Koopman Dairies Inc

RECEIVED/NCDEQ/DWR

SEP 22 2017

Water Quality Regional
Operations Section

Statesville, September 13, 2017

Dear Mr. Joshi,

Enclosed the requested Phosporous Loss Assessment for Permit No. NCA 349040.

Sincerely,

Monique Koopman

204 Loyd Road, Statesville NC 28625

Phone: 704 876 4909 Fax: 704 876 2064

NCANAT Version: 1.98

PLAT Results For: Iredell 8/23/2017 3:20:42 PM

INPUTS

Calendar Year:	2015
County:	Iredell
Producer Identifier:	Koopman Dairies, Inc.
Tract Number:	66
Field Number:	3/Koopman 17
Soil Series:	CfC2: Cecil fine sandy loam, 6 to 10 percent slopes, eroded
Crop:	Corn (Silage) : Conservation Tillage - high residue
BMPs:	Buffer Width Width = 15 ft.
Fertilizers:	Dairy-slurry
	Yearly Applied Amount: 35 1000 gal
	Lb P2O5: 14.1 lb
	Application Method: All other surface applications
Soil Loss:	5.22 t/ac/yr
Receiving Slope Distance	20-29 ft
Soil Test 0" - 4"	69
WV_Factor (DATABASE)	1.2
Hydrologic Condition:	GOOD

OUTPUTS

PARTICULATE P	=	5
SOLUBLE P	=	1
LEACHATE P	=	0
SOURCE P	=	37
TOTAL P RATING	=	43 (MEDIUM)

NCANAT Version: 1.98

PLAT Results For: Iredell 8/23/2017 3:24:52 PM

INPUTS

Calendar Year:	2015
County:	Iredell
Producer Identifier:	Koopman Dairies, Inc.
Tract Number:	66
Field Number:	11/Koopman 17
Soil Series:	CfB2: Cecil fine sandy loam, 2 to 6 percent slopes, eroded
Crop:	Corn (Silage) : Conservation Tillage - high residue
BMPs:	Buffer Width Width = 15 ft.
Fertilizers:	Dairy-slurry
	Yearly Applied Amount: 35 1000 gal
	Lb P2O5: 14.1 lb
	Application Method: All other surface applications
Soil Loss:	4.82 t/ac/yr
Receiving Slope Distance	20-29 ft
Soil Test 0" - 4"	45
WV_Factor (DATABASE)	1.2
Hydrologic Condition:	GOOD

OUTPUTS

PARTICULATE P	=	3
SOLUBLE P	=	1
LEACHATE P	=	0
SOURCE P	=	37
TOTAL P RATING	=	41 (MEDIUM)

NCANAT Version: 1.98

PLAT Results For: Iredell 8/23/2017 3:29:29 PM

INPUTS

Calendar Year:	2015
County:	Iredell
Producer Identifier:	Koopman Dairies, Inc
Tract Number:	314
Field Number:	3/EU 17
Soil Series:	CfB2: Cecil fine sandy loam, 2 to 6 percent slopes, eroded
Crop:	Corn (Silage) : Conservation Tillage - high residue
BMPs:	Buffer Width Width = 15 ft.
Fertilizers:	Dairy-slurry
	Yearly Applied Amount: 30 1000 gal
	Lb P2O5: 14.1 lb
	Application Method: All other surface applications
Soil Loss:	3.86 t/ac/yr
Receiving Slope Distance	10-19 ft
Soil Test 0" - 4"	59
WV_Factor (DATABASE)	1.2
Hydrologic Condition:	GOOD

OUTPUTS

PARTICULATE P	=	4
SOLUBLE P	=	1
LEACHATE P	=	0
SOURCE P	=	32
TOTAL P RATING	=	37 (MEDIUM)

NCANAT Version: 1.98

PLAT Results For: Iredell 8/23/2017 3:36:46 PM

INPUTS

Calendar Year:	2015
County:	Iredell
Producer Identifier:	Koopman Dairies, Inc.
Tract Number:	314
Field Number:	4/EU 17
Soil Series:	CfC2: Cecil fine sandy loam, 6 to 10 percent slopes, eroded
Crop:	Corn (Silage) : Conservation Tillage - high residue
BMPs:	Buffer Width Width = 15 ft.
Fertilizers:	Dairy-slurry
	Yearly Applied Amount: 30 1000 gal
	Lb P2O5: 14.1 lb
	Application Method: All other surface applications
Soil Loss:	5.22 t/ac/yr
Receiving Slope Distance	20-29 ft
Soil Test 0" - 4"	52
WV_Factor (DATABASE)	1.2
Hydrologic Condition:	GOOD

OUTPUTS

PARTICULATE P	=	4
SOLUBLE P	=	1
LEACHATE P	=	0
SOURCE P	=	32
TOTAL P RATING	=	37 (MEDIUM)

NCANAT Version: 1.98

PLAT Results For: Iredell 8/23/2017 3:39:59 PM

INPUTS

Calendar Year:	2015
County:	Iredell
Producer Identifier:	Koopman Dairies, Inc.
Tract Number:	314
Field Number:	5/EU 17
Soil Series:	CfB2: Cecil fine sandy loam, 2 to 6 percent slopes, eroded
Crop:	Corn (Silage) : Conservation Tillage - high residue
BMPs:	Buffer Width Width = 15 ft.
Fertilizers:	Dairy-slurry
	Yearly Applied Amount: 30 1000 gal
	Lb P2O5: 14.1 lb
	Application Method: All other surface applications
Soil Loss:	3.48 t/ac/yr
Receiving Slope Distance	20-29 ft
Soil Test 0" - 4"	53
WV_Factor (DATABASE)	1.2
Hydrologic Condition:	GOOD

OUTPUTS

PARTICULATE P	=	3
SOLUBLE P	=	1
LEACHATE P	=	0
SOURCE P	=	32
TOTAL P RATING	=	36 (MEDIUM)

NCANAT Version: 1.98

PLAT Results For: Iredell 8/23/2017 4:07:52 PM

INPUTS

Calendar Year:	2015
County:	Iredell
Producer Identifier:	Koopman Dairies, Inc.
Tract Number:	9515
Field Number:	2/ L&M17
Soil Series:	LfC2: Lloyd fine sandy loam, 6 to 10 percent slopes, eroded
Crop:	Corn (Silage) : Conservation Tillage - high residue
BMPs:	Buffer Width Width = 15 ft.
Fertilizers:	Layer-slurry
	Yearly Applied Amount: 10 1000 gal
	Lb P2O5: 58.94 lb
	Application Method: All other surface applications
Soil Loss:	8.25 t/ac/yr
Receiving Slope Distance	20-29 ft
Soil Test 0" - 4"	50
WV_Factor (DATABASE)	1.1
Hydrologic Condition:	GOOD

OUTPUTS

PARTICULATE P	=	6
SOLUBLE P	=	1
LEACHATE P	=	0
SOURCE P	=	34
TOTAL P RATING	=	41 (MEDIUM)

NCANAT Version: 1.98

PLAT Results For: Iredell 8/23/2017 4:12:20 PM

INPUTS

Calendar Year:	2015
County:	Iredell
Producer Identifier:	Koopman Dairies, Inc.
Tract Number:	9515
Field Number:	3/L&M 17
Soil Series:	LfC2: Lloyd fine sandy loam, 6 to 10 percent slopes, eroded
Crop:	Corn (Silage) : Conservation Tillage - high residue
BMPs:	Buffer Width Width = 20 ft.
Fertilizers:	Dairy-slurry
	Yearly Applied Amount: 30 1000 gal
	Lb P2O5: 14.1 lb
	Application Method: All other surface applications
Soil Loss:	6.43 t/ac/yr
Receiving Slope Distance	20-29 ft
Soil Test 0" - 4"	101
WV_Factor (DATABASE)	1.1
Hydrologic Condition:	GOOD

OUTPUTS

PARTICULATE P	=	9
SOLUBLE P	=	2
LEACHATE P	=	0
SOURCE P	=	29
TOTAL P RATING	=	40 (MEDIUM)

NCANAT Version: 1.98

PLAT Results For: Iredell 8/23/2017 4:15:55 PM

INPUTS

Calendar Year:	2015
County:	Iredell
Producer Identifier:	Koopman Dairies, Inc.
Tract Number:	9515
Field Number:	4/ L&M 17
Soil Series:	CfB2: Cecil fine sandy loam, 2 to 6 percent slopes, eroded
Crop:	Corn (Silage) : Conservation Tillage - high residue
BMPs:	Buffer Width Width = 20 ft.
Fertilizers:	Dairy-slurry
	Yearly Applied Amount: 30 1000 gal
	Lb P2O5: 14.1 lb
	Application Method: All other surface applications
Soil Loss:	4.39 t/ac/yr
Receiving Slope Distance	10-19 ft
Soil Test 0" - 4"	135
WV_Factor (DATABASE)	1.2
Hydrologic Condition:	GOOD

OUTPUTS

PARTICULATE P	=	10
SOLUBLE P	=	2
LEACHATE P	=	0
SOURCE P	=	32
TOTAL P RATING	=	44 (MEDIUM)

NCANAT Version: 1.98

PLAT Results For: Iredell 8/23/2017 4:20:00 PM

INPUTS

Calendar Year:	2015
County:	Iredell
Producer Identifier:	Koopman Dairies, Inc.
Tract Number:	9516
Field Number:	1/ L&M 17
Soil Series:	LfC2: Lloyd fine sandy loam, 6 to 10 percent slopes, eroded
Crop:	Corn (Silage) : Conservation Tillage - high residue
Fertilizers:	Dairy-slurry
	Yearly Applied Amount: 30 1000 gal
	Lb P2O5: 14.1 lb
	Application Method: All other surface applications
Soil Loss:	6.51 t/ac/yr
Receiving Slope Distance	10-19 ft
Soil Test 0" - 4"	40
WV_Factor (DATABASE)	1.1
Hydrologic Condition:	GOOD

OUTPUTS

PARTICULATE P	=	13
SOLUBLE P	=	1
LEACHATE P	=	0
SOURCE P	=	31
TOTAL P RATING	=	45 (MEDIUM)

NCANAT Version: 1.98

PLAT Results For: Iredell 9/11/2017 3:16:52 PM

INPUTS

Calendar Year:	2015
County:	Iredell
Producer Identifier:	Koopman Dairies, Inc
Tract Number:	9517
Field Number:	1/ L&M 17
Soil Series:	LfC2: Lloyd fine sandy loam, 6 to 10 percent slopes, eroded
Crop:	Corn (Silage) : Conservation Tillage - high residue
BMPs:	Buffer Width Width = 15 ft.
Fertilizers:	Dairy-slurry
	Yearly Applied Amount: 25 1000 gal
	Lb P2O5: 14.1 lb
	Application Method: All other surface applications
Soil Loss:	6.51 t/ac/yr
Receiving Slope Distance	20-29 ft
Soil Test 0" - 4"	193
WV_Factor (DATABASE)	1.1
Hydrologic Condition:	GOOD

OUTPUTS

PARTICULATE P	=	19
SOLUBLE P	=	3
LEACHATE P	=	0
SOURCE P	=	24
TOTAL P RATING	=	46 (MEDIUM)

NCANAT Version: 1.98

PLAT Results For: Iredell 9/11/2017 2:27:20 PM

INPUTS

Calendar Year:	2015
County:	Iredell
Producer Identifier:	Koopman Dairies, Inc
Tract Number:	9781
Field Number:	1/ L&M 17
Soil Series:	CfB2: Cecil fine sandy loam, 2 to 6 percent slopes, eroded
Crop:	Corn (Silage) : Conservation Tillage - high residue
BMPs:	Buffer Width Width = 15 ft.
Fertilizers:	Dairy-slurry
	Yearly Applied Amount: 25 1000 gal
	Lb P2O5: 14.1 lb
	Application Method: All other surface applications
Soil Loss:	4.39 t/ac/yr
Receiving Slope Distance	20-29 ft
Soil Test 0" - 4"	79
WV_Factor (DATABASE)	1.2
Hydrologic Condition:	GOOD

OUTPUTS

PARTICULATE P	=	5
SOLUBLE P	=	1
LEACHATE P	=	0
SOURCE P	=	27
TOTAL P RATING	=	33 (MEDIUM)

NCANAT Version: 1.98

PLAT Results For: Iredell 9/11/2017 2:48:22 PM

INPUTS

Calendar Year:	2015
County:	Iredell
Producer Identifier:	Koopman Diaries, Inc
Tract Number:	9781
Field Number:	2/L&M 17
Soil Series:	CfB2: Cecil fine sandy loam, 2 to 6 percent slopes, eroded
Crop:	Corn (Silage) : Conservation Tillage - high residue
BMPs:	Buffer Width Width = 15 ft.
Fertilizers:	Dairy-slurry
	Yearly Applied Amount: 30 1000 gal
	Lb P2O5: 14.1 lb
	Application Method: All other surface applications
Soil Loss:	3.48 t/ac/yr
Receiving Slope Distance	30-49 ft
Soil Test 0" - 4"	108
WV_Factor (DATABASE)	1.2
Hydrologic Condition:	GOOD

OUTPUTS

PARTICULATE P	=	5
SOLUBLE P	=	2
LEACHATE P	=	0
SOURCE P	=	32
TOTAL P RATING	=	39 (MEDIUM)

NCANAT Version: 1.98

PLAT Results For: Iredell 9/11/2017 2:30:56 PM

INPUTS

Calendar Year:	2015
County:	Iredell
Producer Identifier:	Koopman Dairies, Inc
Tract Number:	9781
Field Number:	3/L&M 17
Soil Series:	CfC2: Cecil fine sandy loam, 6 to 10 percent slopes, eroded
Crop:	Corn (Silage) : Conservation Tillage - high residue
BMPs:	Buffer Width Width = 15 ft.
Fertilizers:	Dairy-slurry
	Yearly Applied Amount: 25 1000 gal
	Lb P2O5: 14.1 lb
	Application Method: All other surface applications
Soil Loss:	5.22 t/ac/yr
Receiving Slope Distance	30-49 ft
Soil Test 0" - 4"	150
WV_Factor (DATABASE)	1.2
Hydrologic Condition:	GOOD

OUTPUTS

PARTICULATE P	=	10
SOLUBLE P	=	2
LEACHATE P	=	0
SOURCE P	=	27
TOTAL P RATING	=	39 (MEDIUM)

NCANAT Version: 1.98

PLAT Results For: Iredell 9/11/2017 2:57:21 PM

INPUTS

Calendar Year:	2015
County:	Iredell
Producer Identifier:	Koopman Dairies, Inc
Tract Number:	9781
Field Number:	8/ L&M 17
Soil Series:	LfC2: Lloyd fine sandy loam, 6 to 10 percent slopes, eroded
Crop:	Corn (Silage) : Conservation Tillage - high residue
BMPs:	Buffer Width Width = 15 ft.
Fertilizers:	Dairy-slurry
	Yearly Applied Amount: 30 1000 gal
	Lb P2O5: 14.1 lb
	Application Method: All other surface applications
Soil Loss:	6.43 t/ac/yr
Receiving Slope Distance	30-49 ft
Soil Test 0" - 4"	145
WV_Factor (DATABASE)	1.1
Hydrologic Condition:	GOOD

OUTPUTS

PARTICULATE P	=	13
SOLUBLE P	=	2
LEACHATE P	=	0
SOURCE P	=	29
TOTAL P RATING	=	44 (MEDIUM)

NCANAT Version: 1.98

PLAT Results For: Iredell 9/11/2017 3:08:31 PM

INPUTS

Calendar Year:	2015
County:	Iredell
Producer Identifier:	Koopman Dairies, Inc
Tract Number:	9781
Field Number:	8/ L&M 17
Soil Series:	LfC2: Lloyd fine sandy loam, 6 to 10 percent slopes, eroded
Crop:	Corn (Silage) : Conservation Tillage - high residue
BMPs:	Buffer Width Width = 15 ft.
Fertilizers:	Dairy-slurry
	Yearly Applied Amount: 30 1000 gal
	Lb P2O5: 14.1 lb
	Application Method: All other surface applications
Soil Loss:	6.43 t/ac/yr
Receiving Slope Distance	30-49 ft
Soil Test 0" - 4"	131
WV_Factor (DATABASE)	1.1
Hydrologic Condition:	GOOD

OUTPUTS

PARTICULATE P	=	12
SOLUBLE P	=	2
LEACHATE P	=	0
SOURCE P	=	29
TOTAL P RATING	=	43 (MEDIUM)

NCANAT Version: 1.98

PLAT Results For: Iredell 9/11/2017 3:13:37 PM

INPUTS

Calendar Year:	2015
County:	Iredell
Producer Identifier:	Koopman Dairies, Inc
Tract Number:	9781
Field Number:	9
Soil Series:	LfC2: Lloyd fine sandy loam, 6 to 10 percent slopes, eroded
Crop:	Corn (Silage) : Conservation Tillage - high residue
BMPs:	Buffer Width Width = 15 ft.
Fertilizers:	Dairy-slurry
	Yearly Applied Amount: 30 1000 gal
	Lb P2O5: 14.1 lb
	Application Method: All other surface applications
Soil Loss:	8.25 t/ac/yr
Receiving Slope Distance	30-49 ft
Soil Test 0" - 4"	145
WV_Factor (DATABASE)	1.1
Hydrologic Condition:	GOOD

OUTPUTS

PARTICULATE P	=	17
SOLUBLE P	=	2
LEACHATE P	=	0
SOURCE P	=	29
TOTAL P RATING	=	48 (MEDIUM)

ARD KOOPMAN
Lloyd Farm
WASTE MANAGEMENT SYSTEM

IREDELL COUNTY, NORTH CAROLINA

LOCATION: LOCATED AT END OF SR 1915
(Lloyd Road)
LONGITUDE - 080°51'46.6" W
LATITUDE - 035°53'53.8" N

DAIRY SIZE: Maximum Number Cattle in Waste Management System
700 MILK AND DRY COWS
100 Heifers DAY OLD TO 200 LB

Address: 204 Lloyd Road, Statesville, NC 28625
Phone: Cell 704-929-0659 Home 704-876-4909

RECEIVED/NCDEQ/DWR
JUN 21 2017
Water Quality Regional
Operations Section

UPDATED BY: Samuel C. Bingham, PE

APPROVED BY: Samuel C. Bingham

DATE: May 21, 2013

This modifies the plan prepared for Ard Koopman in 2002. In this revision, the cow numbers were increased to 700. The increase in cow numbers resulted in less storage period. Mr. Koopman maintains storage capacity in each pond by agitating and pumping between ponds. This mixing also results in a more uniform waste product to spread on cropland. The storage capacity will be based on the three ponds managed as one unit. The 25 yr-24 hr storage capacity was maintained in each pond.

INDEX

1 of 1

WASTE MANAGEMENT SYSTEM

I. Waste Production

A maximum of 700 milk and dry cows will be housed on this farm. 400 milk cows will be confined to freestall barns. 300 dry cows will be housed on the farm. Some of the dry cows are from another dairy farm. Dry cows have limited access to a lounging area. Approximately 90% of waste from dry cows is collected in waste storage ponds. Manure, runoff and milking parlor wash water are stored in waste storage ponds.

Up to 100 heifers day old to 200 lbs are housed in calf hutches. Hutches are located on washed stone beds. Runoff from this area is flows through a vegetated filter.

Runoff and seepage from trench silos will be diverted through vegetated filters away from the main drainage way for clean water.

Maximum Number Cattle in Waste Management System		
Milk Cows	-	400
Dry Cows	-	300
Day old to 200 lb heifers	-	100

Note: Close up heifers are included in the dry cow numbers shown above.

II. Waste Management Objective

A system is planned to economically as possible handle all the waste production described above in a manner that does not degrade air, soil or water resources. The system will prevent discharge of pollutants to surface and ground water by recycling waste through soil and plants.

The following components are required:

A. 25 yr-24 hr Storage Capacity in each Pond

The 25 yr-24 hr storage capacity will be computed for each pond. A pump out marker will be set at the maximum waste storage capacity. The 25 year storage capacity is based on direct rainfall into waste ponds and runoff from drainage areas into each pond.

B. Waste Storage Capacity of Waste Storage Ponds

All three waste storage ponds will be managed as one unit. The storage capacity will be determined based on manure production from the 700 milk and dry cows, milking parlor wash water, direct rainfall into waste ponds and runoff from the drainage areas.

The Waste storage ponds are located over 100 feet from the nearest well. The waste storage ponds are located no closer than 350 feet from any residence other than the owner or his tenants.

Truck haul and hard hose pull will be used to empty the waste ponds.

C. Day Old to 200 lb Heifer Housing

A maximum of 100 day old to 200 lb heifers will be housed in hutches on gravel beds. Runoff from this area flows through vegetated filter.

D. Silo Leachate and Runoff

Seepage and runoff from a trench silo and commodities shed flows into a vegetated filter.

Silo runoff is recognized as a serious pollutant and seepage and runoff is best handled in waste storage ponds; however, present guidance allows this pollutant to be filtered. The vegetated filter planned for silo should be adequate until regulation changes.

E. Clean Water Exclusion

Clean water will be excluded from lounging areas and waste storage ponds to the fullest extent possible. Diversions and guttering are used.

Diversions are used to divert clean water around waste storage ponds. Clean water exclusion components shall have 25 yr-24 hr capacities.

F. Livestock Exclusion, Stock Trails, Lounging Areas, Heavy Use Areas and Filter Areas

Livestock are excluded from waste storage ponds, streams and filter areas.

100 feet of vegetative filter area will be maintained below lounging areas and day old to 200 lb heifers by excluding livestock. These filter areas will infiltrate part of the first flush and filter sediment and organic particles.

G. Plant Available Nutrients

Sufficient land shall be available to properly spread waste at locations, times, volumes, and rates that maintains air, soil and water resources. Waste applications will be based on soil and waste analysis.

K. Operation and Maintenance Plan

The owner shall be responsible for operating and maintaining the system. See the O&M plan attached.

L. Emergency Action Plan

The emergency action plan describes emergency conditions and immediate steps to take to gain control.

III. The 25 yr-24 hr Storage Capacities of each Pond

A. Waste Storage Pond #1 (Upper Pond)

1. 25 yr-24 hr runoff

The drainage area consist of opening roof over feed alley, open area near stock trail @ back of barn and sand storage area.

Drainage Area - 1,920 sq ft + 390 + 18,750 = 21,060 sq ft

CN = 95
Rainfall = 5.5
Runoff = 4.91"

$$\text{25yr-24hr runoff} = \frac{4.91"}{12"/ft} * 21{,}060 \text{ sq ft} = 8{,}617 \text{ cu ft}$$

2. 25 yr-24 hr rainfall on pond surface

Rainfall = 5.5" = .5 ft

3. Freeboard + Emergency spillway stage = 1.0 ft

4. Maximum pump out level

The surface area in pond at 25 yr-24 hr storage level is 158'x175'.

Maximum level - 0.5' + 1.0' + 8,617 cu ft/(158' X 175')
= 1.8 ft

5. Pump Out Elevation and ESW Elevation

The waste storage pond should be hauled before the water level reaches the 25 yr-24 hr storage volume. This elevation is 0.8 ft below the emergency spillway. The emergency spillway elevation is 1.0 foot below the top of dam.

B. Waste Storage Pond #2 (Middle Pond)

1. 25 yr-24 hr runoff

The drainage area consist of opening area @ back of Freestall and concrete trail from upper freestall to lower freestall barn.

Drainage Area - 2,135 sq ft + 1,414 sq ft = 3,549 sq ft

CN = 95
Rainfall = 5.5
Runoff = 4.91"

$$\text{25yr-24hr runoff} = \frac{4.91"}{12"/ft} * 3{,}549 \text{ sq ft} = 1{,}452 \text{ cu ft}$$

2. 25 yr-24 hr rainfall on pond surface

Rainfall = 5.5" = .5 ft

3. Freeboard + Emergency spillway stage = 1.8 ft

4. Maximum pump out level

The surface area in pond at 25 yr-24 hr storage level is 110'X150'.

Maximum level - 0.5' + 1.8' + 1,452 cu ft/(110' X 150')
= 2.4 ft

5. Pump Out Elevation and ESW Elevation

The waste storage pond should be hauled before the water level reaches the 25 yr-24 hr storage volume. This elevation is 0.6 ft below the emergency spillway. The emergency spillway elevation is 1.8 foot below the top of dam.

A. Waste Storage Pond #3, Parlor Wash Water Pond

1. 25 yr-24 hr runoff

The drainage area consist of area around pond.

Drainage Area - 2,000 sq ft

CN = 61
Rainfall = 5.5
Runoff = 1.69"

25yr-24hr runoff= $\frac{1.69"}{12"/ft}$ * 2,000 sq ft = 282 cu ft

2. 25 yr-24 hr rainfall on pond surface

Rainfall = 5.5" = .5 ft

3. Freeboard + Emergency spillway stage = 1.0 ft

4. Maximum pump out level

The surface area in pond at 25 yr-24 hr storage level is 85'X85'.

Maximum level - 0.5' + 1.0' + 282 cu ft/(85' X 85')
= 1.6 ft

5. Pump Out Elevation and ESW Elevation

The waste storage pond should be hauled before the water level reaches the 25 yr-24 hr storage volume. This elevation is 0.6 ft below the emergency spillway. The emergency spillway elevation is 1.0 foot below the top of dam.

IV. Waste Storage Capacity of Waste Storage Ponds

A. Design Volumes

1. Normal Runoff for 4 month period - Use average runoff values in Agricultural Waste Management Field Manual.

For location of drainage areas, see 25 yr-24 hr sections above.

Surface areas = 1,920 + 390 + 2,135 + 1,414 + 18,750 = 24,609 sq ft
Unsurface areas = 2,000 = 2,000 sq ft

MONTH	NORMAL RAINFALL	SURFACE RUNOFF %	SURFACE RUNOFF DEPTH	UNSURFACE RUNOFF %	UNSURFACE RUNOFF DEPTH	NORMAL EVAP.
JAN.	3.70	50	1.85	20	0.74	1.7
FEB.	3.86	56	2.16	25	0.97	1.6
MAR.	4.51	55	2.48	24	1.08	3.1
APR.	3.35	56	1.88	25	0.84	3.8
MAY	3.86	57	2.20	23	0.89	3.9
JUN.	4.19	60	2.51	27	1.13	4.4
JUL.	4.70	60	2.82	26	1.22	4.3
AUG.	4.83	61	2.95	31	1.50	3.9
SEP.	3.82	66	2.52	32	1.22	3.2
OCT.	3.44	62	2.13	30	1.03	2.4
NOV.	2.95	55	1.62	25	0.74	1.7
DEC.	3.80	57	2.17	23	0.87	1.7

Try 4 months:
Nov. through February

Surface Runoff Depth = 7.80"
Unsurface Runoff Depth = 3.32"

$$\text{Surface Runoff} = \frac{7.8" * 24{,}609 \text{ sq ft}}{12 \text{ in/ft}} = 15{,}996 \text{ cu ft}$$

$$\text{Unsurface Runoff} = \frac{3.32" * 2{,}000 \text{ sq ft}}{12 \text{ in/ft}} = 553 \text{ cu ft}$$

2. Rainfall minus evaporation on pond surfaces

14.3 - 6.7 = 7.6" = 0.64 ft/4 month

Waste Pond #1 = 0.64 ft (164.5′ X 181′) = 19,056 cu ft
Waste Pond #2 = 0.64 ft (120′ X 160′) = 12,288 cu ft
Waste Pond #3 = 0.64 ft (93.2′ X 93.2′) = 5,559 cu ft
Total = 36,903 cu ft

3. Volume of Waste

400 milk cows are totally confined in freestall barns. 100% of the manure produced will be collected in the waste storage ponds.

$$\text{Volume} = 400 \text{ cows} * \frac{14.0 \text{ gal/day}}{7.48 \text{ gal/cu ft}} * 120 \text{ days} * 100\%$$

$$= 89{,}840 \text{ cu ft}$$

300 dry cows are partially confined in freestall barns. 75% of the manure produced will be collected in the waste storage ponds.

$$\text{Volume} = 300 \text{ cows} * \frac{14.0 \text{ gal/day}}{7.48 \text{ gal/cu ft}} * 120 \text{ days} * 90\%$$

$$= 60{,}642 \text{ cu ft}$$

4. Sand Storage

It is estimated that dairy cows will waste approximately 40 lbs of sand per freestall per day. Since dry cows will also have access to lounging areas, 30 lbs per freestall will be used in computations. Sand will be removed from waste ponds once a year.

700 freestalls @ 30 lb/day x 365 days/(100 lb/cu ft) = 76,650 cu ft

76,650 cu ft per year is approximately 3,832 tons of sand.

5. Parlor Wash Water

Milking Parlor Wash Water

i.	Pipeline and milker wash water	400 gal/day
ii.	Tank wash water	200 gal/day
iii.	Milk house floor wash water	1200 gal/day
iv.	Cow wash water	200 gal/day

$$\text{Volume} = \frac{2000 \text{ gal/day}}{7.48 \text{ gal/cu ft}} * 120 \text{ days}$$

$$= 32{,}086 \text{ cu ft}$$

B. Summary of Design Volumes

1.	Surface Runoff	15,996 cu ft
2.	Unsurface Runoff	553 cu ft
3.	Rainfall minus evaporation on pond surfaces	36,903 cu ft
4.	Volume of Milk Cow Waste	89,840 cu ft
5.	Volume of Dry Cow Waste	60,642 cu ft
6.	Waste Sand Storage	76,650 cu ft
7.	Parlor Wash Water	32,086 cu ft
	TOTAL	312,670 cu ft

The normal waste volume for 4 months of waste storage and 1 year of waste sand storage in the waste ponds is 312,670 cu ft.

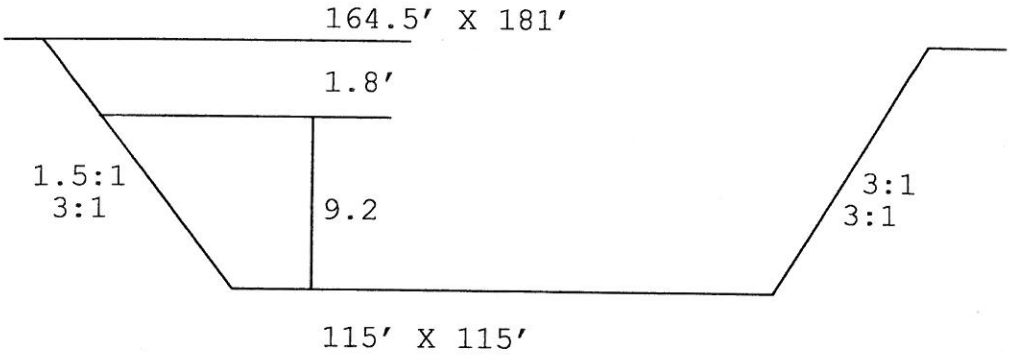
Normal Pump Out Volume not including sand

15,996 + 553 + 36,903 + 89,840 + 60,642 + 32,086 cu ft
= 236,020 cu ft per 120 days
= 717,894 cu ft per 365 days
= 5,370,000 gallons per year

C. Storage Volume in Waste Storage Ponds

1. Waste Storage Pond #1 (Upper Pond)

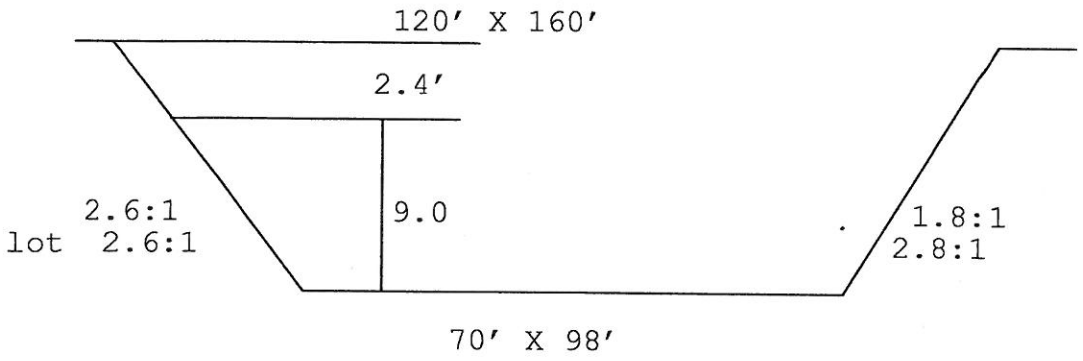
The maximum pump out marker is 1.8′ below top of dam.



Volume = 9.2/6[115 X 115 + 156.4 X 170.2 + 4(135.7 X 142.6)]
= 179,780 cu ft

2. Waste Storage Pond #2 (Middle Pond)

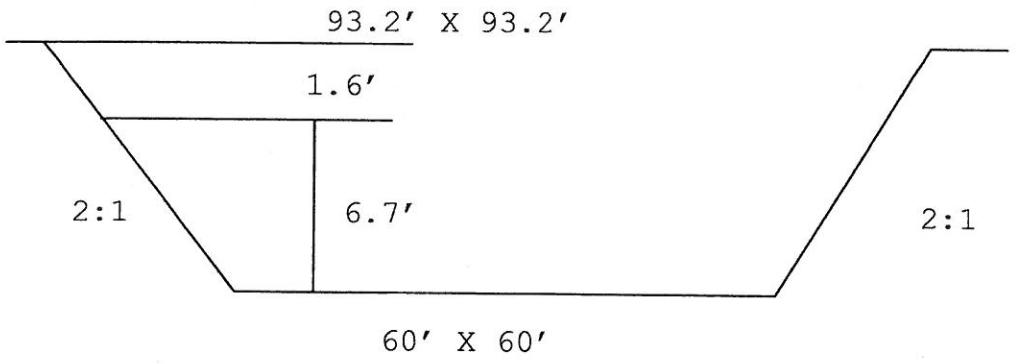
"As Built" data for waste storage pond. The maximum pump out marker is 2.4′ below top of dam.



Volume = 9.0/6[70 X 98 + 109.6 X 146.6 + 4(89.8 X 122.3)]
= 100,286 cu ft

3. Waste Storage Pond #3 (Parlor Wash Water Pond)

"AS BUILT" - The maximum pump out marker is 1.6′ below top of dam.



Volume = 6.7/6[60 X 60 + 86.8 X 86.8 + 4(73.4 X 73.4)]
= 36,498 cu ft

4. Total Waste Storage Capacity below the Maximum Pump Out Markers

Normal Storage Capacity - 179,780 + 100,286 + 36,498 = 316,564 cu ft

Storage capacity is adequate for 4 months of waste storage.

V. Clean Water Exclusion

A. Diversions

Clean water diversions shall be maintained around waste storage ponds and freestall barns. Water from silo feed area will be diverted to a point on ridge to allow the maximum infiltration of water. See drawing.

All diversions shall be maintained to carry the 25 year - 24 hour runoff plus capacity to store some sediment.

B. Guttering

Clean water shall be excluded to the fullest extent possible by guttering. All gutters shall maintained in good operating condition.

VI. Lounging Areas, Stock Trails, Heavy Use Areas and Vegetated Filter Areas

All heavy use areas and stock trails consist of 9" or compacted ABC stone over a specified type of filter cloth. Runoff from these areas and lounging areas will be directed across well-maintained grass sods. Heavy use areas and lounging areas will be located to provide the maximum grass filter possible. Grass filter areas shall be at least 100' wide below lounging areas. Swells or diversions shall be constructed and maintained along fence lines to kick water into filters at frequent intervals.

A. Day old to 200 lb Heifers

100 young heifers are kept in calf hutches on gravel beds. No manure is collected in this type of calf housing. Runoff from calf hutch area will be diverted through as much vegetated filer as possible. Grass will be maintained downhill of hutches.

B. Dry Cows

400 dry cows are housed in a freestall barns and lounging areas. Dry cows are fed in freestall barn. 100 feet of vegetated filters and buffers areas are maintained along the streams adjacent to lounging areas.

VII. Silo Leachate and Runoff

Runoff from trench silo will be diverted through a grass diversion to a ridge to allow maximum filtering possible. Clean water will exclude from silo runoff as much as practicable. See drawing.

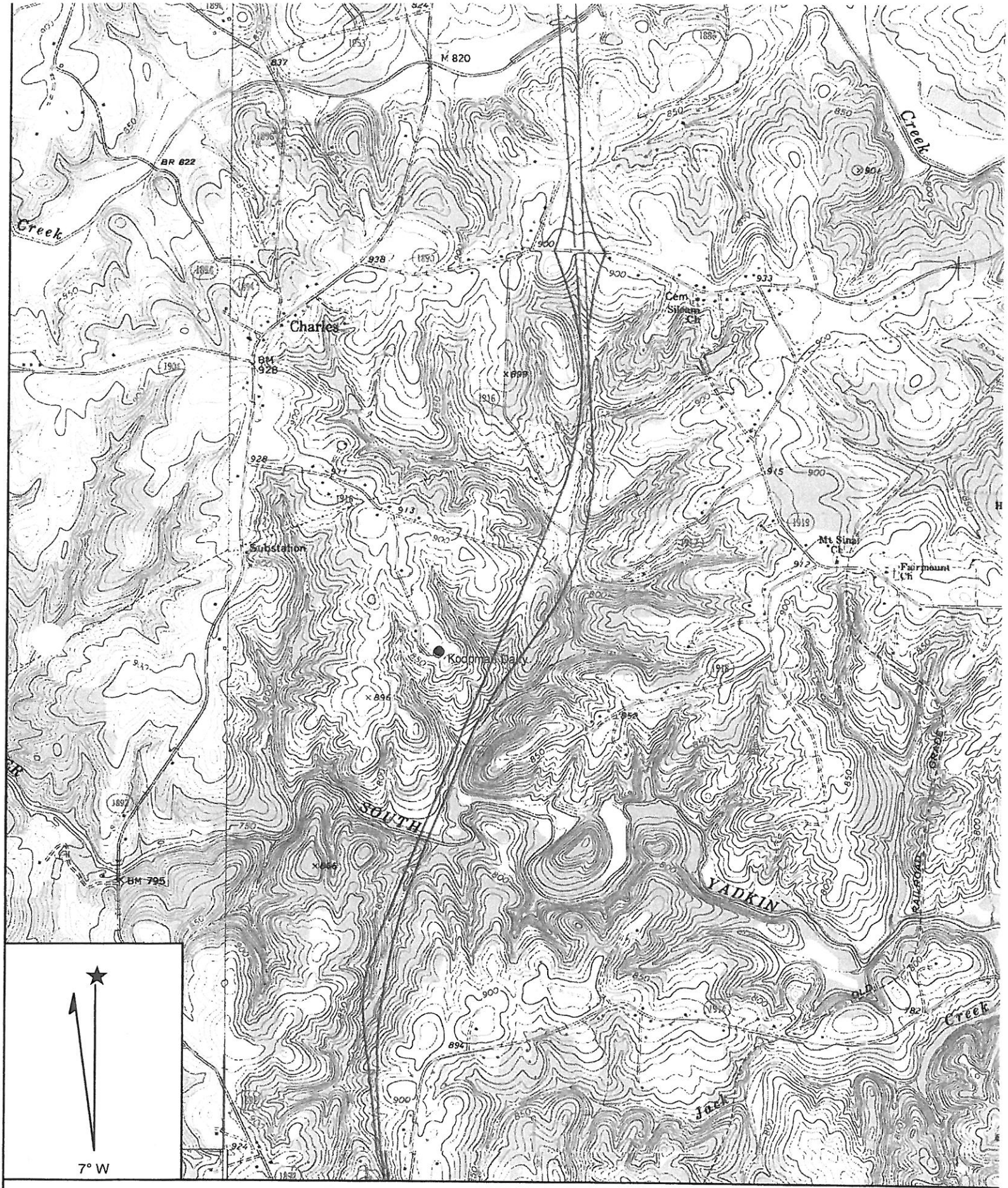
VIII. Waste Nutrients

Waste will be stored in three waste storage ponds for 4 months. During the course of one year, the waste storage ponds will store 5,370,000 gallons of waste.

At least once a year, sand accumulations are removed from the waste storage ponds and placed in sand storage area. It is estimated that 3,832 tons are removed every year. This sand is reused or land applied at agronomic rates.

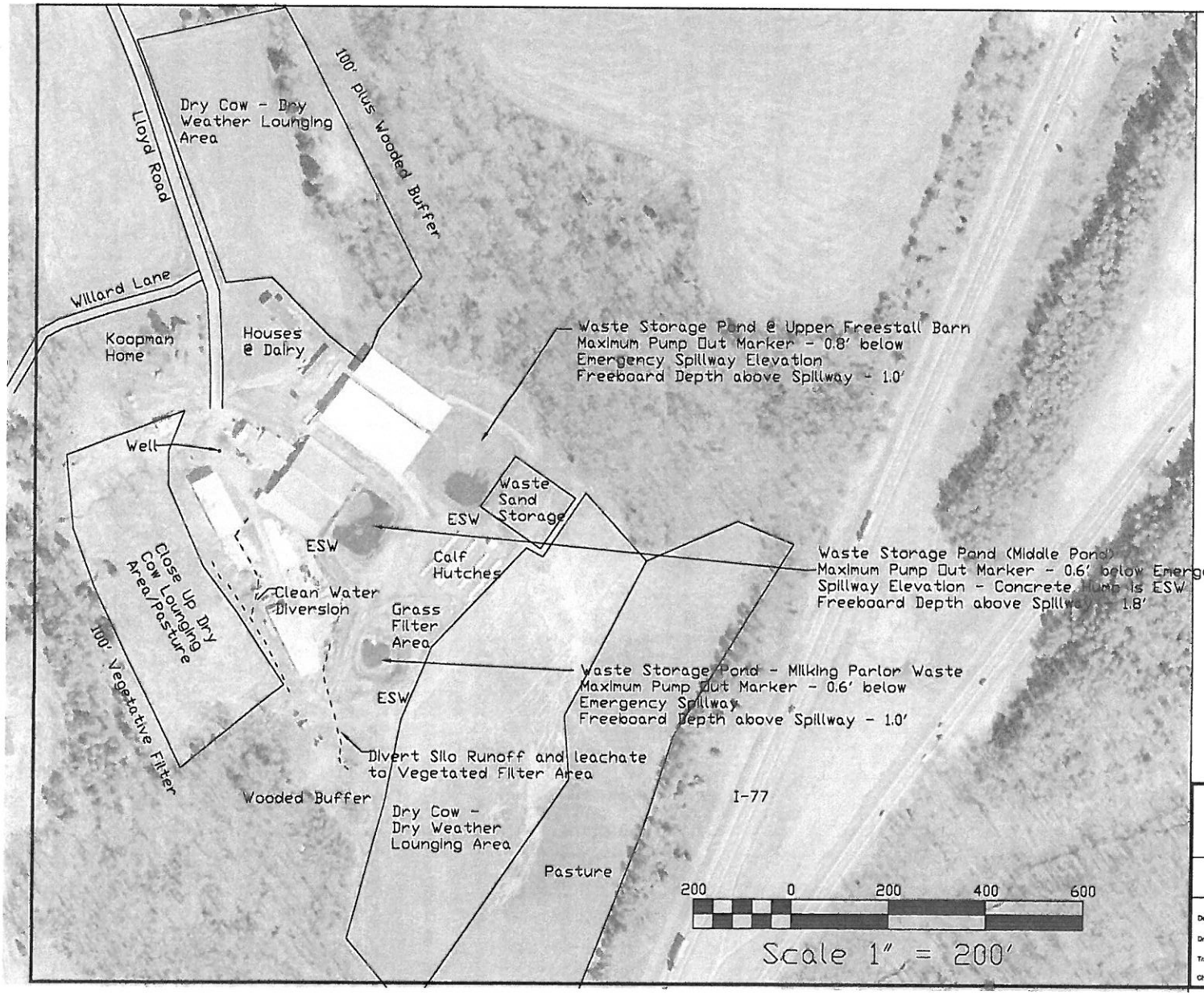
Waste Storage Ponds

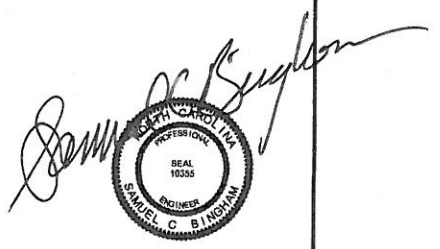
	TOTAL NUTRIENTS	DISPOSAL LOSSES (Plant Available Nutrient - PAN)	AVAILABLE NUTRIENT
N	120,909 lb	0.44	53,200 lb
P2O5	76,000 lb	0.70	53,200 lb
K2O	114,000 lb	0.70	79,900 lb
		9.9 lb N PAN per 1000 gal	



Name: HARMONY
Date: 8/7/2008
Scale: 1 inch equals 2000 feet

Location: 035° 54' 04.67" N 080° 51' 32.66" W
Caption: Koopman Dairy
Iredell County, North Carolina





Koopman Dairy

Lloyd Road Farm

Plan View

Waste Management System

KOOPMAN DAIRIES

IREDELL COUNTY, NORTH CAROLINA

		Date
Designed	SCB	4-2013
Drawn	SCB	4-2013
Traced		
Checked		

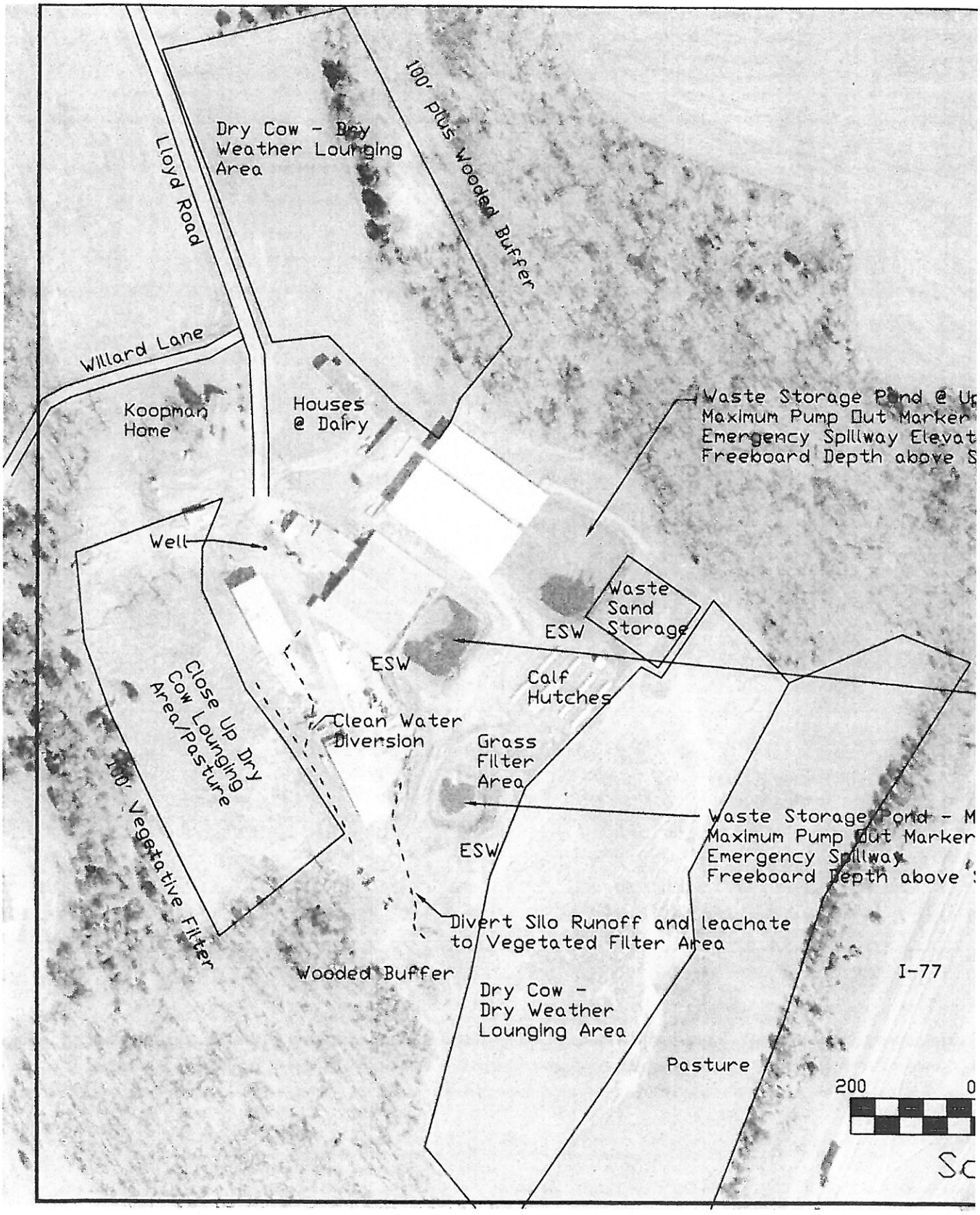
Approved By: _____

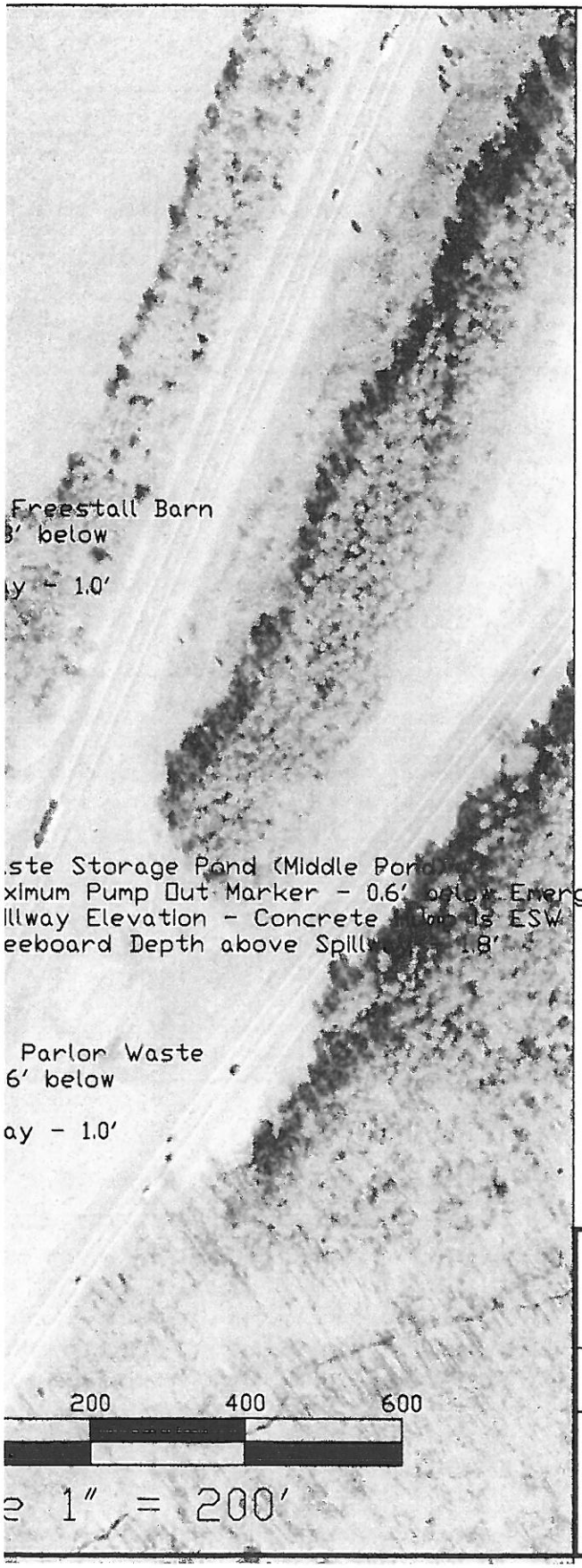
Title: _____

Title: _____

Sheet No. 1 of 1

Drawing File Name: Lloyd Plan View


Dry Cow - Dry Weather Lounging Area
100' plus Wooded Buffer
Lloyd Road
Willard Lane
Koopman Home
Houses @ Dairy
Waste Storage Pond @ Up
Maximum Pump Out Marker
Emergency Spillway Elevat
Freeboard Depth above S
Well
Waste Sand Storage
ESW
ESW
Calf Hutches
Clean Water Diversion
Grass Filter Area
Close Up Dry Cow Lounging Area/Pasture
100' Vegetative Filter
Waste Storage Pond - M
Maximum Pump Out Marker
Emergency Spillway
Freeboard Depth above
ESW
Divert Silo Runoff and leachate to Vegetated Filter Area
Wooded Buffer
I-77
Dry Cow - Dry Weather Lounging Area
Pasture
200
0
Sc



NORTH CAROLINA PROFESSIONAL SEAL 10355 ENGINEER SAMUEL C BINGHAM

Koopman Dairy

Lloyd Road Farm

Plan View

Waste Management System

KOOPMAN DAIRIES

IREDELL COUNTY, NORTH CAROLINA

Designed SCB	Date 4-2013	Approved By Sam Bingham PE	
Drawn SCB	4-2013	Title Civil Engineer	
Traced		Title 5/21/2013	
Checked		Sheet No. 1 of 1	Drawing File Name: Lloyd Plan View

Operation and Maintenance Plan for a Waste Management System

Prepared for

Koopman Dairies, Inc.
Lloyd Dairy
Iredell County, North Carolina

May 2013

Table of Contents

OPERATION AND MAINTENANCE PLAN

SYSTEM OVERVIEW

This Animal Waste Management System consists of the following major components:

1. THREE WASTE STORAGE PONDS
2. MILKING PARLOR WASTE WATER PIPING
3. WASTE APPLICATION
4. CLEAN WATER COLLECTION AND PIPING SYSTEM
5. FILTER AREA FOR LOUNGING AREAS

and the following associated components

6. CONCRETE CURBS
7. VEGETATED DIVERSION
8. LIVESTOCK EXCLUSION
9. FILTER AREA PLANTING
10. STOCK TRAILS

All waste is scraped from the lots and freestall barns and stored in the waste storage ponds. Waste is hauled or drag hose spread from the waste storage ponds and spread at agronomic rates. The waste storage ponds are designed to provide storage for the wastes produced by *700* milk and dry cows.

Also, contaminated runoff flows into the waste storage ponds. The waste storage ponds are designed to provide storage for normal runoff from the drainage areas and waste water from the milk barn and provide storage space for the twenty-five (25) year, twenty-four (24) hour storm runoff from the drainage areas.

This animal waste management system is designed to prevent discharge of animal waste contaminates to surface waters from the twenty-five (25) year, twenty-four (24) hour storm, as required under the non-discharge regulations.

Runoff from lounging areas and small feed areas is diverted through 100' or greater of vegetated filter area. Vegetated filter areas are located below dry cow pasture/lounging areas near freestall barns and all gravel heavy use areas.

Day old to 200 lb heifers are housed in calf hutches on gravel beds. A vegetated filter is also maintained below this group of cattle.

1. WASTE STORAGE PONDS

OVERVIEW

The waste storage ponds are designed to store manure, runoff and wastewater. Additional storage space is included to contain the twenty-five (25) year, twenty-four (24) hour storm runoff from the feedlot. A post is installed with the level of the top of post indicating the level of storage available prior to infringing on the 25 year, 24 hour storm capacity. The waste storage ponds consists of earthen dams and concrete push offs for discharging contaminated water and manure into the structures. . The maximum storage level below the emergency spillway elevation is shown below for each pond. The design storage period is also shown. Note: All ponds are managed as one storage period. Waste is pumped from one pond to other to maintain the 25 year, 24 hour storage capacity.

	Max. level below ESW	Design Storage Period
Upper waste pond	**0.8**	**120 days**
Middle waste pond	**0.6**	**120 days**
Lower waste pond	**0.6**	**120 days**

OPERATION

The level of management for the entire system determines the service life of the waste storage ponds. Once the manure and bedding materials have reached the waste storage pond, how effectively the waste is agitated will determine the amount of solids which remain in the waste storage pond.

Over time it is expected that some solids will accumulate in the waste storage pond. Poor management will result in the rapid accumulation of solids, which will reduce the usable capacity of the waste storage pond to the point that some form of dredging will be required. If a large volume of solid waste is allowed to wash from the lot and/or if inadequate agitation is performed, this dredging operation could be required in a very short period of time.

Sand accumulations are removed once a year to maintain storage capacity in the waste ponds.

MAINTENANCE

The concrete around the waste storage ponds should be inspected periodically for major cracks. Vegetation on the dams should be inspected periodically and reseeded as needed to maintain a vigorous stand. The dams should be mowed at least annually to prevent woody growth. Mowing operations must take place only when the soil of the dam is dry, and vegetation should not be mowed to a height of less than four (4) inches at any time. See filter area planting for further maintenance requirements. Any evidence of sloughing or seepage should be reported to the Iredell Soil & Water Conservation District office.

2. MILKING PARLOR WASTE WATER PIPING

OVERVIEW

The milking parlor wastewater piping consists of a pipe from the milking parlor to the waste storage pond.

MAINTENANCE

Inspect the pipe components for cracks or other damage, and make repairs or replace as needed. Inspect the structure regularly and remove accumulated solids.

3. WASTE APPLICATION

OVERVIEW

The waste hauling equipment consists of tanks for slurry manure and hard hose pull spreading equipment. Slurry tanks are loaded with an agitator pump system. Sand accumulations are removed from the waste ponds and stored next to upper waste pond. Waste sand is reused or land applied at agronomic rates.

OPERATION

Waste application should be initiated prior to the liquid level reaching the full storage level marker in each waste storage pond. When the liquid level in a waste storage pond reaches the marker, liquids must be removed to another waste pond or land applied. Do not spread in such a manner as to cause runoff or erosion. Do not spread on frozen or saturated soils.

MAINTENANCE

Soil tests the application fields annually.

4. CLEAN WATER COLLECTION AND PIPING SYSTEM

OVERVIEW

Clean water collection and piping consists of piping clean water under stock trails and diverting clean water around lounging and feedlot areas and waste storage ponds.

MAINTENANCE

Inspect the components of the clean water collection and piping system annually for cracks or other damage, and make repairs or replace as needed. Inspect annually and remove accumulated sediment.

5. CONCRETE CURBS

OVERVIEW

The concrete curbs constructed around the feedlots and freestall barns are required to divert water and waste into waste storage ponds.

MAINTENANCE

The concrete should be inspected periodically for major cracks.

6. VEGETATED DIVERSION

OVERVIEW

Vegetated diversions are located above the waste storage ponds and will convey non-contaminated runoff around the structures. Diversions will also be located around the feed areas to divert clean water.

MAINTENANCE

The vegetation in the diversion should be inspected periodically and reseeded as needed to insure a vigorous stand. It is essential that neither vehicles nor livestock be allowed to create travel lanes within the diversion. The diversion should be mowed at least annually to prevent woody growth. The diversion may be control grazed or mowed for hay. Grazing and mowing operations must take place only when the soils are dry, and vegetation should not be grazed or mowed to a height of less than four (4) inches. If sedimentation has reduced the capacity of the channel, contact the Iredell Soil and Water Conservation District for technical assistance in correcting this problem. See filter area planting for further maintenance requirements.

7. LIVESTOCK EXCLUSION

OVERVIEW

Livestock exclusion is located around all filter areas.

MAINTENANCE

Inspect the livestock exclusion periodically for mechanical damage or rot. If fencing wire becomes loose, re-tighten. If fence posts are rotted or damaged in any way, replace damaged posts.

8. FILTER AREA PLANTING

OVERVIEW

FILTER AREA PLANTING applies to seeding 100' of grass below the lounging areas and seeding diversions.

MAINTENANCE

Soil samples should be taken at least once per year. Fertilizer and lime should be applied at the rates recommended as a result of the soil test. Fertilizer and lime should be applied either during September-October or February-March. Vegetation should be inspected periodically and reseeded as needed to insure a vigorous stand.

The filter area may be control grazed or mowed for hay. Grazing and mowing operations must take place only when the soils are dry, and vegetation should not be grazed or mowed to a height of less than four (4) inches. All filter areas should be mowed at least annually to prevent woody growth. Mowing operations must take place only when the soil is dry and vegetation should not be mowed to a height of less than four (4) inches at any time. Do not mow cool season grasses during periods when plants are showing signs of drought stress.

9. STOCK TRAILS

OVERVIEW

Stock trails are used to transfer cows to lounging areas.

MAINTENANCE

Inspect the stock trails periodically for damage and wear. If gravel layer becomes thin, gravel shall be replaced to maintain a minimum of 4" of cover over the filter cloth. Manure accumulations in broad-based dips on stock trail shall be removed at regular intervals to prevent overtopping.

GENERAL COMMENTS

PESTICIDE USE

Extreme care should be exercised with the use of all herbicides so that desirable vegetation, especially that of the filter area, diversion and dam, is not adversely affected. It is a violation of law to use any pesticide in a manner not permitted by its labeling. To protect yourself, never apply any pesticide in a manner or for a purpose other than as instructed on the label or in labeling accompanying the pesticide product that you purchase. Do not ignore the instructions for use of protective clothing and devices and for storage and disposal of pesticide wastes, including containers.

REPAIRS

Notify the Iredell Soil and Water conservation District if repairs or major modifications are required for any of the components of this Waste Management System.

Additional Considerations and Requirements

1. The collection, treatment and storage facilities shall be properly maintained and operated at all times; this also includes the land application equipment and sites.

2. A suitable vegetative cover shall be maintained on all land application sites and buffers in accordance with the Waste Utilization Plan. No waste may be applied on fields not approved by or prepared in accordance with the Waste Utilization Plan.

3. An acceptable pH of the soil shall be maintained on all land application sites to insure an optimum yield for the crop(s) being grown.

4. The plant available nitrogen (PAN) application rates and hydraulic loading rates identified in the Waste Utilization Plan shall not be exceeded.

5. Application of animal waste on land which is used to grow crops for direct human consumption (e.g., strawberries, melons, lettuce, cabbage, etc.) shall not occur within 30 days prior to or during the planting of the crop or at any time during the growing season, or in the case of fruit bearing trees, 30 days prior to breaking dormancy. For fiber and food crops, which undergo further processing, application of animal waste shall not occur within 30 days of harvesting. If waste is to be applied to bare soil, the waste shall be incorporated into the soil within 24 hours after the application on land.

6. Domestic wastewater from showers, toilets, etc. shall not be discharged into the animal waste management system. Wash vats required to be connected to the animal waste management system by the Grade A Pasteurized Milk Ordinance Part II, Section 7, Item 5r are exempt from this requirement. Wash-down of stock trailers owned by and used on the dairy only will be permissible as long as the design accommodates the additional wastewater and as long as detergents and disinfectants are used which have been labeled as readily biodegradable by the manufacturer.

7. Disposal of dead animals shall be done in accordance with the North Carolina Department of Agriculture (NCDA) regulations and the Waste Utilization Plan.

8. Grazing of animals on application sites shall be controlled in accordance with USDA-Natural Resources Conservation Service Standards.

9. Solid materials such as, but not limited to, bottles, gloves, syringes, silo covers or any other solid waste from the dairy operation shall be prevented from entering the waste management system and shall be disposed of properly.

10. The facility must have either adequate animal waste application and handling equipment on site, a lease for the use of necessary equipment, a contract with a third party applicator or a contract for the purchase of the equipment. In all cases, the equipment must be capable of applying the waste on sites specified in the Waste Utilization Plan and at rates not to exceed agronomic and hydraulic loading for the sites.

11. Animal waste shall not be applied to wetlands or surface water or shall not reach wetlands or surface waters of the state by runoff, drift, manmade conveyances (pipes or ditches), direct application, or direct discharge during operation or land application. Any discharge of waste, which reaches surface water, is prohibited. Illegal discharges are subject to the assessment of civil penalties of up to $10,000 per day per violation by the Division of Water Quality for every day the discharge continues.

12. Animal waste shall be applied on land eroding at less than 5 tons per acres per year. Waste may be applied to land that is eroding at 5 or more tons but less than 10 tons per acre per year providing grass filter strips are installed where runoff leaves the field.

13. Animal waste shall not be applied to saturated soils, during rainfall events, or when the soil surface is frozen. When animal waste is to be applied on acres subject flooding, it will be soil incorporated on conventionally tilled cropland. When applied to conservation-tilled crops or grassland, the waste may be broadcast, provided the application does not occur during a season prone to flooding.

14. Animal waste shall not be applied closer than 25 feet to surface water. This distance may be reduced for waters that are not perennial provided adequate vegetative filter strips are present.

15. Animal waste shall not be applied closer than 100 feet to wells.

16. Animal waste shall not be applied closer than 200 feet to dwellings other than those owned by the landowner.

17. Waste shall not be applied on other property or public right-of-ways.

18. Animal waste applied on grassed waterways shall be at agronomic rates and in a manner that causes no runoff or drift from the site.

19. Waste shall be tested within 60 days of utilization and soil shall be tested at least annually at crop sites where waste products are applied. Nitrogen shall be the rate-determining element. Zinc and copper levels in the soils shall be monitored and alternative crop sites shall be used when these metals approach excess levels. Soil test and waste analysis records shall be kept for 5 years.

20. Liquid waste shall be applied at rates not to exceed the soil infiltration rate. No ponding shall occur.

21. Records of waste application shall be maintained to establish actual application rates. The records will include date of application, amount of

waste applied per acre by tract number and field number, most recent waste analysis and soil test report, and the realistic yield expectation (RYE) nitrogen rate. Waste application records shall be maintained for 5 years.

22. Proper calibration of application equipment should be done to ensure uniformity and accuracy of spreading rates.

23. Animal waste should be applied on actively growing crops in such a manner that the crop is not covered with waste to a depth that would inhibit growth. The potential for salt damage from animal waste should be considered also.

24. It is the responsibility of the owner of the dairy to secure an update of the waste utilization plan when there is a change in the operation, number of animals (increase), method of utilization or available land.

EMERGENCY ACTION PLAN

CATEGORY	EXAMPLES	ACTION	CONTACTS
Obvious Threat	Complete structural failure; full or partial loss of a Waste Storage Pond wall resulting in a release of waste	1. If there is any potential threat to life or property, contact 911 or Sheriff's Dept. 2. Report failure to Division of Water Quality (DWQ) - **provide operation name, location, problem, time of spill, phone number for return calls & registration/certification number** 3. Make all attempts to stop the discharge and contain the waste on the farm 4. Contact the technical specialist who certified the Waste Storage Pond	Sheriff – 704-878-3180 DWQ at 704-663-1699, or Emergency Management at 704-878-5353 Local Contractor – Marvin Church Grading 459 Fairmount Rd. Statesville, NC 28625 704-876-4369 Tech. Spec. – 704-873-6761, ext. 3
Impending Threat	Structural damage from overtopping; leakage or seepage from base or sidewalls of Waste Storage Pond; waste discharging from underground tiles *Failure to immediately address these may result in complete structural failure*	1. Report failure to DWQ - provide same information as above 2. Make all attempts to stop the discharge; reinforce weak area of structure until a technical specialist can assess situation	DWQ at 704-663-1699 or After Hours Emergency at 919-733-3942 Tech. Spec. – 704-873-6761, ext. 3 Local Contractor – Marvin Church Grading 704-876-4369
Other Discharges	Runoff from spray fields, broken pipes, leaking pumps, discharges from houses and other maintenance deficiencies	1. If waste is leaving property use same contacts as for the previous category 2. Address maintenance deficiencies	Same as for "Impending Threat" category
Lack of Storage Capacity	Anticipated single storm events exceeding 25 yr.24 hr. frequency such as approaching hurricanes; Or extended rainfall periods resulting in waste water levels above the start pump marker	1. Contact DWQ for regulatory approval for emergency pumping	DWQ at 704-663-1699

EMERGENCY ACTION PLAN			
Waste Storage Overflow	Runoff From Waste Application Field	Leakage From Waste Distribution System	Leakage From Base or Sidewall of Storage Pond
* Add soil to berm to increase elevation of dam * Pump wastes to fields at an acceptable rate * Stop all additional flow to the lagoon (waterers) * Call a pumping contractor * Make sure no surface water is entering lagoon	* Immediately stop waste application * Create a temporary diversion or berm to contain the waste on the field * Incorporate waste to reduce further runoff	* Stop recycle (flushing system) pump * Stop irrigation pump * Close valves to eliminate further discharge * Separate pipes to create an air gap and stop flow	* Dig a small well or ditch to catch all seepage, put in submersible pump, and pump back into Waste Storage Pond * If holes are caused by burrowing animals, trap or remove animals and fill holes and compact with a clay type soil * Other holes may be likewise temporarily plugged with clay soil

Dairy Farm Waste Management Odor Control Checklist

Source	Cause	BMPs to Minimize Odor	Site Specific Practices
Farmstead	• Dairy production	☑ Vegetative or wooded buffers ☑ Recommended best management practices ☑ Good judgment and common sense	
Paved lots or barn alley surfaces	• Wet manure-covered surfaces	☑ Scrape or flush daily ☑ Promote drying with proper ventilation ☑ Routine checks and maintenance on waterers, hydrants, pipes, stock tanks	
Bedded areas	• Urine • Partial microbial decomposition	☑ Promote drying with proper ventilation ☑ Replace wet or manure-covered bedding	
Manure dry stacks	• Partial microbial decomposition	☐ Provide liquid drainage for stored manure	
Storage tank or basin surface	• Partial microbial decomposition • Mixing while filling • Agitation when emptying	☐ Bottom or mid-level loading ☐ Tank covers ☐ Basin surface mats of solids ☑ Minimize lot runoff and liquid additions ☑ Agitate only prior to manure removal ☑ Proven biological additives or oxidants	
Settling basin surfaces	• Partial microbial decomposition • Mixing while filling • Agitation when emptying	☐ Liquid drainage from settled solids ☐ Remove solids regularly	
Manure, slurry, or sludge spreader outlets	• Agitation when spreading • Volatile gas emissions	☐ Soil injection of slurry/sludges ☑ Wash residual manure from spreader after use ☑ Proven biological additives or oxidants	

Dairy Farm Waste Management Odor Control Checklist

Source	Cause	BMPs to Minimize Odor	Site Specific Practices
Uncovered manure, slurry, or sludge on field surfaces	• Volatile gas emissions while drying	☐ Soil injection of slurry/sludges ☐ Soil incorporation within 48 hours ☑ Spread in thin uniform layers for rapid drying ☑ Proven biological additives or oxidants	
Flush tanks	• Agitation of recycled lagoon liquid while tanks are filling	☐ Flush tank covers ☐ Extend fill lines to near bottom of tanks with anti-siphon vents	
Outside drain collection or junction boxes	• Agitation during wastewater conveyance	☐ Box covers	
Lift stations	• Agitation during sump tank filling and drawdown	☐ Sump tank covers	
End of drainpipes at lagoon	• Agitation during wastewater conveyance	☐ Extend discharge point of pipes underneath lagoon liquid level	
Lagoon surfaces	• Volatile gas emission • Biological mixing • Agitation	☐ Proper lagoon liquid capacity ☐ Correct lagoon startup procedures ☐ Minimum surface area-to-volume ratio ☐ Minimum agitation when pumping ☐ Mechanical aeration ☐ Proven biological additives	
Irrigation sprinkler nozzles	• High pressure agitation • Wind drift	☐ Irrigate on dry days with little or no wind ☐ Minimum recommended operating procedure ☐ Pump intake near lagoon liquid surface ☐ Pump from second-stage lagoon ☐ Flush residual manure from pipes at end of slurry/sludge pumpings	

Dairy Farm Waste Management Odor Control Checklist

Source	Cause	BMPs to Minimize Odor	Site Specific Practices
Dead animals	• Carcass decomposition	☑ Proper disposition of carcasses	
Standing water around facilities	• Improper drainage • Microbial decomposition of organic matter	☑ Grade and landscape such that water drains away from facilities	
Mud tracked onto public roads from farm access	• Poorly maintained access roads	☑ Farm access road maintenance	

Additional Information:

	Available From :
Cattle Manure Management; .0200 Rule/BMP Packet	NCSU, County Extension Center
Dairy Educational Unit Manure Management System—Lake Wheeler Road Field Laboratory; EBAE 209-95	NCSU—BAE
Lagoon Design and Management for Livestock Manure Treatment and Storage; EBAE 103-83	NCSU—BAE
Management of Dairy Wastewater; EBAE 106-83	NCSU—BAE
Calibration of Manure and Wastewater Application Equipment; EBAE Fact Sheet	NCSU—BAE
Nuisance Concerns in Animal Manure Management: Odors and Flies; PRO107, 1995 Conference Proceedings	Florida Cooperative Extension

Insect Control Checklist for Animal Operations

Source	Cause	BMPs to Control Insects	Site Specific Practices
		Liquid Systems	
Flush gutters	• Accumulation of solids	☐ Flush system is designed and operated sufficiently to remove accumulated solids from gutters as designed ☐ Remove bridging of accumulated solids at discharge	
Lagoons and pits	• Crusted solids	☐ Maintain lagoons, settling basins and pits where pest breeding is apparent to minimize the crusting of solids to a depth of no more than 6 to 8 inches over more than 30 percent of surface	
Excessive vegetative growth	• Decaying vegetation	☑ Maintain vegetative control along banks of lagoons and other impoundments to prevent accumulation of decaying vegetative matter along water's edge on impoundment's perimeter.	
		Dry Systems	
Feeders	• Feed spillage	☑ Design, operate, and maintain feed systems (e.g., bunkers and troughs) to minimize the accumulation of decaying wastage ☑ Clean up spillage on a routine basis (e.g., 7- to 10-day interval during summer; 15- to 30-day interval during winter)	

Insect Control Checklist for Animal Operations

Source	Cause	BMPs to Control Insects	Site Specific Practices
Feed storage	• Accumulations of feed residues	☑ Reduce moisture accumulation within and around immediate perimeter of feed storage areas by ensuring drainage is away from site and/or providing adequate containment (e.g., covered bin for brewer's grain and similar high moisture grain products) ☑ Inspect for and remove or break up accumulated solids in filter strips around feed storage as needed	
Animal holding areas	• Accumulations of animal wastes and feed wastage	☑ Eliminate low areas that trap moisture along fences and other locations where waste accumulates and disturbance by animals is minimal ☑ Maintain fence rows and filter strips around animal holding areas to minimize accumulations of wastes (i.e., inspect for and remove or break up accumulated solids as needed)	
Dry manure handling systems	• Accumulations of animal wastes	☑ Remove spillage on a routine basis (e.g., 7- to 10-day interval during summer; 15- to 30-day interval during winter) where manure is loaded for land application or disposal ☑ Provide for adequate drainage around manure stockpiles ☑ Inspect for and remove or break up accumulated wastes in filter strips around stockpiles and manure handling areas as needed	

For more information contact:

Cooperative Extension Service, Department of Entomology, Box 7613, North Carolina State University, Raleigh, NC 27695-7613.

Mortality Management Methods

(check which method(s) are being implemented)

- [x] Burial three feet beneath the surface of the ground within 24 hours after knowledge of the death. The burial must be at least 300 feet from any flowing stream or public body of water.
- [x] Rendering at a rendering plant licensed under G.S. 106-168.7
- [ ] Complete incineration
- [ ] In the case of dead poultry only, placing in a disposal pit of a size and design approved by the Department of Agriculture
- [x] Any method which in the professional opinion of the State Veterinarian would make possible the salvage of part of a dead animal's value without endangering human or animal health. (Written approval of the State Veterinarian must be attached)

December 18, 1996