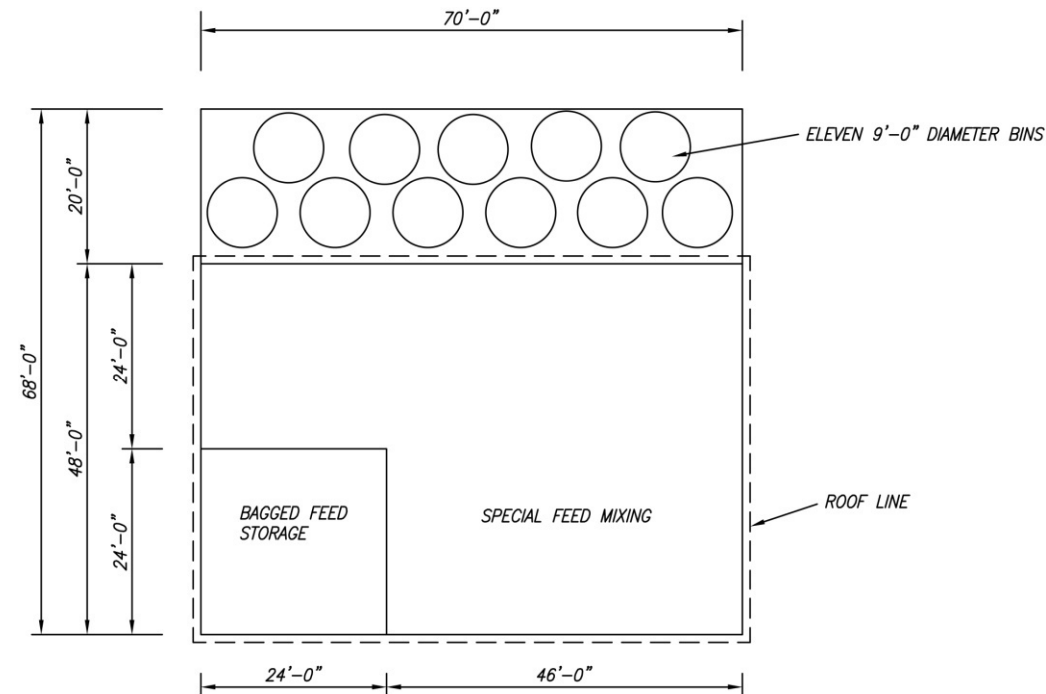
MANURE HANDLING and STORAGE FACILITIES

- Handling Systems:
 - Lactating cows: Flushing system with sand and solids separation.
 - Dry cows, 0-3 month, and 3-6 month old dairy animals: Scraped and stored as dry manure.
- Flush water sand separation system:
 - 12 x 300 foot long sand settling lane
 - 25,200 SF total footprint of the settling lane and sand storage
 - 30 days of drying time before sand recycled as bedding.
- Two bay weeping wall system
 - Used to separate solids from the flush water
 - One bay to be drained and remove solids while the other bay is accepting flush water
 - Each bay minimum 21,000 SF at 6 feet deep to provide 6 months solids accumulation
- Solid manure
 - Scraped and stored in a covered facility 64 x 80 feet x 8 feet deep
 - 180 days storage
 - Will not store solids accumulated in the weeping wall.
- Liquid manure storage tanks
 - Two 120 diameter x 28 feet tall uncovered above ground tanks (4.7 million gallons)
 - 230 days of storage.



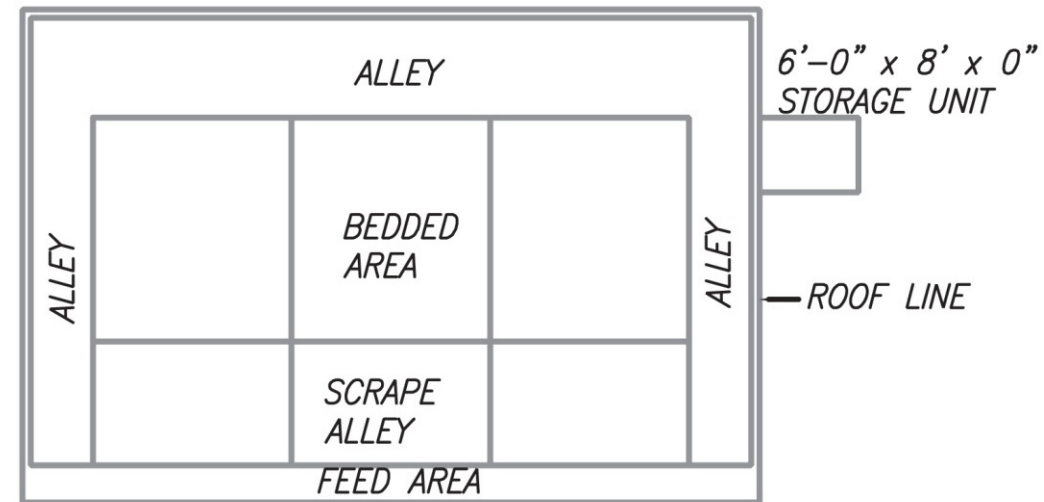
FEED CENTER

- Eleven (11) hopper-bottom steel feed storage bins for feed concentrate/commodity storage.
- 3,360 SF post-framed loading shed to store the feed ranger and mixing equipment, commodities, bagged minerals, other feeds, etc.
- 2,880 SF three-bay bedding/commodity monoslope roof storage barn with concrete dividers.
- 4,800 SF wood-post frame hay storage facilities with 20 foot sidewall for 200 tons of square or round bales.
- 50 x 240 foot concrete silage bag storage slab is for four 8 foot dia. x 200 foot silage bags.
- Four adjacent 30 x 120 x 12 foot concrete-walled bunker silos A 100 x 120 foot concrete loading slab in front with leachate collection.



YOUNG HEIFERS

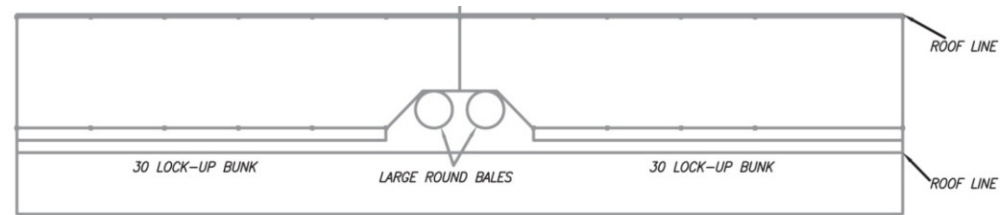
- 3-6 months
- 36 animal spaces
- 2,136 SF monosloped building.
- Three pens with 12 heifers per pen. Animals will be transitioned in and out in groups of 12
- Each pen will have an 18 x 16 foot of straw bedded pack for animal resting.
- 8-foot wide feed alley will be covered by a 6-foot roof overhang.
- 10-foot wide manure scrape alley located between bedded pack and feed alley.
- An area for storage of supplies and materials will be located on one end of the building
- An 8-foot wide alley along the back of the building.

NOTES:

- 12 HEIFERS/PENS
- 24 SF BEDDED AREA/HEIFERS

OLDER HEIFERS

- 6-23 months
- 200 animal spaces
- Pastured year round.
- No permanent shade structures in the pastures.
- Three covered 144-foot long fence line feeders with self-locking head gates
- Bunks will comprise the feeding area for the 3 groups of 60 heifers.
- An 18-foot wide concrete pad will be located on the heifer side.
- A hay feeding area for two large round bales between fence line feeders.
- Covered handling and working facilities with chute near feeding area
- Breeding groups will be brought in once a day for feeding and heat check
- The feed area will have direct access to pastures, and handling and working facilities.



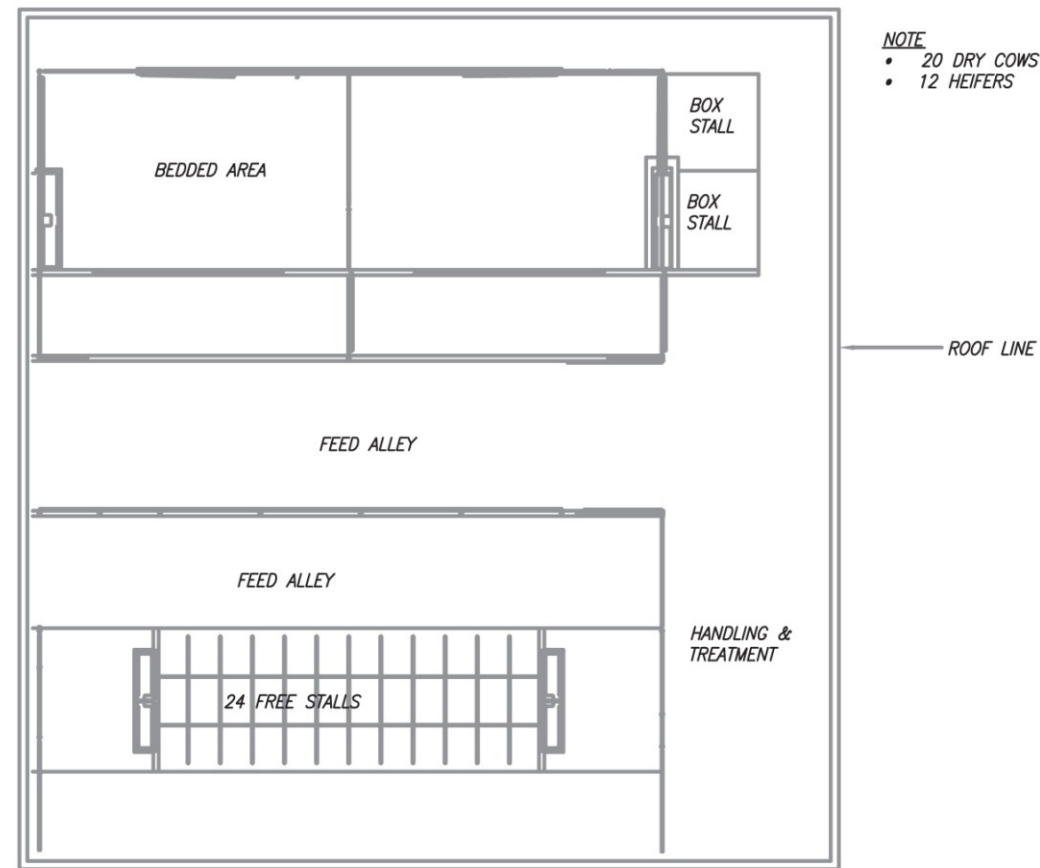
FEEDING FENCE

NOTE:

- THREE SECTIONS AT 144' PER SECTION
- 432' TOTAL LENGTH
- ROOF BUNK AND HAY FEEDING AREA

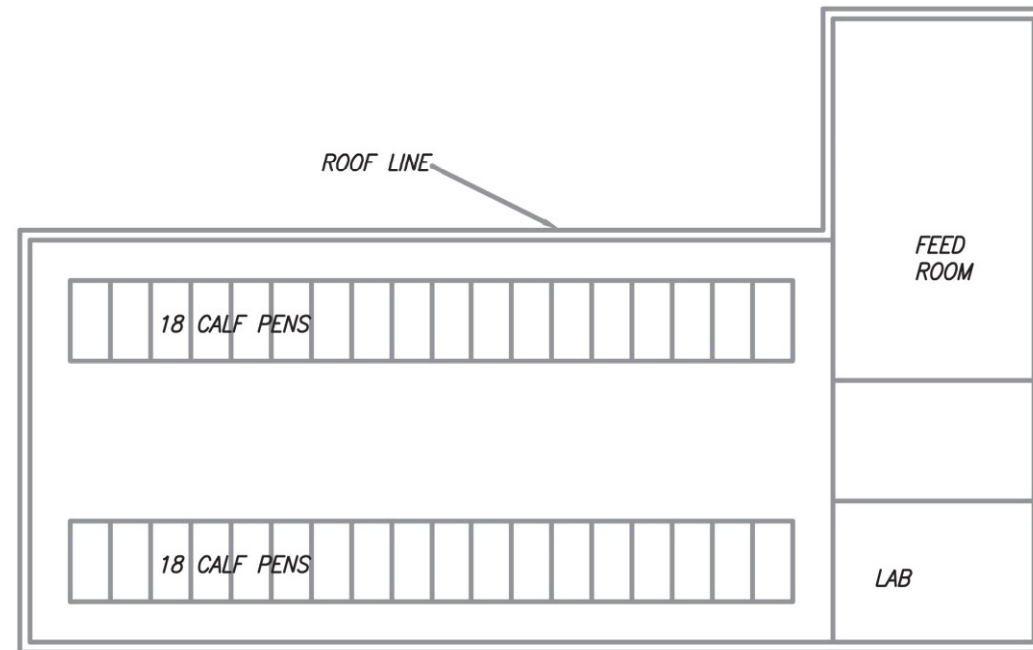
TRANSITION BARN

- 32 animal spaces
- 10,500 SF gabled-roof building with open ridge.
- Twenty-four freestalls, two bedded pens, and two box stalls for 20 dry cows and 12 heifers.
- Handling and treatment area located adjacent to the freestall area.
- Organic bedding.
- Scrape manure into a flush flume and into the liquid manure system.



CALF BARN

- 0-3 months
- 36 animal spaces
- 4,440 SF gabled-roof building with open ridge.
- Two rows of 4- x 8-foot individual pens; 18 pens per row.
- 4-foot wide alley will be behind each row for research and teaching
- 16-foot wide work alley between rows
- 3,200 SF calf area will be unheated and non-air conditioned space.
- 1,240 SF support area will include laboratory and feed room.
- Outside hutches will be used as overflow



NOTES:

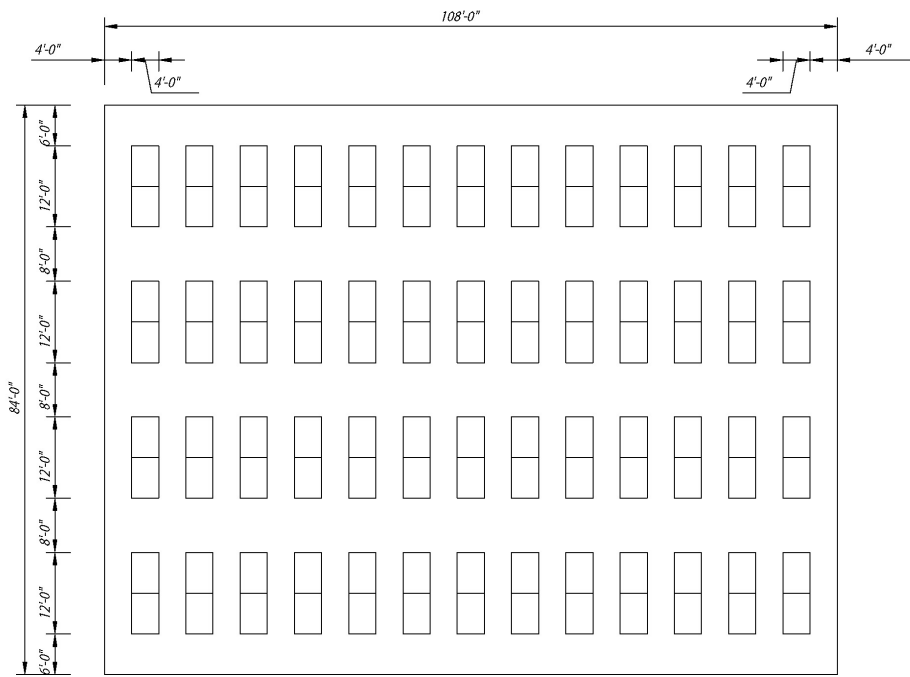
- 18 CALF PENS PER SIDE

CALF HUTCHES

- 0-3 months
- 52 animal spaces
- Overflow or bull calves
- 84 x 108-foot compacted gravel base.
- Hydrants and 120-volt electrical hook-ups.

SUPPORT FACILITIES

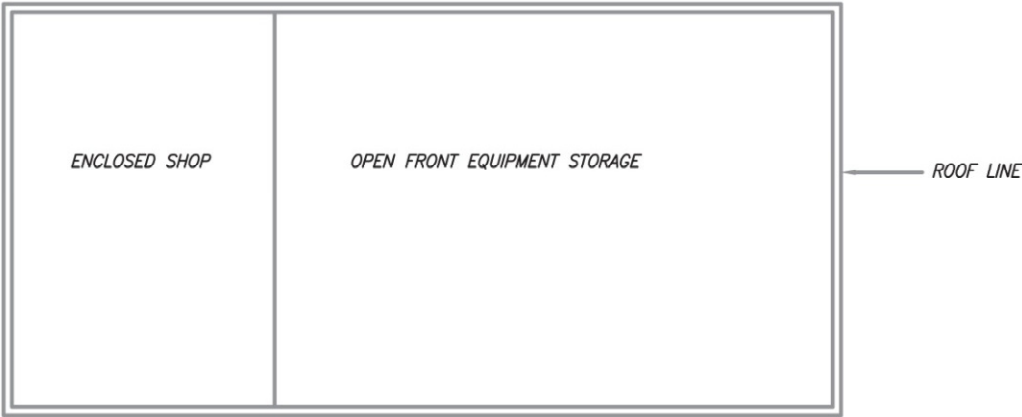
- 4,000 SF post- framed unheated Equipment Storage and heated Shop facility.
- Fuel Depot adjacent to the equipment shop with two 1000-gallon above-ground fuel storage tanks on a containment slab with roof and open sides.



52 CALF HUTCHES



HAY STORAGE



		BETR - Retrofit / New
		Totals
1 CONSTRUCTION COMPONENTS		\$ 2,244,311
a. Building(s) Construction Cost		\$ 2,098,796
b. Site Preparation / Demolition		\$ 287,500
c. Electrical Services		in site cost
d. Water Distribution System		in site cost
e. Sanitary System System		in site cost
f. Storm Water System		in site cost
g. Chilled/Hot Water System		in constr. cost
Construction Subtotal		\$ 2,386,296
Subtotal with Local Construction Factor 0.90%		\$ 2,147,666
Subtotal with Escalation to Midpoint of Construction (3% per yr, midpoint is Oct 2012) 4.50%		\$ 2,244,311
2 OTHER PROJECT COMPONENTS		\$ 297,521
a. Professional Fees		
Base Agreement %	8%	\$ 179,545
Cost Consultant	0.5%	\$ 11,222
b. Fire Marshall	0.06%	\$ 1,403
c. Inspection Services		
Code Administration	0.25%	\$ 5,611
d. Surveys and Tests		
Topological		\$ 7,500
Geotechnical		\$ 8,000
Concrete Test		\$ 20,988
HVAC System Test		by contr.
e. Permit/Impact/Environmental Fees		
Permits	0.15%	\$ 3,366
f. Movable Furnishings & Equipment		\$ 15,000
g. Contingencies	2%	\$ 44,886
TOTAL PROJECT COST ESTIMATE		\$ 2,541,832

MEETING MINUTES



Farm Tour Meeting
November 16, 2009
Page 2

To: Oliver Hirt

From: Keith Storms

Date: December 2, 2009

Re: Virginia Tech Ag Relocation

At the Farm Tour meeting held at Kentland Farm on November 16, 2009, at 2:00 PM, the following were in attendance:

VT	
Hugh Latimer	Campus Planning Director
Alan Grant	Dean of College of Agriculture and Life Sciences
Mike Akers	Department Head of Dairy Science Department
Dwight Paulette	College Farm Coordinator
Oliver Hirt	Construction Services Manager, Facilities
Martin Daniel	Director of Operations, CALS

Planning Team	
Steve Gift	Hanbury Evans, Principal
Keith Storms	Hanbury Evans, Principal / Project Manager
Reid Sabin	Hanbury Evans, Campus Planner
Jerry Wille	Curry-Wille, Agriculture Engineer
Blaine Keesee	Draper Aden Civil Consultant

The following items were discussed:

- Nutrient Management Plan
 - It is the design teams view that
 - The college should want to try to keep nutrients at Kentland
 - There is a possibility of hauling solids nutrients back to main campus or other locations, but not liquid nutrients
 - Tanking the liquids instead of buried lines on Kentland seems the most likely option
 - 80 Acres of pasture grazing research used by Animal Sciences and CSES can be relocated. *This current area needs to be identified.*
 - It is possible to co-locate the beef teaching herd on adjacent land to the beef reproduction herd.
 - Pasture animals can remain on pasture for the full 365 days
 - Utilizing the Rear entrance to the north for Ingress and Egress was discussed as an option for larger dairy and grain trucks.
 - The disadvantages of using the northern portion of the property are
 - Sinkholes
 - Adverse topography
 - Adjacent residential
 - It is Dwight’s preference to locate the new dairy facility near the front entrance where the current hay storage barn is located on top of the hill.
 - It is the desire of the college to design the new facility to be compatible with all animal units
 - There is a potential of separating the heifer herd from the lactating herd at the rear/north portion of property
 - Farm Services
 - The college does not prefer co-locating farm services due to the equal amount of crop land at Kentland and Heth farms.
 - The Land Use Plan 2008 intended to centralize Grain at Kentland versus hauling equipment
- The college does not see an issue in the addition of agricultural use structures within the current historical district overlay on the property. *This overlay district needs to be identified.*

Next Steps

- VT to provide an estimate of the number of truck round trips during the peak of hauling grain, feed, silage, manure and milk production.
- Does the new building need to be sprinkled due to its multiple uses, Agriculture and Education?

- Identify the overlay district at Kentland
- Identify the 80 Ac of pasture grazing research plots
- Locate the rear/north gate
- Identify each land parcel for crop/pasture rotations and nutrient loading

The aforementioned is our understanding of items discussed and decisions made during the meeting. Please contact this office with any additions or corrections to these notes.

file: I:\PROJECTS\ACADEM\VP\Land Use Study 2008\10 Comm\107 Minutes\MM_2008_11_12- Wrap Up.doc

To: Oliver Hirt

From: Keith Storms

Date: December 2, 2009

Re: Virginia Tech Ag Relocation

At a meeting to discuss the VT Ag Relocation held on November 17, 2009, at 8:30 AM, the following were in attendance:

VT	
Hugh Latimer	Campus Planning Director
Alan Grant	Dean of College of Agriculture and Life Sciences
Mike Akers	Department Head of Dairy Science Department
Dwight Paulette	College Farm Coordinator
Oliver Hirt	Construction Services Manager, Facilities
Martin Daniel	Director of Operations, CALS
David Gerrard	Animal and Poultry Sciences
Robert James	Department of Dairy Science
Bruce Ferguson	Capital Project Manager
Craig Moore	VT Civil Engineer

Planning Team	
Steve Gift	Hanbury Evans, Principal
Keith Storms	Hanbury Evans, Principal / Project Manager
Reid Sabin	Hanbury Evans, Campus Planner
Jerry Wille	Curry-Wille, Agriculture Engineer
Blaine Keesee	Draper Aden Civil Consultant

The following items were discussed:

- Overview of the Land Use Plan 2008
 - The VT administration is committed to 5,500’ airport runway expansion.
 - Both runway expansion scenarios leave VT without the support structures needed for dairy operations
 - CRC expansion is an immediate impact on heifer population
 - LUP2008 intended to direct inject nutrient application.
- VT CALS staff has been working on determining the 20 year vision of the whole dept.
- Rocky terrain at Kentland will not allow for deep injection of nutrients but it is still possible to surface incorporate.
- To what extent is VT going to have pasture animals based on pastures. Confinement may be the preferred practice.
- The assumption from the Comprehensive Nutrient Management Plan is that
 - Liquid waste will not hauled off of Kentland
 - Solid waste can be hauled
 - Incorporation is the preferred method of manure application in the future
- Moore Farm
 - Questions of ultimate
 - herd size
 - land use
- Swine
 - VT needs to assess the ultimate
 - vision for animal handling and Bio-Security
 - location of herd
- Heifers
 - VT to determine the preferred approach of replacement herd management, Confinement vs. Pastured
- Dairy
 - VT to determine the ultimate lactating herd size

- Concerns
 - Martin Daniel
 - Timeframe Clarity- FAA to acquire land by 2013
 - David Gerrard
 - Desire to capture the full potential and capacity of land uses for a holistic animal future at VT.
 - A collaborative college discussion for a Teaching & Research facility
 - Dwight Paulette
 - How is Kentland going to be managed in the future?
 - Plant sciences input is needed to fill the holes in the data.

The aforementioned is our understanding of items discussed and decisions made during the meeting. Please contact this office with any additions or corrections to these notes.

file: I:\PROJECTS\ACADEM\VPILand Use Study 2008\10 Comm\107 Minutes\MM_2008_11_12- Wrap Up.doc

To: Oliver Hirt

From: Keith Storms

Date: December 2, 2009

Re: Virginia Tech Ag Relocation

At a meeting to discuss the VT Ag Relocation program held on November 17, 2009, at 9:30 AM, the following were in attendance:

VT	
Hugh Latimer	Campus Planning Director
Alan Grant	Dean of College of Agriculture and Life Sciences
Mike Akers	Department Head of Dairy Science Department
Dwight Paulette	College Farm Coordinator
Oliver Hirt	Construction Services Manager, Facilities
Martin Daniel	Director of Operations, CALS
David Gerrard	Animal and Poultry Sciences
Robert James	Department of Dairy Science
Bruce Ferguson	Capital Project Manager
Craig Moore	VT Civil Engineer

Planning Team	
Steve Gift	Hanbury Evans, Principal
Keith Storms	Hanbury Evans, Principal / Project Manager
Reid Sabin	Hanbury Evans, Campus Planner
Jerry Wille	Curry-Wille, Agriculture Engineer
Blaine Keesee	Draper Aden Civil Consultant

The following items were discussed:

- Dairy
 - There is currently no money available for pasture research.
 - Dairy desires flexibility in the housing for research purposes. 8-10 animals per pen or research group. Dairy would like to match the pen size to the parlor size. I.e., 12 cows and a double 12 parlor
 - Exiting parlor animals need to be sorted for special handling, treatment and teaching. Drover alleys are needed in the free stall buildings.
 - Current research for animal care technology is important, as it applies to herd data.
 - Applied Research is the future for dairy at VT
 - Teaching, Research, and Outreach
 - Research is primary
 - Teaching is secondary
 - Outreach is the most easily cut
 - Calf metabolism is important
 - Currently have 48 calin doors for nutrition studies, many of which are phosphorus research and phosphorus is already being reduced
 - Calin doors need to be arranged in a real world production style operation
 - Spaces don't need to be highly specialized but flexible
- NIH vs USDA funding discussion
 - Most research dollars in Virginia and VT come from USDA funding
 - NIH is bigger on a national level
 - NIH does not fund cattle work/research currently
- Dairy Lactating herd number of 232 is ideal
 - Desired group size is 8-12 typical. Anything below 8 is not cost effective. A double 12 free stall barn is desired.

- Housing and breeding heifers off-site is a good option. Contract growers are a more economical choice.
 - Risks – limitation of access
 - Benefits – reductions in manure management, labor and feed demand
- Currently there is no heifer herd research being performed and funding for research is unavailable
- There is a small need for heifer herd interaction
 - Judging
 - Halter-breaking
 - Educational activities
- In 20 years, heifers are not projected to be a focus.
- 3 areas of future focus
 - Chesapeake Bay nutrient management
 - Immunology mastitis
 - Physiology
- Class schedules and scenarios are needed from Bob James, Mike Akers, and Dairy to test the demands. There could be a scenario that justifies adding a University bus route to Kentland. Currently transportation to Kentland is class specific.
- It may be possible to develop a scenario of transporting animals to an educational unit on the Western land area bussing students only short distances or not at all
- Classes
 - Dairy management – Kentland – 12-15 students per class
 - Lactation – Kentland – 20-40 students per class
 - Dairy Nutrition – Kentland
 - Dairy Judging – closer to central campus – 3 classes
- The palpation herd for Veterinary Medicine is currently 60 head. The future could demand 100 head.
- There will be future housing needs for farm managers at Kentland and accommodations for student help.

The aforementioned is our understanding of items discussed and decisions made during the meeting. Please contact this office with any additions or corrections to these notes.

file: I:\PROJECTS\VACADEM\VP\Land Use Study 2008\10 Comm\107 Minutes\MM_2008_11_12- Wrap Up.doc

To: Oliver Hirt

From: Keith Storms

Date: December 2, 2009

Re: Virginia Tech Ag Relocation

At a meeting to discuss the VT Ag Relocation program held on November 17, 2009, at 1:30 PM, the following were in attendance:

VT	
Hugh Latimer	Campus Planning Director
Alan Grant	Dean of College of Agriculture and Life Sciences
Mike Akers	Department Head of Dairy Science Department
Dwight Paulette	College Farm Coordinator
Oliver Hirt	Construction Services Manager, Facilities
Martin Daniel	Director of Operations, CALS
David Gerrard	Animal and Poultry Sciences
Robert James	Department of Dairy Science
Bruce Ferguson	Capital Project Manager
Craig Moore	VT Civil Engineer

Planning Team	
Steve Gift	Hanbury Evans, Principal
Keith Storms	Hanbury Evans, Principal / Project Manager
Reid Sabin	Hanbury Evans, Campus Planner
Jerry Wille	Curry-Wille, Agriculture Engineer
Blaine Keesee	Draper Aden Civil Consultant

The following items were discussed:

- VT considers current hay production sufficient to meet their needs
- Bedding pack material cost are high because there is very little corn stover or straw available and large shavings use becomes expensive
- Current use of western lands for heifers is not the best use of resources
- 3 options for heifer housing
 - Confinement
 - Grazing
 - Outsource
- VT to
 - Have internal discussions on the impact heifers have on their CNMP
 - Have internal discussions on the impact heifers have on other programs
 - Pursue an external source capable of receiving heifer herd
- VT currently limits the phosphorus in herd diet
- A holistic CNMP that includes swine and beef is desired

Regulations and Code

- Previous dairy facility construction
 - Was outside BCOM supervision
 - Did not get issued a building permit
 - Did not get issued a certificate of occupancy
- A courtesy meeting with Richmond officials was held with the plans on-site before ground breaking.
- Need to confirm that the previous process will be acceptable
 - Dave Badger is the contact at VT for code related issues
- Provost will suggest ADA compliance. Exceptions to ADA construction will be listed
- Permits required
 - NPDES – no
 - VSMP (Virginia Stormwater Mgt. Permit) – yes

- CNMP is submitted annually and is updated throughout the year by a private contractor.
 - Virginia Department of Health will be involved with drain field permitting
- The aforementioned is our understanding of items discussed and decisions made during the meeting. Please contact this office with any additions or corrections to these notes.

file: I:\PROJECTS\VACADEM\VP\ILand Use Study 2008\10 Comm\107 Minutes\MM_2008_11_12- Wrap Up.doc

To: Oliver Hirt

From: Keith Storms

Date: February 15, 2010

Re: Virginia Tech Ag Relocation

The aforementioned is our understanding of items discussed and decisions made during the meeting. Please contact this office with any additions or corrections to these notes.

file: Z:\Projects\Academ\Virginia Tech\Ag Relocation\10 Comm\107 Minutes\2010_01_21 Round 2 M\MMM_2010_01_21-9_00am Kickoff.doc

At a meeting to discuss the VT Ag Relocation program held on January 21, 2010, at 9:00 AM, the following were in attendance:

VT	
Hugh Latimer	Campus Planning Director
Mike Akers	Department Head of Dairy Science Department
Dwight Paulette	College Farm Coordinator
Oliver Hirt	Construction Services Manager, Facilities
Martin Daniel	Director of Operations, CALS
David Gerrard	Animal and Poultry Sciences
Bruce Ferguson	Capital Project Manager
Robert James	Department of Dairy Science

Planning Team	
Steve Gift	Hanbury Evans, Principal
Keith Storms	Hanbury Evans, Principal / Project Manager
Reid Sabin	Hanbury Evans, Campus Planner
Jerry Wille	Curry-Wille, Agriculture Engineer
Blaine Keesee	Draper Aden Civil Consultant

The following items were discussed:

- VT is working with a new Nutrient Management Planner, Jody _____.
- The 2009 Land Use Plan white papers need validation by the CNMP review committee (VT will send to Katharine Knowlton)
- The dean has charged the department to build research facilities with teaching capabilities. The concern is that the construction of a production orientated facility will prematurely commit VT to a production oriented future versus a research/teaching/production diverse future.
- Future manure research will probably result in better identification and utilization of nutrients so that the number of acres need per animal unit will decrease.
- Someone from CALS will contact VT Biosystems Engineering department, Mary Leigh Wolfe Head, about potential research in nutrient management and future manure issues
- The department will internally investigate their future vision for all animal group locations, numbers and focus (teaching / research / production) in parallel to this relocation study. Particularly for the vision of swine's proper/suitable location, programmatic numbers and focus (research). The 2009 Land Use Plan did not plan for the relocation of swine.
- It was decided that the scope and focus of this Planning Study will move forward as originally outlined. The focus will be to provide Programming and conceptual site planning required for the dairy operations to move to the Kentland property.
- The dairy lactating herd numbers are set at 232.
- The animal science beef herd numbers have not been solidified.
- Robert James believes that the hauling of liquid nutrients should be considered a viable practice as the programmatic planning progresses in the relocation of dairy. This is not in agreement with Katharine Knowlton's opinions.
- Phosphorus and nitrogen numbers from soil tests at Kentland will inform the study's approach of nutrient hauling and may be a constraining factor.
- The cost of outsourcing the heifer herd is roughly \$123,000/year for 150 head. Therefore, the plan will include heifer accommodation on site.

Next Steps

- HEWW to give VT the Wille white papers for review.

MEETING MINUTES



Farm Tour Meeting
January 21, 2010
Page 2

To: Oliver Hirt
From: Keith Storms
Date: February 15, 2010
Re: Virginia Tech Ag Relocation

At a meeting to discuss the VT Ag Relocation program held on January 21, 2010, at 1:00 PM, the following were in attendance:

VT	
Hugh Latimer	Campus Planning Director
Mike Akers	Department Head of Dairy Science Department
Dwight Paulette	College Farm Coordinator
Oliver Hirt	Construction Services Manager, Facilities
Martin Daniel	Director of Operations, CALS
David Gerrard	Animal and Poultry Sciences
Bruce Ferguson	Capital Project Manager
Robert James	Department of Dairy Science

Planning Team	
Steve Gift	Hanbury Evans, Principal
Keith Storms	Hanbury Evans, Principal / Project Manager
Reid Sabin	Hanbury Evans, Campus Planner
Jerry Wille	Curry-Wille, Agriculture Engineer
Blaine Keesee	Draper Aden Civil Consultant

The following items were discussed:

- Free-stall barn
 - VT needs more intensive areas than they currently have off of the holding area for teaching and research manipulation.
 - Questions were raised about Vet Med needs for teaching and types of treatment in the Dairy facility. Dairy Science will check with Vet Med to get their input.
 - In accordance with animal care guidelines, they will not do surgery in these facilities other than stand up surgical practices.
- Class schedule from Dairy and Animal Science has been received. Robert James will clarify maximum class sizes that will be going to the farm as opposed to having the animals brought to campus.
- Transportation and vehicular planning needs to be accessible for Buses, cars/trucks and outreach opportunities particularly during large field days.
- VT dairy desires housing accommodations for ±6 student laborers on site
- Housing for VT employees is mandatory. Build new or purchase existing housing w/in neighborhood for at least the herdsman
- Cost for outsourcing heifer herd housing is not financially viable
- Pasture based heifer and dry cow animals is the desired model for VT
- Calves go out to pasture full time at the 6 month mark
- All pastures have and will continue to have fence line feeders
- The lactating Dairy herd is set at 232 head.
 - 1 freestall per animal with equal number of head locks along the feed lane
 - Anticipate no potential expansion
 - Although cows will move in and out of the lactating barn, design for all cows in the lactating barn at any point in time
 - Anticipate 38 dry cows on pasture
 - Anticipate 34 calves 0 to 3 months with no bull calves and if bulls are kept or outside calves are brought in for research, they will be housed in hutches for the number increase
 - Need space for hutches but VT has hutches
 - Anticipate 12 transition heifers located with dry cows
 - Anticipate 12 box stalls for sick bay plus 2 hospital stalls
- Need for 6-8 head to move to metabolism for short time and then move back into the larger population

- Need to design the metabolism for 12 dairy animals plus 12 Animal Science animals for a total of 24 plus feed and laboratory support but not in place milking
- Need for pre-delivery ±28 day short term holding area for animals is desired but it does not need milking facilities and its use will be very intermittent
- Imported animals are held 8-12 wks in isolation off site. The isolation area needs only to be a gravel/grass area off to the side.
- Need for confined housing for research calves. Reasons:
 - Weighing in is an issue
 - Weaning groups
 - Robotic feeding
 - Cost may not be a big factor
 - Prevents duplication of numbers versus hutches
 - Respiratory issues
 - Desire cold calf barn with natural ventilation, open ridge structure with inside facing stalls 4 feet from the outside wall
- Transition Heifers and dry production cows can be housed in the same location
 - Heifer Breeding work area with only a shelter needs to be flexible with chute
 - Current practice for monitoring heifers in heat is not heat syncing. Breeding groups are brought in once a day for feeding and can be viewed/monitored for heat.
- Sick bay
 - Prefer box stall with bedded pack separate from isolation/quarantine area.
 - Would need to be close to the milking parlor
- Desire the ability for Vet medicine to be able to continue to perform numerous types of biopsies on-site
 - Liver biopsies
 - Mammary biopsies
 - Desire a hospital/research area to fulfill needs for standing surgical maneuvers only, on site. Anything beyond this level, the animal would go to the hospital at Vet Med.
- Metabolism barn – Need for 24 individual stalls for no inter-animal contact.
 - Dairy would potentially have 2 intensive groups at the same time (12 animals)
 - Beef would potentially have 2 intensive groups at the same time (12 animals)
 - Does not have to meet NIH standards but does need to meet Animal Care Guidelines
 - No need for air conditioning
 - Need to isolate contact between animals with space that can be used by researcher
- Dairy barn
 - Desire for parlor viewing in barn to be at level (no subway due to ADA and elevator)
 - Desire a receiving lobby/viewing area separate from parlor plus the ability to also view in the parlor
- Per the 2009 Land Use study animal herd numbers, VT land requirements are:
 - 265 Ac of pasture for dairy herd
 - 300 Ac of pasture for beef herd
 - 343 Ac of crop land and nutrient application
 - 30 Ac of land allocation for dairy facilities
- Crops and Feed
 - Need for 2-3 8-ton gravity flow bins plus 4 commodity storage bins for the heifers and 8 additional gravity flow bins for the mature animals
 - Silage will be bagged Robert James will provide volume needs and compare to volumes noted in hand out by Wille
 - Need for hay storage Robert James will provide volume needs and compare to volumes noted in hand out by Wille
 - Currently using TMR (Total Mix Ration) supplement
 - Will need a feed mixing area for feed preparation in connection with sample rations fed with a Data Range type of system
 - Need for weigh-in scale but sized for straight truck not a semi
- Sand bedding will be used in the lactating barn but other areas will use straw bedding
 - Need for solid-liquid separator for sand separation
 - VT is open to the use of sand lanes
 - Currently using plate cooler water for parlor flush but may want to use it for cow drinking water
 - Recycle flushing to the extent possible but not parlor
- Mortalities
 - VT will continue to transport mortalities off-site
- Calf barn specifics

MEETING MINUTES



Farm Tour Meeting
January 21, 2010
Page 3

To: Oliver Hirt

From: Keith Storms

Date: February 18, 2010

Re: Virginia Tech Ag Relocation

At a meeting to discuss the VT Ag Relocation program held on February 17, 2010, at 1:00 PM, the following were in attendance:

VT	
Oliver Hirt	Construction Services Manager, Facilities
Dwight Paulette	College Farm Coordinator
Hugh Latimer	Campus Planning Director
Scott Hurst	University Architect
Bruce Ferguson	Capital Project Manager
Mike Akers	Department Head of Dairy Science Department
Lynn Eichhorn	Executive Director of University Planning, Design and Construction Services
Mike Barnes	Professor, Dairy Sciences
Mark Hanigan	Associate Professor, Dairy Sciences

Design Team	
Steve Gift	Hanbury Evans, Principal (HEWV)
Keith Storms	Hanbury Evans, Principal / Project Manager (HEWV)
Reid Sabin	Hanbury Evans, Campus Planner (HEWV)
Jerry Wille	Curry-Wille, Agriculture Engineer (CWA)
Blaine Keesee	Draper Aden Civil Consultant (DAA)

The following items were discussed:

- Future Dates were decided upon for future milestones
 - March 10-11th – Site Meeting to revise plan with team (this meeting has subsequently been cancelled)
 - End of March – Wrap-up decisions for study.
 - April 19th – Preplanning study completion
- Appropriations are in place for the next phase of design for the Ag Relocation process. VT requested that HEWV submit a proposal response for this phase by March 20th.
- VT requested that this study’s cost estimate take into consideration dividing the animal groups by phase.
- The university requested a GoTo Meeting between the Dairy Science department and the design team to review the proposed building floor plates and relationships.
- The university will investigate opportunities to team with VT Bio Engineers for manure treatment.
- The CNMP will define the parameters for the studies approach to the treatment of manure. Dwight Paulette will look into getting the CNMP with Jody Daniels to provide to the design team.
- HEWV presented site options for the new Dairy Facility on the Kentland property. Site 2 is HEWV’s recommendation. The general consensus of the group is that Site 2 is preferred. However this will need to be reviewed with the Dean as well as others.
- In preparation for the next set of meetings, Dwight Paulette will look into connecting:
 - Dean Gall, DCR contact, with CWA
 - DEQ contact with CWA
- Bruce Ferguson and Lynn Eichhorn will plan an internal meeting on March 4th or 5th with the Dean and CALS to discuss the vision for animal groups and numbers in order to communicate to the team direction for the next set of meetings planned on March 10th.

The aforementioned is our understanding of items discussed and decisions made during the meeting. Please contact this office with any additions or corrections to these notes.

- 16’ center lane with trench drain running the full length for research equipment and teaching classes
- 4’ x 8’ pens with closed sides and back. Use plastic stalls
- Drained gravel base under the pens and the rest concrete
- 4’ lanes on outside edges
- Prefer to have support rooms be more of a box and not long and skinny
- Heifer barn – 3 pens of 12 (4 month – 6 month)
 - Counter slope barn or a deep bedded pack
 - No outside animal runs
 - Feed alley outside but overhang over the manger space
- Heifer area (6 month – 23 months) and dry cow area
 - No building housing or shelter for the animals
 - Need covered bunks which extends over the concrete animal apron
 - Self locking lock up along feed lane
 - Fencing along back side of concrete apron for moving animals to handling facilities
 - Provide direct access form feed area to pastures and handling area
 - Need animal handling working/facilities with at least cover overhead and small records/seamen tank area
- There is no need for upright silos
- Desire for horizontal silos with 12’ Ht side walls
- Hay storage in conventional wood framed building with gravel floor and doors in the end. Not hoop type structure.
- Hay will be mostly big round bales with some small squares and occasionally buying big squares

Next Steps

- VT to provide weigh-in scale sizes
- VT to provide total TMR tonnage used annually for silage and hay usage
- VT to provide maximum hay height reach for hay storage structure
- CWA to provide water usage and demand at Kentland
- VT to discuss the use of methane digestion system with VT Biosystems engineers
- VT to discuss the option of composting mortalities

The aforementioned is our understanding of items discussed and decisions made during the meeting. Please contact this office with any additions or corrections to these notes.

file: Z:\Projects\Academ\Virginia Tech\Ag Relocation\10 Comm\107 Minutes\2010_01_21 Round 2 M\MM_2010_01_21-1_00pm Program.doc

file: Z:\Projects\Academ\Virginia Tech\Ag Relocation\10 Comm\107 Minutes\2010_02_17 Round 3 M\MM_2010_02_17-1_00pm.doc

MEETING MINUTES

To: Oliver Hirt
From: John Dreiling
Date: October 20, 2010 @ 9 am in Hutcheson 104F
Re: Virginia Tech Ag Relocation Study

Attendees are shown on attached sign-in sheet

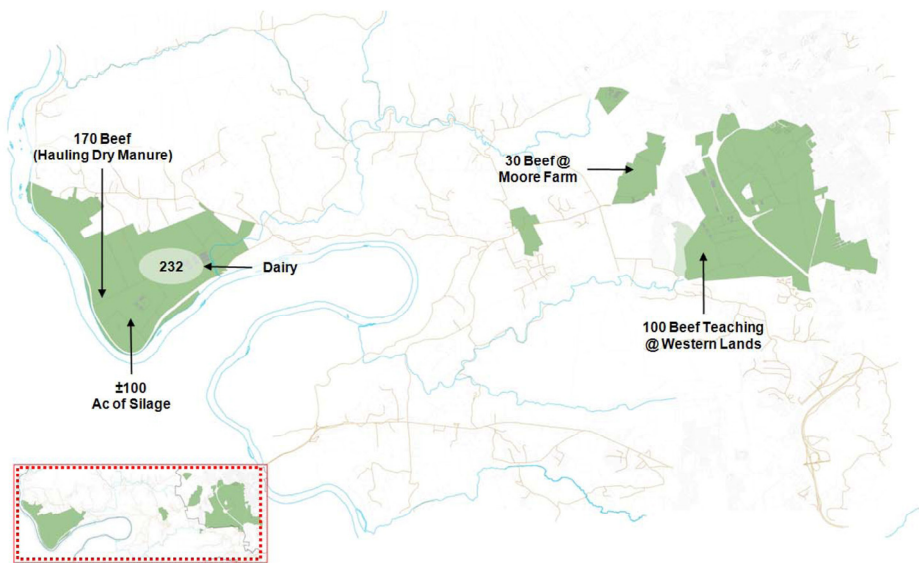
The following items were discussed:

- Review of Project History - A brief recap was given of previous actions on the project and a review of the properties available for use. It was stated that the purpose of this meeting was to approach a decision about how to go about the relocation of the dairy facility to Kentland while trying to achieve the revised herd numbers
- Presentation of the Analysis of the New Herd Numbers and Resulting Land Use Requirements
 - Reviewing comparative charts with original and revised herd numbers, the following issues were noted:
 - With the dairy operation at Kentland, the available silage and pasture acreage will not support the desired numbers for beef and dairy
 - Silage needs at Kentland cannot be met on-site; would require hauling from other VT properties or purchased from outside sources.
 - Considering all VT Countywide lands, needed vs. available pasture acreage would be short 234 acres and the total needed vs. available acreage (silage, pasture and nutrient application) would be short 212 acres
 - In the 2008 Land Use Plan (2008 LUP), ±30 acres of low lands by the river at Kentland were not included in the acres considered for available silage calculations
- Proposed Scenarios for the Locations of the Components
 - Various scenarios to solve the issues were discussed including
 - The possibility of reducing the number of animals
 - Dispersing all of / some of the beef cows to alternative sites
 - Dispersing all of / some of the dairy heifers to alternative sites
 - The combination of utilizing alternative manure management methods and the confining dairy heifers and dry cows
 - With the assumption that the palpation and beef teaching animal herd numbers needed on the Western Lands are to be a part of the larger dairy and beef herd numbers at Kentland or alternative sites, the reduction of that 150 ac pasture demand to 0 brings the total pasture demand closer to equaling the available pasture acreage of VT Countywide lands.
 - If the beef number is reduced to 130 at Kentland, nearly enough pasture acreage would be available at Kentland
 - Need to validate the 2 ½ Ac per cow/calf number based on cutting hay first and then allowing pasture for the rest of the year and based on abnormal rainfall years.
 - Need to consider taking spring hay off of lands to meet demands. It was stated however that VT would still need to purchase hay from other sources.
 - Reviewed the current excess land at the Western Lands and the Moore Farm, and number of cows that could be added
 - The only department that is predicted to be impacted by the proposed location of facilities is CSES and the pasture research currently underway by this department. Coordination of these research pastures and proposed facilities is important to identify.
- Feedback and Direction on Preferred Scenario
 - With background information provided, the various scenarios will be discussed by the College and a decision is anticipated in approximately a month
 - Other lands, including Catawba, Glade Springs and Southern Piedmont, were mentioned as possible locations for beef but the current and necessary new facilities as well as pasture and silage equipment should be considered for possible upgrading

- The Catawba land would be difficult to re-claim for use due to other commitments. This land is good for grazing but not for cropping due to its rocky soils.
- Additional considerations:
 - With separation and flocculation of manure at Kentland, the solids would need to be hauled out away and an entity needs to be found to receive the by-product
In order to create a market for the manure nutrients it is likely that the material would need to be value added probably by composting and that would require bringing in other materials and an additional process at Kentland. The consideration needs to be made that the hauling in of product used in the process of treatment is required. This cost of the treatment of waste needs to be budgeted for.
 - Need to consider the location of teaching facilities on the Western Lands; at the end of Plantation Road?

5. Review of Conclusions and Next Steps

- HEWV to provide revised PowerPoint presentation slides, representing the removal of the palpation / teaching numbers, to the College for internal use and discussions so that the College can reach a final decision on an approved herd scenario. It was stated that a decision could be made in a month's time.
- The design team shall develop a timeline with a start date of Sept 2013 (airport runway extension / demolition) and working backwards to determine the relocation date of pasture research plots at Kentland.
- The Design team shall prepare an overlay of existing Kentland research plots to determine the impacts of the proposed layout of dairy facilities.
- The Design team shall proceed with the archeological survey and take into account the location of the research plots.
- The graphic below shows the conclusions reached for consideration:

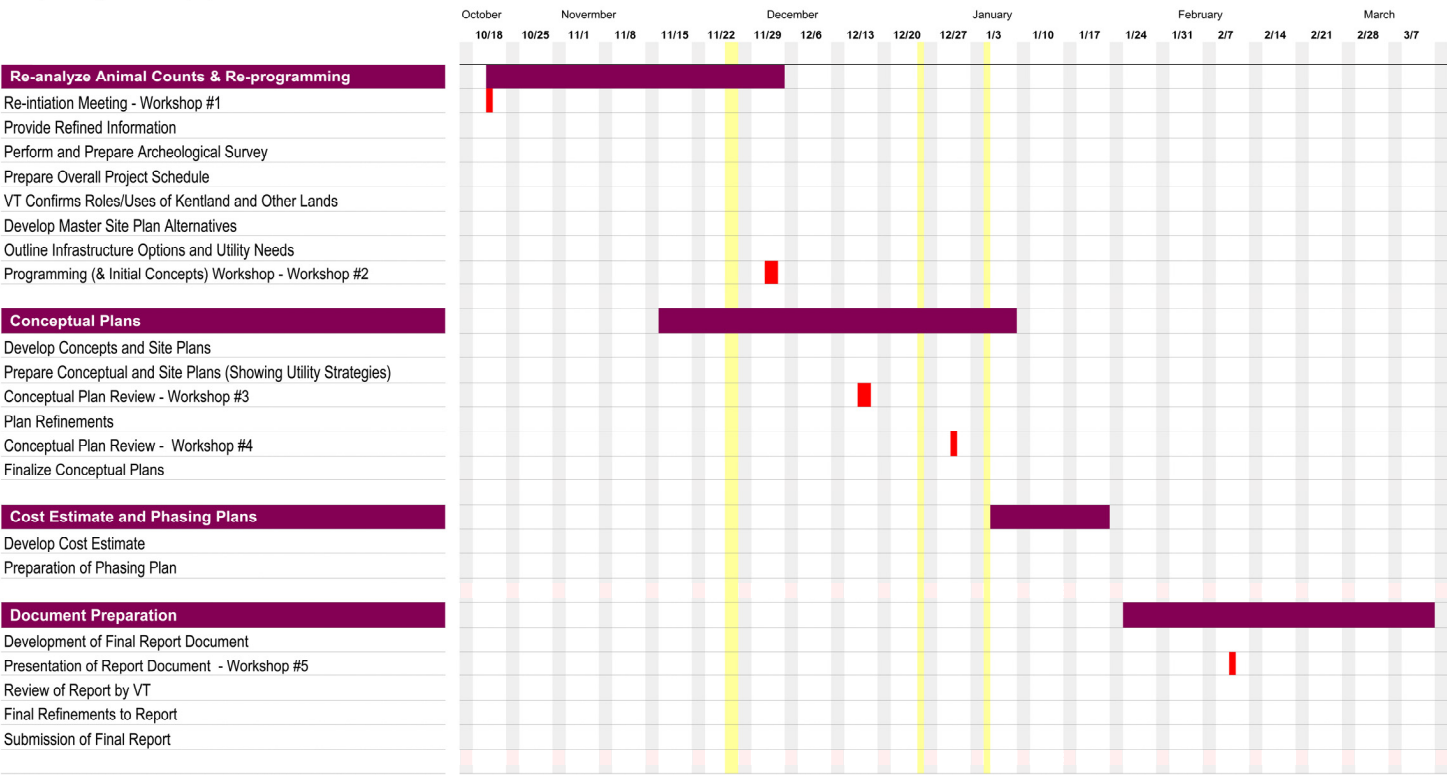


The aforementioned is our understanding of items discussed and decisions made during the meeting. Please contact this office with any additions or corrections to these notes.

Agriculture Relocation Study

Hanbury Evans Wright Viattas + Company

October 21, 2010



Sign-in Sheet

Agriculture Relocation Meeting

Wednesday, October 20, 2010

104F Hutcheson Hall

In Attendance	Name	Company / Department	Phone	Email
✓	John Krelinger	HEWV	(8216) 625-0100	jkrelinger@hewv.com
✓	Hugh Latimer	VT OUA	1-5343	latimerh@vt.edu
✓	Raid Sabh	HEWV	757 321 9625	rsabin@HEWV.com
✓	Jim McKenna	CSES	231-6305	jamckenn@vt.edu
✓	Miki McKinnis	Design & Construction	231-6331	mm14@vt.edu
✓	LT Lora	ENTOMOLOGY	231-6341	ltlora@vt.edu
✓	J. Wolfe			
✓	Mary Leigh Wolfe	BSE	231-6615	mlwolfe@vt.edu
✓	KEITH STORMS	HEWV		
✓	Augusta Powell	College Farm	731-1299	kentland@vt.edu
✓	Blaine Keesee	Draper Allen Assoc	552-0444	hkeesee@daa.com
✓	John McDougal	PRWS	1-2388	john.mcd@vt.edu
✓	Alan Grant	CALS	1-4152	algrant@vt.edu
	Kristi Daniel	vt Tech	231-5500	kdaniel@vt.edu
	DAVID GERRARD	Animal Sci	231-9157	dgerard@VT.edu
	PETER KENNEDY	RECREATION	231-7517	pjkennel@vt.edu
	Oliver Allen	UT	357-0410	ohickson@vt.edu

MEETING MINUTES

HANBURY EVANS WRIGHT VLATTAS + COMPANY
ARCHITECTURE + PLANNING

To: Oliver Hirt
From: John Dreiling
Date: December 14th and 15th @ Sterrett Classroom
Re: Virginia Tech Ag Relocation Study

Attendees are shown on attached sign-in sheet

The following items were discussed:

Day One (Dec 14th) – Tuesday Morning (9:00am – 12:00pm)

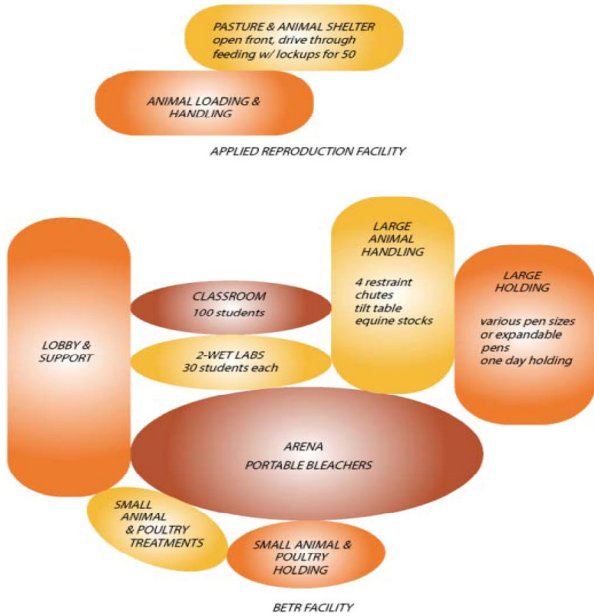
- Kentland Dairy Master Plan Layout
 - Forage Plots and Construction Fence – representatives of the CALS will meet separately to determine the long term plans for the plots but will work with the layout of the Dairy as shown for plots that need to be relocated. And for having the plots relocated by May of 2012 as shown on the Implementation Schedule.
 - It was stressed that the initial phase of the Dairy facility replacement needed to only be for the relocation of the current facility programs and that other changes or additions need to be considered as subsequent phases
 - The budget for the initial phase is limited and will be scrutinized to provide the minimum for the relocation
 - CALS needs to determine the information which needs to be presented to the Board of Visitors at their March meeting
- Existing Infrastructure and Potential Needs
 - It needs to be determined how to meet the water demand of the Dairy as the existing well (capacity 1200g/day) will not provide ample capacity particularly if fire suppression is required
 - The need for fire suppression systems in the buildings need to be determined in conversation with Va Tech's building official.
 - Need to also consider the placement of rest room facilities for visitors and workers throughout the site
 - Investigate the existence of a water line, from the well to the pastures, crossing the site for the dairy
- Scenarios for Manure Treatment – with input from Katharine Knowlton, the following conclusions were reached:
 - The barn floors will be designed to recycle flush in 4 quadrants with a center collection flume. Milking parlor will be flushed with plate cooler water in a similar fashion.
 - Sand will be used for bedding in the freestalls
 - Sand lanes or beach will be used for sand separation
 - The use of a "weeping wall" is preferred for separating solids and liquids, and for its removal. CALS representatives will visit the Jefferson Dairy to gather additional information. The ability to provide chemical enhancement will be considered for adding in the future but not needed at this time
 - Manure storage will be an above ground steel tank or tanks
 - Storage tank, weeping wall, and sand lane covers will be investigated for water volume control and cost implications
 - Aeration will be needed for odor control of recycled flush water if the storage tank is covered
 - The information presented by K. Knowlton considers the ultimate number of cattle at Kentland
 - It was decided that with proper management of cattle and the property, there is enough pasture for dairy heifers and dry cows at Kentland and hay will need to be brought in.
 - Covering the liquid storage could double the cost of the storage tank. Not covering the liquid storage increases the size due to added rainfall (approximately 500k gal/yr addition)

k. Day One (Dec 14th) – Tuesday Afternoon (1:00pm – 5:00pm)

- Location of Dairy Heifers
 - It was determined that having the dairy heifers on pasture at Kentland was the preferred option and could be accommodated.
 - The second choice was to locate them on pasture on the Western Lands.
 - Confinement at Kentland is considered to be the most expensive option due to the additional infrastructure costs, needed man power and nutrients that are added to the system

Meeting Minutes
December 14 - 15, 2010
Page 2

- Project Schedule – with meetings held as proposed, the report should be completed by the end of March. The Implementation Schedule of the relocation of the Dairy shows design and construction needs to start by January of 2012 in order to be able to vacate the current dairy facility by the Fall of 2013, and be out of the way of the airport runway extension work.
- Teaching Facilities Near Campus—through a university Task Force brainstorming the best options, it was decided that 2 separate teaching facilities would best serve the program, its functions, and allow better accessibility to campus. 4 sites were suggested for study but through discussions in our meeting, the following was determined:
 - Applied Reproduction Facility
 - Optimal location is on Moore farm. Other possible locations are on Western Lands with pasture and gravel parking area or possibly on the southern most property of the Western Lands where the current dairy heifers are kept.
 - Ideally located in connection with pastures and easy truck and trailer access
 - Facility will be 3-sided and consisting entirely of headlocks and a concrete pad for classes and labs, and not animalhousing.
 - Drive through feeding
 - Primary animal restraint would be self-locking head gates along feed lane but minor cattle handling and chute would also be needed
 - Most animals would be in and out the same day but some would be pastured
 - K Knowlton to canvas the Task Force for input on the Applied Reproduction facility location
 - Names for the facility were considered and the "Applied Reproduction Facility" is the general consensus label for now.
 - Bovine Extension, Teaching and Research Facility (BETR building)
 - Needs to replace current dairy arena, classrooms, animal handling, labs and cooler and freezer functions
 - Buildings on the western side of Plantation Road, across from the equine arena, are to be considered for use. Also considering using the areas east or south of the Alphin-Stuart arena due to ease of access from campus and other related facilities existing on-site
 - See below for updated bubble diagrams to define the uses needed at the 2 facilities.

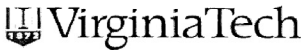


- c. Existing Infrastructure – once a site is determined, additional investigation will be done to determine how the necessary utility needs can be met.
- d. With the primary objective of this study to relocate the dairy facilities to Kentland, the additional services portion of the work involved reassessing the objective in light of the increased cattle numbers but only to the extent of determining what facilities were needed on the Western Lands and other Va Tech lands to accommodate the number of cattle anticipated. Thus, only a conceptual understanding of the program, functions and possible sites are needed at this time.

Day Two (Dec 15th) – Wednesday Morning (9:00am – 12:00pm)

- Layout and uses of Kentland Dairy Buildings – a detailed review of the functions of each of the dairy buildings was conducted to confirm assumptions previously made and define the program better.
 - a. An updated Program document will be provided at a later date for review and additional information
 - b. To the extent possible dairy animals will be brought to campus (BETR building) and not have students always going to Kentland
 - c. To the extent possible people spaces will be developed in the administration building. Thereby making all of the rest of the buildings agricultural structures
 - d. 60' is being allowed between buildings to allow for adequate airflow and circulation
 - e. The cost of providing a roof over the sand lane will be shown as an option in the preliminary cost estimates to be prepared.
 - f. Consideration should be given to bio-security concerns and how they best be addressed
 - g. There will be 3 groupings of heifers; Pre-breeding, breeding and bred
 - h. Cows will be grouped in groups as small as 12 and as large as 60
- Next Steps
 - a. Follow-up meetings– in order to keep the proposed schedule, a meeting the week of January 17th is being planned, along with a follow-up meeting the week of Jan 31st
 - b. Preliminary cost estimates will be presented at the next meeting, along with further refinement of the program and conceptual information in preparation for the final report.
 - c. With the coming March Board of Visitors meeting, CALS should determine what information is needed to update the Board on the plans for relocating the dairy facility.

The aforementioned is our understanding of items discussed and decisions made during the meeting. Please contact this office with any additions or corrections to these notes.



HANBURY EVANS WRIGHT VLATTAS + COMPANY
ARCHITECTURE + PLANNING

Sign-in Sheet
Agriculture Relocation Meeting
Sterrett 65

Dec 14 and 15, 2010
AFTERNOON

In Attendance	Name	Company / Department	Phone	Email
✓	JOHN DREILING	HEWV	(540) 354-0749	jdreiling@hewv.com
OLIVER HURT ✓	Oliver Hurt	PDC	540 357-0410	ohurt@vt.edu
✓	Jerry L. Willis	CWA	515 232 9078	JWillis@CorryWillis.com
✓	Reid Sabin	HEWV	757 321 9625	rsabin@HEWV.com
✓	Mike Peters	DASC	540 231 0331	mpeters@vt.edu
✓	Bob James	DASC	540 231-4776	jamesre@vt.edu
✓	Dwight Paullette	CALS	540/731-1289	kentland@vt.edu
✓	Saeed Mostaghimi	CALS	540/231-6336	smostagh@vt.edu
✓	LYNN EICHEN (in conf) VT		540-231-2810	seich@vt.edu
✓	Hugh Latimer	VT	540-231-5343	latimerh@vt.edu
✓	BLAINE KEESEE	DAA	540-552-0444	kreesee@dAA.com
MARTIN DANIEL ✓	Martin Daniel	CALS	540 231 5900	clanclump@vt.edu
	JIM VICKENNA (BETR)			
	KATHARINE KNOWLES			

Sign-in Sheet
Agriculture Relocation Meeting
Sterrett 65

Dec 14 and 15, 2010
MORNING

In Attendance	Name	Company / Department	Phone	Email
✓	JOHN DREILING	HEWV	(540) 354-0749	jdreiling@hewv.com
OLIVER HURT ✓	Oliver Hurt	UPDC VT	540 357-0410	ohurt@vt.edu
✓	BLAINE KEESEE	DAA	540 552-0444	kreesee@dAA.com
✓	Dwight Paullette	CALS FARMS	540/731-1289	kentland@vt.edu
✓	Alan Grant	CALS	540 231 415	algrant@vt.edu
✓	Bob James	DASC	540-231-4770	jamesre@vt.edu
MIKE PETERS ✓	Mike Peters	DASC	540 231 0331	mpeters@vt.edu
✓	Hugh Latimer	VT OUA	540-231-5343	latimerh@vt.edu
✓	Reid Sabin	HEWV	757. 321.9625	rsabin@HEWV.com
✓	Jerry L. Willis	CWA	515-232-9078	JWillis@CorryWillis.com
MARTIN DANIEL ✓	Martin Daniel	CALS	540 231 5900	clanclump@vt.edu
✓	Saeed Mostaghimi	CALS	540-231-6336	smostagh@vt.edu

MEETING MINUTES

To: Oliver Hirt
From: John Dreiling
Date: January 31, 2011 @ Sterrett Classroom
Re: Virginia Tech Ag Relocation Study

Attendees are shown on attached sign-in sheet

The following items were discussed:

1. Project and Implementation Schedules
 - a. The Project Schedule shows a current estimated completion of the study in early April
 - b. With a Fall of 2013 completion date, the Implementation Schedule shows the Design and Construction starting in Jan 2012 but this is the latest this phase can start and hope to finish as scheduled
 - c. A period of 9 months for Reviews and Approvals is shown but the earliest possible date for a Notice to Proceed with the design is preferred so construction can start as soon as weather permits in the Spring of 2012.
2. Kentland Archeological Survey findings – the archeological field work had been completed. The preliminary report was that there were no significant finds and that no additional study is warranted. The full survey and report will be provided in the final study document.
3. Review of Preliminary Program Costs – Kentland
 - a. Estimates were prepared based on a cost per square foot for each dairy building
 - b. The pure estimated construction cost for the programmed work to initially relocate the dairy to the Kentland property, including site development and demolition of the current dairy buildings, is \$14,839,000.
 - c. While the Campus Planning, Space and Real Estate (CPSRE) is reviewing the various project costs to confirm if they are appropriate for this project, the initial total project cost is estimated at \$16,710,000.
 - d. The figures provided are current construction costs and do not include escalation to the mid-point of construction. CPSRE is to decide if a factor should be included at this time.
 - e. And the estimated construction costs provide are a baseline cost and the location of Blacksburg/Va Tech has yet to be factored in. HEWV will provide a suggested factor and CPSRE will confirm if it is appropriate based on their experience bidding projects.
 - f. Shortly before the meeting, new programming requirements for the Metabolism Building were provided and their cost implications, with an increase expected, had not been reflected in the costs but would be for the next meeting.
4. Review of Preliminary Program Costs – Bovine Applied Repro Facility and BETR Building
 - a. 2 potential sites for the facility Bovine Applied Repro have been identified and their site development costs are assumed to be the same. Similarly with the 3 sites identified for the BETR Building.
 - b. Once again, the costs are based on a cost per square foot of programmed building, the project costs are being reviewed, and the escalation and location factors have not been included to-date.
 - c. The project cost for the Bovine Applied Repro Facility is estimated at \$297,600
 - d. The project cost for the BETR Building is estimated at \$3,700,000
5. Budgetary Considerations
 - a. With a first phase budget of \$5,000,000 for the relocation of the dairy, a list of possible reductions were suggested. It was decided that the Calf Barn could be delayed to the 2nd phase and hutches be used, and the truck scale could be eliminated, for a savings of approximately \$394,000.
 - b. Obviously, the cost of relocating the dairy exceeds the funds allocated at this time but other sources of funds were going to be sought.
 - c. It was noted that funds for the 2nd phase can be requested but the timing of the receipt of those moneys is unknown.
 - d. The potential of using the Beef Arena on Plantation Road should be reflected in the costs for the BETR Building

- e. The question was raised if the partial demolition of the dairy buildings (\$1.9M) could be considered. Though not all the existing dairy buildings are within the zone of the airport extension, the intent of the relocation was to fully remove all buildings from the site.
 - f. Consideration was given to possibly relocating the existing dairy building but due to a lot of the cost being in the concrete, and the sides of lightweight panels, the frame would be the only portion reasonably moved. A paragraph should be prepared explaining the ramifications of trying to relocate the barn.
 - g. With the budget limitation that currently exists, we should prepare a statement explaining what could be bought for the \$5M.
 - h. It was noted that certain capital cost saving measures would increase operating costs.
6. Conclusions and Next Steps
 - a. Refinements of the cost estimates will be made and presented at the next meeting.

The aforementioned is our understanding of items discussed and decisions made during the meeting. Please contact this office with any additions or corrections to these notes.

file: I:\Projects\Academ\Virginia Tech\Ag Relocation\10 Comm\107 Minutes\2011.01.31 Meeting\2011.01.31 MM.docx

Agriculture Relocation Study
Project Schedule

Hanbury Evans Wright Viattas + Company

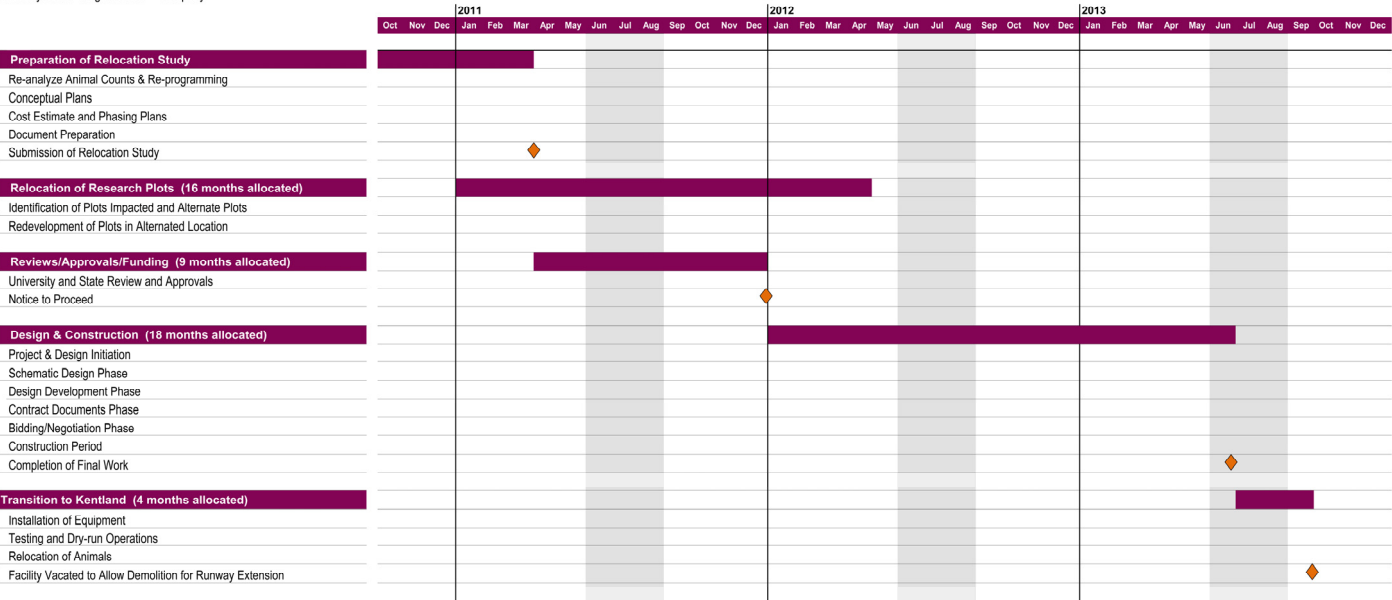
January 31, 2011



Agriculture Relocation
Implementation Schedule

Hanbury Evans Wright Viattas + Company

January 31, 2011



MEETING MINUTES



Meeting Minutes
February 15, 2011
Page 2

To: Oliver Hirt
From: John Dreiling
Date: February 15, 2011 @ Sterrett Classroom
Re: Virginia Tech Ag Relocation Study

Attendees are shown on attached sign-in sheet

The following items were discussed:

1. Project and Implementation Schedules
 - a. As discussed at the previous meeting, the updated Implementation Schedule shows the Design work beginning in June of 2011 to be able have enough time so construction can start as soon as weather permits in the Spring of 2012.
2. Review of Preliminary Program Costs – the following are in response to comments made at the last meeting:
 - a. Metabolism Building Program
 - Updated programming requirements now includes 4 metabolism rooms with a lower level to collect samples, and an elevator unless the structure could be situated to take advantage of the sloping terrain.
 - With these new features an increased cost has been reflected.
 - A conversation with the code official is needed to confirm if these requirements will change the construction classification from Agricultural to Business, which could have additional cost implications.
 - Because of the program dependency on this building, it cannot be phased in later.
 - b. Potential for partial demolition of dairy buildings - due to a previous determination of a 550 foot clear zone at the end of 5500 foot runway, all existing dairy buildings would need to be demolished. A question was raised if the demolition costs (\$1.9M) need to be included in this budget. David Dent is to verify.
 - c. Kentland Dairy Building layout adjustment - from an on-site review of the proposed layout of dairy buildings, it was determined that an adjustment of the location of the freestall barn would take better advantage of the existing terrain. The adjustment will be shown in the report and it was not seen as having an impact on the project's costs.
 - d. Use of Beef Pavilion - as suggested, costs were prepared to reflect the renovation of the beef pavilion on Plantation Road but only a marginal decrease was realized. It was noted that if the dairy program is to make use of the pavilion, coordination will be needed with the current beef program usage.
 - e. Dairy building relocation –upon further investigation and discussion, it was determined that reuse of the current dairy building would not be feasible but that it would be important to reuse some parts of the facility. The Calan doors were suggested and other items will be pursued.
 - f. What is achievable for \$5 million? – New site improvements, demolition of the old dairy site and feed storage but no animal housing would be possible. It was decided that with such limited facilities possible under a budget of \$5 million, the issue was not realistic and did not need to be addressed. And it appears this figure was not presented to the Board of Visitors
3. Revisions to Cost Estimate
 - a. Adjustments to Other Project Cost Components
 - A factor of 90% has now been applied to the estimated costs to reflect the construction location of Blacksburg/Va Tech.
 - Also, a 4.5% increase (3% per year) has been included for escalation in the construction cost figures to show prices at the mid-point of construction.
 - b. The estimated construction cost to relocate the dairy to the Kentland property is \$15,340,000. When Other Project Components are added, the total Project cost reaches \$17,265,000.
 - c. With the revised Other Project Cost Components, the estimated project cost for the Bovine Applied Repro Facility is estimated at \$283,000. The project cost for a new BETR Building is estimated at \$3,505,000, and by making use of the existing beef pavilion and beef barn, its proposed that the facility would cost \$2,983,000.

- d. As a result of discussions, the following was decided:
 - The objective of the study was to determine the cost of moving the Dairy program and not just the animals.
 - The total cost of the project should be presented as the relocation of the existing program to Kentland for the dairy operations, plus the applied reproduction program to the Moore Farm, and the remaining features of the program to the BETR building on Plantation Road.
 - Thus the BETR building needs to only provide for the replacement of the current program, eliminating the small animal holding areas which only account for 14% of the BETR building. Cost estimates should be developed to build either a new facility or a smaller building that anticipates the renovation of the beef pavilion and beef barn for large animal use.
4. Report Draft Outline and Format – an outline with the main topics of an Introduction, Programming, Conceptual Designs, Statement of Probable Costs, Phasing and Implementation was presented with the following comments:
 - a. It is important to clearly state that the work covered is to replace the current dairy program and doesn't create additional programs or new facilities.
 - b. It is important to identify the existing facilities and primary activities in them
 - c. Consideration should be given to showing ways to combine programs in creative ways such as the BETR building and Metabolism.
5. Additional Information and Next Steps
 - a. A draft of the report will be presented at the next meeting on March 22nd, with the intent for it to be circulated prior to the meeting for review. Time will be allowed after the meeting for submitting comments.
 - b. The delivery method of a Construction Manager-at-Risk is being considered to manage the multiple project sites, including the demolition of the existing facilities, to accomplish the building program.
 - c. Per discussions with the Dean and then with Oliver Hirt after the meeting, it was decided that the preferred format for the submission of the report would be a PowerPoint.

The aforementioned is our understanding of items discussed and decisions made during the meeting. Please contact this office with any additions or corrections to these notes.

file: I:\Projects\Academ\Virginia Tech\Ag Relocation\10 Comm\107 Minutes\2011.02.15 Meeting\2011 02 15 MM.docx

Sign-in Sheet

Agriculture Relocation Meeting

Monday, January 31, 2011

Sterrett

Name	Company / Department	Phone	Email
JOHN TREILING	HEMV	(540) 354-0749	jdreiling@hmv.com
Jerry L. Wills	CWA	515-231-7728	JLWills@CorryWills.com
Oliver Hirt	VT	540-357-0410	ohirt@vt.edu
BLAINE KEESEE	DAA	540-552-0444	bkeese@daz.com
DAVID DENT	VT	540-231-9326	ddent@vt.edu
Mark Daniel	VT	540-231-5900	danielup@vt.edu
Saeed Mostafaei	VT	540-231-6336	smostaf@vt.edu
Katherine Knowlton	VT	540-231-5287	knowlton@vt.edu
Ed Watson	VT	1-3939	watson.e@vt.edu
Bob James	VT/DASC	1-4770	jamesre@vt.edu
Mike Olsen	VT/DASC	1-6331	vma@vt.edu

Sign-in Sheet

Agriculture Relocation Meeting

Tuesday, February 15, 2011

Sterrett

Name	Company / Department	Phone	Email
JOHN TREILING	HEMV	(540) 354-0749	jdreiling@hmv.com
Oliver Hirt	VT	540-357-0410	ohirt@vt.edu
DAVID GERRARD	VT	540-231-9157	dgerrard@vt.edu
Alan Grant	VT	540-231-4152	algrant@vt.edu
Saeed Mostafaei	VT	540-231-6336	smostaf@vt.edu
Mark Daniel	VT	540-231-5900	danielup@vt.edu
Katherine Knowlton	VT DASC	540-231-5287	knowlton@vt.edu
Mike Olsen	VT DASC	540-231-6331	vma@vt.edu
Robert James	VT DASC	540-231-4770	jamesre@vt.edu
DAVID DENT	VT-VPDC	540-231-9326	ddent@vt.edu
ED WATSON			

Teaching facility brainstorming document

Our goal is to clarify the functions needed in the teaching facility listed in the Land Use plan generated in 2008-09 (originally and inaccurately labeled a “palpation barn”), and to initiate a “bottom-up” process of collecting input on possible designs from those who will use the facility. What follows is a rough summary of individual conversations and one meeting of faculty heavily involved in teaching with CALS animals (participants listed in footer). While the group is not in perfect consensus on every detail, we firmly believe that our work now will lead to a better result when planning for this teaching facility begins.

Justification

- 1. CALS and VMRCVM need to replace teaching capacity lost with the dairy relocation: working facilities for animals used in classes and functions of the Etgen pavilion.
- 2. Teaching activities using large animals are central to Virginia Tech’s educational mission because they
 - a. offer active-learning opportunities to large numbers of students;
 - b. support undergraduate research activities;
 - c. teach the scientific basis of sampling for animal research, both basic and applied;
 - d. serve the mission of the Agricultural Technology Program, “offering specialized courses that focus on preparing students for their chosen career”; and
 - e. are consistent with the hands-on learning approach used across all colleges at Virginia Tech and at all major universities, to take students outside the classroom, enhancing classroom assignments and increasing student learning.
- 3. Alphin-Stuart classrooms and show ring are overbooked. They originally housed Intro to APSC labs and labs for other live-animal classes. These courses occupied the facilities for ~30 h/week. Because the space is so useful its use has expanded to fill virtually every daytime hour, M-F. Extension and 4-H programs are common at night and on weekends.
- 4. The 40 minute round-trip travel time to Kentland can be accommodated for some specific, limited labs (i.e, some Intro to APSC sessions), but teaching faculty are unanimous that it is not functional for more than a small portion of the hands-on learning sessions offered now and into the future.
- 5. Advanced multi-media networking technology would advance the ability of CALS and VMRCVM to educate and communicate with faculty, students, and clientele nationally and internationally.

Functions needed or suggested

- 1. Restraint to allow use of cows, sheep, hogs and other animals for clinical training, classes in physiology, applied reproduction, and herd health, and other hands-on learning experiences
 - a. Open, multi-species, multi-use working facility to serve course needs (detailed in Appendix 1) and dairy club, 4-H, and extension activities to replace lost space in Etgen Pavilion. These include Little All American dairy show, 4-H field days, Dairy Club’s “Showcase Sale”, and B&B, Equestrian or Pre-vet club activities as needed.
- 2. Classroom space and storage for teaching supplies
- 3. Wet laboratories for APSC 1464, ALS 2304, ALS 3304, DASC 4174, ALS 5304 and many others
- 4. Advanced multi-media networking technology
- 5. Short term accommodation for animals as needed for classes

Working design concept: A classroom & lab building attached to an open barn/working facility with dirt floor & concreted handling area. Details of alternatives are below. Key questions are location, layout of the animal area, layout and capacity of the classroom and lab space. Each is addressed separately.

Includes input from DASC students (Potts, Heizer, Thompson) and faculty from DASC (Akers, Barnes, Corl, Gwazdauskas, Hanigan, James, Knowlton, Mullarky), APSC (Beal, Denbow, Eversole, Gerrard, Knight, McDonald, Wood), VMRCVM (Becvar, Currin, Hodgson, Pelzer, Whittier) and Ag Tech (Hensley).

Multi-species working facility

Concept: Large pole barn with a wash facility, where we can bring in large horse stalls or panels for cattle, sheep, and pigs. Also ~4 restraint chutes, headlocks mounted on an outside wall (dependent on decision on the location of applied reproduction classes, see below), and sufficient open working space to be set up as needed for shows, livestock and dairy judging competitions, etc.

- 1. Pens of variable sizes to hold beef cattle, pigs, sheep, and dairy heifers used in classes (stalls for horses?). Current capacity in Alphin-Stuart has been outgrown with competition between class needs and the “show” function of the arena.
- 2. ~Four restraint chutes in a covered area set on concrete apron
 - a. To be used for various hands-on learning activities (teaching and student research) for the four academic programs (IV catheterization, clinical training, tubing, hoof trimming, etc)
 - b. These must include frame suitable for lifting feet during hoof trimming.
- 3. 4 to 6 tie stalls to allow milking a few cows during lactation induction project, etc. This space would also support experiments and exercises involving jugular catheterization as well as some hands-on equine activities (leg wrapping, etc.)
- 4. Adaptable for youth, extension and dairy club activities. Portable bleachers to create a show or sale ring, gates can be installed to allow animals to be tied for sale or show prep.
- 5. Some adjacent accommodation is needed for animals when they are on site for use in classes.
- 6. Headlocks and drive-by feed alley. Headlocks mounted on outside wall serve the restraint purpose, drive-by feeding provides a means of bringing animals to the headlocks.
 - a. If applied reproduction training from Ag Tech, DASC, APSC, and the vet school is based at this facility (see below), ~ 50 headlocks are needed for the 30-40 cows used at once.
 - b. Concrete apron inside headlocks
 - c. The idea of a palpation rail in place of headlocks was floated but rejected for student safety reasons.
 - d. Need water and electricity
- 7. Truck/trailer access needed to deliver animals from other farms for classes.

Classroom needs

- 1. Classroom space for 100 students.
 - a. Classroom wired for internet and web-based real-time projection.
 - b. Ability to divide classroom to two is useful if we recognize their limitations.
 - c. As with the arena, Alphin-Stuart classrooms are now fully (over-) booked.
- 2. Storage space for teaching supplies.

Lab facilities

- 1. Lab space is needed because:
 - a. We’re likely to get squeezed out of 200, 280, 290 AND they’re not designed well.
 - b. If this new facility is close by (i.e. Plantation Road) labs there would be heavily used for courses in repro and physiology and for swine, poultry and other production labs.
- 2. Need at least two “wet labs” with capacity for ~30 students each, equipped with lab benches, sinks, floor drains, storage for specimens and direct access to exteriorized walk-in cold room and walk-in freezer.
- 3. We discussed addition of Meats lab space to supplement the current Meats Center. Meats facilities would include a cutting room (chilled), a cooler (chilled), and amphitheater or other seating space, connected by rails to first two spaces. The consensus is that this would add great capacity but also great expense.

Includes input from DASC students (Potts, Heizer, Thompson) and faculty from DASC (Akers, Barnes, Corl, Gwazdauskas, Hanigan, James, Knowlton, Mullarky), APSC (Beal, Denbow, Eversole, Gerrard, Knight, McDonald, Wood), VMRCVM (Becvar, Currin, Hodgson, Pelzer, Whittier) and Ag Tech (Hensley).

Location options (see Figure 1)

1. Adjacent to Alphin-Stuart Arena (i.e. a “phase 2” or “auxiliary”)
2. Immediately behind the vet school, with access to pasture stretching back toward 460, adjacent to Smithfield plantation house.
3. Just past swine barn (between it and “Bear woods”)
 - a. *If* BT route is extended down Plantation road, this is a realistic walk for students.
4. Through Hoot Owl woods
 - a. For daily teaching use, this retains many of the problems associated with Kentland (inaccessibility to students without cars, commuting time between classes).

Location preferences

1. Two preferred locations have been identified, with pro’s and con’s for each. These are **adjacent to Alphin-Stuart** or **immediately behind the vet school**.
 - a. Both allow excellent student access and could be shared by faculty in the two colleges.
 - b. Alphin Stuart
 - Would allow us to leverage the existing facility, creating a bigger complex for bigger events.
 - There should be enough space for a facility either on swine barn end of the arena or perpendicular, out toward 460. There is a horse show ring at the swine barn end but the two could co-exist. Towards the sheep barn, runoff would be an issue.
 - c. Behind the vet school
 - There is sufficient pasture space here (as there is NOT next to A-S) for the cows to be used for applied reproduction classes for both colleges. Wherever palpation classes are taught, adjacent housing for cows is needed because they are heavily used during both semesters. However a full herd to support full semester courses would rip up adjacent pasture.
2. The consensus among DASC, AT and APSC faculty is that holding applied repro classes at Kentland could work. Faculty in Vet Med are very concerned about reduced accessibility of cows to their vet students. This reduced access would affect their ability to achieve their mission.
 - a. Palpation cows at Kentland?
 - Beal has well designed facilities that could be expanded to accommodate palpation classes. Add breeding chutes or headlocks.
 - Concern about travel time and transport. Applied repro classes are generally held first thing in the morning, last thing in the afternoon, or on weekends. Upperclassmen generally drive themselves. It would clearly reduce the accessibility to these cows for the (growing number) of vet students.
 - b. An alternative: Put “palpation” facilities (a 3 sided shed surrounding a row of headlocks) through Hoot Owl woods (more isolated, near to pastures for cow housing) and the classroom, labs, animal handling space near Alphin Stuart.
3. A related point: *Cows used in “palpation” classes don’t have to be dairy cows*. Everyone agrees that beef cows (a subset of the beef cow research herd) can work.

Other concepts or ideas

1. Upgrade the beef pavilion (an historic but under-utilized space) for shows, youth activities. The major upgrades would be the addition of heat, modification of the entry area, repairs to bleachers and upgraded restroom facilities. Might funding be available on the basis of historic interest?
2. Modify big beef barn to expand its usefulness for teaching purposes. These are currently used primarily as good production-oriented animal handling facilities, and also for some labs and student activities.

Includes input from DASC students (Potts, Heizer, Thompson) and faculty from DASC (Akers, Barnes, Corl, Gwazdauskas, Hanigan, James, Knowlton, Mullarky), APSC (Beal, Denbow, Eversole, Gerrard, Knight, McDonald, Wood), VMRCVM (Becvar, Currin, Hodgson, Pelzer, Whittier) and Ag Tech (Hensley).

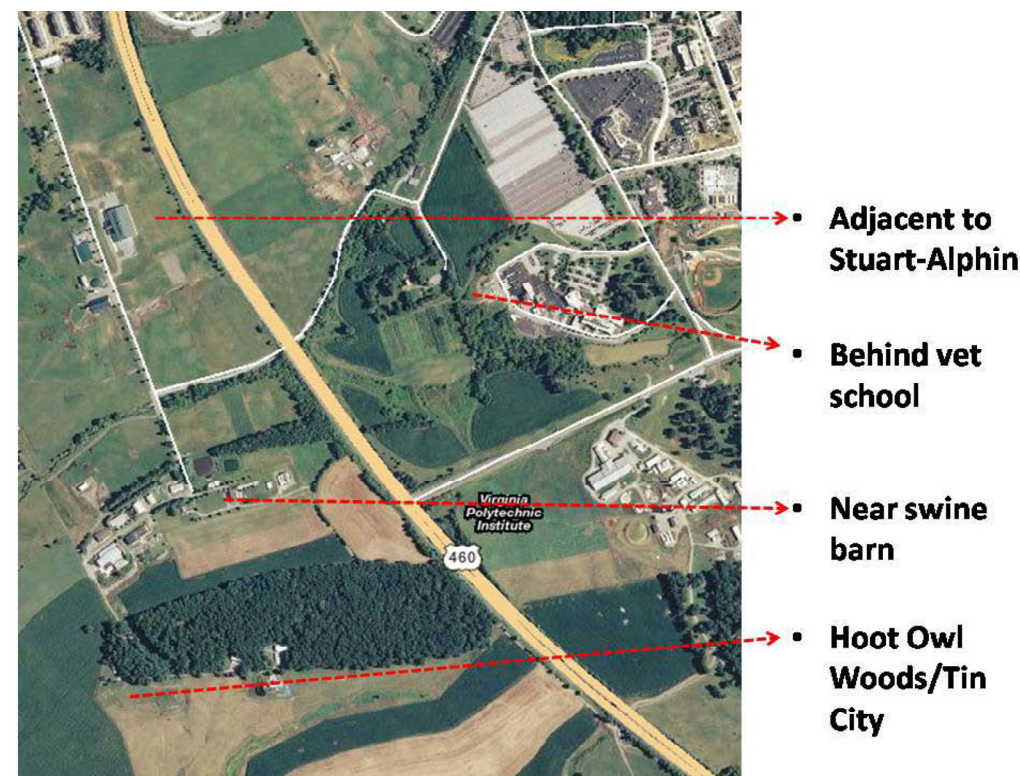


Figure 1. Possible locations of large animal teaching facilities

Includes input from DASC students (Potts, Heizer, Thompson) and faculty from DASC (Akers, Barnes, Corl, Gwazdauskas, Hanigan, James, Knowlton, Mullarky), APSC (Beal, Denbow, Eversole, Gerrard, Knight, McDonald, Wood), VMRCVM (Becvar, Currin, Hodgson, Pelzer, Whittier) and Ag Tech (Hensley).

Dairy Animal Teaching Needs Summary

Appendix 1. Dairy Center and Cow Usage (Developed 12/10/09)

Dairy science courses and courses (ALS) taught by DASC faculty members

DASC 1574 Introduction to Dairy Science (fall semester) ~ currently 35 students to the dairy for 3, 2 hour labs but students go in pairs or small groups throughout the semester (observations, recording behavior, etc.). This would probably be condensed in to 2 or 3 four hour labs to be held at Kentland.

DASC 2484 Dairy Cattle Evaluation (spring semester)
Average 20 lactating cows/ lab period x 15 lab period/ semester ~ 15 students per lab
15 labs x 20 cows = 300 cow contacts. In addition, 24 heifers – class usage and preparation for dairy show - ~ 25 students, daily for ~ 21 days in April. Likely long-term would prefer bringing cows to students.

DASC 4374 Lactation Physiology (spring semester) – Milking Herd during 4 lab period of semester ~ 20 students; 20 palpation herd cows for induction of lactation ~ 1 month (induction treatments + 10 days of 2x milking)

DASC 4304 Applied Reproduction (fall semester) 50 palpation herd cows/ lab period x 15 lab periods; Therefore 15 labs x 50 cows = 750 cow contacts ~ 24 students per lab

DASC 4384 Mammary Immunology (spring semester) 1 farm lab period/ semester; lactating herd; ~ 11 students

DASC 4476 Senior Management II – Enrollment ~ 20; The class herd project requires visits by 2-3 students daily for ~ two weeks followed by visits 2-3 times per week for the remainder of the semester. In addition, there are 6 laboratory sessions at the farm during scheduled class times with ~ 20 students each time.

ALS 2304 Anatomy and Physiology (spring semester) enrollment ~ 100 students; four lab sessions at farm (palpation herd cows) 25 students per lab/ 12 cows per lab

ALS 3134 Livestock and Environment (spring semester) – ~ 20 students, currently one trip per semester to review facilities, would have to move to Kentland and would need to be done outside of a normal class period i.e. not enough time in a 75 min class with the necessary travel.

ALS 3204 Animal Nutrition (spring semester) typical enrollment 200, one optional animal lab (cannulated cows) 30-40 students participating, would work well at the teaching facility (animal transport).

ALS 5304 – Advanced Physiology Domestic Animals (fall semester) 10 palpation herd cows x 2 lab periods/semester ~ 15 students per lab.

Dairy Animal Teaching Needs Summary

Agricultural Technology Program Dairy Related Courses

AT 0324 Livestock Reproduction (spring semester) 15 labs per semester, ~ 30 students per lab, use ~ 20 of the palpation herd cows.

AT 0494 Dairy Management (spring semester) 8 labs per semester, ~ 10 students per lab, involves lactating herd animals.

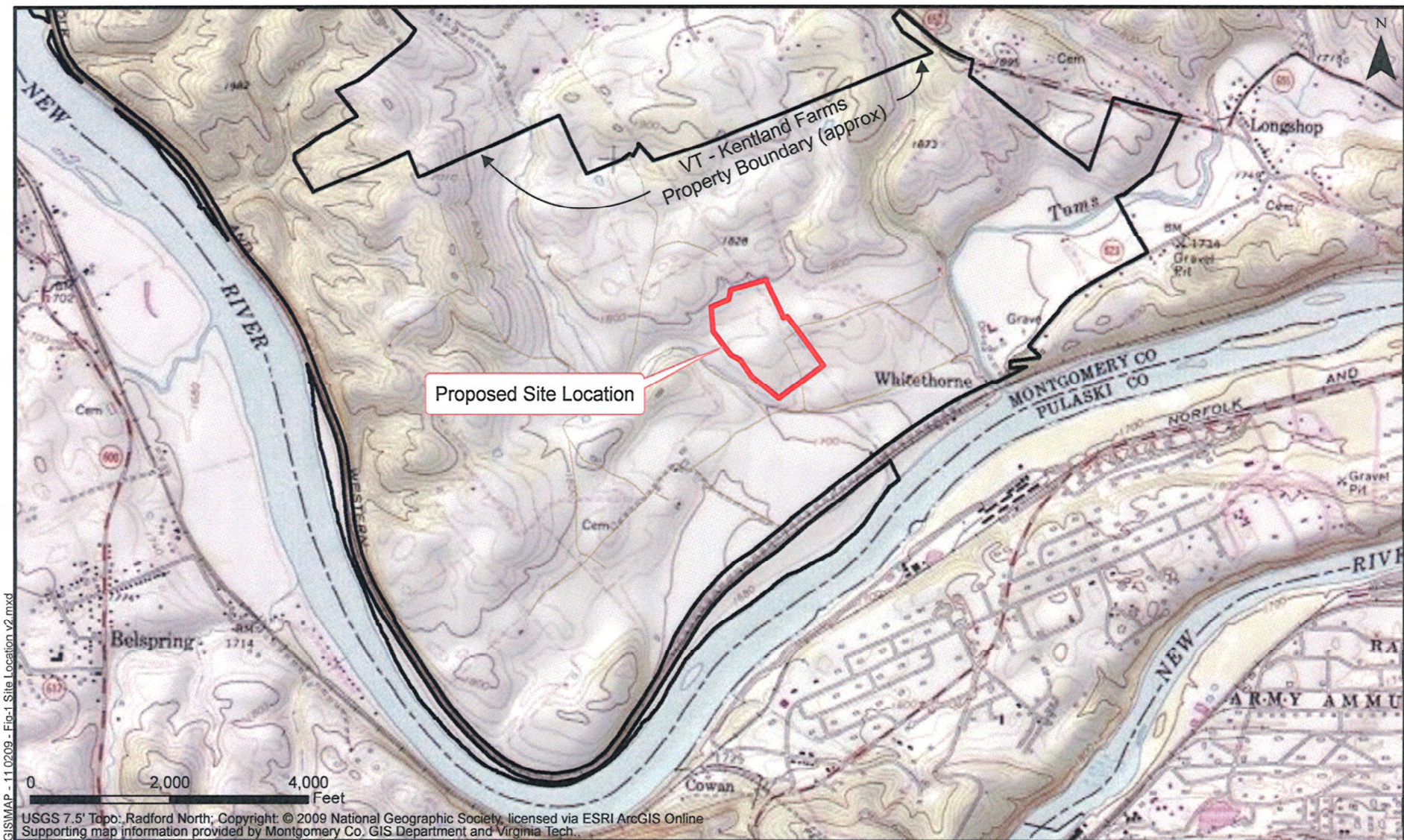
AT 0164 Introduction to Animal Science (fall semester) two labs per semester ~ 30 students per lab, multiple animals and farm areas.

Vet School Dairy Cattle Teaching Needs

Class	Number	Enrollment (anticipated)	Labs/Events	Cows needed/lab	Comments
Anatomy 1	VM 8014	95 (120) (140)	8 (8) (8)	2 (3) (4)	2 rumen fistulated cows needed for 2 labs, normal cows or others
Husbandry	VM 8074	70 (100) (110)	1 (2) (2)		Walk through of the dairy, shows different production stages
Clinical Techniques	VM 8354	95 (120) (140)	4 (6) (6)	30 (30) (30)	Rectal palpation
Theriogenology	VM 8374	95 (120) (140)	4 (5-6) (6)	60 (60) (60)	Rectal palpation
FA Nutrition	VM 8384	30 (50) (60)	1 (2) (3)	10 (10) (10)	BCS , need 10 cows with condition scores of 2 -4

Dairy Animal Teaching Needs Summary

FA Therigenology	VM 8574	30	2	60	Rectal palpation
			1	4	Embryo transfer –
		(50)	(4)	(60)	need 4 cows to
			(1)	(4)	superovulate
		(60)	(6)	(60)	
			(1)	(4)	
Gastroenterology	VM 8614	95	1	40	Need 2 rumen
		(120)	(2)	(40)	fistulated cows,38
		(140)	(3)	(40)	to palapte
FA Medicine and Surgery I	VM 8615	20-25	1 (2)	25	Physical Exam Lab
			1 (2)	6 (12) cows	IV Catheter Lab
		(40)		8(16) calves	
			1 (2)	8-10 (16-20) calves	Dehorn and castrate
			1 (2)	6 (12) cows	Regional nerve block lab
			1 (2)	6 (12) cows	Ophthalmic Lab
FA Medicine and Surgery II	VM 8616	15-20	1 (2)	6 (10)cows	Abdominal surgery
			1 (2)	10(15) cows	Foot trimming lab
		(30)	1 (2)	Milking	Milking evaluation
Food Animal Club		20-25	weekly	40 cows	Saturday morning
		(30-35)		(60)cows	palpations
		(50)		(90) cows	



Site Location Map

Environmental Impact Review
Kentland Farms, Montgomery County Virginia



Draper Aden Associates

Engineering ♦ Surveying ♦ Environmental Services

2206 South Main Street
Blacksburg, VA 24060
540-552-0444 Fax: 540-552-0291

Richmond, VA
Charlottesville, VA
Hampton Roads, VA

DESIGNED KMW
DRAWN SMF
CHECKED WDN
DATE 02-09-11

SCALE 1" = 2000'

PLAN NO. B09199B-01

FIGURE

1






Path: P:\B091001\B09199B\B09199B-01\GISMAP - 11 0209 - Fig-2 Aerial2009.mxd

Aerial Photograph 2009

Environmental Impact Review
Kentland Farms, Montgomery County Virginia



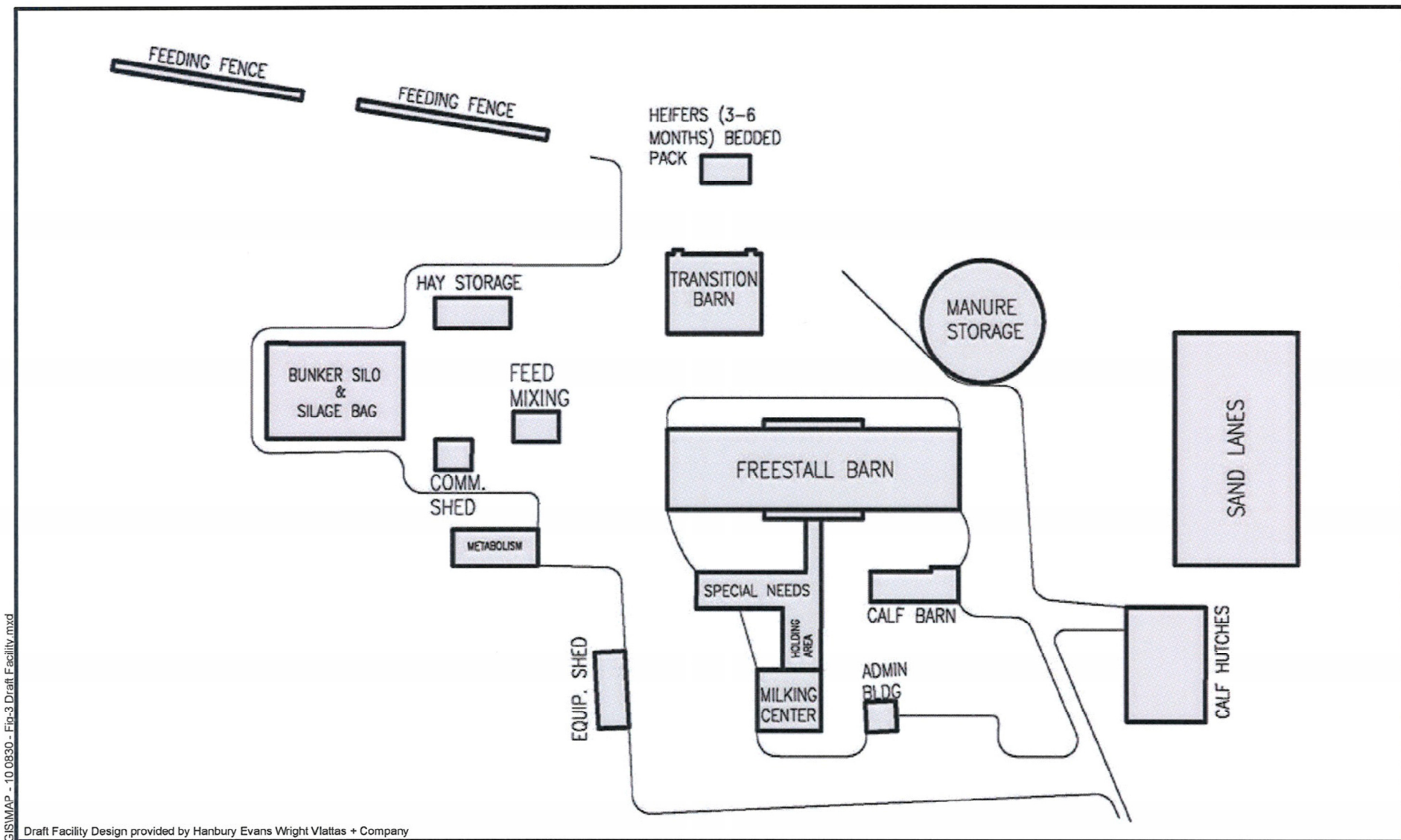
Draper Aden Associates
Engineering ♦ Surveying ♦ Environmental Services
2206 South Main Street
Blacksburg, VA 24060
540-552-0444 Fax: 540-552-0291

Richmond, VA
Charlottesville, VA
Hampton Roads, VA

DESIGNED	KMW
DRAWN	SMF
CHECKED	WDN
DATE	02-09-11

SCALE 1" = 1800'
PLAN NO. B09199B-01

FIGURE
2



Draft Facility Design provided by Hanbury Evans Wright Vlattas + Company

Draft Facility Design

Environmental Impact Review
Kentland Farms, Montgomery County Virginia



Draper Aden Associates

Engineering • Surveying • Environmental Services

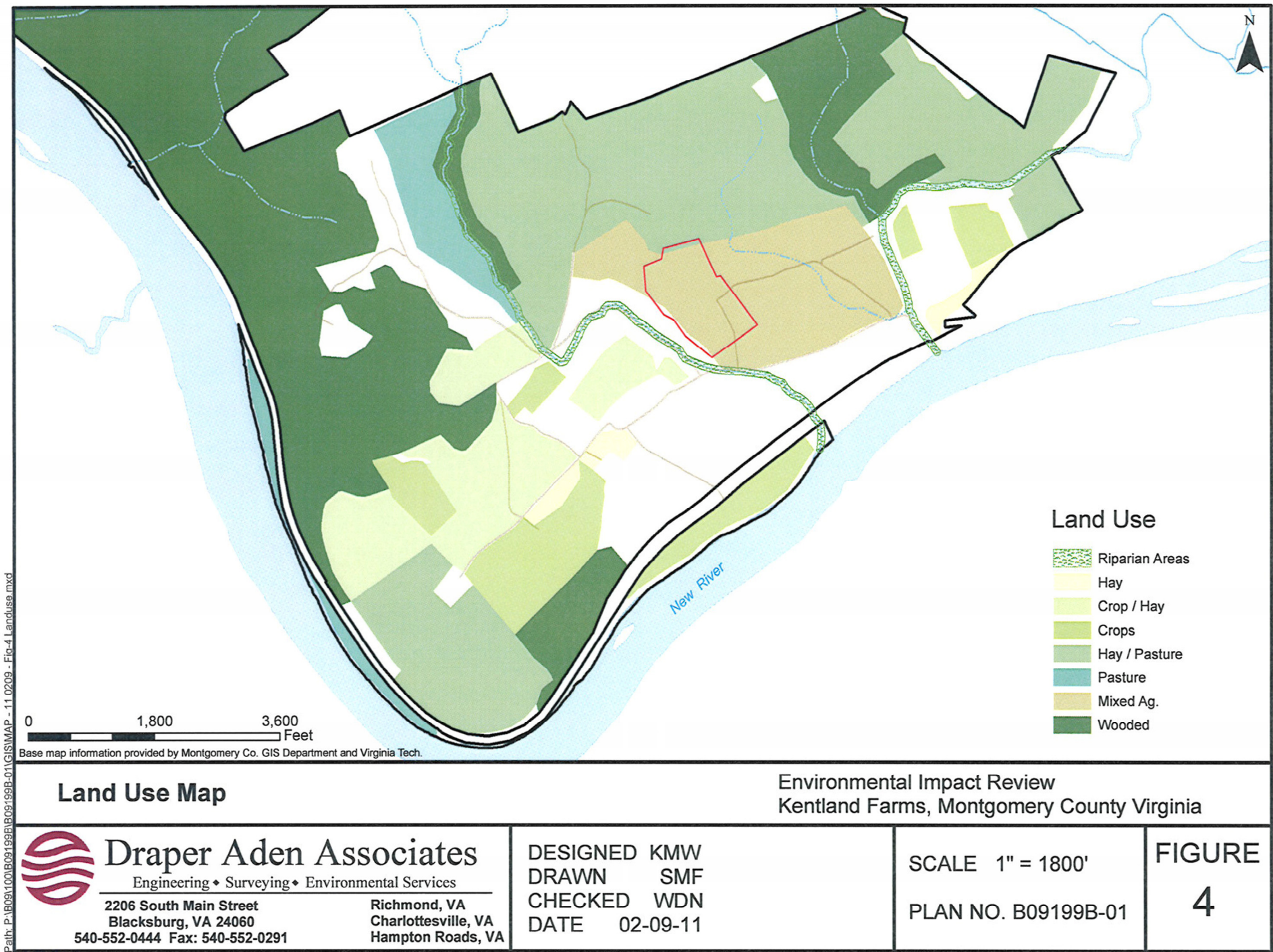
2206 South Main Street
Blacksburg, VA 24060
540-552-0444 Fax: 540-552-0291

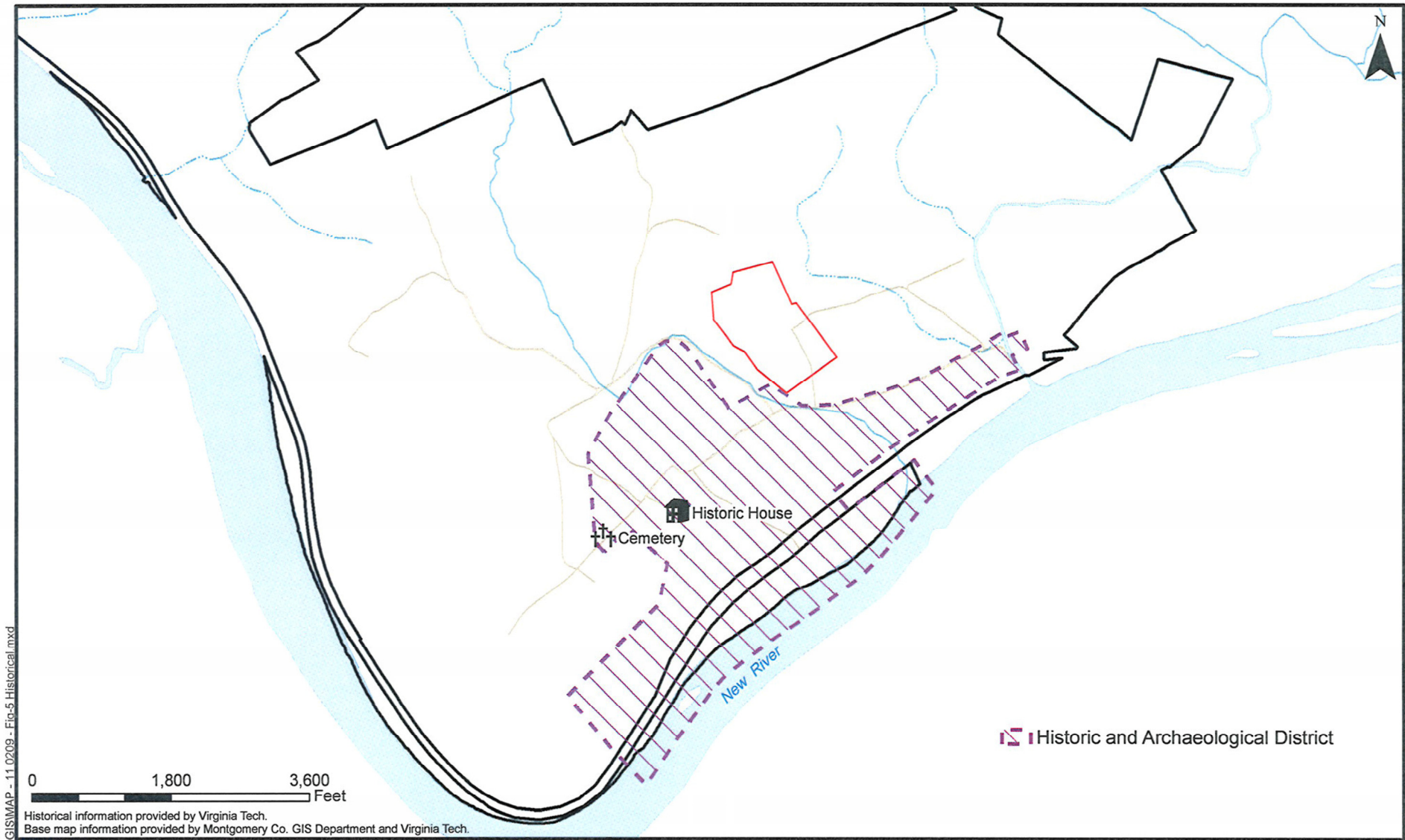
Richmond, VA
Charlottesville, VA
Hampton Roads, VA

DESIGNED KMW
DRAWN SMF
CHECKED WDN
DATE 08-30-10

SCALE none
PLAN NO. B09199B-01

FIGURE
3





Historical Resources Map

Environmental Impact Review
Kentland Farms, Montgomery County Virginia



Draper Aden Associates
Engineering ♦ Surveying ♦ Environmental Services

2206 South Main Street
Blacksburg, VA 24060
540-552-0444 Fax: 540-552-0291

Richmond, VA
Charlottesville, VA
Hampton Roads, VA

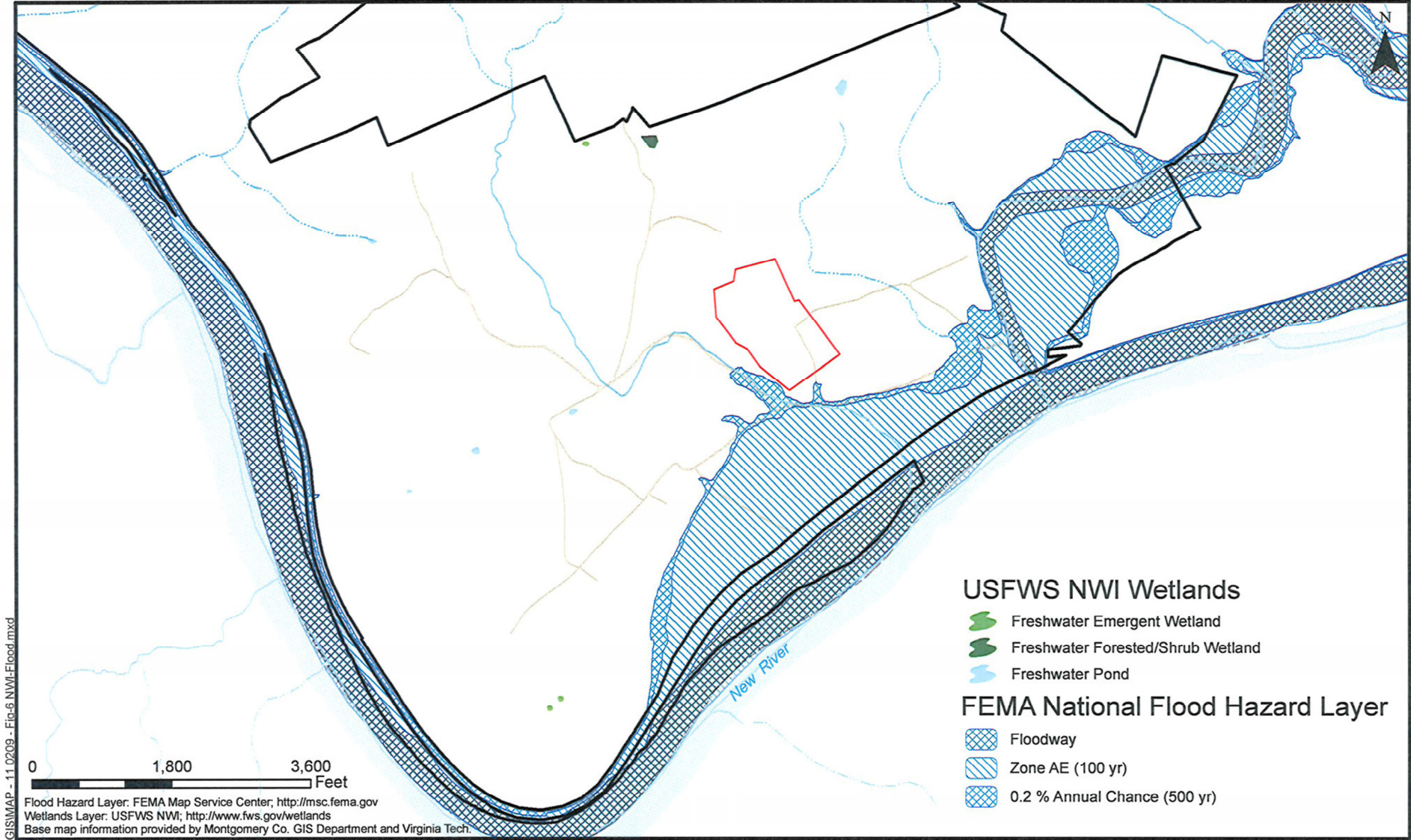
DESIGNED KMW
DRAWN SMF
CHECKED WDN
DATE 02-09-11

SCALE 1" = 1800'

PLAN NO. B09199B-01

FIGURE
5





Wetlands and Flood Plain Map

Environmental Impact Review
Kentland Farms, Montgomery County Virginia



Draper Aden Associates

Engineering ♦ Surveying ♦ Environmental Services

2206 South Main Street
Blacksburg, VA 24060
540-552-0444 Fax: 540-552-0291

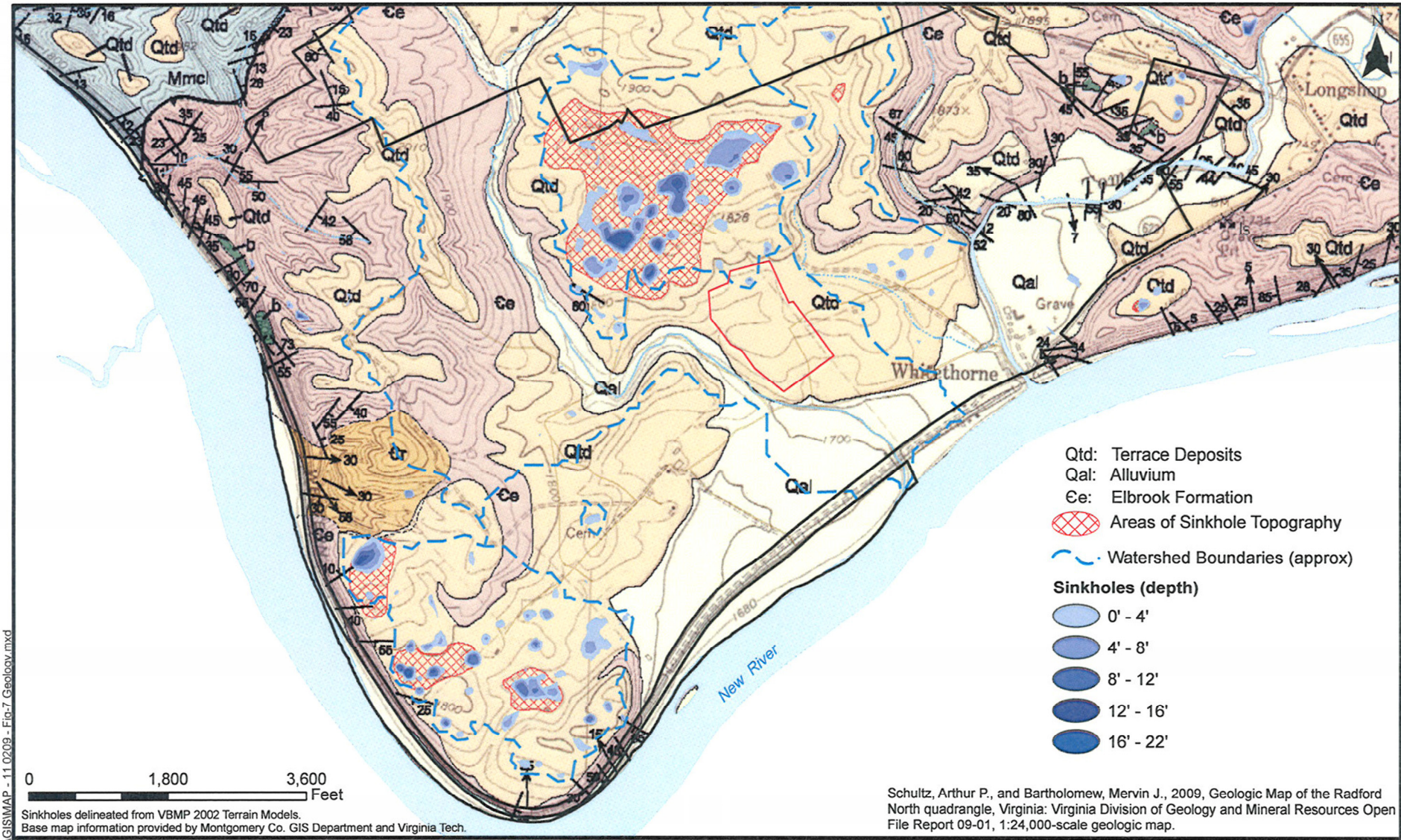
Richmond, VA
Charlottesville, VA
Hampton Roads, VA

DESIGNED KMW
DRAWN SMF
CHECKED WDN
DATE 02-09-11

SCALE 1" = 1800'

PLAN NO. B09199B-01

FIGURE
6



P:\B091001\B09199B\B09199B-01\GISMAP - 11 0209 - Fig-7 Geolcov.mxd

Sinkholes delineated from VBMP 2002 Terrain Models.
Base map information provided by Montgomery Co. GIS Department and Virginia Tech.

Schultz, Arthur P., and Bartholomew, Mervin J., 2009, Geologic Map of the Radford North quadrangle, Virginia: Virginia Division of Geology and Mineral Resources Open File Report 09-01, 1:24,000-scale geologic map.

Geologic Map

**Environmental Impact Review
Kentland Farms, Montgomery County Virginia**



Draper Aden Associates

Engineering ♦ Surveying ♦ Environmental Services

2206 South Main Street
Blacksburg, VA 24060
540-552-0444 Fax: 540-552-0291

Richmond, VA
Charlottesville, VA
Hampton Roads, VA

DESIGNED KMW
DRAWN SMF
CHECKED WDN
DATE 02-09-11

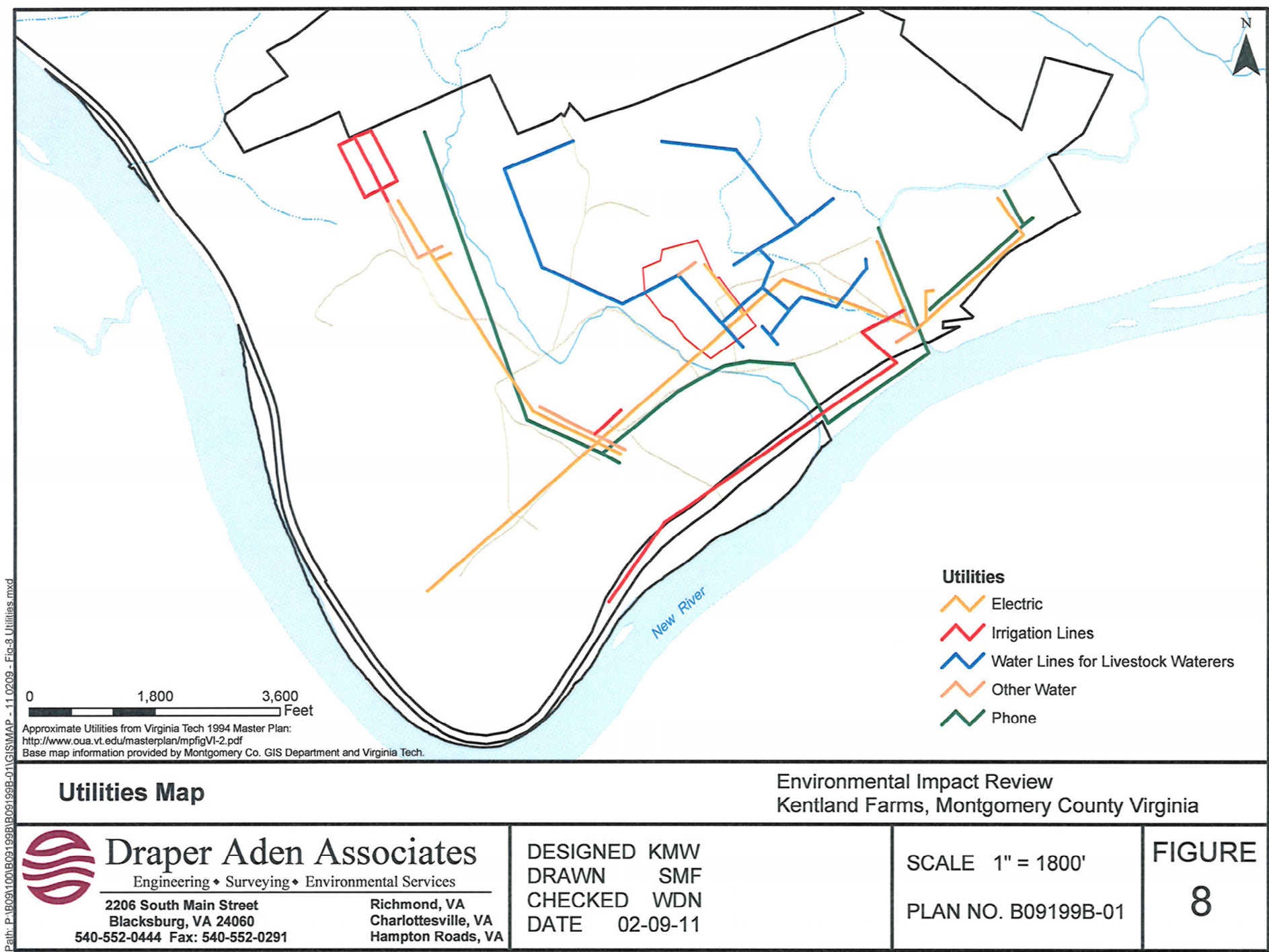
SCALE 1" = 1800'

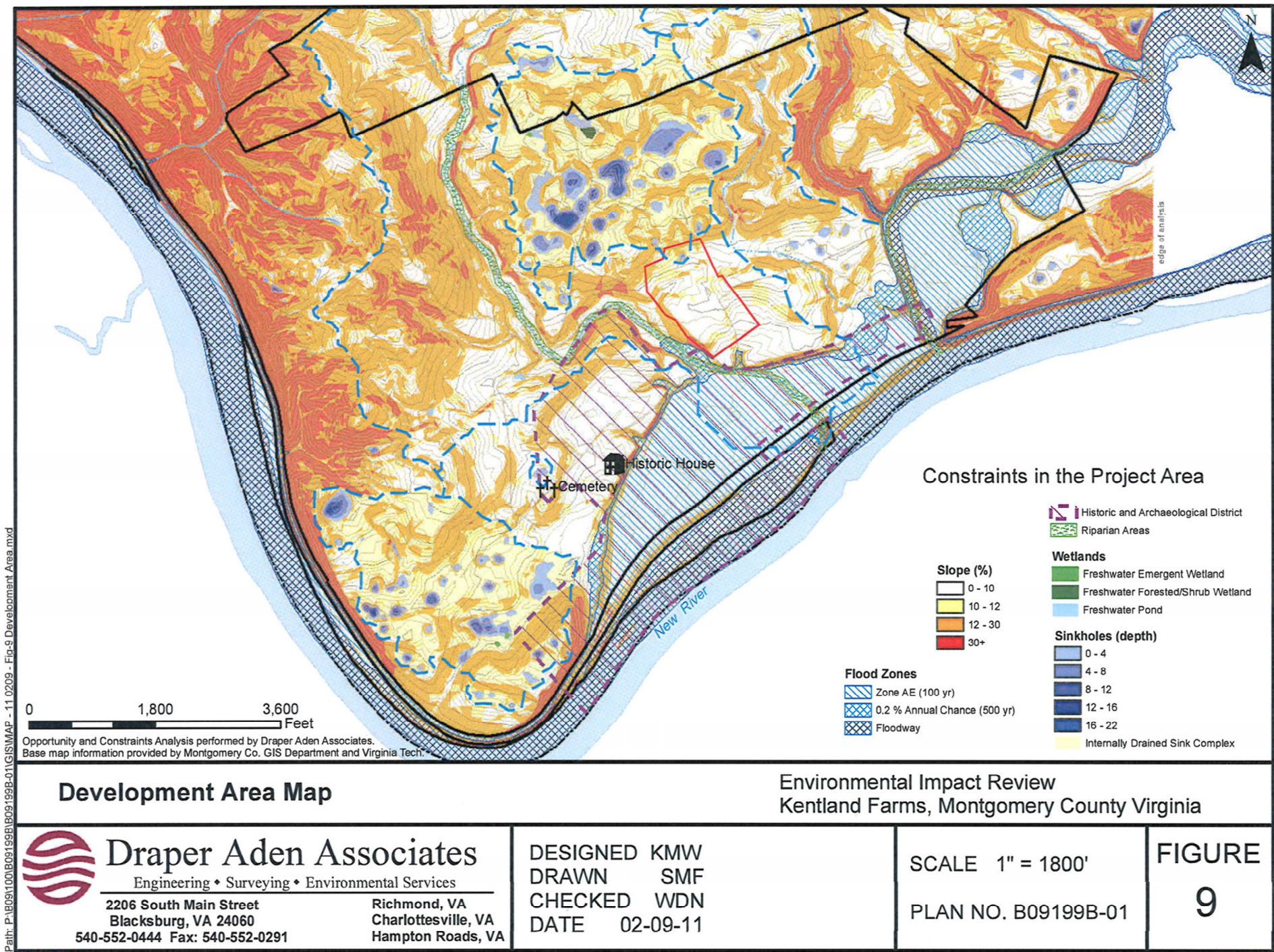
PLAN NO. B09199B-01

FIGURE

7







DAIRY POPULATIONS AND GROUPINGS

This data is typical animal numbers and groupings as associated with a Dairy of this size. It is anticipated that the groupings will be modified to fit the research protocol at any particular time however the total population and associated data will remain the same.

Dairy Herd Numbers

No of Lactating Cattle	232	hd
Average Lactation Length	305	days
Average Dry Period	60	days

Number of Dry Cows	38	hd
--------------------	----	----

Number of Calves Per Year	270	hd
Calf Mortality Rate	0.0%	

Number of Heifers Per Year	135	hd
----------------------------	-----	----

Number of Bull Calves Per Year	135	hd
--------------------------------	-----	----

Average Lactating Cow Weight	1400	lbs
Average Dry Cow Weight	1400	lbs

Milk Production

Average Milk Production	125	lbs. per day per cow
Rolling Herd Average:	38,125	lbs per lactation
% Butterfat	3.75%	
% Protein	3.25%	
Total Milk Production	29,000	lbs. per day
	3,372	gallons per day
Total Butterfat	1088	lbs. per day
Total Protein	943	lbs. per day
Milk Pickup Interval	2	days
Milkings Per Day	3	X
No. of Parlor Stalls	24	
Average Milking Time	2.42	hrs @ 4 turns per hour
Total Daily Milking Time	7.25	hrs
Minimum Bulk Tank Size	69,600	lbs.
(1.2 Safety Factor)	1080.7	cu ft
	8,084	gallons

Young Stock

	<u>Average #</u>					<u>Average Wt.</u>	
Group 1	34	hd from	0	to	3 months	180	lbs
Group 2	34	hd from	3	to	6 months	400	lbs
Group 3	68	hd from	6	to	12 months	610	lbs
Group 4	68	hd from	12	to	18 months	1000	lbs
Group 5	57	hd from	18	to	23 months	1300	lbs

Housing

	Avg. No. of Head	Housing Factor	Housing Size	Details
Lactating Cows	232	100%	232	Freestall
Dry Cows	38	120%	46	Pasture/Freestall
Special Needs		5%	12	Bedded Pack
Maternity		5%	12	Bedded Pack
Metabolism			0	
Group 1 - 0 to 3 mos.	34	106%	37	Calf barn
Group 2 - 3 to 6 mos.	34	103%	36	Bedded Pack
Group 3 - 6 to 12 mos.	68	107%	73	Pasture
Group 4 - 12 to 18 mos.	68	106%	73	Pasture
Group 5 - 18 to 23 mos.	57	132%	76	Pasture