

## **Index File**

**UP-835-13**

**Kristen Paster**

**Assessor's Parcel No. 26-9-A**

**Application No. UP-835-13, Kristen Paster:** Request for a Special Use Permit, pursuant to Section 24.1-306 (Category 2, Number 8) of the York County Zoning Ordinance, to authorize a commercial stable on a 9.1-acre parcel located at 201 Hansford Lane (Route 670) approximately 650 feet north of its intersection with Seaford Road (Route 622) and further identified as Assessor's Parcel No. 26-9-A. The property is zoned RR (Rural Residential) and the Comprehensive Plan designates this area as Conservation.

### **Attachments:**

- Staff Report
- Zoning Map
- Sketch Plan - Existing
- Sketch Plan - Proposed
- Nutrient Management Plan
- Proposed Resolution No. PC13-28

# COUNTY OF YORK

## MEMORANDUM

**DATE:** December 3, 2013 (PC Mtg. 12/11/13)  
**TO:** York County Planning Commission  
**FROM:** Earl W. Anderson, AICP, Planner  
**SUBJECT:** Application No. UP-835-13, Kristen Paster

### ISSUE

This application seeks a Special Use Permit, pursuant to Section 24.1-306 (Category 2, Number 8) of the York County Zoning Ordinance, to authorize a commercial stable on a 9.1-acre parcel located at 201 Hansford Lane (Route 670), further identified as Assessor's Parcel No. 26-9-A.

### DESCRIPTION

- Property Owner: Edward W. Gibbs Sr. Trustee; Applicant is contract purchaser
- Location: 201 Hansford Lane (Route 670)
- Area: Approximately 9 acres
- Frontage: Approximately 20 feet on ingress/egress easement off Hansford Lane
- Utilities: Public water and sewer available
- Topography: Flat
- 2035 Land Use Map Designation: Conservation
- Zoning Classification: RR – Rural Residential
- Existing Development: Gazebo, two sheds, and a fenced pasture area
- Surrounding Development:
  - North: None
  - East: Single-family detached dwelling on Hansford Lane
  - South: None
  - West: None
- Proposed Development: Commercial stable operation with barn, riding ring, pasture area for a maximum of 16 horses, and accessory house.

## **BACKGROUND**

On June 19, 2012 Zoning and Code Enforcement staff performed an inspection at 236 Hansford Lane and found that the applicant, Yorktown Stables (Kristen Paster), was operating an illegal commercial stable on the property. On July 23, 2012 the applicant applied for a Special Use Permit to authorize a commercial stable. The application was incomplete, though, and no public hearing on the application was ever scheduled because the property had many environmental issues that would not allow for the number of horses the applicant wanted.

County zoning staff took the applicant to court on August 26, 2013 for operating a commercial stable without a Special Use Permit, for not having a Certificate of Zoning Compliance, and for not meeting the performance standards for horsekeeping. The judge fined the applicant and ordered the removal of the horses from the property at 236 Hansford Lane.

On October 7, 2013, zoning staff inspected the property at 201 Hansford Lane and found that Yorktown Stables had begun operation of a commercial stable on the property. The applicant withdrew her application for the property at 236 Hansford Lane and submitted this application for the property at 201 Hansford Lane on October 29, 2013. The applicant has been cited for operating a commercial stable without a Special Use Permit, for not having a Certificate of Zoning Compliance, and for not meeting the performance standards for horsekeeping at 201 Hansford Lane and has a summons to appear in court December 16, 2013 with regard to these zoning violations.

## **CONSIDERATIONS/CONCLUSIONS**

1. The subject property is a 9-acre parcel of land located on the northwest side of Hansford Lane that is zoned RR (Rural Residential). The applicant is requesting a Special Use Permit to allow a commercial stable for giving riding lessons and teaching equine safety. No boarding of horses other than those owned by the applicant would occur on the property. Existing development consists of a gazebo, two sheds, and the foundation for a house that was never completed. The property is served by a dirt road extending from Hansford Lane. A small manmade pond exists in the northeast corner of the property. Additionally, the applicant has installed several fenced pasture areas, a small metal fenced riding ring, and a larger open riding ring without any site plan or land disturbing permits.
2. Commercial stables are allowed in the RR district only by Special Use Permit. The prevailing land use pattern of this area is a mix of vacant land and small single-family residential lots. The 20-acre parcel to the south and west of the proposed property is zoned RR. The 67-acre parcel to the north is zoned RC and has substantial wetlands. The single-family detached dwelling to the east is owned by the same owner as the subject property and is zoned RR.
3. The applicant submitted a sketch plan showing the various facilities to be used in connection with the proposed commercial stable. The plan shows a driveway

entrance from Hansford Lane with two areas labeled pasture on either side. It also shows that two structures are to be constructed on the property: a 50-foot by 26-foot house and 100-foot by 40-foot barn both located in the northwest area of the property. The driveway would serve the house and the barn as well as a 70-foot by 50-foot parking area along the eastern property line. Additionally, the sketch plan shows a 200-foot by 100-foot riding ring at the rear of the property, with a manure handling area in the northwest corner.

- Pursuant to the performance standards for horse keeping and commercial stables set forth in Section 24.1-414 of the Zoning Ordinance, the maximum number of horses permitted for commercial stables is two (2) per usable acre of land. The table below denotes the usable acres for the subject nine-acre (396,968 square feet) parcel:

<b><i>EXCLUDED AREAS</i></b>	<b><i>SIZE</i></b>	<b><i>TOTAL</i></b>
<b><i>Proposed Residence</i></b>	50' x 26'	1,300 sq.ft.
<b><i>Front Yard</i></b>	50' x 493'	24,650 sq.ft.
<b><i>Western Side Yard</i></b>	20' x 778'	15,560 sq.ft.
<b><i>Eastern Side Yard</i></b>	20' x 741'	14,820 sq.ft.
<b><i>TOTAL EXCLUDED</i></b>		<b>56,330 sq.ft.</b>
<b><i>Usable Acreage</i></b>	396,968 sq.ft. – 56,330 sq.ft.	340,638 sq.ft. or <b>7.8 acres</b>

Per the usable acreage of 7.8 acres, the applicant can be permitted to have no more than 16 horses on the property.

- The performance standards require a 100-foot setback for any stables or housing for horses, where the adjacent property is under different ownership. In this situation, the applicant has a contract to purchase the property and if the Special Use Permit is approved, all the surrounding property would be owned by other persons and the proposed barn would need to be 100 feet from the property lines. This requirement would require the barn to be relocated further into the property than is shown on the sketch plan.
- The performance standards also require that “stables, pastures, or animal yards shall not be utilized for the keeping of horses in any manner that is detrimental to the use of adjacent property or that, because of odor, noise or attraction of flies or other pests, reduces or otherwise unreasonable restricts the rights of adjacent property owners to enjoy the use of their property.” The Zoning Ordinance does not require buffers for commercial stables; however, staff has proposed a condition to require a 25-foot buffer between the pastures and parking areas and adjacent properties to offer some protection and buffering to the current and any future adjacent property owners.

7. The performance standards have additional standards requiring that horses not be stabled, pastured, or otherwise kept within 1,000 feet of drinking water reservoirs or within 100 feet of any active wells. The applicant has not identified any active wells on the sketch plan and there is no drinking water reservoir within the area. During the site plan process the applicant will need to identify any active wells in the area and show that they will keep horses from coming within 100 feet (or such other distances as may be required by the Virginia Administrative Code provisions if they become the applicable regulation as is proposed to be the case under a text amendment being considered).
8. Manure or animal waste are also regulated in the standards and are not allowed to be stored, stockpiled, or permitted to accumulate in a way that attracts flies or pests. The applicant has located the manure handling area in the northwest corner of the property. No enclosure is noted in the application for the manure handling area, so a condition has been proposed to locate this area no less than 25 feet from the property and to require landscaping to be planted around the area. Additionally, manure is not to contaminate or pollute any stream, well, watercourse, or drainageway, natural or manmade. The manure handling area is located away from such areas.
9. The applicant has provided a soil conservation and management plan that addresses many environmental conditions on the property including soil types, texture, slopes, environmentally sensitive areas, and other soil fertility and management capabilities. The plan describes the methods for removal of horse manure and sets out standards of care for the pasture areas.
10. For commercial stables, the Zoning Ordinance requires at least one parking space for every five stalls. No boarding of horses is proposed to occur on the property and much of the parking will be needed for those attending riding or safety classes. The applicant stated that a maximum of six to eight persons will be on the property for such lessons; therefore, a proposed condition has been included to require a minimum of ten parking spaces (eight for students and two for instructors), or the number as set out in the Zoning Ordinance, whichever is greater.
11. VDOT has reviewed the application, stating that the existing roadways are adequate to handle the trips from the stable operation. The only stipulations VDOT requires would be that the existing stop sign at Hansford Lane and Seaford Road remain in place and that there be adequate sight distance at this intersection.

### **RECOMMENDATION**

The proposed commercial stable is a low-intensity use and a horsekeeping operation in a low-density residential setting such as the subject area should not have any adverse impacts on its surroundings. Staff is of the opinion that the proposed commercial use will not alter the residential character of the area as long as the operation conforms to the recommended conditions and Zoning Ordinance performance standards. Therefore, based on the considerations and conclusions outlined above, staff recommends that the

Commission forward this application to the Board of Supervisors with a recommendation of approval, subject to the conditions set forth in proposed Resolution No. PC13-28.

EWA

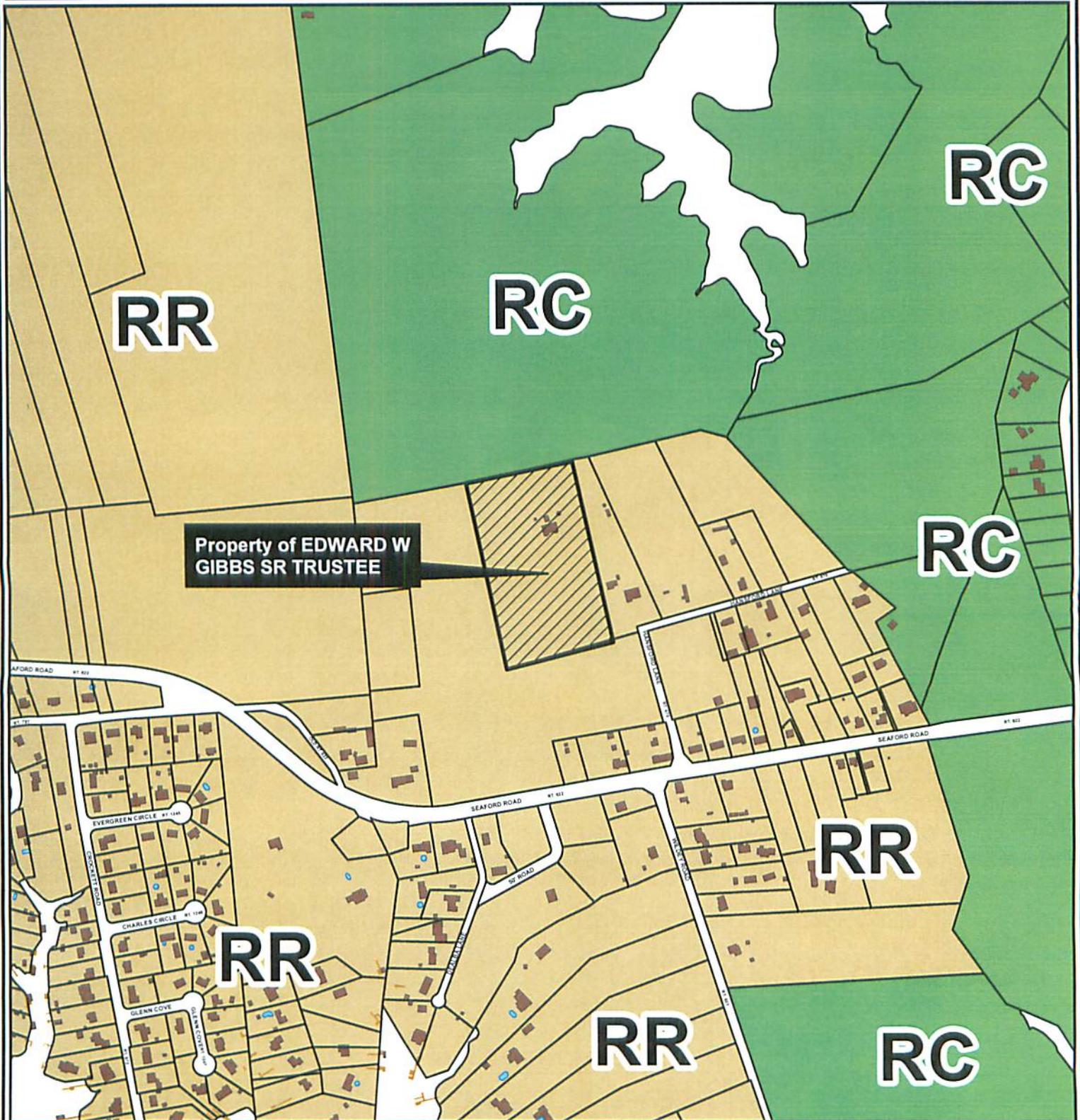
Attachments:

- Zoning Map
- Sketch Plan - Existing
- Sketch Plan – Proposed
- Nutrient Management Plan excerpt
- Proposed Resolution No. PC13-28

**APPLICANT** Kristen Paster  
Request to authorize the establishment  
of a commercial stable.  
201 Hansford Lane

# ZONING MAP

APPLICATION NUMBER: UP-835-13



Printed on August 7, 2013



SOURCE: YORK COUNTY  
GIS PARCEL DATA and  
ZONING COVERAGE

THIS IS NOT A LEGAL PLAT.  
This map should be used for  
information purposes. It is not  
suitable for detailed site planning.

BASIS: P.B.12 PG.331

NOW OR FORMERLY  
SEEFORD, LLC  
GPN: V09c-1400-0029  
INST. #110010380  
INST. #110010031 (PLAT)

CENTERLINE EARTH DITCH  
(NOT A PERENNIAL STREAM)

N02°37'13"W 827.64'

8.5'x12'  
FRAME  
SHED

V09c-1597 0316

**PARCEL "A"**  
9.113 ACRES  
386,968 S.F.

OPEN GRASS / FIELD  
500' RMA

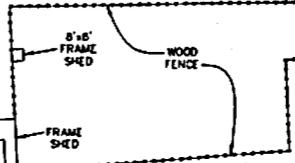
CENTERLINE EARTH DITCH  
(NOT A PERENNIAL STREAM)

N86°55'23"E 369.93'

NOW OR FORMERLY  
TRANQUIL HARBOR LAND CO.  
GPN: V09c-1550-1378  
D.B.676 PG.714

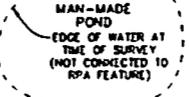
NOW OR FORMERLY  
SEEFORD, LLC  
GPN: V09c-1400-0029  
INST. #110010380  
INST. #110010031 (PLAT)

S84°12'06"W 493.24'



BLOCK FOUNDATION ONLY

FRAME GATEBO



MAN-MADE POND  
EDGE OF WATER AT  
TIME OF SURVEY  
(NOT CONNECTED TO  
RPA FEATURE)

S03°01'37"E 223.91'

S03°29'45"E

566.83'

100' RPA

20' PRIVATE R/W EASEMENT FOR  
ACCESS TO PARCEL "B"

PARCEL "A"  
P.B.12 PG.331  
NOW OR FORMERLY  
EDWARD W. GIBBS, JR.  
GPN: V09c-1825-0343  
INST. #030039099

612.2 TO  
SEAFORD ROAD  
S.R.622

HANSFORD LANE  
VARIABLE WIDTH PUBLIC R/W

APPROXIMATE LOCATION  
OF SEAWARD EDGE OF  
RPA FEATURE

RECEIVED  
YORK COUNTY  
OCT 16 2013

LINE DATA TABLE		
LINE	BEARING	DISTANCE
L1	N88°41'07"E	91.58'
L2	N88°43'27"E	20.69'

SYMBOLS:

- PIPE FOUND
- IRON ROD SET
- IRON ROD FOUND
- CONC. MONUMENT

NOTE:  
THE CHESAPEAKE BAY PRESERVATION AREAS ENVIRONMENTAL &  
SHOWN HEREON ARE SUBJECT TO REVIEW BY DEVELOPMENT SERVICES  
CONFIRMATION BY YORK COUNTY.  
JOB LOCATION: #201 HANSFORD LANE

PLAT OF THE PROPERTY OF:

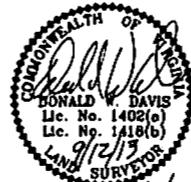
KRISTEN PASTER

**PARCEL "A"**

FAMILY SUBDIVISION OF THE PROPERTY OF  
WILLIAM AVERY GIBBS  
COUNTY OF YORK, VIRGINIA  
P.B.12 PG.331

NOTE:  
PROPERTY SHOWN HEREON IS LOCATED  
IN ZONE AE (EL. 7.7') AS SHOWN ON FLOOD  
INSURANCE RATE MAP COMMUNITY  
NUMBER 510182, MAP NUMBER 51199C0210C  
EFFECTIVE DATE: JUNE 16, 2009.

NOTE:  
THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT  
OF A TITLE REPORT. PROPERTY MAY BE SUBJECT TO  
EASEMENTS AND SERVITUDES OF RECORD.



DAVIS & ASSOCIATES, P.C.  
SURVEYORS - PLANNERS  
YORK COUNTY, VIRGINIA

CODE: 13-0462 DWN:BY: TH SCALE: 1"=60' TO: FIFTH DATE: SEPTEMBER 12, 2013

REvised: OCTOBER 15, 2013  
Chris Bay Area

EXISTING

BASE: P.B.12 PG.331

NOW OR FORMERLY  
SEEFORD, LLC  
CPIN: V09c-1400-0029  
INST. #110010380  
INST. #110010031 (PLAT)

NOW OR FORMERLY  
SEEFORD, LLC  
CPIN: V09c-1400-0029  
INST. #110010380  
INST. #110010031 (PLAT)

NOW OR FORMERLY  
TRANQUIL HARBOR LAND CO.  
CPIN: V09c-1550-1378  
D.B.878 PG.714

HANSFORD LANE  
VARIABLE WIDTH PUBLIC R/W

012'± TO  
SEAFORD ROAD  
S.R.622

CENTRIQUE EARTH DITCH  
(NOT A PERENNIAL STREAM)

N02°37'13"W — 827.64'

PARCEL "A"  
9.113 ACRES  
398,968 S.F.

Pasture

Pasture

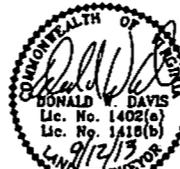
PARCEL "A"  
P.B.12 PG.331  
NOW OR FORMERLY  
EDWARD W. GIBB, JR.  
CPIN: V09c-1825-0343  
INST. #030039099

20' PRIVATE R/W EASEMENT FOR  
ACCESS TO PARCEL "B"

LINE DATA TABLE		
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INSURANCE RATE MAP COMMUNITY  
NUMBER 510182, MAP NUMBER 51199C0210C  
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NOTE:  
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OF A TITLE REPORT. PROPERTY MAY BE SUBJECT TO  
EASEMENTS AND SERVICITUDES OF RECORD



Rev: 10/15/13

SYMBOLS:

- PIPE FOUND
- IRON ROD SET
- IRON ROD FOUND
- CONC. MONUMENT

I HEREBY CERTIFY THAT THE  
SURVEY REPRESENTED BY THIS  
PLAT WAS MADE BY ME ON  
THIS DATE AND IS CORRECT  
TO THE BEST OF MY KNOW-  
LEDGE AND BELIEF THERE ARE  
NO ENCROACHMENTS OF BUILD-  
INGS UNLESS SHOWN HEREON.

DAVIS & ASSOCIATES, P.C.  
SURVEYORS - PLANNERS  
YORK COUNTY, VIRGINIA

CODE: 13-0462

DWN BY: TH

SCALE: 1"=60'

TO: FIRTH

DATE: SEPTEMBER 12, 2013

NOTE:  
THE CHESAPEAKE BAY PRESERVATION AREAS ENVIRONMENTAL &  
SHOWN HEREON ARE SUBJECT TO REVIEW DEVELOPMENT SERVICES  
CONFIRMATION BY YORK COUNTY.  
JOB LOCATION: #201 HANSFORD LANE  
PLAT OF THE PROPERTY OF:

KRISTEN PASTER

Proposed  
Yorktown  
Stables

RECEIVED  
YORK COUNTY  
OCT 16 2013

REVISED: OCTOBER 15, 2013  
Chris Bay Area

**NUTRIENT MANAGEMENT PLAN IDENTIFICATION**

**Operator**  
Kristen Paster  
236 Hansford Ln  
Seaford, VA 23696  
757-291-3207

**Integrator:** None

**Farm Coordinates**  
Easting: 0, Northing: 0, zone: 17

**Watershed Summary**  
Watershed: CB 21  
County: York

**Nutrient Management Planner**  
Alton L. Dews, Jr.  
7300 Flannigan Mill Rd  
Mechanicsville, VA. 23111

**Certification Code:** 134

**Acreage Use Summary**  
Total Acreage in this plan: 9.1  
Cropland: 0.  
Hayland: 0.  
Pasture: 6.4  
Specialty: 2.7

**Livestock Summary**  
Beef Cattle 0  
Dairy Cattle 0  
Poultry 0  
Swine 0  
Other 0

**Manure Production Balance**

	Imported	Produced	Exported	Used	Net
kgals	0.	0.	0.	0.	0.
tons	0.	0.	0.	0.	0.

Plan written 9/15/2013  
Valid until 9/15/2016

Signature: \_\_\_\_\_

Planner

9/15/13  
date

## **Plan Narrative**

This ***Nutrient Management Plan*** has been developed specifically for Kristen Paster of Yorktown Stables, whose operation is located within the county(s) of York, Virginia, and is to be implemented and followed for a period of three(3) calendar years. Yorktown Stables is an equine English Riding, training, and boarding facility made up of 9.11 acres consisting of 1 pasture (paddock) area, a riding and training ring, a barn with sacrifice lot, and small pond. It is recommended that the pasture be divided into several paddocks and rotate horses between paddocks to prevent over-use and over-grazing.

The facility's proximity to waterways, drainage ditches, and marshland coupled with the predominant soil types Nimmo (a shallow environmentally sensitive fine sandy loam) and Tomotley (also fine sandy loam but not as shallow) demands special consideration on uses and fertility treatments. Information pertaining to these soils, setbacks, and other environmental concerns is included in this 'Plan' immediately following this narrative and should be observed and followed. Any changes to this plan, should be addressed in the form of a revised plan by contacting the planner (AL Dews).

The manure collected in confined areas including the barn and sacrifice lot will be temporarily stored at least 100' from surface water and hauled offsite on a regular basis to avoid runoff and groundwater contamination. Pasture manure should be evenly distributed (dragged) on a regular basis to avoid potentially similar contamination. Pastures mostly consist of Fescue grass, a cool season grass cover. Overseeding fescue with annual or perennial ryegrass in the Fall (September or October) will enhance the pasture's grazing quality and will ensure a better ground cover year round. More on these recommendations will be addressed in the 'balance sheet' section.

Fertility recommendations are a direct result of current {within three(3) years} soil test analysis which represent the foundation of this entire plan. Other considerations include but are not limited to:

1. soil type, texture, and slope
2. productivity index (capability of soil type for pasturing)
3. environmentally sensitive soils with high leaching potential
4. slope >15% (HEL), leaching, frequent flooding, and shallow soils
5. organic forms of fertility if applicable (manures)
6. soil loss or runoff
7. pH control (Lime)
8. timing of fertility applications
9. management capabilities and goals of owner
10. local and state environmental regulations

## Plan Narrative

Also consider a consistent weed control program by mowing on a regular basis and applying herbicides when necessary to avoid competition to grass and potentially harmful plants. Refer to details in "Horse Pastures" enclosed.

The data used in the form of maps and acreage was obtained from the Web Soil Survey and the owner/operator of Yorktown Stables. Please refer to enclosed documents for specific field by field information. i.e. nutrient balance sheets, productivity summaries, individual field characteristics, maps, and other pertinent information. **If other forms of nutrient supplements (biosolids, animal manures, etc...) are going to be used, you must substitute new recommendations from either the planner or the supplier.** Micronutrient needs and considerations will be addressed in the final meeting for questions, explanations, and directions for implementation.

It is important to note that special consideration must be given to environmentally sensitive areas such as nearby waterways and wells. In addition, properly maintain and calibrate application equipment, control erosion, and focus on solid pH levels to maximize nutrient uptake while minimizing leaching and runoff. **No commercial fertilizers shall be applied to frozen or snow-covered ground. Also, do not allow active gully erosion and follow all conservation efforts set forth in this plan in order to minimize soil loss and ultimately achieve "T" (soil loss tolerance).** By implementing this nutrient management plan correctly, using realistic goals and good old fashion common sense, you will be contributing to a better overall quality of life for you, your family, and the local environment.

**Please note this plan is a direct result of conservation efforts promoted through your local Soil and Water Conservation District (SWCD) and the Natural Resource Conservation Service (NRCS) and York County. The owner/operator has agreed to follow specific conservation practice recommendations set forth in this plan, as well as, the NRCS Conservation Plan if applicable. A record keeping worksheet will be provided by the planner or NRCS to be properly filled out and kept up to date. All nutrient application rates, dates and methods of application, weather and other information should be recorded. Any questions can be addressed by the plan writer or your local SWCD and NRCS office.**

I have provided detailed instruction for plan implementation and contact information, and to the best of my knowledge this plan accurately meets the requirements set forth in DCR's required "Plan Content" regulations as set forth in the latest version of Virginia Nutrient Management Standards and Criteria.

## Farm Summary Report

**Plan:** Yorktown Stables Fall, 2013 - Fall, 2016

**Farm Name:** Yorktown Stables

**Location:** York

**Specialist:** Alton L. Dews, Jr.

**N-based Acres:** 8.2

**P-based Acres:** 0.0

**Tract Name:** Yorktown Stables

**FSA Number:** T-201

**Location:** York

**Field Name:** 201

**Total Acres:** 6.40 **Usable Acres:** 6.40

**FSA Number:** #1

**Tract:** town Stables

**Location:** York

**Slope Class:** A **Hydrologic Group:** C

**Riparian buffer width:** 0 ft

**Distance to stream:** 0 ft

### **Conservation Practices:**

Pasture (>75% cover)

### **P-Index Summary**

N-based

Phosphorus Limit method: Phosphorus Environmental Threshold (PET) method

%slope: 0.0 Slope Len: 0. R factor: 0.0 K factor: 0.0

T factor: 0.0 P factor: 1.0 Cmax: 0.000 Erosion: 0.0 tons/acre

### **Soil Test Results:**

DATE	PH	P	K	Lab
Fa-2013	5.1	M(30 P lbs/acre)	L(43 K lbs/acre)	Virginia Tech

MOST RECENT LIME: Fall-2014 1.0 tons/acre

**Soils:**

PERCENT	SYMBOL	SOIL SERIES
50	24	Nimmo
50	33	Tomotley

**Field Warnings:**

*Environmentally Sensitive Soils due to:*

*Soils with high potential for subsurface lateral flow based on soil texture and poor drainage*

**Field Name:** Barn  
**Total Acres:** 0.50 **Usable Acres:** 0.50  
**FSA Number:** 1  
**Tract:** town Stables  
**Location:** York  
**Slope Class:** A **Hydrologic Group:** C

Riparian buffer width: 0 ft  
Distance to stream: 0 ft

**P-Index Summary**

N-based

Phosphorus Limit method: Phosphorus Environmental Threshold (PET) method

%slope: 0.0 Slope Len: 0. R factor: 0.0 K factor: 0.0  
T factor: 0.0 P factor: 1.0 Cmax: 0.000 Erosion: 0.0 tons/acre

**Soil Test Results:**

DATE	PH	P	K	Lab
[NO TEST]				

**Soils:**

PERCENT	SYMBOL	SOIL SERIES
50	24	Nimmo
50	13	Dragston

**Field Warnings:**

*Environmentally Sensitive Soils due to:*

*Soils with high potential for subsurface lateral flow based on soil texture and poor drainage*

**Field Name:** Ring  
**Total Acres:** 1.25 **Usable Acres:** 1.25  
**FSA Number:** 1  
**Tract:** town Stables  
**Location:** York  
**Slope Class:** A **Hydrologic Group:** C

**Riparian buffer width:** 0 ft  
**Distance to stream:** 0 ft

**P-Index Summary**

N-based

Phosphorus Limit method: Phosphorus Environmental Threshold (PET) method

%slope: 0.0    Slope Len: 0.    R factor: 0.0    K factor: 0.0  
 T factor: 0.0    P factor: 1.0    Cmax: 0.000    Erosion: 0.0 tons/acre

**Soil Test Results:**

DATE	PH	P	K	Lab
[NO TEST]				

**Soils:**

PERCENT	SYMBOL	SOIL SERIES
100	13	Dragston

**Field Warnings:**

### Field Productivities for Major Crops

Tract Name	Tract/ Field	Field Name	Acres	Predominant Soil Series	Corn	Small Grain	Alfalfa	Grass Hay	Environmental Warnings
Yorktown Sta	T-201/#1	201*	6	Nimmo	IVa	III	Not Suited	IV	Poor Drainage
	T-201/1	Barn*	1	Nimmo	Ila	I	Not Suited	II	Poor Drainage
	T-201/1	Ring	1	Dragston	Ila	I	Not Suited	II	

\* Do not apply manure or biosolids more than 30 days prior to planting. Apply commercial fertilizer nitrogen to row crops in split spring applications.

### Yield Range

Field Productivity Group	Corn Grain Bu/Acre	Barley/Intensive Wheat Bu/Acre	Std. Wheat Bu/Acre	Alfalfa Tons/Acre	Grass/Hay Tons/Acre
I	>170	>80	>64	>6	>4.0
II	150-170	70-80	56-64	4-6	3.5-4.0
III	130-150	60-70	48-56	<4	3.0-3.5
IV	100-130	50-60	40-48	NA	<3.0
V	<100	<50	<40	NA	NA

**Soil Test Summary**

<b>Tract</b>	<b>Field</b>	<b>Acre</b>	<b>Date</b>	<b>P2O5</b>	<b>K2O</b>	<b>Lab</b>	<b>Soil pH</b>	<b>Lime Date</b>	<b>rec. lime tons/Ac</b>
Yorktown Stables	201	6	2013-Fa	M (30 P lbs/acre)	L (43 K lbs/acre)	Virginia Tech	5.1	2014Fa	1.
Yorktown Stables	Barn	1	[No Test]						
Yorktown Stables	Ring	1	[No Test]						

**Application Summary Report**

**2013: Fescue grass (hay), maint.**

Tract	Field	Acres	Manure Rate and Type (Season)	Broadcast Commercial	Banded Commercial	Topdress Commercial	Lime (tons)
Yorktown Stabl	201	6.4		30-50-130(Fa)			2.0 (Fa)

**2013: Fallow**

Tract	Field	Acres	Manure Rate and Type (Season)	Broadcast Commercial	Banded Commercial	Topdress Commercial	Lime (tons)
Yorktown Stabl	Barn	.5		0-0-0(Fa)			
	Ring	1.3		0-0-0(Fa)			

**2014: Fescue grass (hay), maint.**

Tract	Field	Acres	Manure Rate and Type (Season)	Broadcast Commercial	Banded Commercial	Topdress Commercial	Lime (tons)
Yorktown Stabl	201	6.4		30-50-130(Fa)		40-0-0(Sp)	1.0 (Fa)

**2015: Fescue grass (hay), maint.**

Tract	Field	Acres	Manure Rate and Type (Season)	Broadcast Commercial	Banded Commercial	Topdress Commercial	Lime (tons)
Yorktown Stabl	201	6.4		30-50-130(Fa)		40-0-0(Sp)	

**2016: Fescue grass (hay), maint.**

Tract	Field	Acres	Manure Rate and Type (Season)	Broadcast Commercial	Banded Commercial	Topdress Commercial	Lime (tons)
Yorktown Stabl	201	6.4				40-0-0(Sp)	

# Virginia Cooperative Extension Soil Test Report

**Questions? Contact:**  
 York County Office  
 P.O. Box 532  
 Yorktown, VA 23690-0532  
 757-890-4940

Virginia Tech Soil Testing Laboratory  
 145 Smyth Hall (0465)  
 Blacksburg, VA 24061  
 www.soiltest.vt.edu

SEE NOTES:  
**X 1 17**

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R**  
**PASTER KRISTEN**  
**236 HANSFORD LANE**  
**SEAFORD, VA 23696**

**C F  
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P R  
Y**

### SAMPLE HISTORY

Sample ID	Field ID	LAST CROP		LAST LIME APPLICATION		SOIL INFORMATION				
		Name	Yield	Months Prev.	Tons/Acre	SMU-1 %	SMU-2 %	SMU-3 %	Yield Estimate	Productivity Group
YS201										

### LAB TEST RESULTS (see Note 1)

Analysis	P (lb/A)	K (lb/A)	Ca (lb/A)	Mg (lb/A)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	B (ppm)	S.Salts (ppm)
Result	30	43	518	90	1.7	3.8	0.5	53.5	0.1	38
Rating	M	L	L+	M-	SUFF	SUFF	SUFF	SUFF	SUFF	L

Analysis	Soil pH	Buffer Index	Est.-CEC (meq/100g)	Acidity (%)	Base Sat. (%)	Ca Sat. (%)	Mg Sat. (%)	K Sat. (%)	Organic Matter (%)
Result	5.1	6.18	3.0	43.2	56.8	42.7	12.3	1.8	1.8

### FERTILIZER AND LIMESTONE RECOMMENDATIONS

\*\*\*FAX: 757-599-0504

Crop: NEW LAWN ESTAB. - BLUEGRASS, FESCUE (201)

**611. LIME RECOMMENDATIONS:** Apply 80 pounds of agricultural limestone (ground or pulverized) per 1000 square feet. Disk or rototill 6" deep into the soil. If it is not possible to incorporate the lime, make several small applications of up to 50 lbs each, at intervals of 1 to 6 months, until the full amount is applied.

990. We are trying to improve our service. PLEASE take a moment to complete our brief, anonymous customer survey at [tinyurl.com/soiltestsurvey](http://tinyurl.com/soiltestsurvey)

991. Numbered notes are viewable at <http://www.soiltest.vt.edu/Files/publications.html>

**201. FERTILIZER RECOMMENDATIONS:** Apply a 1-2-1 ratio fertilizer (examples of grades to use are 5-10-5, 15-30-15, etc.) Using the rate listed in the "1.0" LB. nitrogen column in Table 2 in the note on lawn fertilization. Be sure to incorporate the fertilizer into the soil (along with lime, if needed) to a depth of 4 to 6 inches. After the turf has been established (6 to 8 weeks) follow one of the maintenance fertilization programs described in the Note. **OPTIONAL PROGRAM** If 0-46-0 or a nitrogen-only fertilizer is not available, they can both be replaced by using a complete fertilizer with a 1-2-1 ratio (examples of grades to use are 5-10-5, 15-30-15, etc.) using the rate listed in the "1.0" lb. nitrogen column in Table 2 in the Note on lawn fertilization. **NOTE** - This optional program, while meeting the turf's nutrient needs, provides extra potash which is not necessary for optimum growth.

677. Soluble Salts are not high enough to cause salt injury.

**Nutrient Management Plan Balance Sheet**  
**(Fall, 2013-Fall, 2016)**  
**Yorktown Stables**  
**Planner: Alton L. Dews, Jr. (cert. No. 134)**

Tract: Yorktown Stables      Location: York  
(N = N based, 1P = P based, 1.5P = P based at 1.5 removal, 0P = No P allowed)

Field CFSA No. /Name	Size (ac) Total/ Used	Yr.	Crop	Needs N-P-K (lbs/ac)	Leg /Man Resid	Manure/Biosid Rate & Type (season)	IT (d)	Man/Bios N-P-K (lbs/ac)	Net = Needs - appld N-P-K (lbs/ac)	Sum P rem cred	Commercial N-P-K (lbs/ac)	Notes
#1/201(N)	6/6	2013	Fescue grass hay mt.	70-50-130	0/0				70-50-130	N/A	30-50-130(br)	1
		2014	... ..	70-50-130	0/0				70-50-130	N/A	40-0-0(td) 30-50-130(br)	1
		2015	... ..	70-50-130	0/0				70-50-130	N/A	40-0-0(td) 30-50-130(br)	1
		2016	... ..	70-50-130	0/0				70-50-130	N/A	40-0-0(td)	
1/Barn(N)	1/1	2013	Fallow	0-0-0	0/0				0-0-0	N/A	0-0-0(br)	2
		2014	... ..	---								
		2015	... ..	---								
		2016	... ..	---								
1/Ring(N)	1/1	2013	Fallow	0-0-0	0/0				0-0-0	N/A	0-0-0(br)	2
		2014	... ..	---								
		2015	... ..	---								
		2016	... ..	---								

**Commercial Application Methods:**

br - Broadcast ba - Banded sd - Sidedress

**Notes:**

- 1 Please refer to 'Horse Pasture Management' section of this 'Plan' for rotation of animals as to avoid over grazing and over use of paddocks.
- 2 No fertilizer can be applied to this area, and soil loss due to erosion must be avoided. Please refer to erosion prevention techniques.

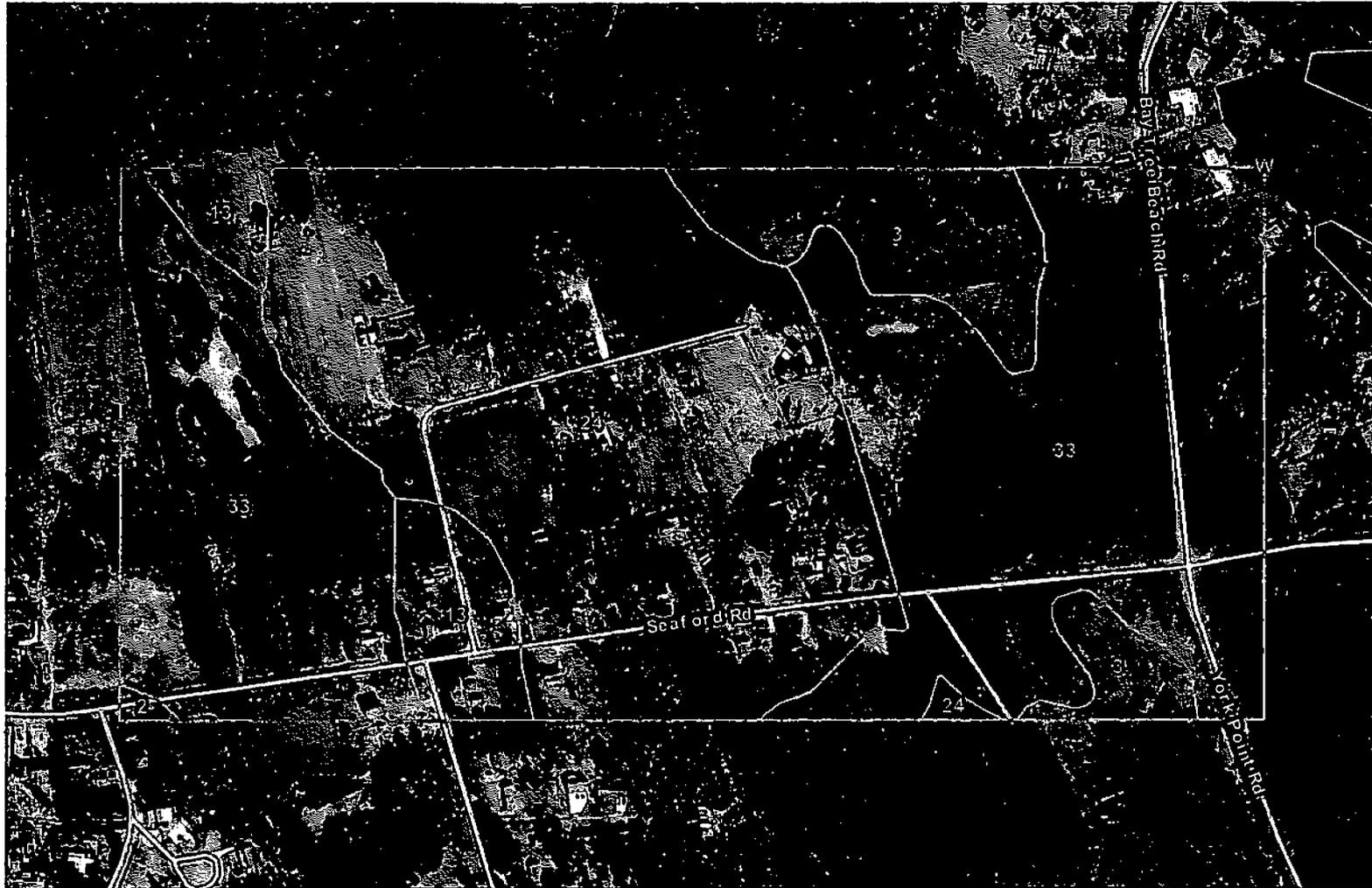
Soil Map—James City and York Counties and the City of Williamsburg, Virginia  
(Firth soils)

76° 28' 44" W

76° 28' 00" W

37° 11' 37" N

37° 11' 39" N



37° 11' 17" N

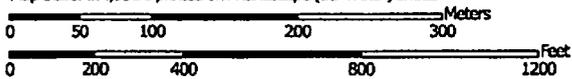
37° 11' 17" N

76° 28' 44" W

76° 28' 00" W

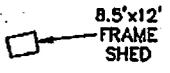


Map Scale: 1:4,950 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84

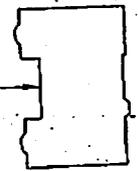
827.64'



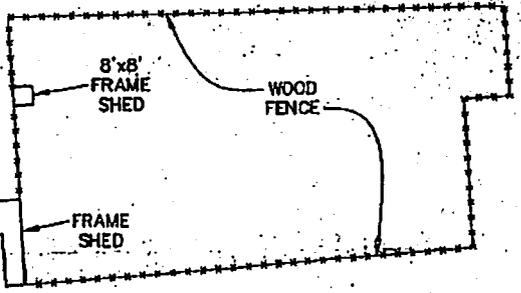
**PARCEL "A"**  
9.113 ACRES  
396,968 S.F.

Entrance

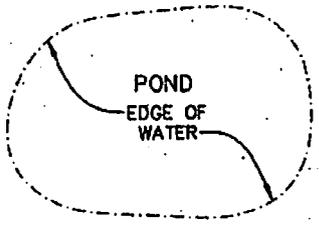
BLOCK  
FOUNDATION  
ONLY



FRAME  
SHED



FRAME  
GAZEBO



CENTERLINE EARTH DITCH

L1

N86°55'23"E 369.93'

L2

S03°01'37"E 223.91'

S03°29'45"E 566.83'

To see all the details that are visible on the screen, use the "Print" link next to the map.

Google



### Orchardgrass/Fescue (Tall Grass) Hay Production, Soil Productivity Groups III, IV

<u>Soil Test Level</u>	<u>Nutrient Needs (lbs/ac)</u>		
	<u>N</u>	<u>P<sub>2</sub>O<sub>5</sub></u>	<u>K<sub>2</sub>O</u>
L	60-80*	70-90	120-150
M	60-80*	40-60	80-110
H	60-80*	40	40-70
VH	60-80*	0	0

\* N recommendation is for a March application of commercial fertilizer.

For additional fall hay production apply 60-80 lbs N/acre in late August/early September. Do not apply more than 160 lbs N/acre/year.

Organic nutrient sources may be applied in one or more applications, not to exceed 160 lbs/acre plant available nitrogen annually. If applied after 9/1 of any year until 3/1 of the following year, application rates during this period shall not exceed ½ of the total nitrogen rate (80 lbs/acre).

When applying organic nutrient sources, fields should be maintained at no less than three inches in height in order to reduce runoff and assure adequate regrowth of crop.

### Bermudagrass Establishment

<u>Soil Test Level</u>	<u>Nutrient Needs (lbs/ac)</u>		
	<u>N</u>	<u>P<sub>2</sub>O<sub>5</sub></u>	<u>K<sub>2</sub>O</u>
L	70	100-120	100-120
M	70	70-90	70-90
H	70	40-60	40-60
VH	70	0	0

### Bermudagrass Pastures - Soil Productivity Groups I, II

<u>Soil Test Level</u>	<u>Nutrient Needs (lbs/ac)</u>		
	<u>N</u>	<u>P<sub>2</sub>O<sub>5</sub></u>	<u>K<sub>2</sub>O</u>
L	175-225*	100-120	100-120
M	175-225*	40-90	40-90
H	175-225*	0	0
VH	175-225*	0	0

\* The N recommendation represents the total amount of Nitrogen to be applied during the season. Split the N into three applications - April, June and July.

Organic nutrient sources may be applied in one or more applications, not to exceed 225 lbs./ac. plant available nitrogen annually. If applied after 7/1, application rates shall not exceed ½ the total nitrogen rate (112 lbs/ac.) based on above criteria while crop is still actively growing up to 9/15, with the remaining rate not to be applied until after 4/1 of the following year.

When applying organic nutrient sources, pastures should be maintained at no less than three inches in height in order to reduce runoff and assure adequate regrowth of crop.

### NUTRIENT APPLICATION FIELD RECORD SHEET

Three Rivers Soil & Water Conservation District

Farm(er) Name: \_\_\_\_\_

FSA Farm #	FSA Tract #	FSA Field #(s)	Acres	Crop	Commercial Fertilizer					Manure/Biosolids					Lime	
					Date	Method <sup>1</sup>	Plant Food lbs./acre			Manure Type (Poultry, Dairy, Swine):					Date	Ton(s) Per Acre
							N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Manure or Biosolids?	Date	Incorp Time <sup>2</sup>	Acres Applied	Actual Rate/Acre		

<sup>1</sup> Starter = ST, Broadcast = BR, Top Dress = TD, Side Dress = SD

<sup>2</sup> Incorporation Time: Immediate, greater than two days, (>2 days), >4 days, or >7 days

I certify that the nutrient applications recorded above are true and accurate and comply with recommendations from my nutrient management plan and I am therefore eligible to receive cost-share funding.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

## Section I.A Explanation of Environmentally Sensitive Sites

The regulations define "environmentally sensitive site" to mean any field which is particularly susceptible to nutrient loss to groundwater or surface water since it contains or drains to areas which contain sinkholes; or where at least 33% of the area in a specific field contains one or any combination of the following features:

1. Soils with high potential for leaching based on soil texture or excessive drainage;
2. Shallow soils less than 41 inches deep likely to be located over fractured or limestone bedrock;
3. Subsurface tile drains;
4. Soils with high potential for subsurface lateral flow based on soil texture and poor drainage;
5. Floodplains as identified by soils prone to frequent flooding in county soil surveys; or
6. Lands with slopes greater than 15%.

Table 1-4 contains environmental risk ratings for Virginia soils for criteria 1,2 and 4 listed above. Determine the percentage of field area for soils listed as H (high) for Environmental Sensitivity Rating in Table 1-4 plus any field areas that meet criteria 3, 5 or 6 above to determine if the field is an environmentally sensitive site. Soils listed as moderate risk are not defined as environmentally sensitive, but should be treated with similar caution when making nitrogen recommendations.

The primary reason for the environmental sensitivity rating for each soil listed as high or moderate risk in Table 1-4 is identified by the following key:

**Leaching** - Soils with potential for leaching based on soil texture or excessive drainage

**Shallow** - Shallow soils less than 41 inches deep likely to be located over fractured or limestone bedrock

**Drainage** - Soils with high potential for subsurface lateral flow based on soil texture and poor drainage

The category rating should be used to develop nitrogen application programs to address this concern through rate and timing recommendations.

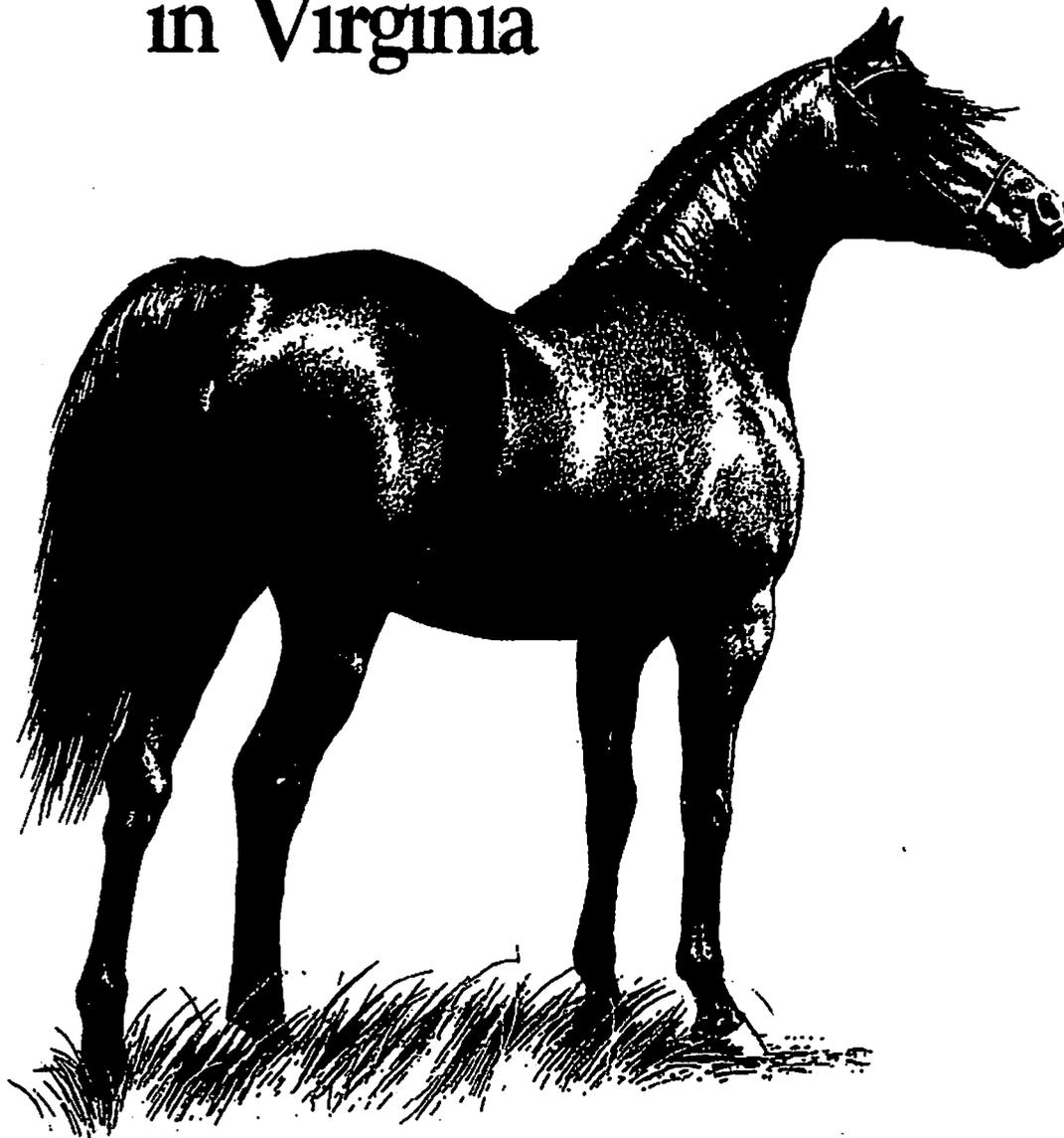
Table 1-4 that follows lists the environmental sensitivity rating and category for each soil in Virginia.

## Section I.B Recommended Setback Areas

In addition to other management practices discussed in this section, animal waste or biosolids shall not be applied within the following setback areas around the specific features listed. Select the category which applies to the plan you are writing. The set-back requirements exist for animal waste and biosolids primarily to reduce the potential for pathogens (such as fecal coliform) to enter surface and ground waters.

- ◆ Setbacks for plans not associated with Biosolids applications, VPA permitted animal operations or DEQ industrial waste application permits.
  - ▶ 100 feet from wells or springs
  - ▶ 50 feet from surface water if surface applied
  - ▶ 25 feet from surface water if injected
  - ▶ 50 feet from sinkholes\*
  - ▶ 50 feet from limestone rock outcrops
  - ▶ 25 feet from other rock outcrops
- \* In addition to the 50 feet setback, manure and biosolids should not be applied in areas subject to concentrated flow generated by runoff from storm events that drains into sinkholes.
  
- ◆ Setback distances for manure applications in plans written as part of a VPA or VPDES permit for confined animal feeding operations.
  - ▶ 100 feet from wells or springs
  - ▶ 100 feet from surface waters (no vegetated buffer) or 35 feet with a vegetated buffer\*\* in place or a DEQ approved conservation practice that will achieve at least equivalent pollutant reductions.
  - ▶ 50 feet from sinkholes\*
  - ▶ 50 feet from limestone rock outcrops
  - ▶ 25 feet from other rock outcrops
  - ▶ 10 feet from agricultural drainage ditches (5 feet if injected)
  - ▶ 200 feet from occupied dwellings (unless waived in writing by the occupant)
- \* Waste shall not be applied in such a manner that it would discharge into sinkholes.
- \*\* Vegetated buffer is a permanent strip of dense vegetation established parallel to the contours of and perpendicular to the dominant slope of the field.

# HORSE PASTURES in Virginia



Virginia Cooperative Extension



VIRGINIA STATE UNIVERSITY

Publication 418-008  
Reprinted 1993



VIRGINIA POLYTECHNIC INSTITUTE  
AND STATE UNIVERSITY

# HORSE PASTURES IN VIRGINIA

Prepared by  
Harlan E. White, Extension Agronomist, Forages

Pastures furnish horses and ponies with high-quality, nutritious feed at a relatively low cost and help to maintain healthy animals by furnishing exercise, sunshine, and fresh air.

The horse is a natural grazing animal. Mature horses and younger horses (perhaps well-developed yearlings) can be maintained on good pasture with no grain during a normal pasture season. Other classes of horses benefit from the supplemental feed and exercise provided by pasture.

Virginia is a transition area between southern, tropical pasture plants and those adapted to cooler conditions to the north. This provides an opportunity to produce a wide range of pasture plants but also requires that different species be grown in various parts of the state. Total moisture availability is adequate in the state, although poor summer distribution sometimes causes dry periods. Productive and favorable temperatures are also present. To take advantage of these pasture potentials, proper management is necessary.

One of the objectives of good horse pasture management is to provide grazing during as much of the year as possible. This means depending on different types of pasture plants during various seasons because there is no pasture plant available which is productive year-round. The three types of pasture plants to be discussed will be the cool-season permanent species, the summer perennials, and the winter annuals.

## **COOL-SEASON PERMANENT PASTURES**

The cool-season perennial grasses and legumes do not have to be seeded each year and are most commonly used for horse pastures in Virginia. Such cool-season plants as Kentucky bluegrass, tall fescue, orchardgrass, ladino clover, and white clover make most of their growth during spring and fall.

Brief descriptions of the commonly grown cool-season pasture plants will help in their identification and management:

**Kentucky bluegrass** - low-growing sod-forming grass. Its leaves are narrow and will reach a length of 7" with tips shaped like the bow of a boat. It has underground rhizomes (stems) which enable it to heal areas where turf becomes torn. This favorite grass for horses is well adapted for pastures in the Northern Piedmont and areas west of the Blue Ridge Mountains.

**Tall fescue** - tall grass which forms dense long-lasting sod. It is somewhat coarse in texture and has a dark, shiny green color. Its leaves are about 1/4" wide at the base, are deeply veined, and are rolled as they emerge from the sheath. Tall fescue is less palatable than most forage grasses during the summer, but is adapted to a wider range of soil conditions in Virginia than any other grass in common use. It is fairly drought tolerant and is especially useful for heavily travelled areas or exercise lots. It also is well suited to accumulate for winter grazing. Many tall fescue plants harbor an endophytic fungus which can cause abortions and other problems in foaling.

**Orchardgrass** - tall grass with a clump-type growth habit. It is widely adapted in Virginia, high in feed value, high yielding, and recovers well after cutting or grazing. It does not tolerate close grazing as well as tall fescue

or bluegrass. Its leaves are dull green in color and are folded at the base. It grows very well with ladino clover and red clover. Orchardgrass does not persist as well as tall fescue in eastern and southern Virginia, and should be considered a semi-permanent pasture in these areas.

**Timothy** - tall, normally short-lived perennial grass that makes nearly all its growth in the spring, with very little recovery growth after cutting or grazing. Relative to other forage grasses, it does well in poorly drained areas. The leaves of Timothy are erect, light green in color, and gradually taper to a point with a tendency to twist slightly. A small bulb forms at the base of its stem in late spring. It is best suited for the cooler regions of Virginia.

**White clover** - low-growing perennial legume common to all areas of Virginia. The leaves consist of three heart-shaped leaflets. The plant is shallow rooted and does best on fertile soils with good moisture holding capacity. It persists well under close grazing and, because it is low growing, does very well with Kentucky bluegrass.

**Ladino clover** - giant variety of white clover which resembles white clover in every respect except that it is much larger. It is used with the tall pasture grasses such as orchardgrass and tall fescue. Ladino is adapted to all areas of Virginia but does best on fertile soils with good water-holding capacity.

**Red clover** - short-lived perennial legume. It grows to a height of about 18" and has numerous leafy stems arising from a crown. Its stems and leaves are usually hairy. Flowers are reddish-purple and are borne on heads at the tips of the branches. Its root system consists of a tap root with many side branches. It is adapted to all parts of Virginia and does best on deep, well drained, heavy-textured soils.

A basic goal of pasture management is to maintain a balance of about 40% clover and 60% desirable grass in the sod. Clover provides nitrogen for the grass and improves the feed value of the pasture.

Seeding dates, mixtures, seeding rates, and region of adaptation in the state for these plants are shown in Tables 1 and 2.

<b>Region</b>	<b>Spring Seeding</b>	<b>Fall Seeding</b>
Northern Piedmont and West of Blue Ridge	March 1 - April 15	After first good rain in August to September 15
Middle and Southern Piedmont	February 1 - April 1	After first good rain in August to October 1
Eastern Virginia	February 1 - March 15	After first good rain in August to October 15

<b>Table 2. Permanent Cool-Season Horse Pasture Mixtures For Virginia</b>			
		<b>Seeding Rate - Lbs/A</b>	<b>Region of Adaptation</b>
<b>Mixture 1*</b>	Orchardgrass	3-5	Northern Piedmont and West of Blue Ridge
	Kentucky bluegrass	10-15	
	White clover	1-3	
<p>* Timothy may also be added for Northern Virginia at the rate of 3-5 lbs/A. If Timothy is included, reduce bluegrass seeding rate to 3-5 lbs/A. This mixture may be grazed either continuously or rotationally. Under continuous grazing it will become a bluegrass-white clover pasture. The productive period of orchardgrass will be increased by rotational grazing, or grazing down to 1.5" - 2" then removing the horses to allow recovery growth to 5" - 10" before grazing again.</p>			
<b>Mixture 2*</b>	Tall Fescue	10-14	
	Ladino clover or White Clover	1-2	All sections of the state
	Red clover	3-4	
<p>* Widely adapted and is suitable for moderately to poorly drained soils, as well as moderately droughty soils. Grazing may be continuous if the pasture is not overgrazed to the point where the plants are kept grazed down closer than 2".</p>			
<b>Mixture 3*</b>	Orchardgrass	8-12	
	Ladino clover or white clover	1-2	All sections of the state though it does not persist in eastern and southern Virginia
	Red clover	3-4	
<p>* Provides high quality pasture which yields well. It is only moderately drought tolerant and should be placed on well-drained soils. For best utilization, graze down to from 1.5" - 2", then remove the horses to allow recovery growth to 5-10". Also is an excellent mixture for hay.</p>			

### **Management of Cool-Season Permanent Pastures**

#### **Renovation**

Often an older perennial pasture can be renovated or reseeded without plowing the old sod. If the existing pasture has a 50 percent stand of desirable plants, it can often be improved by liming and fertilizing according to soil tests, disking lightly, and seeding grasses and/or legumes.

It may also be overseeded by disking lightly, scattering the seed on the soil surface or drilling with a conventional grain drill or sod seeder. Regardless of seeding method, the seeding should be made in late winter with the existing plants grazed down to one inch and properly limed and fertilized. If there is less than half a stand of desirable grasses and legumes, it is best to plow or disk heavily and reseed.

#### **No-Till Seeding**

New pastures can be seeded successfully without tillage by using herbicides to kill existing vegetation and then seeding one of the pasture mixtures using a no-till drill. This virtually eliminates soil erosion and greatly reduces the amount of equipment needed. There are a number of variations of no-till seeding procedures. For details, contact the local Extension Office.

### ***Complete Seedbed Preparation***

For spring seedings on areas not subject to erosion, it is often desirable to plow heavy soils the previous fall to allow freezing and thawing to break apart the larger clods. For fall seedings, plow 3-4 weeks before the intended seeding date to allow the soil to absorb moisture and become firm before final seedbed preparation. Plowing in advance will often allow many weed seeds to germinate before the pasture mixture is seeded.

Just prior to seeding, disk lightly to kill the weed seedlings and loosen the soil for seed coverage. The actual seeding may be done with a cultipacker-seeder or with a cyclone-type seeder followed by a cultipacker. Do not cover the seed deeper than 1/4" in heavy soils and 1/2" in sandy soils. Always inoculate the clover seed just prior to seeding to ensure that it will have the ability to fix nitrogen.

### ***Fertilization for New Seedlings***

Take a soil sample so the soil can be tested to determine how much fertilizer and/or lime is needed. Soil boxes, record sheets, and advice on how to take the samples are available from your local Virginia Tech Cooperative Extension office.

On soils low in fertility and pH according to soil test results, apply 1/2 the needed lime before plowing and plow it down. The remainder should be disked-in after the land is plowed. In the absence of a soil test, apply 30 lbs of N, 90-120 lbs of P<sub>2</sub>O<sub>5</sub>, and 60-90 lbs of K<sub>2</sub>O per acre.

### ***Grazing Management***

The goal of sound grazing management is to utilize as much of the available forage as possible and still maintain dense stands of high-feed-value plants.

Do not allow new seedlings to be grazed until the plants have become well established. The root systems should be well developed to avoid the seedlings being pulled out of the soil by grazing animals and to reduce damage to the stand by running horses.

During an average growing season, two acres of well managed pasture should provide adequate grazing and exercise for a mature horse. If practical, the total pasture acreage should be divided into 2-4 separate pastures. This will permit flexible management such as rotating the horses among pastures to allow pasture clipping, recovery time for heavily grazed areas, and use of other types of stock where practical.

Abortions, foaling difficulties, and milk production problems are often encountered with pregnant mares grazing tall fescue. To avoid these problems, pregnant mares should be removed from tall fescue pastures during the last three months of pregnancy. Other classes of horses have no documented problems when grazing tall fescue.

There are often instances where land is so limited that perhaps only an acre or less is available. If the horse or horses are permitted to use the entire area, it is nearly impossible to maintain a pasture sod with the constant traffic. In such instances, dividing the area into two lots - one lot for exercise with no pasture and the other lot for grazing - is a practical solution. Permit grazing on the pasture sod only when 2-6" of growth are present. Proper fertilization and perhaps irrigation of such an area will provide a surprising amount of grazing and can drastically reduce the feed bill.

In many instances, having different plant species planted in the various pastures makes it possible to provide grazing throughout the year. For example, in the Southern Piedmont and Eastern Virginia, having one pasture planted to Midland, Tifton 44, or Coastal Bermudagrass will ensure that summer grazing is available. Having a pasture of tall fescue provides an opportunity to accumulate the fall growth for grazing during winter. (These latter points are discussed in more detail later).

Regulate grazing to maintain clover in the stand. Tall grass tends to crowd out clover. If the clover is thinning, keep the pasture grazed or clipped to reduce grass competition and to give the clover stand an opportunity to thicken.

Plan to remove the animals from pastures during very wet soil conditions, since horses can damage even a well-established pasture sod considerably by running, stopping and turning sharply. This rips the sod, leaving bare areas and often holes.

Under continuous grazing, horse pastures are not uniformly grazed because horses are spot-grazers. They overgraze certain areas while other parts of the pasture are undergrazed. However, there are management practices which will help to overcome the problems caused by these grazing habits.

Never allow pastures or portions of them to become overgrazed. Before pasture plants are eaten into the ground, move the animals to another area. Keeping pastures grazed down continuously below 2" weakens and thins the stand, allowing weeds to invade. It is not generally harmful to graze down to 2" if the horses are then removed and the plants allowed to recover.

Undergrazed areas of the pasture which have mature growth with seed heads present should be clipped in the spring. At least two more clippings during the summer and early fall will promote uniform grazing and aid in controlling weeds.

Piles of manure droppings contribute to uneven grazing, since horses avoid these spots. The plants in these areas make rapid growth due to the added fertility producing lush forage which is often wasted. Scattering the manure periodically during the year will reduce this problem. This can be done by pulling a spiketooth harrow, chain, harrow, or similar implement across the pasture. A good time to do this is shortly after clipping the pasture.

There are advantages in grazing different types of livestock on horse pastures. Horses tend to graze only particular areas in the pasture, while cattle and sheep graze more at random. Other types of livestock will also graze around manure piles left by horses, while horses avoid these areas. A combination of livestock keeps pastures grazed more uniformly and helps to maintain them in the high-quality leafy stage of growth. Such a combination not only makes more efficient use of the pastures but offers additional income. Beef animals and horses may be stocked together in the same field, or beef animals may follow horses in the rotation of pastures on the farm.

#### ***Fertilization of Established Pastures***

Soil tests should be made every 2-3 years to determine the fertility status of the soil. Recommendations on the amount of fertilizer to apply will be made based on the results of this soil test. The soil pH should be maintained at about 6.2.

As a general rule, the cool-season mixtures of grass and clover should be fertilized each year with 40-60 lbs of phosphate ( $P_2O_5$ ) and 60-80 lbs of potash ( $K_2O$ ) per acre. If the grass stand is thinning, include 25-50 lbs of nitrogen (N) in this application.

The fertilization rate is also regulated by the need for grazing. Pastures to be heavily stocked should be fertilized at the higher application levels of the suggested range. If additional grazing is not needed, fertilize at the lower level, but apply enough to maintain the stand of desirable plants.

The time of year to apply fertilizer will also depend on the needs for pasture. In most instances, it is desirable to fertilize some of the pastures in early spring (February or March) and some of them in early fall (August or September). Since cool-season grasses make most of their growth during spring and fall, the greatest response from fertilizer is obtained at these times. By dividing the pastures as to time of fertilization, some of the pastures will show the growth response in the fall and some in the spring.

In order to maintain clover in the pasture mixture, it is especially important to maintain adequate levels of lime,  $P_2O_5$ , and  $K_2O$ . As the levels of these nutrients drop, the clovers usually die out before the grasses.

A specialized fertilization program with tall fescue can provide low-cost winter grazing. Graze or clip the tall fescue pasture closely by August 15 and remove all horses. Then apply 60-80 lbs of N per acre and lime,  $P_2O_5$ , or  $K_2O$  as specified by soil test. Allow the resulting growth to accumulate during the fall. When other pastures are grazed down in early winter, turn horses in on the accumulated growth. It is high-quality, inexpensive winter feed.

### **Weed Control**

Weeds lower the feed value of a pasture and compete with desirable plants for water, light, and nutrients. In addition, some of them may be harmful to animals.

Proper fertilization and grazing management are the best weed control measures. If weeds still invade, clipping before the weeds form seeds or crowd out desirable plants is helpful. Selective chemicals are also available to kill many of the broadleaf pasture weeds. Consult with your Extension Agent for the latest recommended chemical control for particular problem weeds.

## **SUMMER PERMANENT PASTURES**

Although cool-season pastures furnish abundant grazing in the spring and fall, they are usually low in productivity during the summer months. Bermudagrass is a warm-season perennial grass that does not break dormancy and begin to grow in the spring until the cool-season plants have already been growing for several weeks. Once the soil warms-up in late spring and early summer, bermudagrass grows rapidly and produces excellent pasture during the hot, often dry, summer months. The first frost in the fall kills the tops back, but by then the cool-season pastures are growing vigorously again. Utilizing the growth habits of both the cool-season and warm-season grasses provides grazing essentially all year.

### **Management**

Bermudagrass prefers an unshaded field with a southern exposure, and a light to medium textured soil. These pastures may be grazed continuously but for highest yields they should be grazed rotationally down to 2", then allowed to recover to 6-12". Always graze the plants down before seedheads develop.

### **Varieties**

Several strains of Common bermudagrass grow wild on farms throughout the Piedmont and Eastern Virginia. Under proper liming, fertilization, and management, many of these strains will produce high yields.

Hybrid forage varieties such as Tifton 44, Midland, and Coastal are recommended for planting new stands, since they are generally higher yielding than Common. Tifton 44 and Midland are the more cold-hardy, and are adapted in most regions of the state at low and medium altitudes. Coastal is less cold-hardy but does well in southeastern Virginia. Since none of these hybrids produce live seed, new stands must be established by planting the underground stems or rhizomes of the grass. These plant portions used for establishment are commonly called "sprigs."

### **Seedbed Preparation**

Prepare a clean, level, firm seedbed by plowing and harrowing as for a normal pasture seeding. If possible, prepare the seedbed in advance and wait until after a rain before planting.

### **Planting**

The sprigs should be planted April 15-July 15 in soil free of Common bermudagrass plants. Plant freshly dug, 6-10" long sprigs every 18-30" in rows 8' to 5' apart. This spacing requires 12-20 bushels of sprigs per acre. Place one end of the sprig 3-4" in the ground with the other end protruding slightly above the soil. Firm the soil around the sprig. The most effective way to plant sprigs is with a transplanter. They may also be placed in a furrow and covered mechanically or broadcast on the soil surface and disked-in.

### ***Fertilization and Liming***

Have the soil tested to determine lime and fertilizer needs. Apply lime as needed to bring the pH to 6.0-6.5 and disk into the soil.

In the absence of a soil test, disk-in 50-80 lbs each of  $P_2O_5$  and  $K_2O$  per acre during seedbed preparation. Before planting, apply 30-40 lbs of N and 30-40 lbs each of  $P_2O_5$  and  $K_2O$  per acre in the row. After the stand is assured, broadcast 40-60 lbs per acre of actual N, 30-40 days following planting, but not later than August 15.

Topdress bermudagrass annually with a total of 100-200 lbs of N, 40-60 lbs of  $P_2O_5$ , and 80-120 lbs of  $K_2O$  per acre. The higher N rates will promote high yields when more grazing is needed. Apply a complete fertilizer in March or April. Additional N applications of 50-70 lbs each may be applied, but usually not more frequently than every 45-60 days during the growing season. The last N application should be made by August 15.

### **SUMMER ANNUAL PASTURES**

There is often a need for rapid growing, high yielding, high quality, and drought resistant pastures during the summer months when cool season pastures slow down in growth. Dwarf pearl millet meets these requirements very well.

Dwarf pearl millet grows to a height of about 4 feet. It is leafy, drought resistant, is readily grazed by animals, and makes excellent recovery growth following grazing. The plants are killed by frost and need to be reseeded each spring. There have been no nutritional problems reported, although nitrate poisoning can be a concern when grazing severely drought-stunted plants that have been heavily fertilized with nitrogen.

### ***Establishment and Fertilization***

Seed at the rate of 25-30 lb of seed per acre after the soil warms in the spring, usually between May 10 and July 1. Seed in either a prepared seedbed or no-till into killed cover. The soil pH should be 6.0-6.2 with a medium-high level of  $P_2O_5$  and  $K_2O$  according to soil test. In the absence of a soil test, apply 60 lbs per acre of N,  $P_2O_5$  and  $K_2O$ . A second application of 60 lb per acre of N in mid-summer will encourage growth in late summer.

### ***Grazing Management***

Pearl millet can be grazed at any height but for best quality and regrowth it should be allowed to reach a height of 12-18 inches and then grazed down to 4-6 inches. Regrowth is made primarily from the stubble rather than the base of the plant. Since horses graze plants close to the ground, it is usually difficult to graze pearl millet properly. Mowing at a 4-6 inch stubble height periodically will maintain the plants in a leafy stage of growth.

### ***Summer Annuals NOT Recommended For Grazing***

Sudangrass, sorghums, or sorghum-sudangrass hybrids are summer annual grasses which are not recommended for grazing. Horses or ponies grazing these grasses or eating them as green chop may develop a sometimes fatal kidney condition called cystitis syndrome. Hay from these grasses, properly cured and stored, can be safely fed to horses and ponies.

German or foxtail millet has been reported to have a diuretic effect on horses and is not recommended for horses. These plants also have coarse, fuzzy heads that may be of concern.

### **WINTER ANNUAL PASTURES**

The small grains such as rye and barley furnish grazing in the late fall, early winter, and early spring to complete the 12-month grazing program. Annual ryegrass is used in a similar manner. These are not the primary horse pastures, but supply additional grazing during the months when the cool-season permanent pasture grasses are not actively growing.

### ***Small Grains for Grazing***

The small grains are adapted in all areas of the state and do well on soils with moderate drainage, fertility, and pH. They may be grazed continuously in fall, early winter, and early spring. They do not form a tight sod, so to avoid damage to the soil and plants they should not be grazed while the soil is wet.

Rye is the small grain most commonly used for grazing because of its ability to provide fall and early spring growth. Barley may also be used. Rye and barley are seeded September 1 - November 1, with the early seedings providing more fall and winter grazing. Seeding rates are about 1.5 bu. per acre. Disking followed by seeding with a grain drill or by broadcasting is a practical and effective way to seed new stands.

### ***Fertilization***

Fertilize with 60-80 lbs each of N, P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O per acre at the time of seeding.

### ***Annual Ryegrass for Grazing***

Ryegrass is adapted to all soils with moderate drainage, fertility, and pH and can be grazed continuously in late fall, winter, and early spring. To avoid damage to the soil and plants, do not graze when the soil is wet.

Seeding should be done August 15 - November 15, with the earlier seeding dates required in the Western and Northern sections of the state. Seeding 20-30 lbs of seed per acre by disking and broadcasting is usually effective. Fertilize as for small grain, with 60-80 lbs each of N, P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O per acre.

## **MANAGEMENT OF HORSES ON PASTURE**

Horses thrive on good pastures, their natural habitat, but pastures require proper management and care. Pastures should be well drained and safely fenced. Pits, stumps, poles, and places dangerous to horses should be eliminated or guarded. The area should be kept free of wire, trash, idle farm machinery, etc.

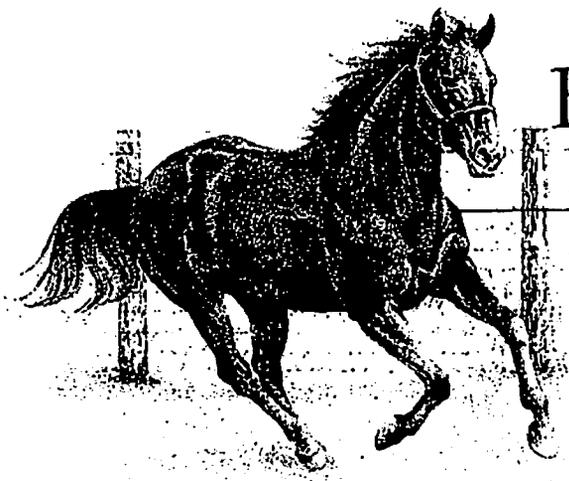
Ponies and some horses may founder ("grass founder") on lush spring growth or thick stands of clover. Feeding hay before turning into lush pasture and limiting grazing time initially will help prevent founder.

All animals should have continuous access to shade, fresh clean water, salt, and a simple mineral mixture. Animals should be checked daily. A veterinarian should be consulted for preventive medicine and parasite control recommendations. Extension Agents can be of assistance in recommending control measures for flies and external parasites. The teeth and feet should be inspected at regular intervals. Hoof care - trimming, resetting shoes, etc. - is just as important in the field as in the stable.

It is best to graze various age groups separately. For example, yearlings should be grazed separately from older horses.

Remember that abortions, foaling difficulties, and milking problems can occur with pregnant mares on tall fescue pasture. Plan to remove pregnant mares from tall fescue pastures 3-4 months before they foal.

Certain practices in using pastures are extremely important in the control of internal parasites. The following will assist in reducing parasite infestation on the pasture and thus lower the number of parasites a horse will ingest while grazing. (1) Do not overstock, since parasite problems often occur on very short grass. (2) Rotate pastures as much as possible. (3) Since most of the common parasites are specific to a particular type of livestock, follow horses with cattle or sheep on the pasture. (4) Graze young animals (weanlings and yearlings) separately from older horses. (5) Do not spread fresh horse manure on pastures grazed by horses. (a) Store or compost horse manure for at least two weeks away from horses before using it. (b) It is best to spread horse manure in thin layers on fields that will not be used for grazing.



# Basic Horse Nutrition

*Equine Section, Department of Animal Sciences*

## Basic Nutrients

### Water

All horses require a good, clean source of fresh water daily for normal physiological function. Clean the water buckets and tanks frequently, removing algae and other foreign material. Water deprivation is more common in winter than summer because of freezing temperatures. Make every effort to ensure that water sources do not freeze, because with most species of animals water deprivation causes death quicker than starvation. Therefore, it is extremely important that a clean fresh source of water be supplied to horses at all times.

Knowledge of horse nutrition has grown by leaps and bounds during the last 15 years. Research has become more precise and critically evaluated. But more important, this research has given horse owners greater understanding of nutrition. They are more aware of the basic nutrients required by all classes of horses, than in past years.

## Anatomy of the Digestive System

When you feed horses, you need to have good understanding of their digestive system, including its physical limitations, and important areas of digestion and absorption. Figure 1 shows the important parts of the horse's gastrointestinal tract.

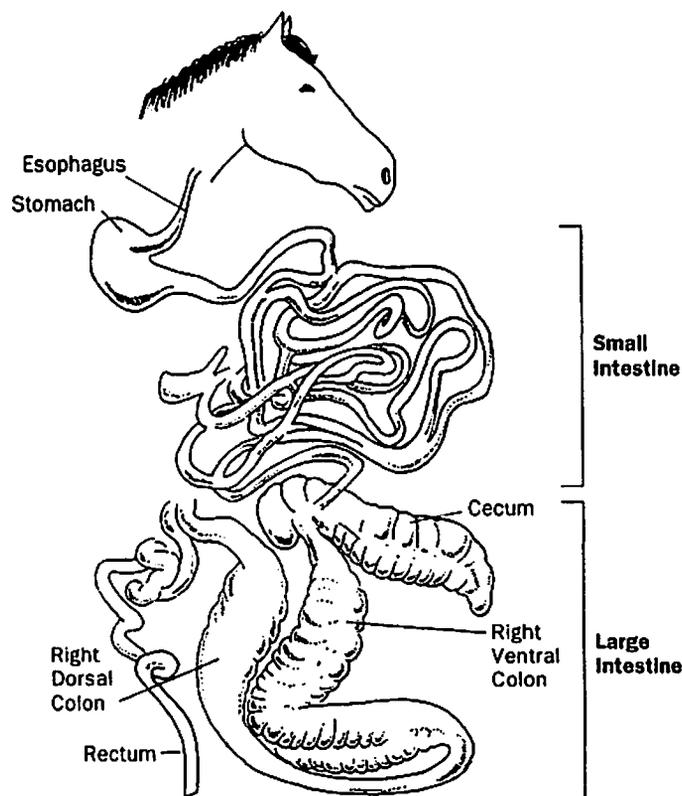
Most digestion and absorption take place forward of the cecum and are similar to other simple-stomach animals like pigs. Digestion begins when the horse eats and its mouth releases enzymes. Then, as food enters the stomach and small intestines, the major digestive enzymes are released and digestion occurs. Major absorption occurs in the small intestines, with less nutrient absorption in the cecum and colon.

Of course, the horse's hindgut is also functionally important, since microbial digestion takes place in it. A functional cecum is beneficial because it produces significant amounts of the B Vitamin complex and volatile fatty acids to help meet vitamin and energy requirements.

Also note the size of the horse's stomach. Because it is small compared to the horse's size, many classes of horses are not able to consume enough forage to meet their nutrient requirements. Therefore, you need to provide concentrates and increase feeding frequency to support proper growth, development and performance.

All classes of horses (young, growing horses; horses at work; mature, idle horses; pregnant mares and lactating mares) must get enough essential nutrients: water, energy, protein, minerals and vitamins.

Figure 1. Digestive system of a horse. (Adapted from: "Feeding and Care of the Horse". Lon Lewis, Lea & Febiger, 1982.)



## *Energy*

Energy is what horses use to do work. Their energy requirements are influenced by age and by the work's degree and duration. Young, growing horses, horses at high work intensities and lactating mares have the greatest requirement for energy. ATP is the basic unit of energy substance utilized at the cellular level. Energy is provided by the breakdown of starch and other soluble carbohydrates and from volatile fatty acids arising in the cecum as a result of microbial digestion of fibrous dietary components.

Cereal grains like corn, oats, barley, wheat, wheat by-products, etc. are the primary energy sources found in concentrate mixes. In most cases the greater the energy requirement, the greater the energy density (units of energy [kcal]/lb of feed) of the concentrate. For example, the horse in hard race training needs a more concentrated, energy-dense feed than the pregnant mare.

Mature, idle horses and mares in the first 2 trimesters of pregnancy require less energy and therefore can meet their energy requirement on good quality hay or pasture alone. In young, rapidly growing horses, horses at work and lactating mares the hay fed should be supplemented with concentrated energy sources to meet their energy requirements.

## *Protein*

Horses use protein to synthesize various body tissues, such as muscle. Proteins are composed of amino acids and will vary in amino acid composition. Currently, the exact amino acid requirements of horses are not known. But feeding an adequate source of protein should ensure that horses get the composition of amino acids they need.

Protein requirements vary for different classes of horses. Young, growing horses have a higher requirement for protein because they are growing body tissues like muscle and bone.

Mature horses have a much lower requirement for protein than do young horses since mature horses need protein for maintenance of body tissue rather than growing new tissue. Note that horses with increased exercise do not need more protein than do horses not in training. They lose a small amount of nitrogen in the sweat, but the additional grain fed to meet the performance horse's energy needs will more than adequately provide for the increased nitrogen requirement without increasing the percent protein in the diet. When protein is fed beyond what the horse requires, the body uses it as an energy source and excretes the unused nitrogen in the urine. Although doing so does not harm the horse, protein is a very expensive energy source.

Both the forage and concentrate portions of the horse's diet supply protein. The quality of hay or forage fed will greatly influence how much protein is required in the concentrate. A good quality legume hay will contain from 14-18% crude protein and a high quality grass hay will contain 7.0-12% crude protein. Cereal grains will also supply protein in the diet. But depending on the class of horses being fed, the forage component of the diet may not be able to meet their protein requirement. Cereal grains will range

in protein content from 8.0-12.0%. To meet the protein requirement of the young, growing horses you will need to use a protein supplement.

Soybean meal is the most common protein supplement used in horse rations. Other protein supplement sources are available such as linseed meal, cottonseed meal, dried skim milk or commercially prepared protein supplements which may contain a combination of the above ingredients.

## *Minerals*

Minerals are needed by the horse's body for various purposes, ranging from serving as components of the horse's skeletal system to maintaining nerve conductivity, muscle contraction and electrolyte balance.

**Calcium** and **phosphorus** comprise about 70% of the mineral content of the horse's body. Therefore these minerals need to be supplied to the horse in the greatest amount and are of most concern in formulating horse rations. Horses are more likely to suffer from a lack of calcium and phosphorus than from lack of any other mineral. Proper levels and ratios (calcium:phosphorus) of these 2 minerals are very important to normal development of bone, because if inadequate levels or improper ratios are supplied structural deformities may result. Ideally calcium and phosphorus should be fed at a 1.2-1.6: 1 ratio. However, ratios as high as 6:1 have been fed to mature horses and ratios of 3:1 have been fed to growing horses with no detrimental effects. Never feed an inverted calcium:phosphorus ratio because it may harm the horse.

Always provide **salt** to the horse free-choice. Salt is most commonly given by providing a trace mineralized salt block free choice. In addition to the block, include a trace mineralized premix in the ration at 1/2% of the concentrate mix. Salt is composed of sodium and chloride which are important in maintaining electrolyte and acid base balance. Over consumption of salt is usually not a problem if free choice, nonsaline water is available. The practice of providing trace mineral salt will not only meet the horse's sodium and chloride requirements but will also meet its needs for other trace minerals.

**Copper** and **zinc** have been implicated in metabolic bone disease. Although their exact role is not clearly understood, it is recommended to include copper in the concentrate at 30-50 ppm and zinc at 80-120 ppm.

**Selenium** is also a trace mineral required by the horse. Most naturally occurring feedstuff will have enough selenium to meet the horse's needs. (Selenium is extremely toxic when fed in quantities above recommended levels.) However, Kentucky is a selenium marginal state and as such most commercial feeds will contain selenium at .1 ppm. Therefore, do not top-dress it as a mineral supplement.

## *Vitamins*

Vitamins A, D and E are the most common vitamins added to horse diets. Although B complex vitamins may not be commonly supplemented, including them in performance horse diets may be necessary. It is a common practice to fortify diets with a vitamin premix like the one shown in Table 1.

**Vitamin A** is the vitamin most likely to be marginal in most horse diets. The natural source of Vitamin A is beta-carotene which occurs in green forages and properly cured hays. As long as the hay source has a green color and is leafy, then it will probably be more than adequate to meet the horse's Vitamin A requirement. Vitamin A functions in the maintenance of epithelial integrity, normal bone metabolism and is very important for night vision. Therefore, a deficiency in Vitamin A may result in night blindness, upper respiratory infection, brittle bones and possibly many other deficiencies. One reason to supplement Vitamin A is that horses are not very efficient in converting beta-carotene to active Vitamin A.

**Table 1. Vitamin Premix for Horses**

Vitamin	Per lb Premix	Amt per lb feed when premix added at: ———	
		2 lb/Ton	1 lb/Ton
Vitamin A	1,000,000 I.U.	1000 I.U.	500 I.U.
Vitamin D	100,000 I.U.	100 I.U.	50 I.U.
Vitamin E	5,000 I.U.	5 I.U.	2.5 I.U.
Thiamine	1.2 g	1.2 mg	0.6 mg
Riboflavin	800 mg	0.8 mg	0.4 mg
Pantothenic Acid	800 mg	0.8 mg	0.4 mg
Vitamin B12	5 mg	5.0 mcg	2.5 mcg

**Vitamin D** is very important in the normal absorption and utilization of calcium and phosphorus. It also functions in the absorption of several minerals for bone deposition. Vitamin D is converted from precursors through a series of reactions in the skin stimulated by sunlight. Rickets in young horses and osteomalacia in older horses are the two most common symptoms of Vitamin D deficiency. Giving large doses of Vitamin D should be avoided as toxicity may occur resulting in calcification of soft tissue. Natural sources of Vitamin D occur in sun-cured hay and cod liver oil.

**Vitamin E** is found in ample quantities in most natural feedstuffs to meet the horse's requirement. Roughages, cereal grains and especially cereal germ oils are high in Vitamin E, particularly wheat germ oil. Vitamin E has been implicated in many physiological functions in the horse body. It maintains membrane stability and red blood cell integrity. Selenium and Vitamin E interactions may play a role in treating and preventing "tying up," and possibly in assuring normal reproduction.

It is believed that the microflora in the cecum will synthesize adequate amounts of **B vitamins** for absorption to meet the horse's requirement. Many of the B vitamins function as coenzymes in energy pathways and it is questionable whether adequate amounts of B vitamins are synthesized by the horse to meet the needs of young, rapidly growing horses and horses at high work levels.

Remember that horses need long stem roughage in their diet for normal digestive function. Horses fed hay or those on pasture are more able to maintain gastro-intestinal tract normalcy, experience less colic and are less prone to developing annoying stable vices when compared to horses not receiving a long stem roughage source.

Feed horses a hay that is bright colored, leafy, harvested in an early stage of maturity and free from mold or foreign matter. Common hays fed include alfalfa, timothy, clover, orchardgrass, brome-grass, prairie hay and bermuda. You can also combine these hays for feed. When timothy and alfalfa are used together, alfalfa will usually be fed as a nutrient source and timothy as the roughage source.

Use pastures to their utmost in a feeding program. Many classes of horses can meet their nutrient requirements on pasture alone, if the pasture is managed and stocked properly. Mature, idle horses, barren mares and mares in the first 2 trimesters of gestation on well managed pasture should require little or no supplementation.

Remember that horses are individuals and should be managed as such. By knowing the nutrients they need and their function, you will find the art of feeding horses much easier and simpler.



# Forages for Horses

Equine Section, Department of Animal Sciences

Horses are herbivores, meaning that grasses and other types of forages are natural dietary components. Absence of forage in the horse's diet can lead to digestive disorders. Basically the horse has an absolute requirement for roughage so that its digestive tract will function normally. This requirement can be supplied either as pasture or hay.

Forages contribute energy, protein, minerals and vitamins at various levels depending on the forage specie and quality. Stage of maturity greatly influences forage quality and availability of nutrients. Horses have limited ability to utilize poor quality forage, so good pasture management is vital if the horse is going to use the forage to its utmost.

Mature horses doing little or no work can be maintained without supplementation on high quality pasture. The main reason concentrate mixes are fed to hard working and productive horses is because the horse's digestive tract has a relatively small capacity, making it impossible for them to consume enough roughage to meet their nutrient needs.

## Forage Quality

### Nutrients

Forages and grains contain much the same nutrients, but their proportions and availability are different. Forages supply energy. One form is fiber. The horse does not break down fibrous energy as readily as energy sources like starch. As a forage's fiber content increases, the availability of energy decreases. Horses cannot utilize poor quality forage as efficiently as cattle can.

**Table 1. Effect of maturity on energy and protein value of selected hays.**

Stage of maturity	Digestible Energy (Mcal/kg)	TDN %	Crude Protein %	Digestible Protein %
<b>Alfalfa</b>				
Early bloom	2.42	55	17.2	13.4
Mid-bloom	2.29	52	16.0	11.6
Full bloom	2.16	49	15.0	10.1
<b>Bluegrass</b>				
Pre-grazed	2.15	50	15.0	12.6
Post-head grazed	2.0	45	10.0	
<b>Orchardgrass</b>	2.2	50	16.0	13.5

**Protein** is another nutrient that can be supplied at adequate levels by forage if the forage is managed properly. Mature forages will contain lower levels of protein and be less digestible than the same forage in the early growth stages. Research shows that horses can digest about 50 to 70% of forage protein.

A forage's stage of maturity, more than any other factor, affects how useful it is as a source of nutrients for the horse. The more mature the plant becomes, the less available the nutrients. Table 1 shows the dramatic effect that maturity has on digestible energy and protein.

Forages are good sources of **vitamins** particularly vitamins A, C and B-complex and can supply large amounts of minerals like calcium.

### Determining Quality

Forage quality can be determined to a limited extent by visual inspection, or more accurately by chemical analysis. A forage's nutrient content is determined by management techniques and forage species. Grazing density can influence pasture forage quality by its influence on stage of maturity and leafiness.

In addition to stage of maturity, leafiness, presence of foreign material, color and the type of forage are all indicators of quality.

- Leafiness is a good indicator of quality, especially in legume hays, because the leaf contains twice the amount of nutrients as the stem.
- Freedom from weeds, mold and debris is critical to a high quality forage. Horses are very susceptible to colic and digestive disorders particularly when consuming forages containing foreign material.

## Pasture Types and Management

### Type

The forage's ability to meet the horse's nutrient needs is not only determined by those needs but also by how digestible and available the forage source is. In Kentucky, bluegrass and fescue pastures dominate simply because they are best suited for the state's environment.

**Bluegrass** pastures provide an excellent source of high quality forages for most classes of horses, particularly

in the spring. Mature idle horses, barren mares and mares in the first two-thirds of gestation can meet their nutrient needs adequately on well managed bluegrass pasture.

**Fescue** is probably the most predominant grass used in Kentucky, because it does very well on Kentucky soil. Fescue has a long, growing season and will provide forage during most of the year. However, endophyte infected fescue should not be fed to mares in late gestation or lactation and does not adequately meet the needs of the young growing horse.

Regardless of what species of plant dominates in grass pastures, the nutritional value can be enhanced by introducing some type of legume.

**Mixed pastures** (grass-legume pastures) usually are higher in protein. Also, because the growing seasons of most grasses and legumes vary, a mixture allows an extended grazing season. A common practice is over seeding with some type of clover, like sweet, white or ladino clover. Legumes also reduce fertilizer costs because of their nitrogen fixing capacity.

### Management

Management practices are essential to maintaining a high quality pasture.

**Plant height** is critical from a nutritional standpoint. As plant height increases, digestibility decreases thus making the pasture less valuable. Also, as grass height increases the clovers and other low growing grasses are crowded out and weeds are more likely to gain hold. Pastures should be mowed or grazed adequately to keep grasses 3 to 4 inches high to optimize digestibility and allow for legume growth. Avoid over grazing as it can damage pasture plants and increase parasite and sand colic problems.

**Manure control** can be most effective via a chain harrow. Chain harrowing prevents manure build up in certain areas of the pasture and allows for more uniform grazing. It also exposes parasites and parasite eggs to sunlight and dryness, helping control them.

A good **fertilization** program, pasture rotation, and light grazing of new pastures and of pastures early in the spring are other management practices which allow for higher quality pastures. Nitrogen fertilization (25-50 lb N/acre) in early March can move the grazing season forward, particularly for grass pastures.

**Stocking rates** can help maintain good pastures. Obviously the stocking rate varies with type and class of horse, specie of grasses used in pasture, season and soil fertility. Generally you should allow 2 to 3 acres/horse year round to optimize pasture utilization while maintaining healthy pastures. Some horse operations use cattle to aid in pasture maintenance.

### Using Forages in the Diet

Horses are expected to consume from 2.5 to 3.0% of their body weight in dry matter. For example, a 1200 lb mare is expected to consume 30-36 lb of dry matter/day. The greater the nutrient density of the feed stuff consumed, the smaller the amount which must be consumed to meet her nutrient needs. This point further emphasizes how important forage maturity is for meeting a horse's nutrient requirements.

Several factors affect either voluntary intake or horses' ability to consume enough forage to meet their nutrient needs. As stage of pregnancy increases, voluntary intake of forages decreases and nutrient needs increase. Because the horse at high work intensities has high nutrient needs, the mare in late gestation, the lactating mare and the young, rapidly growing horse probably cannot consume enough forage to meet their nutrient needs. However the mature idle horse, horses at light work and the pregnant mare early in gestation may meet their nutrient needs with good quality forage alone.

The cost of forage is a large part of feed cost on any horse farm. Decisions on how to supply that forage will depend on many factors, such as land availability, land that can be used as

pasture and type of operation. Regardless of how the forage is supplied, it should be done in the most economical way. So when purchasing hay, compare it on a nutrient cost basis as well as a cost per weight. For example compare the protein cost of the following hays:

#### Hay A:

Cost \$100/ton  
Contains 18% crude protein (CP)

$2000 \text{ lb} \times .18 \text{ CP} = 360 \text{ lb CP}$   
 $\$100/360 \text{ lb CP} = \$0.27/\text{lb CP}$

#### Hay B:

Cost \$80/ton  
Contains 10% CP

$2000 \text{ lb} \times .10 \text{ CP} = 200 \text{ lb CP}$   
 $\$80/200 \text{ lb CP} = \$0.40/\text{lb CP}$

In this example, hay A supplies protein at less expense than does hay B. Hay B contains more fibrous material, making the protein less available and compounding the problem of low protein.

Estimating costs of supplying nutrients from hay and grain rations is a little more difficult. Consider how to estimate cost and meet the needs of a group of mares in late gestation. If the energy content of hay A were higher than hay B, then less grain is needed with this hay. The mares require a total ration of 12% crude protein. Therefore a 70:30 ratio of hay A:grain and a 60:40 ratio of hay B:grain can be estimated to meet the group's needs. In this example two grain rations are available, a 12% and a 16% crude protein. The 12% CP mix will be combined with hay A and the 16% CP mix with hay B.

Cost calculations:

#### Ration 1

70:30 hay to grain mix  
Contains 18% CP hay which costs  
\$100/ton  
12% grain mix which costs \$135/ton

Total ration cost =  
 $(.70 \times \$100) + (.30 \times \$135)$   
Total ration cost = \$110.50/ton

Total ration CP =  
 $(.70 \times .18) + (.30 \times .12)$   
Total ration CP = 16.2%

### Ration 2

60:40 hay to grain mix  
Contains 10% CP hay which costs  
\$80/ton

16% grain mix which costs \$160/ton

Total ration cost =

$$(.60 \times \$80) + (.40 \times \$160)$$

Total ration cost = \$112/ton

Total ration CP =

$$(.60 \times .10) + (.40 \times .16)$$

Total ration CP = 12.4%

Both rations meet or exceed the mares' requirements. However by using ration 1 the horseman saves \$175.20/year between the two rations (based on a 20 head mare herd consuming 32 lb of ration/head/day).

Hay can be fed to horses on pasture to supplement their diet. Hay supplementation is usually done during the winter months or during drought situations. Feed hay according to the horse's body condition. Horses maintained solely on pasture should have access to a trace mineral salt block to allow for adequate intake of minerals and salt.

## Toxicity Problems with Forages

Horses are extremely susceptible to molds, fungus and other sources of toxic substances in forages. Fresh, clean sources of forages are always recommended when feeding horses.

Some forages have toxic effects due to endogenous substances.

- **Sudangrasses** may contain a glycoside which can cause muscle weakness, urinary tract failure, neural degeneration and death.
- **Fescue** is another forage that could have toxic properties if contaminated by the endophyte fungus. Mares grazing infected fescue suffer from agalactia (extremely decreased milk production), prolonged gestation and tough placentas. Decrease the diet's fescue component by feeding supplemental grain or legume hay. The safest prevention is to remove mares from the fescue pasture or hay before the last 3 months of gestation.

**Mold problems** can occur in hay and grains harvested in humid environments. Be especially careful in Kentucky to harvest hay correctly and without mold.

**Blister beetles** contain a toxin, "cantharidin," which causes irritation to the digestive tract's lining and ingestion is fatal. In the past, blister beetles in alfalfa have not been a concern to most Kentucky horse producers. Recently, however, some blister beetles have been found in hay imported to Kentucky. Because no level of ingestion is safe, proper forage management techniques must be implemented to ensure that the hay is free of beetles.

Many poisonous plants produce toxins fatal to horses. Some common plants include ornamental shrubs (yews) and nightshade, but any plant known to cause problems in other species will probably affect horses. Usually, these plants are not palatable and horses will not eat them unless restricted from quality sources of hay or pasture.

# Virginia Cooperative Extension

*Knowledge for the Common Wealth*

## Safe Water for Horses, Questions About Water Testing

Livestock Update, December 1998

Larry Lawrence, Extension Animal Scientist, Horses, Animal and Poultry Sciences, Virginia Tech

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Nothing has greater influence on the overall wellbeing of the horse than water intake. It affects fluid balance, temperature control, exercise tolerance, and digestibility of feedstuffs. There are two primary concerns for horse owners in relation to water quality. First, is the quality of the water poor enough to affect consumption or cause toxicities and therefore compromise the health of the horse? Second, does the water serve as a carrier for the spread of disease?

Maximizing water intake should be a primary goal in the management of horses. Recent surveys have indicated that restricting a horse from water for as little as 2 hours will increase the chances of colic. There are a number of factors to consider in maximizing water intake.

Temperature is probably the number one factor. When the water temperature increases from just above freezing to 40 degrees Fahrenheit, the amount of water consumed will increase almost 40%.

The quality of the water offered to horses is also a factor determining intake. Testing water may reveal problems that may reduce intake or cause other serious health concerns. But, before you run out and test your water, there are a few facts you should know.

The foremost issue is the source of water. In the summer stagnant ponds, water tanks, and buckets contaminated with algae can lower intake. More importantly, blue-green algae can be toxic to horses. Regular scrubbing with bleach can help eliminate the algae problem. Horses drinking from marshy areas or areas where wildlife or cattle carrying Leptospirosis have access tend to have an increased incidence of moonblindness associated with Leptospirosis infections. Fresh water snails have been identified as a carrier of the agent causing Potomac Horse Fever.

There is some anecdotal evidence that cattle farms with abundant waterfowl have a slightly higher incidence of salmonella disease in their cattle. Whether or not this is true for horses is undetermined at this time. We have always been told that running streams are safe sources of water, however, they have their own special problems. The sands lining coastal beaches originate from mountain streams. Horses drinking from some streams have swallowed enough sand over time to cause colic.

Should we panic and test every source of water for every possible contaminant? Absolutely not. Natural pure water are terms we hear a lot but in fact almost all sources of water contain contaminants. When water comes in contact with air and soil dissolved minerals, organic compounds and microorganisms find their way into water supplies. It is only when contamination levels exceed acceptable limits that they become detrimental to human and animal health.

How can we determine if water is safe? If your source of water is from public utilities, it is constantly

monitored. If your water comes from a private well or spring, yearly testing is a standard recommendation. Local Cooperative Extension offices and County Health offices are good places to find out about water testing. In general, water tests fall into three categories: biological contaminants, organic chemicals, and inorganic elements.

Biological contaminants are determined by testing for an indicator bacteria, coliform. Coliform bacteria themselves cause little problem but elevated total coliform counts indicate the water is contaminated with animal or human waste, soil, or decaying vegetation and that the probability exists that other pathogenic (disease-carrying) viruses, bacteria, and protozoa may be present. Total coliform and fecal coliform can be identified in bacteriological analysis. If water does contain coliform bacteria, it is considered an unsanitary supply that may contain waterborne disease-carrying organisms.

When should you test for bacterial contamination? Test when any of the following situations arise: (1) there is a change in color, odor, or taste of the water; (2) when flooding has occurred near the water supply; (3) any person or animal becomes sick from a suspected waterborne disease; or (4) after maintenance on the water system.

Organic chemicals that may contaminate water include pesticides, polychlorinated biphenyls (PCBs), solvents, and industrial wastes. These find their way into water as the result of spills, improper mixing and application, or illegal dumping. PCBs were outlawed in 1976, however, old dump sites that have not been cleaned and previous misuse may still serve as potential contaminants.

Total Dissolved Solids (TDS) concentration is a standard water quality test that is a measure of organic materials and inorganic metals in water. Increases in TDS are a clear signal for further testing to identify specific problems. The TDS concentration can indicate high levels of one or more contaminants. Water contaminated with calcium, magnesium, nitrate, nitrite, iron sulfate, copper, lead, and other material may show high TDS levels. Some of these materials cause serious health risk, others are considered nuisance factors.

Water hardness is often a concern for homeowners. High concentrations of calcium and magnesium are associated with hard water. It is interesting to note that many areas of the country known for hard water are limestone based and are also recognized as excellent horse producing areas. The high calcium intakes from water and grazing are reasons given for good bone development. Also, the changes from copper to vinyl pipes in horse operations are partly blamed for lower copper intakes and signs of deficiency in young foals and mares. On the other hand, acid or low pH water and lead pipes are blamed for serious health hazards to young children.

Livestock producers are often concerned with nitrates in water. Nitrates enter the water supply from improper or excessive fertilizer applications or flooding of manure storage areas. Horses are very tolerant of high nitrates. Toxic levels for humans are in the 45ppm range while there is little concern for horses up to 450ppm.

The Council for Agricultural Science and Technology reports there are few toxicities to livestock from ingestion of natural constituents in drinking water. In general, horse owners should be conscious of rapid changes in water sources because horses are sensitive to unusual tastes and odors. A yearly test of water sources done after heavy rains or floods or possible contamination by fertilizer, pesticide, or heavy road salt use may be warranted. Other red flag indicators include: signs of waterborne diseases in animals, changes in odor, taste, color, or when work is done on water systems.

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# Virginia Cooperative Extension

*Knowledge for the Common Weal*

## Developing a Grazing Management Plan for Horses

Crop and Soil Environmental News, March 1997

Paul R. Peterson,  
Extension Agronomist, Forages

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Pastures furnish horses with high-quality, nutritious feed at a relatively low cost and help to maintain healthy animals by furnishing exercise, sunshine, and fresh air. The horse is a natural grazing animal. If the horse owner practices good grazing management; mature, non-working horses and well-developed, older yearlings can be maintained on pasture with no grain supplementation during a typical pasture season. Well-managed pasture can provide many of the nutrients needed by growing horses and work horses, but some additional grain and hay feeding is generally needed for these horse classes.

Virginia has tremendous pasture potential due to the adaptation of a wide variety of forage species, favorable moisture and temperature, and a long growing season. However, proper grazing management is necessary to take advantage of pasture's potential.

Development of a grazing plan requires an understanding of the growth requirements of forage species that can provide good grazing for horses in Virginia. Cool-season grasses that can be used include Kentucky bluegrass, tall fescue, orchardgrass, and timothy. Kentucky bluegrass and tall fescue are sod-forming grasses that are the most forgiving of poor grazing management.

Abortions, foaling difficulties, and milk production problems can be encountered with pregnant mares grazing endophyte-infected tall fescue. Keep pregnant mares off of infected tall fescue during the last three months of pregnancy. For other classes of horses, there have been no reported health problems when grazing tall fescue.

Orchardgrass and timothy are high quality bunch grasses that require more careful management to be productive and persistent under horse grazing. While timothy can provide high quality forage, it is often not the best choice for pasture in Virginia because of poor summer growth due to a lack of heat and drought tolerance.

White (Ladino) clover, red clover, and alfalfa are the best legume options to mix with cool-season grasses in horse pastures. Alfalfa should only be used where soils are well-drained and the pH is at least 6.2. It is important to regulate grazing to maintain legumes in the stand. A balance of 40% legume and 60% desirable grass in the pasture sod is a goal to shoot for. Tall grass tends to crowd out clover. If the clover is thinning, keep the pasture grazed or clipped to reduce grass competition. This will improve the legume's chances of flourishing. While horses generally prefer grasses to legumes, they do graze some legume. Legumes will enrich their diet, improve summer pasture production, and provide fixed nitrogen to the pasture grasses.

Pasture production can be stabilized by having different forage species in various pastures, thus extending

the grazing season. For example, in the Southern Piedmont and Eastern Virginia, having pasture planted to bermudagrass will ensure summer grazing and a strong sod to support horse traffic. Dwarf pearl millet is a summer annual that works well for providing summer horse pasture, too.

Sorghum, sudangrass, sorghum-sudan hybrids, and Johnsongrass should NOT be used for horse pasture. These warm-season annuals have been known to cause a condition called cystitis which is characterized by paralysis and urinary disorders. Foxtail millet is also not recommended because diuretic effects have been reported.

Having a pasture of tall fescue allows the potential for stockpiling (accumulating) fall growth for late fall and winter grazing. Winter annual grasses such as winter cereals are excellent species for providing late fall, late winter, and early spring grazing.

The amount of pasture acreage required per horse varies with size and age of the horse, pasture species, the amount of supplemental feed, and soil productivity. In order for pasture to be expected to provide the majority of a horse's diet, 2 acres of pastureland is generally needed for a mature horse. The most common pasture management problem among horse owners is overgrazing because of too many horses on too small an area of land.

Ideally, the total pasture acreage should be divided into 2-4 separate pastures (paddocks). This will allow the flexibility to rotate horses among pastures to allow for recovery of pasture plants and clipping as well.

While a minimum of 2 acres of pasture per horse is ideal, oftentimes land area is limited to the point where only an acre or less is available. If horses are allowed to access this entire area, it is nearly impossible to maintain a pasture sod with constant traffic. In such cases, dividing the area into at least two lots is a practical solution. One lot can be an exercise lot where pasture is sacrificed, and the other lot(s) used for grazing. Key to this is not allowing overgrazing in the pasture areas -- permit grazing on the pasture sod only when sufficient growth is present.

Do not allow horses to graze pasture down to less than 2". Since horses are spot grazers, the only practical way to follow this rule is to subdivide pasture area into subunits and rotate the horses through. A rule of thumb is to allow about 4 weeks of recovery time between grazings for any one pasture area. This will ensure a stronger, more productive sod and reduce weed encroachment.

Because of their spot grazing behavior, there will almost always be areas of pastures that are underutilized and overmature. These areas should be clipped. Two to three clippings per year may be necessary to help promote more uniform grazing and aid in controlling weeds.

Horses should be removed from pastures during very wet soil conditions, since horses can damage even well-established pasture sods when they run, stop, and turn sharply.

There are advantages to grazing different types of livestock on horse pastures. For example, beef or sheep can be stocked together with horses, or they can follow horses in the rotation of pastures. Since they are more random grazers than horses, beef or sheep help to make more efficient use of pasture by grazing more uniformly and thus maintaining more of the pasture in a high-quality, vegetative stage.

Well-managed pasture with grazing horses is a beautiful sight. There are a few key management moves that the horse owner can make to ensure good pasture condition. Foremost of these is dividing pasture area into a minimum of two and preferably more paddocks.

# Virginia Cooperative Extension

*Knowledge for the Common Weal*

## Disaster Planning: Barn Safety

Livestock Update, July 1998

Larry A. Lawrence, Animal and Poultry Sciences, Virginia Tech

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### **BEFORE:**

Plan, Plan, Plan. You never can stop planning ahead for an unknown disaster. Have a plan in place before the disaster. The plan can start with a safety inspection of your farm premises. The inspection should include:

#### **Electrical systems:**

- Are the service boxes in a dry, dust-free location and mounted on fire resistant materials?
- Are the electrical fixtures free of dust, dirt, cob webs, chaff, hay or combustible materials?

#### **Heating and cooling systems:**

- Are they designed for barns and stables?
- Are they properly installed?

#### **Fuel storage:**

- Are the storage tanks located away from buildings at least 40 feet away?
- Are the tanks properly grounded?
- Are there fire extinguishers near tanks?
- Are the tanks protected from collision by vehicular traffic?
- Are there clean up protocols for spills?

#### **Are your barns and buildings free of weeds, grass and debris?**

- Is the hay cured prior to being stored? Are the roofs, walls and windows weather tight?
- Are many fire extinguishers located in every building?
  - Are they annually charged?
  - Is there 10 pounds ABC or better?
  - Are they protected from freezing?
- Is there a phone in all barns with important numbers (fire, police, key personnel)?
- Are there no smoking signs? (Is the rule enforced?)
- Are horses valued over \$100,000 stabled in separate barns?

#### **Paddock and pastures:**

- Are they free of harmful objects?

- Are there no broken planks, exposed nails, sharp or broken gates?
- Are the horses rotated to break the life cycle of parasites?

### Stables:

- Are the aisles at least 12 feet wide?
- Are the aisles free of harmful objects?
- Are the stalls latched?
- Are the stalls designed to prevent contact with neighboring horses?
- Is the wiring on electrical fixtures (fans, etc.) inaccessible to horses and properly protected?
- Are the grain and feed rooms locked and containers covered?

***This is not a complete list. It is a start on your way to a safer environment for your horses. BEFORE A DISASTER:***

Survey your property for the best location for animal confinement. **WRITE IT DOWN.**

- Alternate water and power sources should be identified. **WRITE IT DOWN.**
- Cell phone, portable radios, flashlights, extra batteries, portable generators are all good equipment to have on hand.
- Evacuation plans to relocate (route to fairgrounds, other farms, race tracks, humane societies). **WRITE IT DOWN.**
- A list of all resources -- feed, supplies, vets, EMTs, truckers. Include all emergency telephone numbers (police, fire, hospital -- vet and human -- EMT, poison control). **WRITE IT DOWN.** Make copies: this information should be available at various locations on the farm.
- Have a current list of the horses on the farm or in the stable.
  - What paddock and stall are they in?
  - Who are the owners or contact persons and what are their telephone numbers?
  - A written procedure on what is to be said to owners/agents in a disaster?
  - Records of feeding, vaccinations, Coggins, amount of hay and feed and what kind given to each animal should be available. **WRITE IT DOWN.**
- Have a procedure on what animals will be saved in an evacuation and what animals will be put out to safety.
- Have a job description of who does what.
- Have a phone tree of all key personnel and make sure they know how to use it.
- Have a drill every quarter in the barn regarding a disaster.
  - Who does what? Who calls who? **DON'T PANIC.**
- Have emergency kits available in farm trucks and tack rooms. Emergency kits should have the necessary supplies to treat almost any kind of minor injury or assist in stopping a major injury from getting worse. You should have a halter shanks, dressings, bandages, medicines, water buckets, flash lights, radios, etc.

### **WATER / FEED**

- Make sure you have enough water and feed for 72 hours. Secure it before the disaster occurs. Most horses drink 5 gallons per 1,000 pound weight and 20 pounds of hay.
- Make sure all horses are identified with halters or neck straps and spray paint names on horses left outside to weather the storm.
- If you evacuate and mark horses, make sure you have enough feed and hay for 48 hours. Call prior to movement to other farms to make sure the site is still available. Bring the emergency kit with you.
- If you leave horses behind, make sure they have water and hay for 48 to 72 hours. Leave them in an

area that you have determined appropriate for the disaster situation.

- Make a list of the animals that you evacuate and where they go. Be sure they are identified.
- Reinforce the emergency training drills you have done at the farm prior to the disaster.

Plan. Plan. Plan. WRITE IT DOWN.

### ***DURING A DISASTER***

Be calm don't panic -- remember the emergency drill procedures

- Get information from the Emergency Broadcast System. Know the station. Use a battery operated radio if the power is off.
- If you evacuate and take horses, take all important records, feeds, etc. Call prior to shipping to make sure emergency location is still available.
- If you leave horses behind make sure they are turned out in a pre-selected area that would be appropriate for the disaster situation.
- Leave enough hay and water for 48 to 72 hours. Power may be lost: a large water tub would be a better choice than automatic waterer.
- Identify all horses with halters and possible splint boots or bandages with information on the horse inside.

### ***DO NOT PANIC***

- Horses will be aware of the disaster by the way you act and the environment they will be in.
- Call all owners / agents regarding the disaster. Keep them updated if possible. Use a script or prepared statement when you call.

### ***AFTER A DISASTER***

- Call all owners/agents regarding the disaster, even if there is no damage to your property.
- Check fencing, pastures and gates for sharp objects.
- Be aware of wild animals and snakes. They could be a danger to you and the horses.
- If horses are lost, contact local farms, veterinarians, humane societies. Listen to the Emergency Broadcast System for people who are accepting lost animals.
- Be careful in approaching animals that have gone through a disaster. They may be frightened and unruly.
- Check with your veterinarian and the Department of Agriculture for information about possible disease outbreaks.
- Check all feed.
- Inventory all horses.

### ***TO SUMMARIZE:***

It is very important to plan and have written procedures in place before the disaster: phone numbers, cellular phones, flashlights, generators, emergency kits.

Have drills every quarter to sharpen the employees' and owners' skills.

Credit: American Medical Equestrian Association. May, 1998

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PLANNING COMMISSION  
COUNTY OF YORK  
YORKTOWN, VIRGINIA

Resolution

At a regular meeting of the York County Planning Commission held in the Board Room, York Hall, Yorktown, Virginia, on the \_\_\_\_ day of \_\_\_\_\_, 2013:

Present

Vote

Mark B. Suiter, Chair  
Melissa S. Magowan, Vice Chair  
Glenn A. Brazelton  
Timothy D. McCulloch  
Todd H. Mathes  
Richard M. Myer, Jr.

On motion of \_\_\_\_\_, which carried \_\_\_\_, the following resolution was adopted:

A RESOLUTION TO RECOMMEND APPROVAL OF A SPECIAL USE PERMIT TO AUTHORIZE A COMMERCIAL STABLE ON PROPERTY LOCATED AT 201 HANSFORD LANE (ROUTE 670)

WHEREAS, Kristen Paster has submitted Application No. UP-835-13 to request a Special Use Permit, pursuant to Section 24.1-306 (Category 2, Number 8) of the York County Zoning Ordinance, to authorize a commercial stable on a 9.1-acre parcel of land located at 201 Hansford Lane (Route 670), further identified as Assessor’s Parcel No. 26-9-A (GPIN V09d-1597-0316); ); and

WHEREAS, said application has been referred to the York County Planning Commission in accordance with applicable procedure; and

WHEREAS, the Planning Commission has conducted a duly advertised public hearing on this application; and

WHEREAS, the Commission has carefully considered the public comments with respect to this application;

NOW, THEREFORE, BE IT RESOLVED by the York County Planning Commission this the \_\_\_\_ day of \_\_\_\_\_, 2013, that Application No. UP-835-13 be, and it is hereby, transmitted to the York County Board of Supervisors with a recommendation

of approval to authorize a Special Use Permit, , pursuant to Section 24.1-306 (Category 2, Number 8) of the York County Zoning Ordinance, to authorize a commercial stable on a 9.1-acre parcel located at 201 Hansford Lane (Route 670), further identified as Assessor's Parcel No. 26-9-A (GPIN V09d-1597-0316), subject to the following conditions:

1. This Special Use Permit shall authorize a commercial stable on a 9.1-acre parcel located at 201 Hansford Lane (Route 670) approximately 650 feet north of its intersection with Seaford Road (Route 622) and further identified as Assessor's Parcel No. 26-9-A (GPIN V09d-1597-0316).
2. A site plan prepared in accordance with the provisions of Article V of the York County Zoning Ordinance shall be submitted to and approved by the County prior to commencement of any land clearing or construction activity on the subject property. Except as modified herein, said plan shall be substantially in conformance with the sketch plan submitted by the applicant titled "Proposed Yorktown Stables, Kristen Paster, Operator".
3. All activities shall comply with Section 24.1-414, *Standards for horsekeeping and commercial stables*, of the York County Zoning Ordinance and Chapter 4, Article II, Livestock, of the York County Code.
4. A maximum of sixteen (16) horses shall be allowed on the property.
5. Restroom facilities shall be constructed on the property prior to the commencement of the operation of the commercial stable.
6. A minimum of ten (10) all-weather surface off-street parking spaces, or the minimum number of spaces required by the Zoning Ordinance, whichever is greater, shall be required in conjunction with the commercial stable operation.
7. Pasture fence lines and any areas to be utilized for the horses shall be a minimum of 25 feet from any property boundary.
8. Parking areas and the manure handling area shall be located at least 25 feet from any property boundary and landscape screening shall be installed to buffer views from adjoining properties. A mix of evergreen trees and shrubs shall be planted with a maximum of 10-foot spacing along the outside perimeter of the areas.
9. Operation of the stable shall be in compliance with all the stipulations set forth in the soil conservation and management plan prepared Alton L. Dews, Jr. on 9/15/2013, a copy of which shall be kept in the office of the Planning Division.
10. In accordance with Section 24.1-115(b)(6) of the York County Zoning Ordinance, prior to site plan approval a certified copy of this resolution shall be recorded at the

expense of the applicant in the name of the property owner as grantor in the office of the Clerk of the Circuit Court.

BE IT FURTHER RESOLVED that this Special Use Permit is not severable, and invalidation of any word, phrase, clause, sentence, or paragraph shall invalidate the remainder.