Manure Management Manual 2011 Revisions

Ag Advisory Board

June 15, 2011

* Overview of Process
* Overview of Draft Manual
* Use of Forms/Tables
* Practical Implementation
* Schedule / Future Actions

Manure Management Manual 2011 Revisions

Timeline

- Manure Management Manual
  - October 1986
  - November 2001
- AAB Meetings
  - December 2009 (5 Additional Meetings)
- AAB Workgroup
  - January 2010 (5 Additional Meetings)
- Manure Management Manual Revisions
  - Public Review August 2010 – November 2010
  - 164 People Commented

Manure Management Manual 2011 Revisions

- Comment Period ended November 12, 2010

- Revisions Include:
  - Glossary
  - *Penn State Agronomy Guide* References
  - Plan Format
  - Manure Management on Environmentally Sensitive Areas
  - Winter Application
  - Pasture Management
  - Animal Concentration Areas (ACAs)

Manure Management Manual 2011 Revisions

Operation Information - Section 1

Information about farm:

- Animal Information
- Crop Rotation
- Environmentally Sensitive Areas
- Winter Application
- Manure Storage
- Pastures
- ACA acres

Manure Management Manual 2011 Revisions

Mechanical Manure Application - Section 2

- Environmentally Sensitive Areas
- Winter Application
- Manure Application Rates and Timing
    - *Nitrogen based
    - *Phosphorus based – P Index
    - *Application season

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Farm Maps - Section 3

* Fields with Acreage
* Environmentally Sensitive Areas
* Manure Storage Structures
* Manure Stockpiling and Stacking Areas
* Pastures
* ACAs
* Roads

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Record Keeping - Section 4

* Manure application
* Crop Yield
* Manure Export
* Manure Storage Observations

Manure Management Manual 2011 Revisions

Manure Storage and Stockpiling/Stacking Area – Section 5

* Permanent manure storage
  * No new criteria, just document what you have
* In-field Stacking on Unimproved Areas
  * Allowed for Stackable Manure

Manure Management Manual 2011 Revisions

Pasture Management - Section 6

* NRCS CPS 528 – Grazing Plan
* Maintain "dense vegetation through out the growing season"
  * Minimize bare spots
  * Maintain average vegetation height of at least 3 inches

Manure Management Manual 2011 Revisions

Animal Concentration Areas - Section 7

* Divert Clean Water
* Collect/Treat Water thru Vegetated Strip
* Limit Access to Streams
* Minimize Size of ACA
* Feeding/Watering Areas Away from Water
* Routinely Remove Manure

Manure Management Manual 2011 Revisions

MMM Revision Process

* Manual Edits – began December 2009
* Public Review – Aug 2010 PA Bulletin
* Agricultural Advisory Board Workgroup
* June 2011 – Present Revised MMM to AAB
* Summer 2011 – Publish Revised MMM
* Summer 2011 – Education / Outreach, Training

Completing the MMM forms (sample farm description)

- Animals on operation:
  - 100 cow dairy operation (45 heifers, 20 calves)
  - 2 additional beef steers (this manure is exported)
- Manure storage facilities
  - Concrete circular tank; 92’ diameter 12’ deep
  - Manure stacking pad; 50’ X 60’
- ACA
  - One; north side of heifer barn

Completing the MMM forms (sample farm description)

- 170 acres of crop fields
  - 25 crop fields (all continuous no-till)
  - One pasture
  - All soil test levels less than 200 ppm P
- Crop rotation
  - Corn silage (4 yrs) / mixed grass hay (4 yrs)
  - 20 acre permanent pasture
- Manure may be applied to:
  - Corn silage or grass hay
  - No manure applied to alfalfa hay fields
  - Approximately 100 acres/yr needed for application

Completing the MMM forms

- Work through the following forms
  - Farmer/planner ID and date of development
  - Operation information
  - Environmentally sensitive worksheet
  - Winter application worksheet
  - Manure mgmt plan summary (using rates charts)
  - Manure storage(s) description
  - Pasture management verification
  - ACA contact verification + worksheet
  - Sample record keeping sheets
    - Manure application, yields, manure transfer, manure storage observation

Farm Operation Information

(Page 3)

Section 1 - General Information (All farms must complete this section)

This section includes a contact information page for the plan listing the farm name and address, the plan preparer name and address and the date the plan was developed or updated. The operation information page provides general information about the farm and, depending on the responses, directs the farmer to other sections of the plan that must be completed.

1. **Contact Information Page**. Insert the contact information for the farm, and the date of the plan below. If the plan is prepared by someone other than the farmer, include the name, address and phone number of the person that prepared the plan on the contact information page. The following is a sample of how the Contact Information Page may look for a given operation:

Farm name	*Sample Farm*
Name of Owner/Operator	*Mr. and Mrs. John Q. Public*
Operation Street address	*23 Sample Road*
City, State and Zip Code	*Farm City, PA. 12345*
Phone number (home/barn)	*717-123-4567*
(cell)	*717-012-3456*
Email address	*samplefarm@email.com*

Name of person preparing the Manure Management Plan (if other than owner/operator)

Preparer name	*Mr. John Smith*
Preparer organization	*Fertilizer Sales Company*
Street address	*35 Spreader Lane*
City, State and Zip Code	*Spreader City, PA. 23456*
Phone number (business)	*601-123-4567*
(cell)	*601-012-3456*
Email address	*fertilizersales@sales.com*

Date of Development *April 1, 2011*

Note that the manure management plan must be evaluated by the owner/operator annually and updated when necessary to keep the plan consistent with farm management practices.

Farm Operation Information (page 5)

Operation Information Page (Example)

a. Acres of the operation: Owned 120 Rented 50

b. Animals on the operation:

Animal type	Animal # (normal production day)	Days on farm per year
Dairy cows	*100*	*365*
Dairy heifers	*45*	*365*
Dairy calves	*20*	*365*
Beef steers	*2*	*260*

c. Crop Rotation used on the Operation (use additional pages if necessary: *4 years corn silage, 4 years mixed hay*

d. Environmentally Sensitive Areas:

Private or public drinking water wells	Yes X	No ☐
Streams, lakes or ponds	Yes X	No ☐
Sinkholes	Yes ☐	No X
Areas of concentrated flow including swales, ditches, gullies, etc.	Yes X	No ☐
For winter application, above ground inlet to agricultural drainage system	Yes ☐	No X

Farm Operation Information

(bottom of page 5)

All farms containing environmentally sensitive areas must complete the Environmentally Sensitive Areas worksheet on pages 6 and 7 and develop a map of environmentally sensitive areas.

e. **Winter Application:** Is manure applied during the winter? Yes X No ☐
If yes, you must complete the Winter Application Worksheet on pages 8 and 9.

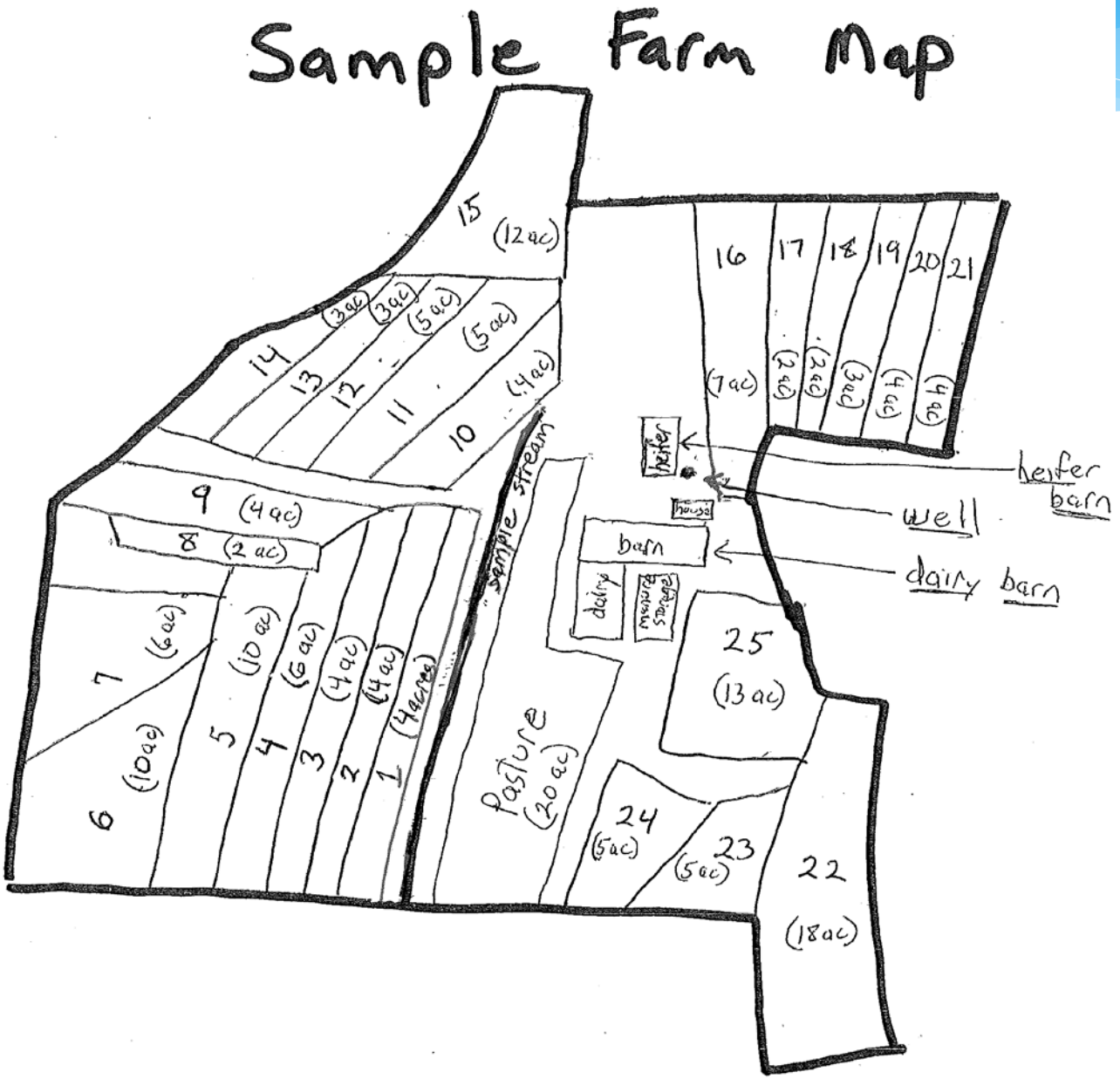
f. **Manure Storage Facilities.** Is manure stored in a manure storage facility (concrete tank, metal tank, under building structure, clay, or synthetic lined pond or lagoon, etc.)? Yes X No ☐
If yes, you must meet the requirements in Section 5 - Managing Manure Storage in Structures as described on pages 19 and 20.

g. **Solid Manure Stockpiling or Stacking**
Is manure stockpiled or stacked in outdoor areas? Yes X No ☐
If yes, you must meet the requirements in Section 5 - Managing Manure Stockpiling/Stacking Areas as described on page 21.

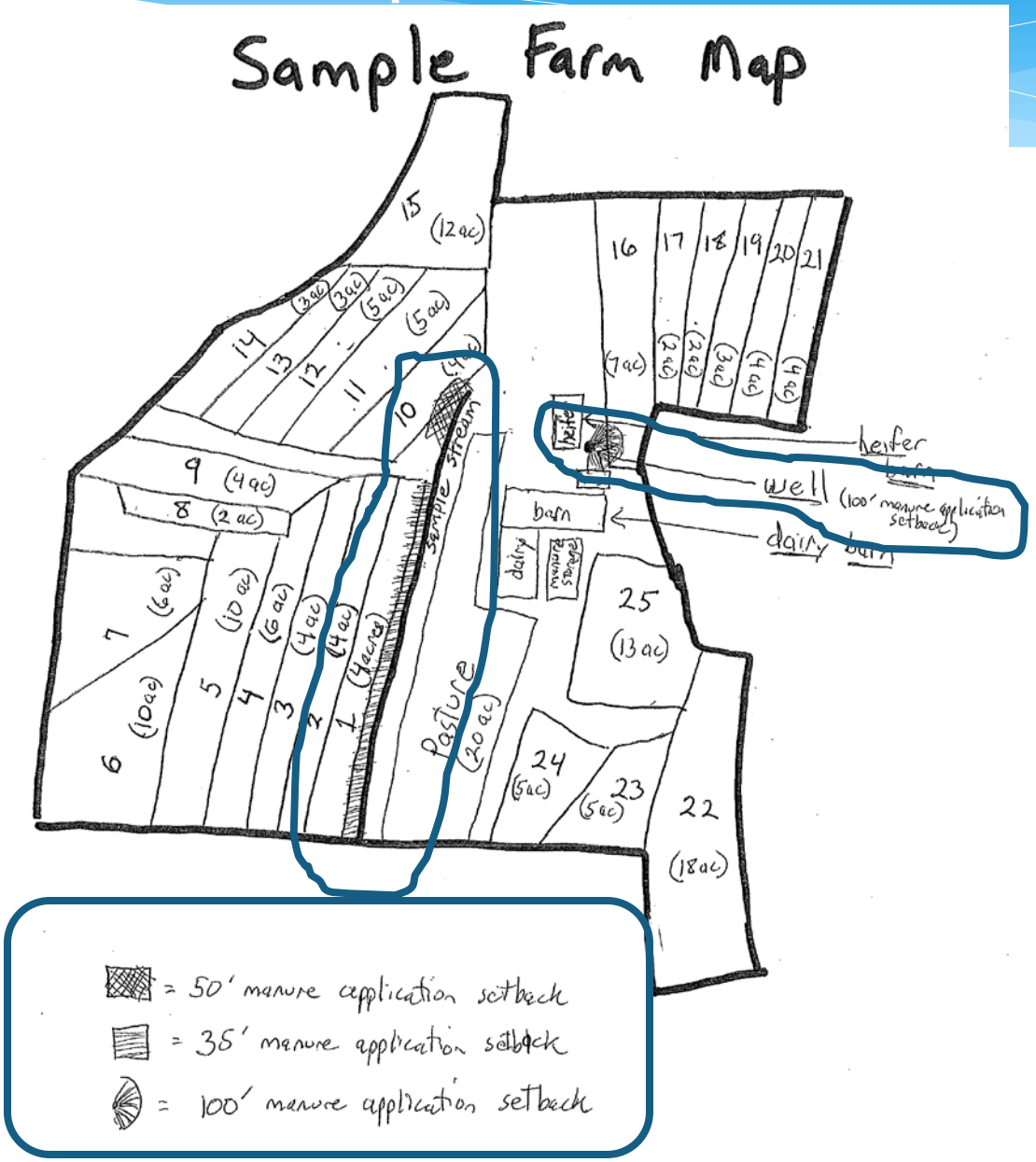
h. **Pasture Areas:** Yes X If yes list acres: Owned *20* Rented ____ No ☐
If yes, you must meet the requirements in Section 6 – Managing Manure in Pastures as described on page 21.

i. **Animal Concentration Areas (ACAs):** Yes X If yes: Owned X Rented ☐ No ☐
If yes, you must meet the requirements in Section 7 – Managing Manure in ACA as described on pages 22 and 23.

Farm Map


Sample Farm Map
15 (12ac)
14 (3ac)
13 (3ac)
12 (5ac)
11 (5ac)
10 (4ac)
9 (4ac)
8 (2ac)
7 (6ac)
6 (10ac)
5 (10ac)
4 (6ac)
3 (4ac)
2 (4ac)
1 (4acres)
Pasture (20ac)
sample stream
16 (7ac)
17 (2ac)
18 (2ac)
19 (3ac)
20 (4ac)
21 (4ac)
heifer
house
barn
dairy
manure storage
25 (13ac)
24 (5ac)
23 (5ac)
22 (18ac)
heifer barn
well
dairy barn

Farm Map (setbacks page 6)



Environmentally sensitive areas worksheet (streams, sinkholes, wells, ditches, Page 6 &7)

ENVIRONMENTALLY SENSITIVE AREAS WORKSHEET

Example

Field Identification (a)	Environmentally Sensitive Area (stream, lake, pond, sinkhole, drinking water source, concentrated flow area) (b)	Setback or restricted distance (see page 6) (b)	Is this setback restricted area shown on the plan map (yes/no) (c)
1	*Stream*	*50' (cover crop)*	*Yes*
16	*Home water well*	*100'*	*Yes*
10	*Stream*	*35' (buffer)*	*Yes*

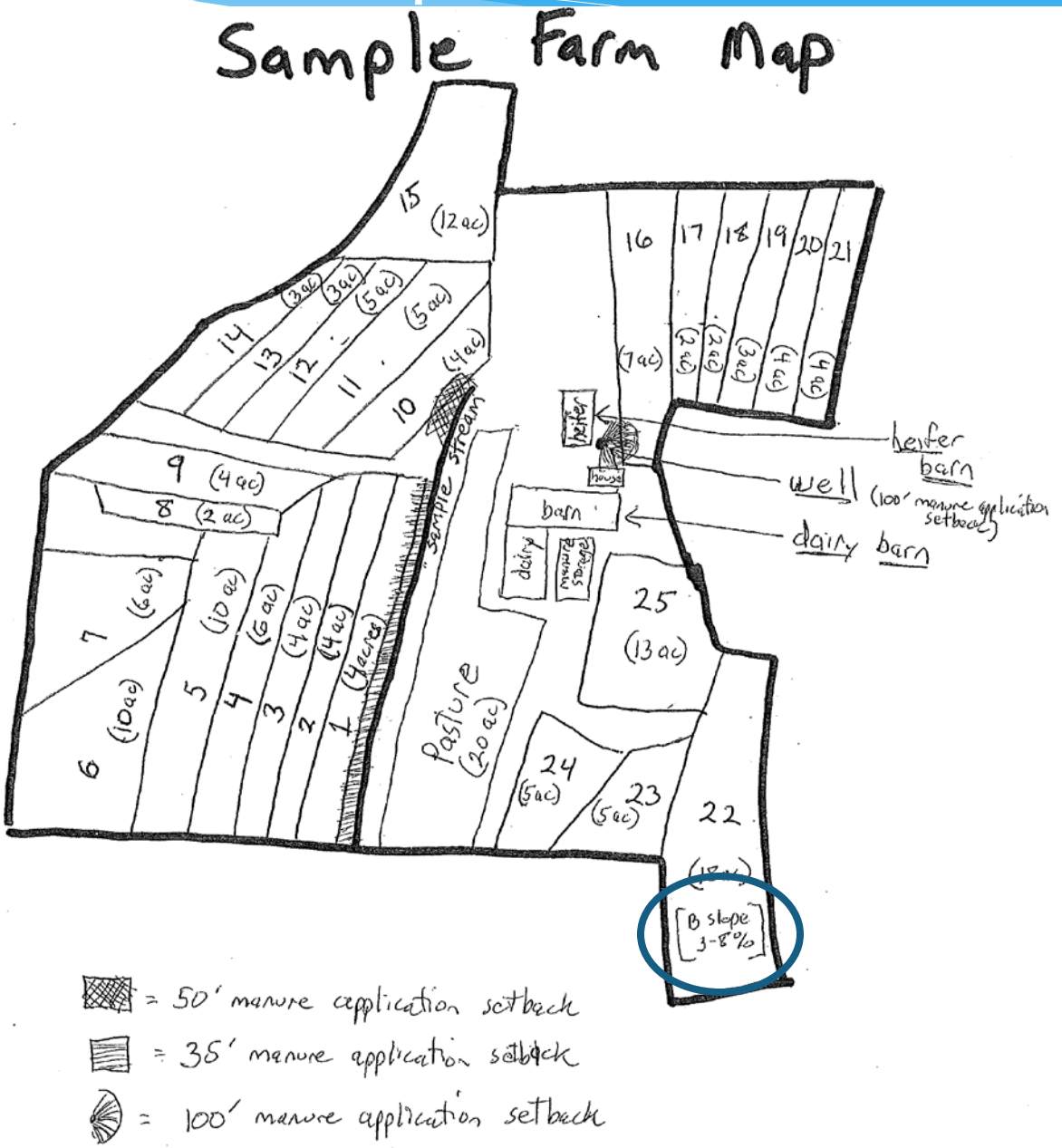
Winter Application Worksheet

where used and management used, Page 8 & 9)

WINTER APPLICATION WORKSHEET
Example

Field Identification (a)	Type of Manure (from the manure application charts) (b)	Winter Season Application Rate (c)	Percentage of Crop Residue (d)	Type of Cover Crop (if applicable) (d)	Field Slope Percentage (e)
22	*Solid dairy*	*20 ton/acre*	*NA*	*Grass Hay*	*3-8%*

Farm Map (winter fields slopes)



Filling out the manure mgmt plan summary

corn silage **liquid** dairy example

MANURE MANAGEMENT PLAN SUMMARY

Use Additional Sheets as Necessary

Crop Group and Yield (a)	Manure Group (b)	Application Season (c)	Planned Application Rate from C, NBS, PI * (d)	Incorporation Timing (e)	Commercial Fertilizer Application Rate (f)	Fields where this crop group can be used (g)
Corn silage 21 tons	*Liquid dairy*	*Spring*				

Filling out the manure mgmt plan summary (using the rate tables)

Corn Silage Nitrogen Based

Application charts, page 11

	Yield Groups (ton/A)								Increase N fertilizer/1000 gal manure rate reducton from rate in table
	17-21		21-25		25-29		29-33		
Liquid Dairy	Manure gal/A	Fert N lb/A	Manure gal/A	Fert N lb/A	Manure gal/A	Fert N lb/A	Manure gal/A	Fert N lb/A	
Spring Inc. 1 day	9000	0	11000	0	14000	0	16000	0	14
Spring In. 1 week	13000	0	16000	0	16000	35	16000	65	10
Spring Uninc.	16000	40	16000	70	16000	100	16000	130	6
Fall	16000	40	16000	70	16000	100	16000	130	6
Winter w/cover crop	5000	75	5000	105	5000	135	5000	165	11
Winter No cover crop	5000	100	5000	130	5000	160	5000	190	6

16,000 gallons max rate – 9,000 gallons selected rate = 7,000 gallons reduced from max rate
7,000 gallons X 6 lbs per 1,000 gallons = 42 lbs of additional N needed
42 lbs additional N needed + 70 lbs base need **= 112 lbs of N need if applying 9,000 gal**

Filling out the manure mgmt plan summary (corn silage liquid dairy, complete entry)

MANURE MANAGEMENT PLAN SUMMARY

Use Additional Sheets as Necessary

Crop Group and Yield (a)	Manure Group (b)	Application Season (c)	Planned Application Rate from C, NBS, PI * (d)	Incorporation Timing (e)	Commercial Fertilizer Application Rate (f)	Fields where this crop group can be used (g)
Corn silage 21 tons	*Liquid dairy*	*Spring*	*9,000 gal per acre C*	*Unincorporated*	*110 lbs N*	*1-25*

Filling out the manure mgmt plan summary

corn silage **solid** dairy example

MANURE MANAGEMENT PLAN SUMMARY

Use Additional Sheets as Necessary

Crop Group and Yield (a)	Manure Group (b)	Application Season (c)	Planned Application Rate from C, NBS, PI * (d)	Incorporation Timing (e)	Commercial Fertilizer Application Rate (f)	Fields where this crop group can be used (g)
Corn silage 21 tons	Liquid dairy	Spring	9,000 gal per acre C	Unincorporated	110 lbs N	1-25
Corn silage 21 tons	*Solid dairy*	*Fall*				

Filling out the manure mgmt plan summary (using the rate tables)

Corn Silage Nitrogen Based

Application charts, page 11

Solid Dairy	Yield Groups (ton/A) 17-21 Manure t/A	17-21 Fert N lb/A	21-25 Manure t/A	21-25 Fert N lb/A	25-29 Manure t/A	25-29 Fert N lb/A	29-33 Manure t/A	29-33 Fert N lb/A	Increase N fertilizer/ton manure rate reducton from rate in table
Spring Inc. 1 day	25	0	30	10	40	0	45	0	5
Spring In. 1 week	35	0	45	0	50	15	50	45	4
Spring Uninc.	50	30	50	60	50	90	50	120	2
Fall	50	30	50	60	50	90	50	120	2
Winter w/cover crop	20	50	20	80	20	110	20	140	4
Winter No cover crop	20	90	20	120	20	150	20	180	2

50 tons max rate – 25 tons selected rate = 25 tons reduced from max rate

25 tons X 2 lbs per ton reduced rate = 50 lbs of additional N needed

50 lbs additional N needed + 60 lbs base need **= 110 lbs of N need if applying 25 tons**

Filling out the manure mgmt plan summary (corn silage solid dairy)

MANURE MANAGEMENT PLAN SUMMARY

Use Additional Sheets as Necessary

Crop Group and Yield (a)	Manure Group (b)	Application Season (c)	Planned Application Rate from C, NBS, PI * (d)	Incorporation Timing (e)	Commercial Fertilizer Application Rate (f)	Fields where this crop group can be used (g)
Corn silage 21 tons	Liquid dairy	Spring	9,000 gal per acre C	Unincorporated	110 lbs N	1-25
Corn silage 21 tons	*Solid dairy*	*Fall*	*25 tons per acre C*	*Unincorporated*	*110 lbs N*	*1-25*

Manure Storage Description Sheet

description, pages 19 & 20)

1. Manure Storage Facilities (for each facility provide):
Example

Type of storage (concrete or metal tank, under building structure, earthen or clay or plastic lined pond or lagoon, exposed concrete pad, roofed solid manure stacking pad, etc.) and year of construction:

Concrete circular tank constructed in 1998

Manure stacking pad constructed in 2005

Size (length, width and depth (excluding required freeboard)) of existing manure storage, indicate if exposed to precipitation. Calculate storage volume for facilities storing liquid or semi-solid manure:

Concrete Tank 92' diameter, 11' deep (excluding freeboard of 6 inches) exposed to precipitation, 550,000 gallons capacity

Stacking pad 50' by 60'

Manure Storage Description Sheet

(... description, pages 19 & 20)

Indicate if any additional materials are added to the manure including bedding, agricultural process wastewater (water system overflow, wash water, milkhouse waste, egg wash water, etc.).

Tank – 150 gallons per day of milkhouse water

Pad – straw bedding used for stacked manure

Manure storage related practices that need to be installed on the farm to address identified problems (such as inadequate storage volume, leaking facilities, inadequate maintenance, runoff from a stack that directly reaches a water body, etc):

Tank – No problems found with tank

Pad – Need to direct clean water from pad

Pasture verification form

PASTURE MANAGEMENT

All pastures on the farm must be listed in the Manure Management Plan and identified on the farm map.

Please identify your pasture management approach below:

☐ I have a grazing plan meeting the requirements of the Natural Resources Conservation Service Pennsylvania Technical Guide Practice Standard 528 for Prescribed Grazing

X I am managing my pastures by maintaining dense vegetation in the pasture throughout the growing season. Dense vegetation means that the pasture is managed to minimize bare spots and to maintain an average vegetation height across the pasture to at least 3 inches high.

Grazed fields that do not have an NRCS grazing plan which are overgrazed (as defined as not meeting the management requirements described above in check box "2") need either to be managed to restore dense vegetation or these areas will be defined as Animal Concentration Areas ("ACAs") and will need to meet the requirements of Section 5 Animal Concentration Areas of this manual.

ACA verification form

Pages 22 & 23

ACA worksheet

List date contact was made to the assisting agency/party to help in these efforts:
March 1, 2011

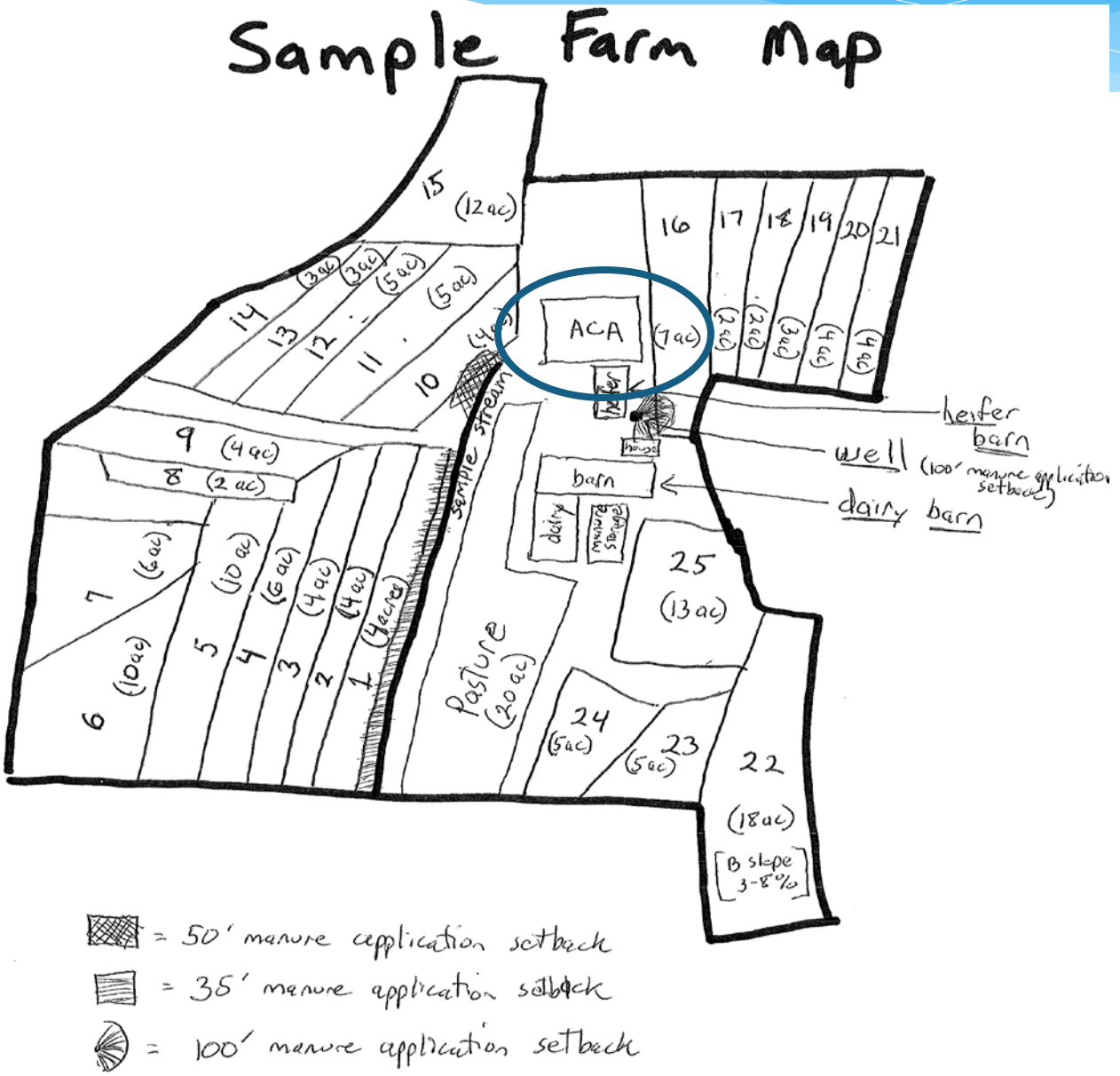
List who was contacted to assist in these efforts: *John Brown, York County Conservation District*

ANIMAL CONCENTRATION AREA WORKSHEET

Example

Location of ACA (refer to Farm Map)	Divert clean water around ACA	If BMP has been implemented, list implementation date. If BMP is planned, list date for planned installation			
		Direct polluted water to storage or vegetated treatment area	Limit access to streams through stabilized crossings and watering areas	Limit size of denuded areas	Locate area where animals congregate (feed areas, shade, etc.) away from streams
North side of heifer barn	*Summer 2012*	*Summer 2012*	*Summer 2012*	*2005*	*2012*

Complete Farm Map



That's the plan

- **Parts of the plan:**
  - Cover page (who the plan is for)
  - Operation information page (describe the farm at time of plan)
  - Environmentally sensitive worksheet (what areas relevant to setbacks)
  - Winter application worksheet (what fields will get winter manure)
  - Manure application summary (manure application rates)
  - Manure storage description (what storages are on site)
  - Pasture management verification (how are you managing you pastures)
  - ACA worksheet/contact page (who is going to give you advise, if needed)
- **Now on to record keeping during plan implementation**
  - Manure application
  - Yields
  - Manure transfer
  - Manure storage observations

Record keeping forms
(actual application rates)

MANURE APPLICATION RATE RECORD
JANUARY 1, _2011_ THROUGH December _2011_
Use Additional Sheets as Necessary
Example

Date	Field Identification	Acres	Manure Group	Crop Group	Application Rate	Notes
4/22	*1,3,5,7*	*24*	*Liquid dairy*	*Corn silage*	*9,000 gal*	
4/25	*2,4,6,8*	*22*	*Liquid dairy*	*Grass Hay*	*7,000 gal*	
10/5	*9,11,13*	*12*	*Solid dairy*	*Corn silage*	*25 tons*	
10/15	*10,12,14,16*	*29*	*Liquid dairy*	*Grass Hay*	*7,000 gal*	
10/15	*15,17,19*	*17*	*Liquid dairy*	*Corn silage*	*9,000 gal*	

Record keeping forms
(crop yields records)

CROP YIELD RECORD
JANUARY 1, *2011* THROUGH December 31, *2011*
Use Additional Sheets as Necessary
Example

Field Identification	Crop Group	Date Harvested	Yield Goal	Actual Yield Harvested	Notes
1,3,5,7,9,11,13 15,17,19,21, 23,25	*Corn silage*	*9/10*	*21 tons*	*22 tons*	
2,4,6,8,10,12, 14,16,18,20, 22,24	*Grass hay*	*2 times/yr.*	*3 tons*	*4 tons*	

Record keeping forms
(manure transfer records)

MANURE TRANSFER RECORD
JANUARY 1, *2011* THROUGH December 31, *2011*
Use Additional Sheets as Necessary
Example

Date	Name of Importer/Broker	Address and Phone Number – Importer/Broker	Manure Group	Amount of Manure Transferred	Crop Group and Application Rate
4/20	*Bill Jones*	*55 Manure Road Manure Town 717-123-4567*	*Solid beef*	*20 tons*	*Unknown*
10/5	*Bill Jones*	*55 Manure Road Manure Town 717-123-4567*	*Solid Beef*	*15 tons*	*Unknown*

Record keeping forms
(manure storage records)

MANURE STORAGE FACILITY RECORD
MONTHLY INSPECTION FORM
Use Additional Sheets as Necessary
Example

Storage Name	Inspection Date	Manure Depth (liquid)	Depth to Freeboard (liquid)	Leak Detection System Inspections. Are there any leaks, overflows, or seapages. Describe.	Structural Integrity. Are there cracks, erosion, slope failures, liner deterioration, rodent holes, large vegetation, excessive or lush vegetation, fencing issues, loading area issues ? Describe.
Liquid dairy	*1/1/2010*	*3.5 feet*	*7.5 feet*	*None*	*No problems observed*
Same	*2/1/2010*	*5 feet*	*6 feet*	*None*	*Same*
Same	*3/1/2010*	*6.5 feet*	*4.5 feet*	*None*	*Same*
Same	*4/1/2010*	*8 feet*	*3 feet*	*None*	*Same*
Same	*5/1/2010*	*1 foot*	*10 feet*	*None*	*Same*
Same	*6/1/2010*	*2.5 feet*	*8.5 feet*	*None*	*Same*

What is a stream

Winter spreading

Stacking

* Pastures

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