Section 5

Site Information

Bruns Feedlot, LLC

Application Site Summary

Total Acres: 557.76

Application Site # / Name	Useable Acres	Land Use	Dominate Soil Slope [A]	Legal Description	Land Owner	Application Agreement	Shared Manure Application Site
Site 1 McGuires	112.00	Dryland Crop	Belfore Silty Clay Loam 0 - 2% Slopes	W1/2 SW1/4, W1/2 E1/2 SW1/4 S15-T25N-R5E	Lonnie McGuire 58511 849th Rd Pender, NE 68047	Yes	No
Site 2 SW Pivot	76.48	Effluent Irrigated Crop	Nora Silt Loam 6 - 11% Slopes	SE1/4 NW1/4, E1/2 SW1/4 NE1/4 S11-T25N-R5E	Leon Bruns 1174 I Ave Pender, NE 68047	Owned	No
Site 3 Joels 100	108.10	Dryland Crop	Nora Silt Loam 6 - 11% Slopes	E1/2 NE1/4, Pt. W1/2 NE1/4 S3-T25N-R5E	Marilyn Hansen PO Box 234 Wakefield, NE 68784	Yes	No
Site 4 E Corner	27.54	Dryland Crop	Lamo Silty Clay Loam Occassionally Flooded	Pt. NE1/4 NE1/4, W1/2 SW1/4 NE1/4 S11-T25N-R5E	Leon Bruns 1174 I Ave Pender, NE 68047	Owned	Yes
Site 5 S 80	80.06	Dryland Crop	Nora Silt Loam 6 - 11% Slopes	S1/2 NW1/4 S26-T25N-R5E	Marilyn Hansen PO Box 234 Wakefield, NE 68784	Yes	No
Site 6 Marylin N40 & W80	114.60	Dryland Crop	Nora Silt Loam 6 - 11% Slopes	W1/2 SW1/4, SW1/4 NW1/4 S2-T25N-R5E	Marilyn Hansen PO Box 234 Wakefield, NE 68784	Yes	No
Site 7 N40	38.98	Dryland Crop	Nora Silt Loam 6 - 11% Slopes	SE1/4 SW1/4 S2-T25N-R5E	Mary Bruns 1174 I Ave Pender, NE 68047	Owned	No

Nutrient Advisors (402) 372-2236

A - Soil type and slope provided by Agri-Data Inc.; see site specific soil maps in Section 7

Bruns Feedlot, LLC

Best Management Practices

Application Site #	Phosphorus Risk Assessment[B]	Nitrogen Risk Assessment[C]	Conservation Practices	Setbacks[D]	Best Management Practices Phosphorus	Best Management Practices Nitrogen
Site 1 McGuires	Low Risk 0.4	Silty Clay Loam = Fine Texture Fine Texture and Fall or Spring Application = Low nitrogen leaching potential	Conservation Tillage/No Till	None	Soil Sampling Manure Sampling Conservatin Tillage/No Till	Soil Sampling Manure Sampling Conservation Tillage/No Till
Site 2 SW Pivot	Medium Risk 3.9	Silt Loam = Medium Texture Mediun Texture and Split Application = Low nitrogen leaching potential	Conservation Tillage/No Till	Stream Well	Soil Sampling Manure Sampling Conservatin Tillage/No Till	Soil Sampling Manure Sampling Conservation Tillage/No Till
Site 3 Joels 100	Medium Risk 4.8	Silt Loam = Medium Texture Mediun Texture and Fall or Spring Application = Medium Low nitrogen leaching potential	Conservation Tillage/No Till	None	Soil Sampling Manure Sampling Conservatin Tillage/No Till	Soil Sampling Manure Sampling Conservation Tillage/No Till
Site 4 E Corner	Low Risk 0.8	Silty Clay Loam = Fine Texture Fine Texture and Fall or Spring Application = Low nitrogen leaching potential	Conservation Tillage/No Till	Stream Well	Soil Sampling Manure Sampling Conservatin Tillage/No Till	Soil Sampling Manure Sampling Conservation Tillage/No Till
Site 5 S 80	Medium Risk 2.3	Silty Clay Loam = Fine Texture Fine Texture and Fall or Spring Application = Low nitrogen leaching potential	Conservation Tillage/No Till	None	Soil Sampling Manure Sampling Conservatin Tillage/No Till	Soil Sampling Manure Sampling Conservation Tillage/No Till
Site 6 Marylin N40 & W80	Low Risk 4.9	Silt Loam = Medium Texture Mediun Texture and Fall or Spring Application = Medium Low nitrogen leaching potential	Conservation Tillage/No Till	None	Soil Sampling Manure Sampling Conservatin Tillage/No Till	Soil Sampling Manure Sampling Conservation Tillage/No Till
Site 7 N40	Medium Risk 4.9	Silt Loam = Medium Texture Mediun Texture and Fall or Spring Application = Medium Low nitrogen leaching potential	Conservation Tillage/No Till	Well	Soil Sampling Manure Sampling Conservatin Tillage/No Till	Soil Sampling Manure Sampling Conservation Tillage/No Till

B - The Nebraska Phosphorus Index C-NRCS (S-590) D-as found on site specific site maps, Section 7

Nitrogen Leaching Potential

Timing of Application	Soil Texture		
	Coarse	Medium	Fine
Fall Application	High	Medium-Low	Low
Spring Application, Pre-Plant	High-Medium	Medium-Low	Low
Sidedress or Split Application	Medium-Low	Low	Low

Coarse Texture	(Sand, Loamy sand, sandy loam)
Medium Texture	(Silt, silt loam, loam);
Fine Texture	(silty clay loam, silty clay, clay, clay loam, sandy clay loam, sandy clay)

This table indicates the leaching potential based on soil texture and application timing. This information can be used to make appropriate adjustments in the timing, method and formulation of Nitrogen applied to avoid excessive losses.

Contents of table is from NRCS Nutrient Management (S-590)

NRCS S590 Nitrogen Risk Guide

Section 6

Manure Production & Utilization

Bruns Feedlot, LLC

Nutrient Production Worksheet

Maximum Capacity

A Manure Type / Amount (See Manure Production Summary)	B Nutrient	C Lbs. / Unit (See Manure Analysis Summary)	D Nutrient Production Actual Inventory (A x C)	E Nutrient Production Maximum Inventory (D x % Increase)	F % Available After Application (NebGuide G1335)	G Total lbs. Nutrient Available (ExF)
Actual Inventory Feeder Cattle	3,033			Maximum Capacity Feeder Cattle	4,000	% Increase 31.9
Solid Manure (Tons) 4,709	Ammonium N	1.08	5,086	6,707	0%	0
	Organic N	14.20	66,868	88,187	47%	41,448
	Phosphorus	23.05	108,542	143,149	100%	143,149
Effluent (Acre Inches) 11,271,197	Ammonium N	49.73	20,642	27,223	50%	13,612
	Organic N	19.13	7,941	10,472	57%	5,969
	Phosphorus	19.50	8,094	10,675	100%	10,675

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Total Ammonium N: 13,612 lbs.
Total 1st Yr. Organic N: 25,712 lbs.
Total 2nd Yr. Organic N: 14,799 lbs.
Total 3rd Yr. Organic N: 6,906 lbs.

Total N Available All Sources: 61,029 lbs.

Total Phosphorus Available: 153,823 lbs.

Bruns Feedlot, LLC		
Percent Nitrogen Available after Application		
Ammonium Nitrogen		Lbs. N Available
Dry Manure Preplant Application and Not Incorporated	**0%**	0
Effluent Sprinkler Application	**50%**	13,612
Availability of Organic Nitrogen in Solid Manure		
Solid Manure First Year Availability	25%	22,047
Solid Manure Second Year Availability	15%	13,228
Solid Manure Third Year Availability	7%	6,173
Total Availability of Solid Manure Application	**47%**	41,448
Availability of Organic Nitrogen in Effluent		
Effluent First Year Availability	35%	3,665
Effluent Second Year Availability	15%	1,571
Effluent Third Year Availability	7%	733
Total Availability of Effluent Application	**57%**	5,969
Values based on NebGuide G1335 Figure 2		

FIELD PLAN - 5 YEAR NUTRIENT PROJECTION

NUTRIENT ADVISORS

Application Site Summary

Field Management Description:	A. Irrigated Corn Corn Rotation	Site # in Rotation:	2
	Effluent Application		

Field Plan For Nitrogen

Year	Previous Crop	Planned Crop	Expected Yield bu/ac	Total Crop N Need lb/ac	Nitrogen Credits: Soil N lb/ac	Previous Crop Legume N lb/ac	Prior Manure Organic N: 2nd year lb/ac	Prior Manure Organic N: 3rd year lb/ac	Irr. N lb/ac	Nitrogen Need before Manure Application lb/ac	Planned Manure N Application 1st yr Avail lb/ac	Planned Commercial N Application lb/ac	Nitrogen Balance lb/ac
1	Corn	Corn	222	302	30	0	0.0	0.0	0.0	232	143	89	0
2	Corn	Corn	222	302	30	0	13.0	0.0	0.0	219	143	76	0
3	Corn	Corn	222	302	30	0	13.0	6.1	0.0	213	143	70	0
4	Corn	Corn	222	302	30	0	13.0	6.1	0.0	213	143	70	0
5	Corn	Corn	222	302	30	0	13.0	6.1	0.0	213	143	70	0

Field Plan For Phosphorus

Year	Previous Crop	Planned Crop	Expected Yield	Total Crop P Removal	Phosphorus Need before Manure Application lb/ac	Planned Manure P Application lb/ac	Planned Commercial P Application lb/ac	Phosphorus Balance lb/ac
1	Corn	Corn	222	73	73	88	0	15
2	Corn	Corn	222	73	73	88	0	30
3	Corn	Corn	222	73	73	88	0	44
4	Corn	Corn	222	73	73	88	0	59
5	Corn	Corn	222	73	73	88	0	74

* These manure applications are projections only - any of these sites may or may not receive manure in any given year and may receive more or less manure N than is projected in any given year.

* County Averages are used for crop yield goals in this crop rotation projection - Actual yield goals may be based on site specific yield data at time of manure application.

* Projections are for acres that are controlled by the operation - Other manure nutrients may be transfered to acres that are not controlled by the operation.

FIELD PLAN - 5 YEAR NUTRIENT PROJECTION

Application Site Summary

Field Management Description:	G. Dryland Corn Corn Soybean Rotation	Site # in Rotation:	7
	Dry Manure Application		

Field Plan For Nitrogen

Year	Previous Crop	Planned Crop	Expected Yield bu/ac	Total Crop N Need lb/ac	Soil N lb/ac	Nitrogen Credits: Previous Crop Legume N lb/ac	Nitrogen Credits: Prior Manure Organic N 2nd year lb/ac	Nitrogen Credits: Prior Manure Organic N 3rd year lb/ac	Irr. N lb/ac	Nitrogen Need before Manure Application lb/ac	Planned Manure N Application 1st yr Avail lb/ac	Planned Commercial N Application lb/ac	Nitrogen Balance lb/ac
1	Soybeans	Corn	202	278	30	45	0.0	0.0	0.0	203	36	167	0
2	Corn	Corn	202	278	30	0	21.3	0.0	0.0	226	36	191	0
3	Corn	Soybeans	62	228	30	45	21.3	9.9	0.0	122	0	0	0
4	Soybeans	Corn	202	278	30	0	0.0	9.9	0.0	238	36	202	0
5	Corn	Corn	202	278	30	45	21.3	0.0	0.0	181	36	146	0

Field Plan For Phosphorus

Year	Previous Crop	Planned Crop	Expected Yield	Total Crop P Removal	Phosphorus Need before Manure Application lb/ac	Planned Manure P Application lb/ac	Planned Commercial P Application lb/ac	Phosphorus Balance lb/ac
1	Soybeans	Corn	202	67	67	231	0	164
2	Corn	Corn	202	67	67	231	0	328
3	Corn	Soybeans	62	48	48	0	0	280
4	Soybeans	Corn	202	67	67	231	0	444
5	Corn	Corn	202	67	67	231	0	608

* These manure applications are projections only - any of these sites may or may not receive manure in any given year and may receive more or less manure N than is projected in any given year.
* County Averages are used for crop yield goals in this crop rotation projection - Actual yield goals may be based on site specific yield data at time of manure application.
* Projections are for acres that are controlled by the operation - Other manure nutrients may be transferred to acres that are not controlled by the operation.

FIELD PLAN - 5 YEAR NUTRIENT PROJECTION

NUTRIENT ADVISORS

Application Site Summary

Field Management Description:	H. Dryland Corn Soybean Rotation	Site # in Rotation:	6
	Dry Manure Application		

Field Plan For Nitrogen

Year	Previous Crop	Planned Crop	Expected Yield bu/ac	Total Crop N Need lb/ac	Nitrogen Credits: Soil N lb/ac	Previous Crop Legume N lb/ac	Prior Manure Organic N: 2nd year lb/ac	Prior Manure Organic N: 3rd year lb/ac	Irr. N lb/ac	Nitrogen Need before Manure Application lb/ac	Planned Manure N Application 1st yr Avail lb/ac	Planned Commercial N Application lb/ac	Nitrogen Balance lb/ac
1	Soybeans	Corn	202	278	30	45	0.0	0.0	0.0	203	36	167	0
2	Corn	Soybeans	62	228	30	0	21.3	0.0	0.0	177	0	0	0
3	Soybeans	Corn	202	278	30	45	0.0	9.9	0.0	193	36	157	0
4	Corn	Soybeans	62	228	30	0	21.3	0.0	0.0	177	0	0	0
5	Soybeans	Corn	202	278	30	45	0.0	9.9	0.0	193	36	157	0

Field Plan For Phosphorus

Year	Previous Crop	Planned Crop	Expected Yield	Total Crop P Removal	Phosphorus Need before Manure Application lb/ac	Planned Manure P Application lb/ac	Planned Commercial P Application lb/ac	Phosphorus Balance lb/ac
1	Soybeans	Corn	202	67	67	231	0	164
2	Corn	Soybeans	62	48	48	0	0	116
3	Soybeans	Corn	202	67	67	231	0	280
4	Corn	Soybeans	62	48	48	0	0	233
5	Soybeans	Corn	202	67	67	231	0	396

* These manure applications are projections only - any of these sites may or may not receive manure in any given year and may receive more or less manure N than is projected in any given year.

* County Averages are used for crop yield goals in this crop rotation projection - Actual yield goals may be based on site specific yield data at time of manure application.

* Projections are for acres that are controlled by the operation - Other manure nutrients may be transferred to acres that are not controlled by the operation.

FIELD PLAN - 5 YEAR NUTRIENT PROJECTION

Application Site Summary

	I. Dryland Corn Corn Rotation	Site # in Rotation:	1-6
Field Management Description:	Dry Manure Application		

Field Plan For Nitrogen

Year	Previous Crop	Planned Crop	Expected Yield bu/ac	Total Crop N Need lb/ac	Nitrogen Credits					Nitrogen Need before Manure Application lb/ac	Planned Manure N Application 1st yr Avail lb/ac	Planned Commercial N Application lb/ac	Nitrogen Balance lb/ac
					Soil N lb/ac	Previous Crop Legume N lb/ac	Prior Manure Organic N 2nd year lb/ac	Prior Manure Organic N 3rd year lb/ac	Irr. N lb/ac				
1	Corn	Corn	202	278	30	0	0.0	0.0	0.0	248	36	212	0
2	Corn	Corn	202	278	30	0	21.3	0.0	0.0	226	0	226	0
3	Corn	Corn	202	278	30	0	0.0	9.9	0.0	238	36	202	0
4	Corn	Corn	202	278	30	0	21.3	0.0	0.0	226	0	226	0
5	Corn	Corn	202	278	30	0	0.0	9.9	0.0	238	36	202	0

Field Plan For Phosphorus

Year	Previous Crop	Planned Crop	Expected Yield	Total Crop P Removal	Phosphorus Need before Manure Application lb/ac	Planned Manure P Application lb/ac	Planned Commercial P Application lb/ac	Phosphorus Balance lb/ac
1	Corn	Corn	202	67	67	231	0	164
2	Corn	Corn	202	67	67	0	0	97
3	Corn	Corn	202	67	67	231	0	261
4	Corn	Corn	202	67	67	0	0	194
5	Corn	Corn	202	67	67	231	0	358

* These manure applications are projections only - any of these sites may or may not receive manure in any given year and may receive more or less manure N than is projected in any given year.
* County Averages are used for crop yield goals in this crop rotation projection - Actual yield goals may be based on site specific yield data at time of manure application.
* Projections are for acres that are controlled by the operation - Other manure nutrients may be transferred to acres that are not controlled by the operation.

FIELD PLAN - 5 YEAR NUTRIENT PROJECTION

NUTRIENT ADVISORS

Application Site Summary

	J. Dryland Alfalfa	Site # in Rotation:	1
Field Management Description:	Dry Manure Application		

Field Plan For Nitrogen

Year	Previous Crop	Planned Crop	Expected Yield bu/ac	Total Crop N Need lb/ac	Nitrogen Credits: Soil N lb/ac	Previous Crop Legume N lb/ac	Prior Manure Organic N: 2nd year lb/ac	Prior Manure Organic N: 3rd year lb/ac	Irr. N lb/ac	Nitrogen Need before Manure Application lb/ac	Planned Manure N Application 1st yr Avail lb/ac	Planned Commercial N Application lb/ac	Nitrogen Balance lb/ac
1	Corn	Alfalfa	5	254	30	0	0.0	0.0	0.0	224	36	188	0
2	Alfalfa	Alfalfa	5	254	30	80	21.3	0.0	0.0	123	0	123	0
3	Alfalfa	Alfalfa	5	254	30	80	0.0	9.9	0.0	134	0	134	0
4	Alfalfa	Alfalfa	5	254	30	80	0.0	0.0	0.0	144	0	144	0
5	Alfalfa	Alfalfa	5	254	30	80	0.0	0.0	0.0	144	0	144	0

Field Plan For Phosphorus

Year	Previous Crop	Planned Crop	Expected Yield	Total Crop P Removal	Phosphorus Need before Manure Application lb/ac	Planned Manure P Application lb/ac	Planned Commercial P Application lb/ac	Phosphorus Balance lb/ac
1	Corn	Alfalfa	5	55	55	231	0	175
2	Alfalfa	Alfalfa	5	55	55	0	0	120
3	Alfalfa	Alfalfa	5	55	55	0	0	64
4	Alfalfa	Alfalfa	5	55	55	0	0	9
5	Alfalfa	Alfalfa	5	55	55	0	0	-47

* These manure applications are projections only - any of these sites may or may not receive manure in any given year and may receive more or less manure N than is projected in any given year.
* County Averages are used for crop yield goals in this crop rotation projection - Actual yield goals may be based on site specific yield data at time of manure application.
* Projections are for acres that are controlled by the operation - Other manure nutrients may be transferred to acres that are not controlled by the operation.

2015 CAFO Annual Report

Submitted to the United States Environmental Protection Agency For:

Bruns Feedlot, LLC
IIS # 72328

RR 3 Box 158
Pender NE 68047
402-385-3650

1. Maximum number of livestock at facility during each month of 2015:

January -	**2,940**	**feeder cattle**	**July -**	**2,517**	**feeder cattle**
February -	**2,940**	**feeder cattle**	**August -**	**2,517**	**feeder cattle**
March -	**3,117**	**feeder cattle**	**September -**	**2,423**	**feeder cattle**
April -	**3,117**	**feeder cattle**	**October -**	**2,278**	**feeder cattle**
May -	**2,695**	**feeder cattle**	**November -**	**2,354**	**feeder cattle**
June -	**2,402**	**feeder cattle**	**December-**	**2,460**	**feeder cattle**

2. Estimated Generated Waste:

=	**4,109**	tons of cattle manure
=	**7,824,000**	gallons of process wastewater

3. Estimated Transferred Waste:

=	**1,900**	tons of cattle manure
=	**0**	gallons of process wastewater

4. Application Area:

   Total acres controlled by CAFO used for land application during 2015: **169.1**

5. Discharges from LWCF in 2015:

   There were no discharges from this facility in 2015.

6. Nutrient Management Plan Information:

   The Nutrient Management Plan was submitted by Nutrient Advisors.

2016 CAFO Annual Report

Submitted to the United States Environmental Protection Agency For:

Bruns Feedlot, LLC
NE0135399

1174 I Ave.
Pender NE 68047
402-385-3650

1. Maximum number of livestock at facility during each month of 2016:

January -	**2,659 feeder cattle**	**July -**	**2,200 feeder cattle**
February -	**2,659 feeder cattle**	**August -**	**2,200 feeder cattle**
March -	**2,580 feeder cattle**	**September -**	**2,516 feeder cattle**
April -	**2,652 feeder cattle**	**October -**	**3,053 feeder cattle**
May -	**2,652 feeder cattle**	**November -**	**3,053 feeder cattle**
June -	**2,343 feeder cattle**	**December-**	**2,752 feeder cattle**

2. Estimated Generated Waste:

=	**3,887**	tons of cattle manure
=	**13,464,000**	gallons of processed wastewater

3. Estimated Transferred Waste:

=	**1,400**	tons of cattle manure
=	**0**	gallons of processed wastewater

4. Application Area:
   Total acres controlled by CAFO used for land application during 2016: **198.6**

5. Discharges from LWCF in 2016:
   There were no discharges from this facility in 2016.

6. Nutrient Management Plan Information:
   The Nutrient Management Plan was completed by Nutrient Advisors.

Note: Land application records represent the 2016 crop year and may include applications in the fall of 2015.

2017 CAFO Annual Report

Submitted to the United States Environmental Protection Agency For:

Bruns Feedlot, LLC
NE0135399

1174 I Ave.
Pender NE 68047
402-385-3650

1. Maximum number of livestock at facility during each month of 2017:

January -	**2,511 feeder cattle**	**July -**	**2,695 feeder cattle**
February -	**2,511 feeder cattle**	**August -**	**2,559 feeder cattle**
March -	**2,487 feeder cattle**	**September -**	**2,559 feeder cattle**
April -	**2,866 feeder cattle**	**October -**	**2,720 feeder cattle**
May -	**2,866 feeder cattle**	**November -**	**2,928 feeder cattle**
June -	**2,695 feeder cattle**	**December-**	**2,928 feeder cattle**

2. Estimated Generated Waste:

=	**6,131**	tons of cattle manure
=	**12,525,590**	gallons of processed wastewater

3. Estimated Transferred Waste:

=	**2,100**	tons of cattle manure
=	**0**	gallons of processed wastewater

4. Application Area:

   Total acres controlled by CAFO used for land application during 2017: **221.1**

5. Discharges from LWCF in 2017:

   There were no discharges from this facility in 2017.

6. Nutrient Management Plan Information:

   The Nutrient Management Plan was completed by Nutrient Advisors.

Note: Land application records represent the 2017 crop year and may include applications in the fall of 2016.

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Bruns Feedlot, LLC Manure Production Summary Production based on CAFO Annual Reports					
Manure Production Calculation Method	Tons of Solid Manure	Gallons of Effluent	Gallons of Slurry Manure	Annual Inventory	Livestock Type
2017	6,131	12,525,590		2,928	Feeder Cattle
2016	3,887	13,464,000		3,053	Feeder Cattle
2015	4,109	7,824,000		3,117	Feeder Cattle
Averages	4,709	11,271,197		3,033	Feeder Cattle

Bruns Feedlot, LLC

Nutrients Required for Crop Growth

Crop	Irrigated Corn	Dryland Corn	Dryland Soybeans	Alfalfa			Totals
Crop Yield bu/ac	222	202	62	5			
Crop Acres	56	435	27	40			558
Total N Required[1] lbs.	14,898	105,590	6,117	10,159			136,765
Total P Required[1] lbs.	4,097	29,037	1,273	2,217			36,624

Total N Required for Crop	136,765	Lbs.	Total P_2O_5 Required for Crop	36,624	Lbs.
Total N Available all Sources[2]	61,029	Lbs.	Total P_2O_5 Available all Sources[2]	153,823	Lbs.
Un-utilized Manure N	0	Lbs.	Un-utilized Manure P_2O_5	117,199	Lbs.
Number of acres to utilize all Nitrogen produced:	249		Number of acres to utilize all Phosphorus produced:	2343	

[1]Nutrient Required based on **Wardguide**

[2]See Nutrient Production Worksheet

Manure Averages for Bruns Feedlot, LLC

	Ammonium Nitrogen			Organic Nitrogen			Phosphorus		
	Solid Manure Lbs. / Ton	Effluent Lbs. / acre inch		Solid Manure Lbs. / Ton	Effluent Lbs. / acre inch		Solid Manure Lbs. / Ton	Effluent Lbs. / acre inch	
Averages	1.08	49.73		14.20	19.13		23.05	19.50	
Report Number									
13-869	1.5			14.4			18.3		
14-1794	1.7			15.6			26.1		
15-2173	0.5			12.8			23.3		
16-1664	0.6			14			24.5		
15-10722		11.3			21.9			18.6	
16-11220		128			19			23.7	
17-10788		9.9			16.5			16.2	

Values from Ward Analysis Reports

WARD Laboratories, Inc.
Ag Testing - Consulting

Account No:	20850		Manure Analysis Report

NUTRIENT ADVISORS LLC
449 E DEERE ST
WEST POINT NE 68788

Date Received: 4/15/2013
Date Reported: 4/16/2013
Lab No.: 869

Results for: BRUNS FEEDLOT
Sample ID: PEN STOCKPILE
Sample Desc.: PEN 5 4/13

	Analysis Dry Basis	Analysis As Received	Lbs./Ton As Received
Ammonium, %N	0.204	0.07	1.5
Organic N, %N	1.97	0.72	14.4
Total N, %N	2.174	0.79	15.9
Phosphorus, %P2O5	2.51	0.91	18.3
Potassium, %K2O	3.08	1.12	22.4
Sulfur, %S	0.7	0.26	5.1
Calcium, %Ca	2.51	0.91	18.3
Magnesium, %Mg	0.8	0.29	5.8
Sodium, %Na	0.36	0.13	2.6
Zinc, ppm ZN	346.7	126	0.3
Iron, ppm Fe	5886.1	2144	4.3
Manganese, ppm Mn	395.3	144	0.3
Copper, ppm Cu	72.8	27	0.1
Soluble Salts, mmho/cm	54.73		25.5
pH	6.4		
Moisture, %	63.57		
Dry Matter (TS), %	36.43		

"<" - Not Detected / Below Detection Limit

Reviewed By: **Nick Ward**

Bus:308-234-2418
Fax:308-234-1940
web site
www.wardlab.com
4007 Cherry Ave., P.O. Box 738
Kearney, Nebraska 68848-0788

WARD
Laboratories, Inc.
Ag Testing - Consulting

MINNESOTA DEPARTMENT OF AGRICULTURE — 2016 Certified Manure Testing Program

Account No: 20850

Manure Analysis Report

Date Received: 9/8/2014
Date Reported: 9/9/2014

NUTRIENT ADVISORS LLC
449 E DEERE ST
WEST POINT NE 68788

Lab No.: 1794

Results for: BRUNS FEEDLOT
Sample ID: FIELD STOCKPILE
Sample Desc.: PENS 1 9-14

	Analysis Dry Basis	Analysis As Received	Lbs./Ton As Received
Ammonium, %N	0.144	0.09	1.7
Organic N, %N	1.31	0.78	15.6
Total N, %N	1.454	0.87	17.3
Phosphorus, %P2O5	2.19	1.3	26.1
Potassium, %K2O	1.64	0.98	19.6
Sulfur, %S	0.5	0.3	5.9
Calcium, %Ca	2.67	1.59	31.8
Magnesium, %Mg	0.86	0.51	10.2
Sodium, %Na	0.26	0.15	3.1
Zinc, ppm ZN	334.8	199	0.4
Iron, ppm Fe	10387	6185	12.4
Manganese, ppm Mn	647.3	385	0.8
Copper, ppm Cu	73.9	44	0.1
Soluble Salts, mmho/cm	28.29		21.6
pH	6.7		
Moisture, %	40.45		
Dry Matter (TS), %	59.55		

"<" - Not Detected / Below Detection Limit

Reviewed By: **Nick Ward**

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Account No: 20850

Manure Analysis Report

Date Received: 9/11/2015
Date Reported: 9/14/2015

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WEST POINT NE 68788

Lab No.: 2173

Results for: BRUNS FEEDLOT
Sample ID: FIELD STOCKPILE
Sample Desc.: PENS 9/15

	Analysis Dry Basis	Analysis As Received	Lbs./Ton As Received
Ammonium, %N	0.046	0.03	0.5
Organic N, %N	1.18	0.64	12.8
Total N, %N	1.226	0.67	13.3
Phosphorus, %P2O5	2.14	1.16	23.3
Potassium, %K2O	2.01	1.09	21.9
Sulfur, %S	0.5	0.27	5.5
Calcium, %Ca	2.24	1.22	24.4
Magnesium, %Mg	0.83	0.45	9
Sodium, %Na	0.3	0.16	3.3
Zinc, ppm ZN	288.6	157	0.3
Iron, ppm Fe	10941.7	5951	11.9
Manganese, ppm Mn	659.8	359	0.7
Copper, ppm Cu	61.7	34	0.1
Soluble Salts, mmho/cm	35.28		24.6
pH	6.6		
Moisture, %	45.61		
Dry Matter (TS), %	54.39		

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Account No: 20850

Manure Analysis Report

Date Received: 7/13/2016
Date Reported: 7/14/2016

NUTRIENT ADVISORS LLC
449 E DEERE ST
WEST POINT NE 68788

Lab No.: 1664

Results for: BRUNS FEEDLOT
Sample ID: PEN STOCKPILE
Sample Desc.: PENS 7/16

	Analysis Dry Basis	Analysis As Received	Lbs./Ton As Received
Ammonium, %N	0.045	0.03	0.6
Organic N, %N	1.02	0.7	14
Total N, %N	1.065	0.73	14.6
Phosphorus, %P2O5	1.78	1.23	24.5
Potassium, %K2O	1.23	0.85	17
Sulfur, %S	0.38	0.26	5.3
Calcium, %Ca	1.83	1.26	25.3
Magnesium, %Mg	0.74	0.51	10.2
Sodium, %Na	0.14	0.1	1.9
Zinc, ppm ZN	238	164	0.3
Iron, ppm Fe	14270.3	9854	19.7
Manganese, ppm Mn	653.4	451	0.9
Copper, ppm Cu	43.8	30	0.1
Soluble Salts, mmho/cm	13.49		11.9
pH	7.9		
Moisture, %	30.95		
Dry Matter (TS), %	69.05		

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Account No: 20850

Slurry Analysis Report

Date Received: 4/16/2015
Date Reported: 4/17/2015

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WEST POINT NE 68788

Lab No.: 10722

Results for: BRUNS FEEDLOT
Sample ID: EFFLUENT
Sample Desc.: POND 1 4/15

	Analysis As Received	Lbs per Acre Inch	Lbs. per 1000 gal.
Ammonium, ppm N	49.7	11.3	0.4
Organic N, ppm N	96.8	21.9	0.8
Total N, ppm N	146.5	33.2	1.2
Phosphorus, ppm P2O5	81.9	18.6	0.7
Potassium, ppm K2O	663.5	150.4	5.6
Sulfur, ppm S	71.5	16.2	0.6
Calcium, ppm Ca	93	21.1	0.8
Magnesium, ppm Mg	78.3	17.8	0.7
Sodium, ppm Na	155.7	35.3	1.3
Zinc, ppm ZN	0.2	0.1	0
Iron, ppm Fe	5.8	1.3	0
Manganese, ppm Mn	0.6	0.1	0
Copper, ppm Cu	< 0.1	0	0
Soluble Salts, mmho/cm	3.66		18
pH	7.8		
Dry Matter (TS), %	0.32		

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Account No: 20850

Slurry Analysis Report

Date Received: 6/1/2016
Date Reported: 6/2/2016

NUTRIENT ADVISORS LLC
449 E DEERE ST
WEST POINT NE 68788

Lab No.: 11220

Results for: BRUNS FEEDLOT
Sample ID: EFFLUENT
Sample Desc.: POND 1 5/16

	Analysis As Received	Lbs per Acre Inch	Lbs. per 1000 gal.
Ammonium, ppm N	56.7	12.8	0.5
Organic N, ppm N	83.7	19	0.7
Total N, ppm N	140.4	31.8	1.2
Phosphorus, ppm P2O5	104.6	23.7	0.9
Potassium, ppm K2O	553.9	125.5	4.6
Sulfur, ppm S	21.3	4.8	0.2
Calcium, ppm Ca	104.8	23.8	0.9
Magnesium, ppm Mg	80.5	18.2	0.7
Sodium, ppm Na	154.4	35	1.3
Zinc, ppm ZN	0.3	0.1	0
Iron, ppm Fe	18.1	4.1	0.2
Manganese, ppm Mn	1.2	0.3	0
Copper, ppm Cu	0.1	0	0
Soluble Salts, mmho/cm	3.08		15
pH	8.1		
Dry Matter (TS), %	0.3		

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Account No:	20850		Slurry Analysis Report

Date Received: 4/27/2017
Date Reported: 4/28/2017

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449 E DEERE ST
WEST POINT NE 68788

Lab No.: 10788

Results for: BRUNS FEEDLOT
Sample ID: EFFLUENT
Sample Desc.: POND 1 4/17

	Analysis As Received	Lbs per Acre Inch	Lbs. per 1000 gal.
Ammonium, ppm N	43.5	9.9	0.4
Organic N, ppm N	73	16.5	0.6
Total N, ppm N	116.5	26.4	1
Phosphorus, ppm P2O5	71.4	16.2	0.6
Potassium, ppm K2O	409.5	92.8	3.4
Sulfur, ppm S	89.3	20.3	0.8
Calcium, ppm Ca	167.3	37.9	1.4
Magnesium, ppm Mg	87.6	19.8	0.7
Sodium, ppm Na	144.5	32.8	1.2
Zinc, ppm ZN	0.3	0.1	0
Iron, ppm Fe	5.7	1.3	0
Manganese, ppm Mn	0	0	0
Copper, ppm Cu	0.4	0.1	0
Soluble Salts, mmho/cm	3		15
pH	7.9		
Dry Matter (TS), %	0.22		

"<" - Not Detected / Below Detection Limit

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Table 4–8 Beef waste characterization—as excreted—Continued

(c) Finishing cattle excretion in units per finished animal 1/

Components	Units	Finishing cattle: Corn, no supplemental P	Corn with supplemental P	Corn with 25% wet distillers grains	Corn with 30% wet corn gluten feed
Weight	lb/f.a.	9,800	9,800		
Volume	ft³/f.a.	160	160		
Moisture	% w.b.	92	92		
TS	lb/f.a.	780	780		
VS	lb/f.a	640	640		
BOD	lb/f.a.	150	150		
N	lb/f.a.	53	53	75	66
P	lb/f.a.	6.6	8.3	10	11
K	lb/f.a.	38	38		

1/ Assumes a 983 lb finishing animal fed for 153 days

(d) Finishing cattle in units per day per 1,000 lb animal unit 1/

Components	Units	Finishing cattle: Corn, no supplemental P	Corn with supplemental P	Corn with 25%wet distillers grains	Corn with 30% wet corn gluten feed
Weight	lb/d/1000 lb AU	65	65		
Volume	ft³/d/1000 lb AU	1.1	1.1		
Moisture	% w.b.	92	92		
TS	lb/d/1000 lb AU	5.2	5.2		
VS	lb/d/1000 lb AU	4.3	4.3		
BOD	lb/d/1000 lb AU	1.0	1.0		
N	lb/d/1000 lb AU	0.36	0.36	0.50	0.44
P	lb/d/1000 lb AU	0.044	0.056	0.069	0.076
K	lb/d/1000 lb AU	0.25	0.25		

Table 4–9 Nitrogen content of cattle feedlot runoff (Alexander and Margheim 1974) 1/2

Annual rainfall	Below-average conditions 3/	Average conditions 4/	Above-average conditions 5/
	lb N/acre-in		
<25 in	360	110	60
25 to 35 in	60	30	15
>35 in	15	10	5

1/ Adapted from the 1992 version of the AWMFH

2/ Applies to waste storage ponds that trap rainfall runoff from uncovered, unpaved feedlots. Cattle feeding areas make up 90 percent or more of the drainage area. Similar estimates were not made for phosphorus and potassium. Phosphorus content of the runoff will vary inversely with the amount of solids retained on the lot or in settling facilities.

3/ No settling facilities are between the feedlot and pond, or the facilities are ineffective. Feedlot topography and other characteristics are conducive to high solids transport or cause a long contact time between runoff and feedlot surface. High cattle density—more than 250 head per acre.

4/ Sediment traps, low gradient channels, or natural conditions that remove appreciable amounts of solids from runoff. Average runoff and solids transport characteristics. Average cattle density—125 to 250 head per acre.

5/ Highly effective solids removal measures such as vegetated filter strips or settling basins that drain liquid waste through a pipe to storage pond. Low cattle density—less than 120 head per acre.

Raymond C. Ward, Ph.D.
Certified Professional Soil Scientist

Crop	Nitrogen Requirement	Subsoil Factor
Corn	1.2 lbs / bu	0.3
Milo	1.15 lbs / bu	0.3
Popcorn	0.031 lbs / lb	0.3
Seed Corn	2 lbs / bu	0.3
Corn Silage	10.5 lbs / ton	0.3
Sorghum Silage	9.5 lbs / ton	0.3
Feed-Hay	27 lbs / ton	0.3
Sudan Hay	27 lbs / ton	0.3
Soybeans	See Footnote	
Pinto Beans	3 lbs / cwt	0.3
Gr. No. Beans	3 lbs / cwt	0.3
Peanuts	See Footnote	
W. Wheat	2.4 lbs / bu	0.3
Sp. Wheat	2.5 lbs / bu	0.3
Oats	1.3 lbs / bu	0.3
Rye	1.9 lbs / bu	0.3
Feed Barley	1.5 lbs / bu	0.3
Malting Barley	1.3 lbs / bu	0.3
Sm. Gr. Silage	13 lbs / ton	0.3
Sm. Gr. Hay	40 lbs / ton	0.3
Alfalfa	0	0
New Alfalfa	See Footnote	
Grass-Alfalfa	20 lbs / ton	0.3
Clover	0	0
Bromegrass	40 lbs / ton	0.3
Bermudagrass	40 lbs / ton	0.3
Fescue	40 lbs / ton	0.3
Native Grass	27 lbs / ton	0.3
Lovegrass	32 lbs / ton	0.3
Cool Grass	40 lbs / ton	0.3
Sugar Beets	8 lbs / ton	0.3
Sunflowers	0.05 lbs / lb	0.3
Potatoes	0.5 lbs / cwt	0.3
Cotton	0.1 lbs / lb	0.3
Millet	1.7 lbs / bu	0.3
Onions	0.25 lbs / cwt	0.3
Melons	14 lbs / ton	0.3
Garden	135 lbs / unit	0.3

Footnote: The nitrogen rate for these legume crops is calculated on the basis of the P2O5 requirement.
The N requirement is based on a 1:3 ratio (N:P2O5)

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Quantities of Plant Nutrients in Crops
(Pounds of Plant Nutrient per Unit Indicated)

Crop	Yield Unit	N (Nitrogen)	P_2O_5 (Phosphate)	K_2O (Potash)	Calcium	Magnesium	Sulfur	Copper	Manganese	Zinc
Corn (Grain)	per bu	0.75	0.33	0.23	0.01	0.05	0.07	0.0004	0.0006	0.001
	200 bu	150	66	60	46	10	14	0.08	0.12	0.2
Soybeans (Grain)	per bu	3.7	0.77	1.4	0.18	0.18	0.32	0.001	0.0013	0.001
	60 bu	222	46.2	84	10.8	10.8	19.2	0.06	0.078	0.06
Wheat (Grain)	per bu	1.2	0.52	0.26	0.015	0.15	0.12	0.0007	0.002	0.003
	60 bu	72	31.2	15.6	1.5	9	7.2	0.042	0.12	0.18
Cotton (Lint and Seed)	per bale	12.5	4.8	5.8	0.67	1.33	0.96	0.02	0.037	0.107
	2 bale	25	9.6	11.6	1.34	2.66	1.34	0.04	0.074	0.214
Sorghum (Grain)	per bu	0.9	0.27	0.2	0.067	0.083	0.083	0.000167	0.0007	0.00067
	100 bu	90	27	20	6.7	8.3	8.3	0.0167	0.07	0.067
Sunflowers (Grain)	per cwt	3.6	1.2	1.1	1.2	0.20	0.22	.002	.002	.005
	20 cwt	72	24	22	2.4	4.0	4.4	0.04	0.04	0.1
Alfalfa (Total)	per ton	55	12	50	28	5.25	5.0	0.015	0.11	0.105
	6 ton	330	72	300	168	31.5	30	0.09	0.66	0.63
Grass (Total)	per ton	30	12	42	8	3.5	3.75	0.01	0.15	0.04
	4 ton	120	48	168	32	14	15	0.04	0.6	0.16
Sugar Beets (Total)	per ton	8	1.4	6.7	2.2	0.50	0.67	0.002	0.05	.002
	25 ton	200	35	160	55	12.5	16.75	0.05	1.25	.05
Oats (Grain)	per bu	0.70	0.25	0.15	0.025	0.0375	0.074	0.0004	0.0015	0.0006
	80 bu	56	20	12	2	3	5.9	0.032	0.12	0.048
Potatoes (Tuber)	per cwt	0.35	0.13	0.60	0.015	0.03	0.03	0.0002	0.0005	0.00025
	100 cwt	35	13	60	1.5	3	3	0.02	0.05	0.025
Peanuts (Nuts)	per cwt	3.7	0.46	0.68	0.6	0.57	0.53	*	*	*
	35 cwt	129.5	16.1	23.8	21	19.95	18.55	*	*	*

*No data for this nutrient

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NITROGEN AND SULFUR FERTILIZER RECOMMENDATION CALCULATIONS

NITROGEN RECOMMENDATIONS

N lbs/A = (yield x N req) – (ppm topsoil NO_3-N x .3 x depth in inches) – (ppm subsoil NO_3-N x .3 x depth in inches) – legume credit – manure credit – irrigation water credit.

If no subsoil sample, assume 2 ppm NO_3-N for sandy soils and 5 ppm NO_3-N for loamy or clayey subsoils.

SULFUR RECOMMENDATIONS

$$\text{S rec} = \frac{\text{(S req-Soil S)}}{.7 \text{ or } 1.0}$$

Note: divide by .7 for sandy soils or by 1.0 for loamy and clayey soils.

S req = Yield goal x S req factor
Soil S = ppm S x .3 x depth in inches with a maximum of 8 in.

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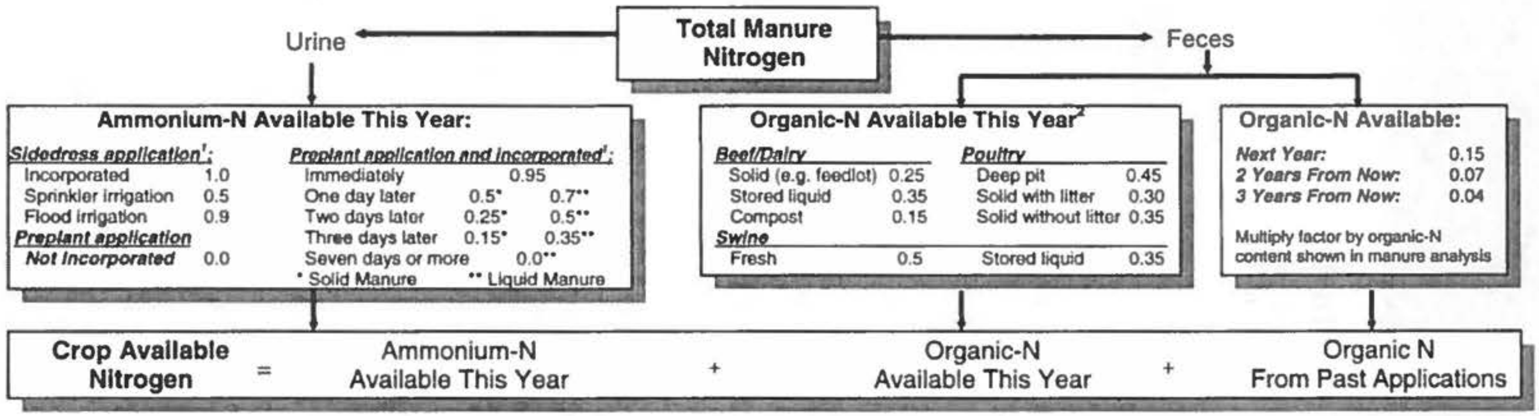

[1]Incorporation can be accomplished by tillage or by a 0.50 inch or greater rainfall.

[2]Organic-N availability assumes spring seeded crops such as corn and soybeans. For winter or spring manure application prior to planting small grains, multiply organic-N availability factor by 0.7.

Figure 2. Availability factors for manure nitrogen.

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SOIL ANALYSIS METHODS

used by Midwest Laboratories, Inc.

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Analysis	Method	Reference
Organic Matter	Loss of Weight on Ignition	NCR, p. 32
Phosphorus		
a. P_1	Extraction with dilute acid and ammonium fluoride (Weak Bray)/colorimetric	NCR, p. 14-15
b. P_2	Extraction with strong Bray solution (4 times the acid concentration of weak Bray)/colorimetric	
c. Bicarbonate P	Extraction with sodium bicarbonate/colorimetric	ASA, p. 421-422
Potassium, Magnesium, Calcium, Sodium, Sulfur	Neutral ammonium acetate (1 N) extraction/ Inductively Coupled Argon Plasma (ICAP) detection	RMST, p. 60-65 NCR, p.17-18
pH	1:1 Soil:Water mixture/combination electrode.	NCR, p. 5-8
Soil pH, Buffer index		
Cation Exchange Capacity (CEC)	a. Summation of cations, Ca^{++}, Mg^{++}, K^{+}, Na^{+}, and H^{+} (see 3 & 4) b. Ammonium acetate saturation/displacement with NaCl/distillation and titration	 ASA, p. 149-151
Nitrate-N	Saturated CaO Extraction/Cadmium Reduction/Segmental Flow Analysis (SFA)	NCR, p. 11
Ammonia-N, Exchangeable	Neutral salt (KCl) extraction/SFA	ASA, p. 648
Zinc, Manganese, Iron, Copper	a. DPTA extraction/ICAP detection b. 0.1 N HCl extraction ICAP detection	NCR, p.18-19 NCR, p. 19-20
Boron	DTPA/Sorbitol ICAP	NAPT
Excess Lime	1 N HCl spot test	-
Soluble Salts	Conductivity meter 1:1 Soil:Water	USDA, P. 89-90
Soil Texture	Hydrometer method	ASA, p. 549-566

Chloride	.01 M $Ca(NO_3)_2$ FIA	NCR 13, p. 26-27
Molybdenum, extractable	Acid ammonium oxalate extraction/ICAP	ASA, p. 491-493
Water Soluble Cations	1:5 Water extraction ICAP det.	RMST, p. 87
Field Capacity (1/3 Bar moisture holding capacity)	Porous plate pressure apparatus	ASTM, D 2325 (1981)
Wilting Point (15 Bar moisture holding capacity)	Porous plate pressure apparatus	ASTM, D 2325 (1981)
Bulk Density	Disturbed sample	Volume weight

References

NCR - Recommended Chemical Soil Test Procedures for the North Central Region. No. 499 (revised). North Dakota State University.

ASA - Methods of Soil Analysis - Part 2: Chemical and Microbiological Properties, Second Edition, 1982. American Society of Agronomy.

RMST - Handbook on Reference Methods for Soil Testing, 1974, Council on Soil Testing and Plant Analysis.

USDA - USDA Agriculture Handbook 60.

ASTM - American Society for Testing and Materials 04.08 Soil and Rock, Building Stones: Geo Textiles

NebGuide
University of Nebraska–Lincoln
Published by University of Nebraska–Lincoln Extension, Institute of Agriculture and Natural Resources

G1740

Guidelines for Soil Sampling

Richard B. Ferguson, Gary W. Hergert, Charles A. Shapiro and Charles S. Wortmann
Extension Soil Specialists

Soil samples representative of a field are the best guidelines to determine fertilizer needs. This publication describes proper procedures to collect representative soil samples.

Objectives

The primary objectives of soil sampling are to determine the average nutrient status and degree of variability in a field. Correct fertilizer use, based on accurate information about soil fertility levels in fields, can result in increased crop yield, reduced cost and minimized environmental impact. Knowing a field's nutrient status variability means fertilizer application can be adjusted to more closely meet the supplemental nutrient needs of a crop for specific field areas.

General Guidelines

Determine Sampling Approach

With the development of technologies and procedures for site-specific management of fertilizer and other inputs, producers can collect and quantify information about soil nutrient variability within a field. Prior to sampling, decide how soil nutrient information will be used to manage fertilizer, and that will help determine how samples should be collected. For uniform fertilizer application, collect soil samples randomly within representative areas of the field. If variable rate fertilizer application is anticipated, sample either in predefined management zones or in a grid pattern with known sample locations.

Uniform Fertilizer Application

If fertilizer is to be applied uniformly, it still is helpful to have some idea of the variability in soil fertility within a field. Knowing this variability may allow you to adjust rates, application timing or fertilizer sources accordingly. Collect samples from subareas within fields that are relatively uniform. These areas can be determined based on soil type, slope, degree of erosion, cropping history, known crop growth differences, spatial patterns of crop yield and any other factors that may influence nutrient levels in the soil.

Avoid odd areas in the field (eroded spots, turn rows, abandoned farmsteads or feedlots), or sample them separately. Soil samples from these areas can significantly alter test results for the rest of the field. When sampling furrow-irrigated fields for residual nitrate-nitrogen, collect samples from the upper, middle and lower portions of the field *(Figure 1)*. The amount

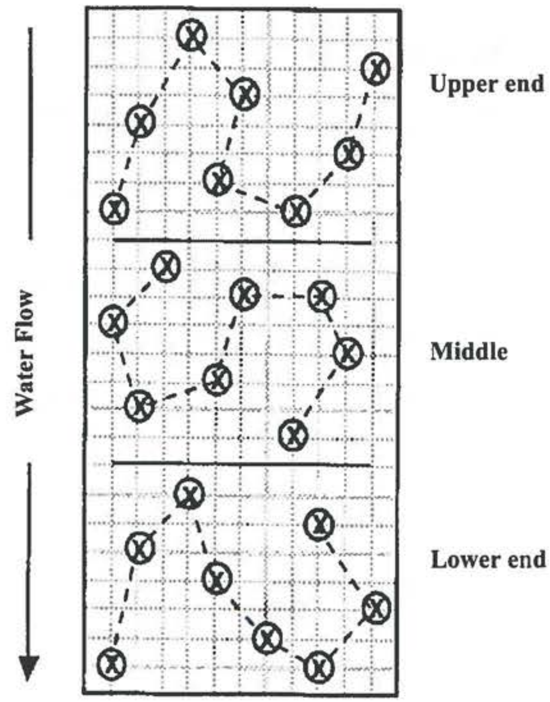

Figure 1. Dividing and sampling a furrow-irrigated field.

of irrigation water that infiltrates the soil will influence the amount and depth of nitrate-nitrogen in the soil.

Variable Rate Fertilizer Application

There are two basic approaches to soil sampling for site-specific fertilizer management — grid sampling or management zone-based sampling. Both approaches provide more detailed information about the variability of nutrient levels within a field than sampling normally done as described above for uniform fertilization. Grid sampling is more expensive and time-consuming, but can provide useful information for variable rate fertilization for several years. Management zone sampling is based on zones derived from various spatial information resources — yield maps, soil surveys, aerial photographs, soil apparent electrical conductivity, etc. Often information from several spatial data layers can be combined to derive management zones. *Figure 2* illustrates grid and management zone approaches to sampling a field. More detailed information on site-specific sampling is available in two other resources — *Soil Samp[illegible]ion Agriculture* (EC154) and *Site-Specific Nitro[illegible]ent for Irrigated Corn* (EC163).

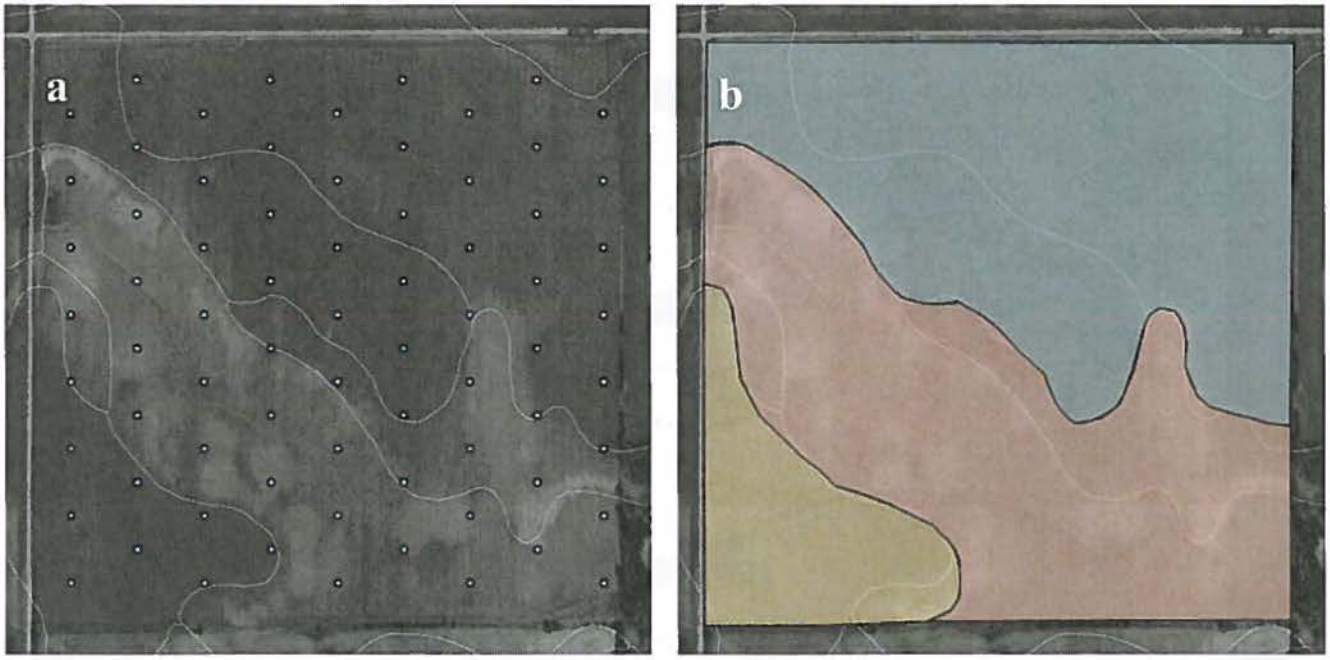

Figure 2. Examples of grid and management zone approaches to collecting soil samples. *Figure 2a* has 72 sample points. Within each of the three management zones in *Figure 2b*, 10-15 cores should be collected and composited into a sample representing each zone.

Select Proper Sampling Depth

Surface samples are used to determine soil pH, lime need, organic matter, phosphorus, potassium, sulfur and zinc. In Nebraska, soil test correlation and calibrations for these tests are based on surface samples collected from 0-8 inches. It is important to use the same sampling depth when re-sampling fields so soil test values over time can be accurately compared. Sampling deeper than 8 inches generally results in lower test values for organic matter, phosphorus and zinc. Potassium and pH may increase, decrease or remain the same with deeper samples. Surface samples are needed for all crops. Fertilizer recommendations for all nutrients except nitrogen are based on nutrient levels in the surface soil sample. Nitrogen recommendations for many crops depend on the organic matter content in the surface soil sample, as well as residual nitrate-nitrogen in surface and subsurface samples.

Stratification of soil nutrients can occur when fields have not been tilled for several years, with higher nutrient concentrations close to the soil surface, often in the top 2-3 inches. Availability of nutrients from fields where stratification exists generally is not a concern, as plant roots can effectively access nutrients at shallow depths. However, it is important to sample to the proper depth of 8 inches, with complete mixing of all cores collected prior to retention of a subsample to send to the lab. If stratification exists and samples are not collected to the proper depth or not well mixed, there is greater risk of a nonrepresentative sample and an inaccurate fertilizer recommendation.

Both surface (0-8 inches) and subsurface (below 8 inches) samples are needed to accurately estimate nitrate-nitrogen in the root zone, because nitrogen in the nitrate form moves easily with water and will leach into the subsoil. Nitrate-nitrogen in the root zone is readily used by plants. For most soils and annual crops, roots will reach a depth of 4 feet or more. To accurately predict nitrate-nitrogen in the root zone, subsurface samples should be collected to a depth of 3 feet. A 2-foot sample is the minimum sampling depth recommended for nitrate-nitrogen, and will not predict plant available nitrate-nitrogen as accurately as a deeper sample. For crops with shallow root zones, such as dry beans, canola and millet, a 2-foot sample is adequate. If rooting depth is limited because of coarse sand or gravel, rock or a high water table, sample to the depth possible. Nitrogen fertilizer recommendations for several crops grown in Nebraska are based on the amount of nitrate-nitrogen in the root zone determined from subsurface samples, as well as organic matter content in the surface sample. If subsurface samples for nitrate-nitrogen aren't taken, nitrogen recommendations for crops will be based on historical average values of nitrate-nitrogen in the root zone, and the accuracy of fertilizer recommendations may decrease.

Collect Soil Cores

A soil core is an individual sample collected at one spot in the field. For each area of the field to be sampled, collect cores randomly throughout the area, unless information is being collected for site-specific fertilizer management. Take care to adequately represent the entire area when sampling. Be sure to sample the entire 0-8 inch layer for general fertility analysis. Place individual soil cores in a clean plastic pail for mixing. Separate pails should be used for subsurface samples. Break up and thoroughly mix soil cores in each pail after collecting samples over the entire area. After mixing, retain a portion of the mixed soil and place it in a properly labeled sample bag or box to send to the laboratory for analysis. Typically, a sample of a pint volume, or one pound in weight, will be adequate for analysis. The sample label should include the producer's name, field ID, sample ID, and depth of sample *(Figure 3)*.

The University of Nebraska–Lincoln recommends that samples represent fields or areas within fields no larger than 40 acres. Larger areas may contain enough variability in soil properties and nutrient values to render the average soil test level from a single sample meaningless. Sampling field areas

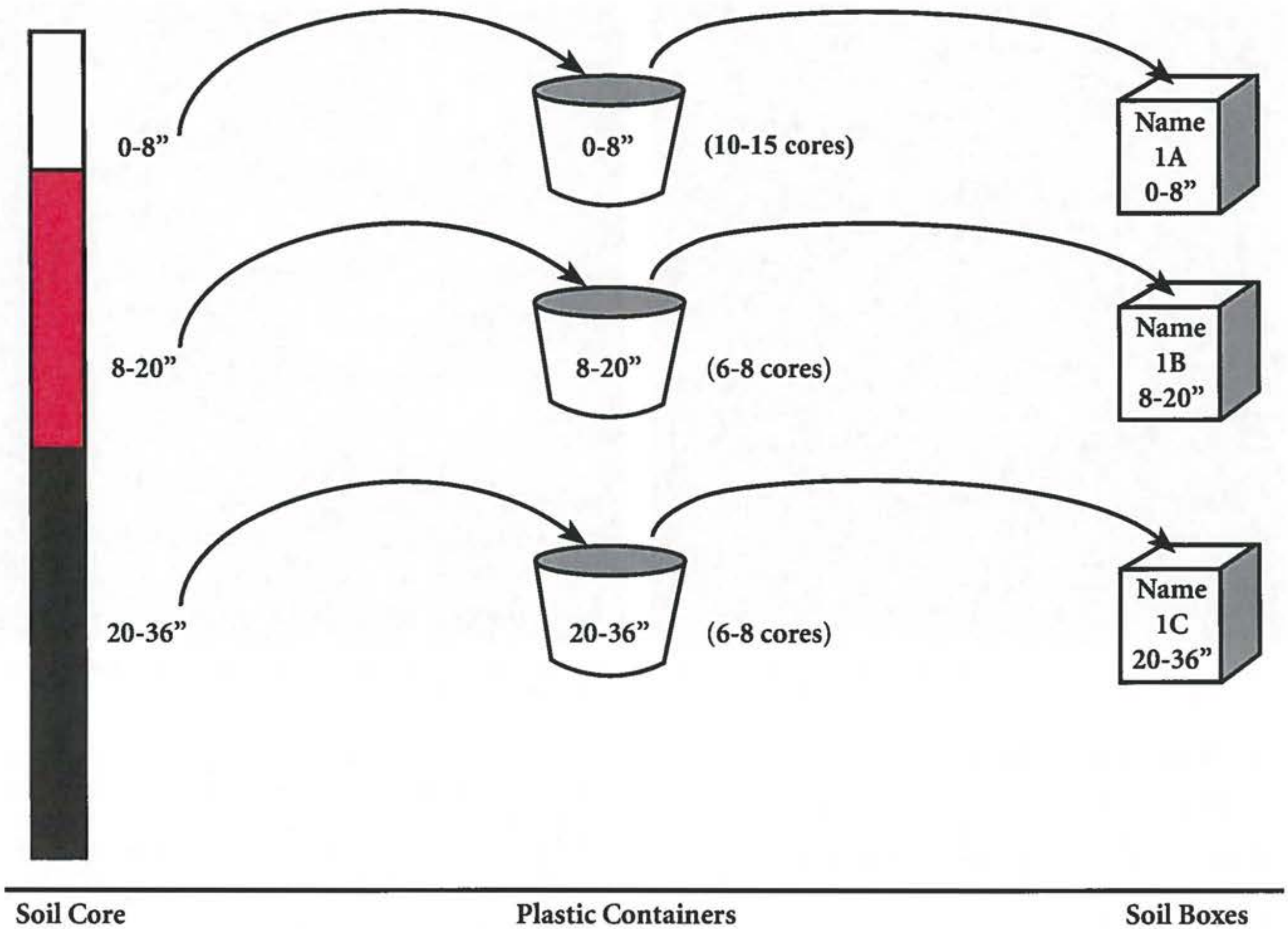

Figure 3. Division of soil cores by depth, with retention of a well-mixed subsample into labeled boxes or sample bags.

smaller than 40 acres in size can increase the accuracy of the test, and provide a measure of variability across the field.

Acceptable measurement of the average nutrient status in a 40-acre area can be obtained with 10 to 15 randomly collected surface cores and six to eight subsoil cores for nitrate-nitrogen analysis. For furrow-irrigated fields, four to five subsurface cores per 20 acres generally will provide more useful estimates of nitrate-nitrogen than six to eight cores per 40 acres, provided the field is divided into upper, middle and lower portions based on the direction of water flow across the field.

Subsurface samples should be continuous to the bottom of the core. For example, with a surface sample of 0-8 inches, collect the subsurface sample from 8-36 inches. However, information about the vertical distribution of nitrate-nitrogen in the field can be obtained if the subsoil sample is broken into segments. A surface sample of 0-8 inches, combined with a subsoil sample separated into depth increments of 8-20 and 20-36 inches, has several advantages over a single subsurface sample. It is difficult to obtain a well-mixed, representative sample from multiple cores covering a large depth range. Variations in soil texture and moisture by depth, coupled with the large volume of soil involved, make mixing difficult. Also, nitrate-nitrogen concentration in the subsoil is likely to vary with depth. The normal pattern is for nitrate-nitrogen concentrations to decrease with depth, but that is not always the case. If nitrate-nitrogen concentrations increase at deeper depths, perhaps caused by dry growing conditions followed by improved moisture and increased crop nitrogen removal, the availability of nitrate-nitrogen in the subsoil may be overestimated. *Figure 4* illustrates two situations where the total amount of root zone nitrate-nitrogen is the same. *Figure 4a* is typical. *Figure 4b* has a significant amount of nitrate-nitrogen deeper in the root zone, which may result in the deeper nitrate-nitrogen leaching below the root zone before crop roots can reach it. For situations like that in *Figure 4b*, it is appropriate to increase nitrogen fertilizer rate recommendations because of uncertainty regarding availability of nitrate-nitrogen deep in the root zone.

Soil Sampling Equipment

Surface soil samples can be collected using a soil probe or soil auger. The soil probe is the most desirable tool for collecting soil samples. It will give a continuous core with minimal disturbance of the soil. Cores can be subdivided for various depth increments. In many soils, a probe can be placed back into the hole left by sampling the surface layer to collect a subsoil sample. Normally very little contamination occurs from one depth to another with a soil probe. A

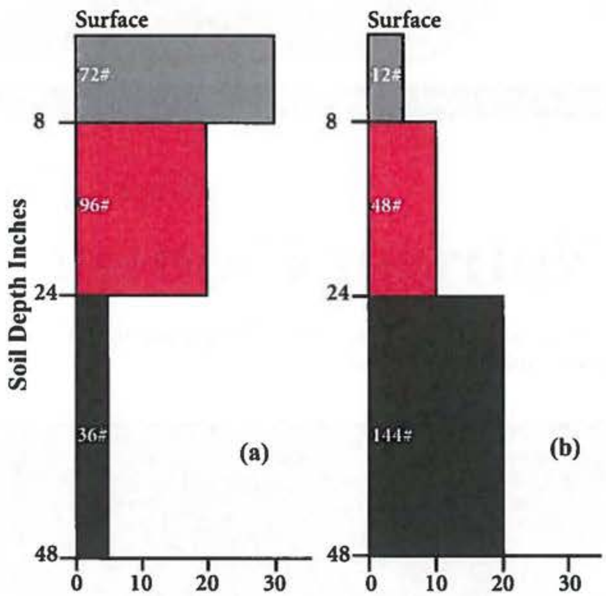

Figure 4. Two potential patterns of vertical distribution of nitrate-N in the root zone. Both contain 204 lb nitrate-N/acre.

soil probe cannot be used when the soil is too wet, too dry, rocky or frozen. High clay content soils can be difficult to sample with a probe, but most problems can be avoided by using a tip intended for high clay soils; avoiding very wet or dry conditions; lubricating the probe with silicone spray; and using a probe that is in good condition.

A soil auger can be used in soils that are frozen or contain gravel; however, care must be taken to obtain representative samples and to avoid mixing soil from different depths. If soils are too wet or dry when sampled with an auger, mixing soil from different depths can occur. A soil auger will not effectively gather dry, powdery soils. Use a soil auger only if a soil probe cannot be used or is unavailable.

A variety of hydraulic or mechanical samplers are available for collecting both surface and subsurface samples. Generally these are designed to push soil probes into the soil, but some may have rotary heads allowing the use of an auger. For commercial use or when sampling many fields, these samplers can be very helpful.

Time of Sampling

Late fall or early winter is a good time for soil sampling, except for testing nitrate-nitrogen on coarse-textured soils. Fall sampling allows more time to get results back from the laboratory and to use the information in designing the fertilizer management program for the following year.

Fall samples should provide meaningful results for all nutrients. However, excessive precipitation between the time of sampling and when crops are grown the next year may result in some leaching of nitrate-nitrogen — either deeper in the root zone, or out of the root zone altogether. If more than 8 inches of effective precipitation (total amount that percolates into the soil) occurs on fine-textured soils, or 4 inches on coarse-textured soils, between the time of sampling and the time the crop is planted, leaching losses of nitrate-nitrogen may have occurred. If leaching loss of nitrate-nitrogen in the root zone is suspected due to winter or spring precipitation, re-sample the field.

Spring sampling prior to planting is the preferred option. Delaying sampling until spring allows soil moisture in the root zone to be replenished, thus easing sampling on many soils. The distribution of nitrate-nitrogen in the subsoil is more likely to be representative of conditions during the growing season with spring sampling.

Handling of Samples

Be careful to avoid contamination when collecting soil samples. Use clean sampling equipment and plastic buckets to receive and mix soil samples. Do not leave samples moist and warm for more than 24 hours after collection. If moist soil samples are stored for extended periods of time, additional mineralization from soil organic matter can occur, increasing soil nitrate concentrations, and perhaps affecting other nutrients as well. If samples cannot be taken to the lab within 24 hours after collection, they should be dried, refrigerated or frozen. Dry soil samples by spreading them out to air dry at room temperature for two to three days, depending on air circulation and humidity. Do not dry soil samples at high temperatures, as this can affect the analysis. Avoid contaminating samples while drying, such as with wind-blown dust. Refrigerating or freezing samples will slow or stop microbial activity adequately until the samples can be dried and ground at the lab.

Acknowledgments

The authors acknowledge the contributions to this publication by Kenneth D. Frank and Edwin J. Penas, former Extension Soil Specialists, and Richard A. Wiese, former Extension Environmental Nitrogen Specialist.

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Index: Soil Management
Fertility
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NebGuide

University of Nebraska–Lincoln Extension, Institute of Agriculture and Natural Resources

Know how. Know now.

G1450
(Revised June 2014)

Manure Testing for Nutrient Content

Charles S. Wortmann, Nutrient Management Specialist; Charles A. Shapiro, Extension Soils Specialist; and Amy M. Schmidt, Livestock Bioenvironmental Engineer

This publication contains guidelines for determining manure nutrient content to improve crop and soil management. Manure testing combined with agronomically sound nutrient management and uniform application optimizes manure nutrient use while protecting water resources.

Manure and Soil Fertility Management

Animal manure has long been recognized as a source of nutrients for crop growth. When substituting manure for chemical fertilizers, farmers need to know the amounts of nutrients supplied to crops in the manure to properly adjust commercial fertilizer rates to meet crop needs while minimizing contamination of water supplies through leaching or runoff.

Typical values for the nutrient content of different animal manures are available in other extension publications, but actual nutrient values can differ significantly from farm to farm due to variations in manure storage and handling conditions, livestock type and age, ration formulation, and other management practices. Weather conditions and variations in management practices can cause manure nutrient contents to vary from month to month and from year to year on the same farm. To determine the nutrient content of manure, submit samples for analysis to one of the laboratories serving Nebraska livestock producers *(see Page 4)*.

Sampling Manure for Nutrient Analysis

If manure is tested before land application, the results can be used to adjust application rates. This may not be practical, however, and livestock feeding operations that are consistent in their feeding and manure management practices can determine application rates based on the average results of past manure analyses. Samples collected at the time of application have several advantages: The manure is mixed and similar to what is being applied; storage and handling losses do not need to be estimated; analysis results can be used to determine if additional nitrogen or other nutrients will be needed; and current analysis records are valuable for maintaining records of manure application.

The manure sample must be properly collected and handled to ensure reliable results. As explained in the following subsection, samples need to be composed of several subsamples for various types of manure to represent the available nutrients. The minimum numbers of subsamples suggested in this document are based upon generating a reliable estimate of manure nitrogen availability.

Figure 1. A soil probe can help provide a representative sample.

Solid and Semisolid Manure

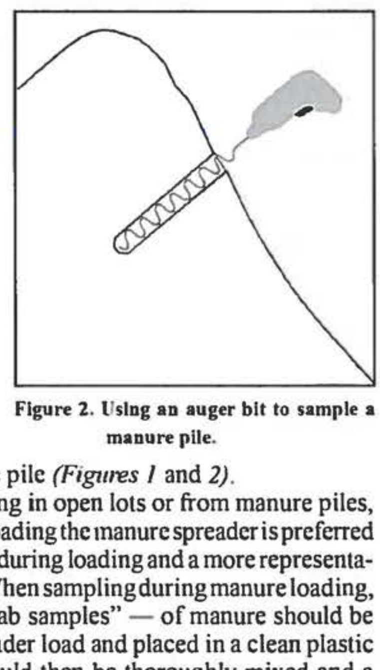


Figure 2. Using an auger bit to sample a manure pile.

Manure with greater than 20 percent dry matter is considered solid manure while manure with 10-20 percent dry matter is considered semisolid. While a spade can be used to sample a manure pile, more representative samples can be obtained using an auger or soil probe, which can reach deep into a manure pile *(Figures 1 and 2)*.

Compared to sampling in open lots or from manure piles, sampling during or after loading the manure spreader is preferred because manure is mixed during loading and a more representative sample is obtained. When sampling during manure loading, a few handfuls — or "grab samples" — of manure should be collected from each spreader load and placed in a clean plastic bucket. The samples should then be thoroughly mixed and a single sample collected from the bucket for analysis. If several spreader loads of manure are being hauled, grab samples should be collected from at least 10 spreader loads to form a composite sample.

Manure can be sampled from open lots by scraping together manure in at least 20 areas of the feedlot and putting grab samples into a 5-gallon plastic bucket. The collection points should be representative of the entire feedlot area from which manure will be removed for spreading. Wet areas near water-

Figure 3. Place solid manure samples in a resealable freezer bag.

Subsampling and Packaging Solid Manure Samples

During sampling, put the manure in a five-gallon bucket and break up the lumps *(Figure 3)*. Mix manure well and subsample enough to fill a resealable, quart-sized freezer bag. Squeeze the bag to remove excess air and seal. Put the bag into a second resealable bag to further ensure against leakage. Refrigerate if the sample cannot be sent to the laboratory immediately. Freeze the sample if delivery will be delayed by several days.

ing points may have a different analysis than manure scraped from mounds. Carefully consider where to sample to obtain a sample that represents the manure that will be land applied. Avoid getting hay or other feedstuffs in the sample.

Manure that is stacked can be sampled by following a few simple rules: The surface crust of the pile should not be included. Rather, begin sampling at least 6 inches below the pile surface. Grab samples should be taken from at least 15 locations in a manure stack, including from the center of the stack. Recent research indicates that taking 30 samples minimizes error.

Solid manure can also be collected during application by spreading a plastic sheet or tarp measuring at least 4 feet by 4 feet in the path of the applicator. After the spreader passes, the manure on the tarp should be weighed. Manure should be gathered in this way five to six times during application, mixed thoroughly, and subsampled. An advantage of this method is that the manure spreader can be calibrated simultaneously. The number of pounds of manure collected on a tarp of 22 square feet — 5.5 feet by 4 feet — equals the number of tons per acre. If a differently sized tarp is used, the application rate can be calculated as shown:

$$\textit{Application Rate}\left(\frac{tons}{acre}\right) = \frac{lb\ of\ manure}{area\ of\ tarp\ (ft^2)} \times 21.78$$

Slurry and Liquid Manure

Manure having 4 to 10 percent dry matter is considered slurry, while liquid manure has less than 4 percent dry matter by weight. Because these types of manure tend to contain a variety of suspended and settleable solids, causing the manure to become stratified, sampling during pumping is recommended to obtain a representative sample. The concentration of phosphorus can be two to eight times greater at a 14-foot depth compared to a 2-foot depth. Nitrogen concentration can be twice as high at the 14-foot depth as near the surface. Therefore, reliability of slurry or liquid manure analysis results is best with agitation.

Figure 4. Liquid out of pump.

Good mixing of manure in a storage facility may require two to four hours of agitation before manure removal and continued mixing during the emptying process.

Collect a sample in a clean container from the pump during loading, or when pumping to an irrigation system or an umbilical cord applicator *(Figure 4)*. Samples can be taken from the unloading port of a tank spreader immediately after loading. Do this for several loads or several times during pumping to ensure a representative sample. Be sure the sampling port does not have an accumulation of solids.

If sampling directly from the storage facility is the only option, a tool made with PVC pipe may be useful for vertical sampling *(Figure 5)*. Again, it is ideal to collect the sample during or immediately following agitation. If a storage structure is sampled without agitation, it is especially important to obtain manure from the various depths due to stratification of the nutrients. A good estimate of manure nitrogen content of liquid manure sampled from unagitated storage requires at least 20 subsamples.

It is hazardous to sample slurry and liquid manures from inside a building storage (e.g., a deep pit under a slatted floor) due to the possibility of falling into the storage unit or breathing potentially lethal gases emitted during agitation of manure in enclosed pits or tanks. To protect animals and workers, all people and animals should be removed from the building during agitation, and all available ventilation options should be implemented, including opening curtains, running ventilation fans, and opening other vents. Take additional precautions: Wear gloves and have someone else present when you are in the building. ***Never enter confined manure storage areas without the appropriate safety equipment.***

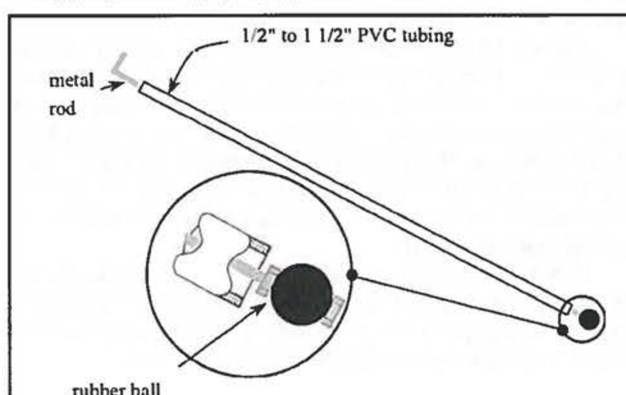


Figure 5. PVC pipe sampler.

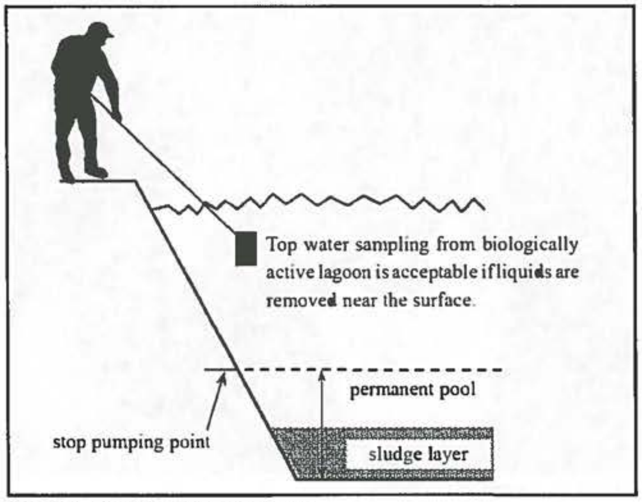


Figure 6. Sampling from a lagoon.

Anaerobic Lagoons

Anaerobic lagoons are not usually agitated before manure removal. When sampled from May through November, the top layer from the surface to the interface with the sludge layer (i.e., effluent) is fairly uniform in nutrient concentration due to biological mixing. If anaerobic lagoons are pumped from near the surface, a representative effluent sample can be obtained by taking several surface samples with a small container attached to a 10-foot pole *(Figure 6)*. Floating solids on the lagoon surface and near the edge of the lagoon should be avoided as these can misrepresent actual nutrient content of the liquid.

Liquid manure applied through sprinkler irrigation systems also can be collected during application. Place collection pans or buckets at eight or more points throughout the application area to collect the manure. This accounts for any dilution if water is added to the manure and for ammonium losses during application; however, ammonium losses from the soil surface will not be accounted for by collecting samples after sprinkler irrigation.

Labeling, Shipping, and Analysis of Samples

Label the sample container for identification, including your name and address, your sample identification, the date of sampling, manure type, and the sample location. Provide additional information with the sample as requested by the laboratory. A link to a generic manure sample submission form is included at the end of this NebGuide. It includes information useful in making a manure application recommendation. Each laboratory has its own sample forms, so check with the lab to determine what information will be required.

If it will take more than a few hours to deliver the sample, it should be refrigerated or frozen to prevent nutrient losses and transformations. Keep in mind that freezing samples will cause them to expand so containers should not be filled completely to the top. If kept at room temperature, the manure may eventually ferment or decompose, with significant breakdown of the solids. Avoid leaving samples in a vehicle where they can become very warm.

If the sample will be shipped, keep the sample chilled during shipping by packing it in an insulated container or wrapping it in layers of newspaper. Cold packs may be added. Avoid weekend delays in shipping by sending it early in the week.

Laboratory Analysis

Tests Desired

The tests most frequently needed to optimize nutrient management are total and ammonium nitrogen, phosphorus, potassium, pH, soluble salts, sodium, and dry matter content.

Nitrogen. Manure contains both organic and inorganic forms of nitrogen. Ammonium-N is the primary inorganic form in manure and is readily available to crops. Nitrate-N is usually too small to affect management decisions, unless the manure is composted. Organic nitrogen is determined as the difference between total nitrogen and inorganic nitrogen. Organic nitrogen becomes available to plants as manure decomposes, with 20 to 50 percent of organic nitrogen available to the first crop after application. Much of the remaining organic nitrogen becomes available in subsequent years.

Phosphorus. Most manure phosphorus (about 75 percent) is in inorganic forms. Phosphorus analysis allows calculation


Figure 7. Put liquid manure samples in plastic, screw-topped containers.


Figure 8. Seal liquid manure samples carefully.

Subsampling and Packaging Liquid of Slurry Manure Samples

During sampling, collect the manure in a five-gallon bucket. Mix well and remove a subsample while the sample is still swirling. Put the subsample in a pint-sized plastic, screw-topped container that can be tightly closed *(Figure 7)*. Never use glass containers. Fill the bottle to 1-2 inches from the top and seal the lid with tape to ensure that it does not become unscrewed *(Figure 8)*. Put the sample in a resealable plastic bag. Chill the sample and send or deliver to the laboratory within a few days. Freeze the sample if delivery will be delayed.

of the most economical manure rates while avoiding overapplication of phosphorus, which can have severe consequences to surface waters.

Other tests. Tests for potassium, sulfur, zinc, and other nutrients may be useful. When manure is applied to meet nitrogen or phosphorus needs, other nutrients are generally adequate for soils in Nebraska. If liquid manure is applied to a crop through sprinkler irrigation, testing for soluble salts, or electrical conductivity (EC), helps predict if there might be potential for leaf burning (See *http://www.ianrpubs.unl.edu/sendIt/ec778.pdf*). Information on soluble salt content or EC is useful in managing anaerobic lagoons. When the surface of a lagoon has a purple color, the microbial processes are functioning well and the odor is less.

Report Information

Units. Specify if the results should be reported in pounds of nutrient per ton (spreader), per 1,000 gallons (tanks or umbilical cord), or per acre-inch (irrigation). This depends on your application method. Phosphorus and potassium should be reported in the oxide form (P_2O_5 and K_2O) so their fertilizer value is easy to calculate.

Moisture. Reporting the results on an "as is" or "wet" basis allows a producer to determine the nutrient application rate without adjusting for water content.

Nutrient availability. Laboratories can estimate the amount of nutrients available in the first year, and the amount of manure nitrogen that will be available during following years. This is especially important for solid manures.

Application basis. Manure is often applied on a "nitrogen basis" to supply enough nitrogen to meet crop needs. When soil test phosphorus is excessive, manure may be applied on a "phosphorus basis" that is at a rate sufficient to match phosphorus removal by the crop.

Land Application and Rate Determination

Some manure nutrients will not be available to the crop in the season following application. The laboratory report should give an estimate of nutrients available to the first crop following manure application as well as total nutrient content. For example, 20-50 percent of the organic nitrogen should be available to the first crop, depending on the manure type; much of the remaining organic nitrogen becomes available in following years. The report also may provide an estimate of ammonium-nitrogen losses, which will vary with application and incorporation practices.

Nebraska Laboratories Providing Manure Testing Services

Midwest Laboratories	Olsen's Agricultural Laboratory	Platte Valley Laboratories	Servi-Tech Laboratories	Ward Laboratories
13611 "B" St.	210 E. 1st St., P.O. Box 370	914 Hwy. 30, P.O. Box 807	1602 Park West Dr., P.O. Box 169	4007 Cherry Ave., P.O. Box 788
Omaha, NE 68144	McCook, NE 69001	Gibbon, NE 68840	Hastings, NE 68902	Kearney, NE 68848-0788
402-334-7770	308-345-3670	308-468-5975	402-463-3522	308-234-2418
https://www.midwestlabs.com/	*http://www.olsenlab.com/*	*http://www.soillab.com/*	800-557-7509	800-887-7645
			http://www.servitechlabs.com	*http://www.wardlab.com/*

LINK **Generic Manure Sample Submission Form**

This publication has been peer reviewed.

Disclaimer

Reference to commercial products or trade names is made with the understanding that no discrimination is intended of those not mentioned and no endorsement by University of Nebraska–Lincoln Extension is implied for those mentioned.

UNL Extension publications are available online at *http://extension.unl.edu/publications*.

Manure-related extension publications are available online at *http://manure.unl.edu*.

Index: Waste Management
Waste Resource Management

2002-2009, Revised June 2014

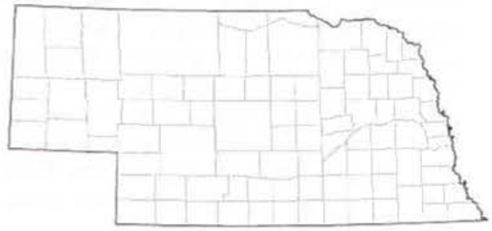
2016 **STATE AGRICULTURE OVERVIEW**

Nebraska

† *Survey Data from Quick Stats as of: Sep/12/2017*

Farms Operations †

Farm Operations - Area Operated, Measured in Acres / Operation	934
Farm Operations - Number of Operations	48,400
Farm Operations - Acres Operated	45,200,000



Livestock Inventory †

Cattle, Cows, Beef - Inventory (First of Jan. 2017)	1,920,000
Cattle, Cows, Milk - Inventory (First of Jan. 2017)	60,000
Cattle, Incl Calves - Inventory (First of Jan. 2017)	6,450,000
Cattle, On Feed - Inventory (First of Jan. 2017)	2,470,000
Goats, Milk - Inventory (First of Jan. 2017)	3,700
Sheep, Incl Lambs - Inventory (First of Jan. 2017)	83,000
Hogs - Inventory (First of Dec. 2016)	3,400,000

Milk Production †

Milk - Production, Measured in Lb / Head	23,317
Milk - Production, Measured in $	236,431,000
Milk - Production, Measured in Lb	1,399,000,000

Crops - Planted, Harvested, Yield, Production, Price (MYA), Value of Production †
Sorted by Value of Production in Dollars

Commodity	Planted All Purpose Acres	Harvested Acres	Yield	Production or Sales	Price per Unit	Value of Production or Sales in Dollars
CORN						
CORN, GRAIN		9,550,000	178 BU / ACRE	1,699,900,000 BU	3.35 $ / BU	5,694,665,000
CORN	9,850,000					
CORN, SILAGE		240,000	19.5 TONS / ACRE	4,680,000 TONS		
CORN, NON-IRRIGATED, GRAIN		3,973,000	147.2 BU / ACRE	584,961,000 BU		
CORN, IRRIGATED, GRAIN		5,577,000	199.9 BU / ACRE	1,114,939,000 BU		
CORN, NON-IRRIGATED	4,088,000					
CORN, IRRIGATED	5,762,000					
SOYBEANS						
SOYBEANS	5,200,000	5,150,000	61 BU / ACRE	314,150,000 BU	9.25 $ / BU	2,905,888,000
SOYBEANS, IRRIGATED	2,479,000	2,462,000	67.5 BU / ACRE	166,150,000 BU		
SOYBEANS, NON-IRRIGATED	2,721,000	2,688,000	55.1 BU / ACRE	148,000,000 BU		
HAY & HAYLAGE						
HAY & HAYLAGE		2,475,000	2.38 TONS / ACRE, DRY BASIS	5,880,000 TONS, DRY BASIS		449,050,000
HAY & HAYLAGE, ALFALFA	110,000	760,000	4.18 TONS / ACRE, DRY BASIS	3,177,000 TONS, DRY BASIS		
HAY & HAYLAGE, (EXCL ALFALFA)		1,715,000	1.58 TONS / ACRE, DRY BASIS	2,703,000 TONS, DRY BASIS		
HAY						
HAY		2,450,000	2.35 TONS / ACRE	5,748,000 TONS	77 $ / TON	439,000,000
HAY, ALFALFA		750,000	4.15 TONS / ACRE	3,113,000 TONS	80 $ / TON	250,597,000
HAY, (EXCL ALFALFA)		1,700,000	1.55 TONS / ACRE	2,635,000 TONS	70 $ / TON	188,403,000
WHEAT						
WHEAT	1,370,000	1,310,000	54 BU / ACRE	70,740,000 BU	3.14 $ / BU	219,294,000
WHEAT, WINTER	1,370,000	1,310,000	54 BU / ACRE	70,740,000 BU	3.14 $ / BU	219,294,000
WHEAT, WINTER, NON-IRRIGATED	1,224,000	1,170,000	51.2 BU / ACRE	59,904,000 BU		
WHEAT, WINTER, IRRIGATED	146,000	140,000	77.4 BU / ACRE	10,836,000 BU		
BEANS						
BEANS, DRY EDIBLE	138,000	122,000	2,270 LB / ACRE	2,766,000 CWT	27.9 $ / CWT	77,171,000
POTATOES						
POTATOES	16,500	16,400	450 CWT / ACRE	7,380,000 CWT	10.1 $ / CWT	74,538,000
SORGHUM						
SORGHUM, GRAIN		175,000	102 BU / ACRE	17,850,000 BU	4.9 $ / CWT	48,980,000
SORGHUM, SILAGE		10,000	14 TONS / ACRE	140,000 TONS		
SORGHUM	200,000					
SUNFLOWER						
SUNFLOWER	41,500	39,000	1,491 LB / ACRE	58,150,000 LB	15.9 $ / CWT	11,179,000
MILLET						
MILLET, PROSO	95,000	88,000	35 BU / ACRE	3,080,000 BU	2.65 $ / BU	8,162,000
OATS						
OATS	135,000	25,000	60 BU / ACRE	1,500,000 BU	2.25 $ / BU	3,075,000
HAYLAGE						

-

HAYLAGE		45,000	5.96 TONS / ACRE	268,000 TONS		
HAYLAGE, (EXCL ALFALFA)		25,000	5.5 TONS / ACRE	138,000 TONS		
HAYLAGE, ALFALFA		20,000	6.5 TONS / ACRE	130,000 TONS		
SUGARBEETS						
SUGARBEETS	48,000	47,200	29.9 TONS / ACRE	1,411,000 TONS		
PEAS						
PEAS, DRY EDIBLE	55,000	52,000	1,340 LB / ACRE	697,000 CWT	(D) $ / CWT	(D)

(NA) Not Available
(D) Withheld to avoid disclosing data for individual operations
(S) Insufficient number of reports to establish an estimate
(X) Not Applicable
(Z) Less than half the rounding unit

Alternative Crop
Nitrogen and Phosphorus Needs

Alternative Crop	Average Yield[A]	Production Unit	Nitrogen Requirement per Unit[B]	Phosphorus Removal Rate per Unit[C]	Nitrogen Requirement to Raise Average Yield (lbs./acre)[B]	Phosphorus Requirement to Raise Average Yield (lbs./acre)[C]
Irrigated Soybeans	65.5	bushels/acre	3.77	0.77	247	50
Corn Silage	19.5	ton/acre	10.5	5.9	205	110
Grain Sorghum	102.0	bushels/acre	1.15	0.27	117	28
Oats	60.0	bushels/acre	1.3	0.25	78	15
Potatoes	450.0	cwt.	0.5	0.13	225	59
Sugar Beets	29.9	ton/acre	8	1.4	239	42
Sunflowers	15.9	cwt.	5	1.2	80	19
Wheat	54.0	bushels/acre	2.4	0.52	130	28

A - "2016 Nebraska State Agricultural Overview"

B - "Nitrogen Requirement" Ward Guide page 39

C - "Quantities of Plant Nutrients in Crops" Ward Guide page 58

* A different source for providing proven yields may or may not be used at time of alternative crop planting.

Manure Fertilizer Sales Agreement

Seller: Bruns Feedlot LLC ______ Date: ______

1172 I Avenue

Pender, NE 68047

Buyer: ______

Address: ______ Phone: ______

______ Cell: ______

Application Site Details

Field Name: ______ Legal Description: ______ Acres: ______

Previous crop: ______ Planned crop: ______ Proven Yield Goal: ______ bu/acre,

Manure: $ ______ / ______ Application fee: $ ______ / ______

Application Rate: ______ ______ /acre (**specified by buyer**)

Total $ ______ **/ton**

Seller and Buyer agree to the above stated field details regarding the application of manure fertilizer on said fields. It will be the buyer's responsibility to notify seller when the fields are ready for application or stockpiling. Seller will supply manure fertilizer on a first available basis to its buyers. The buyer will control the application rate and timing of application of manure fertilizer and will pay the seller the above fee for custom application of the product. Seller shall be excused for failure to provide a saleable product under this agreement by labor problems, adverse weather, acts of God or other events beyond seller's control.

The seller and Nutrient Advisors, LLC will provide buyer with current laboratory results of the manure fertilizer product. Nutrient Advisors, LLC will provide buyer with soil sample analysis of each field and provide recommendations only for the said fields. The buyer will not apply supplemental commercial fertilizers in excess of recommended rates provided by Nutrient Advisors LLC. These recommendations will be itemized on the nutrient budgets provided to buyer for each application site. The seller and Nutrient Advisors, LLC shall not be held liable for crop failures or economic losses from buyer's decisions. By signing this agreement and notifying seller of field availability, the buyer shall have determined that the manure fertilizer product is good and acceptable for its uses. The seller and Nutrient Advisors, LLC makes no expressed or implied representations and warranties beyond what is represented by the laboratory analysis. In no event shall seller be liable to buyer for any consequential or incidental damages in connection with the performance of the manure fertilizer product or its application. The buyer or seller shall have the right to cease applications at any time in the event that either party is dissatisfied. In this event, the buyer shall be responsible to pay seller for tons or acres of the contract that were delivered upon prior to ceasing.

Seller: ______ Buyer: ______

By: ______ By: ______

Date: ______ Date: ______

Section 7

Application Site Maps

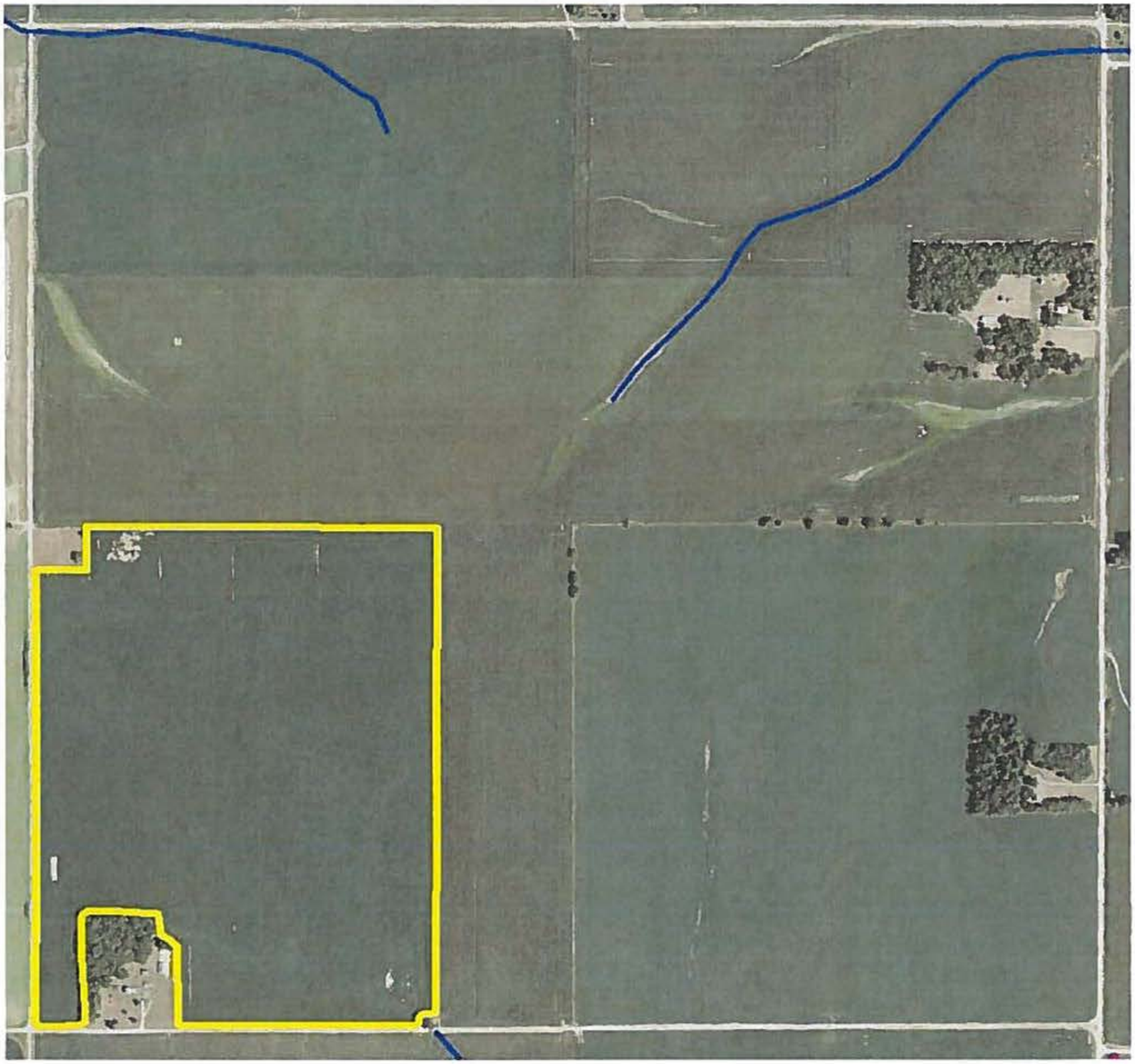
Aerial Maps

Soils Maps

Phosphorus Index

Land Application Agreements

Bruns Feedlot, LLC



Layer Key

- Boundary
- Registered Wells
- Setbacks
- Streams/Water
- Tile Inlets

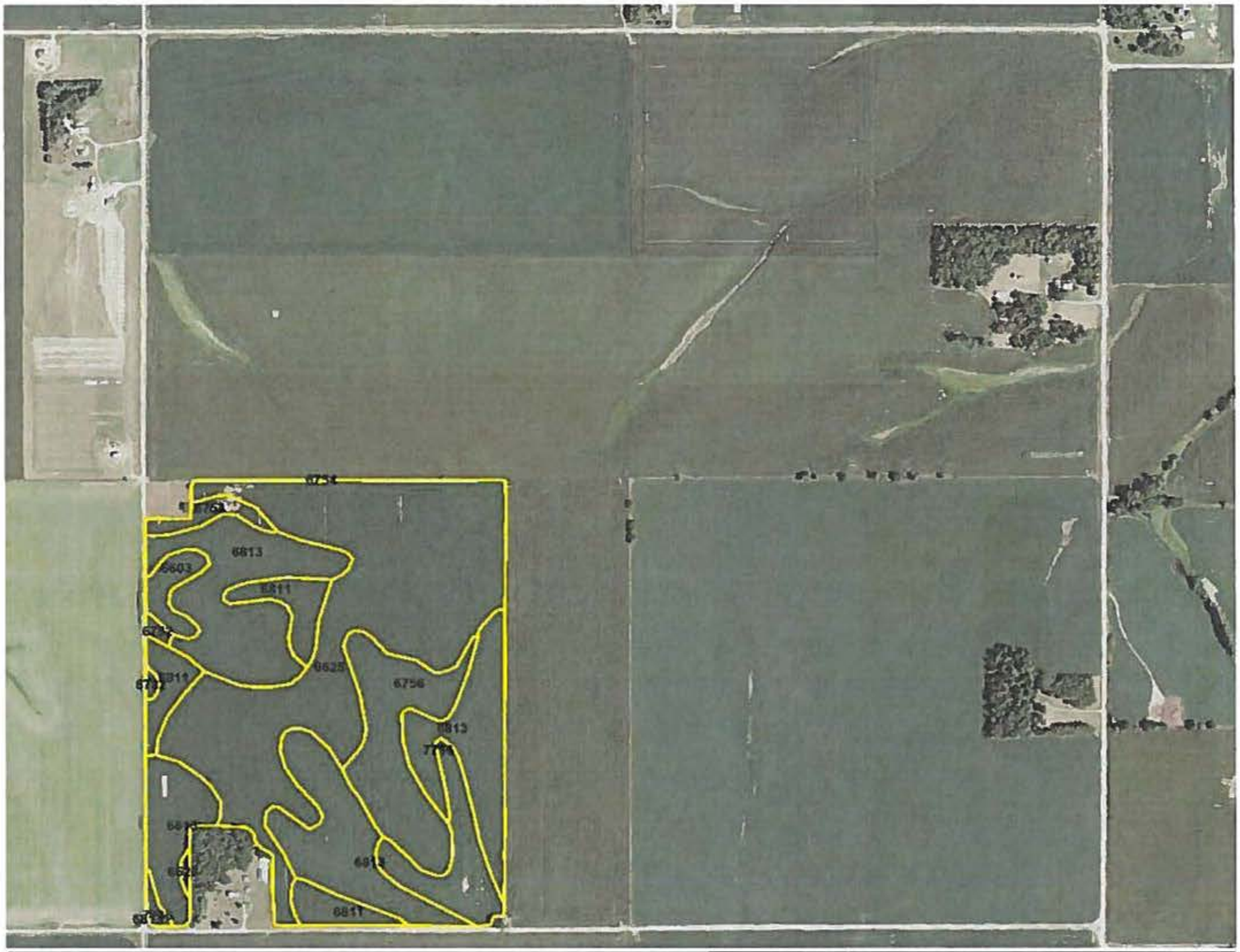
Name: Site 1 McGuires

Landowner: Lonnie McGuire

Legal: W1/2 SW1/4, W1/2 E1/2 SW1/4 S15-T25N-R5E

Acres: 112.00

Bruns Feedlot, LLC



Area Symbol: NE179, Soil Area Version: 15							
Code	Soil Description	Acres	Percent of field	Non-Irr Class *c	Irr Class *c	Productivity Index	SRPG
6628	Belfore silty clay loam, 0 to 2 percent slopes	43.27	38.6%	I	I	0	71
6813	Moody silty clay loam, 6 to 11 percent slopes	38.94	34.8%	IIIe	IVe	0	67
6756	Nora silt loam, 6 to 11 percent slopes, eroded	11.73	10.5%	IIIe	IVe	52	64
6811	Moody silty clay loam, 2 to 6 percent slopes	7.25	6.5%	IIe	IIIe	67	73
7716	McPaul silt loam, occasionally flooded	6.44	5.8%	IIw	IIw	0	25
6603	Alcester silty clay loam, 2 to 6 percent slopes	2.17	1.9%	IIe	IIIe	90	73
6754	Nora silt loam, 2 to 6 percent slopes, eroded	1.67	1.5%	IIe	IIIe	50	68
6782	Nora-Moody silty clay loams, 6 to 11 percent slopes	0.53	0.5%	IIIe	IVe	0	65
					Weighted Average	**12.3**	**66.3**

Name: Site 1 McGuires

Landowner: Lonnie McGuire

County: Wayne

Legal: W1/2 SW1/4, W1/2 E1/2 SW1/4
S15-T25N-R5E

Acres: 112.00

NUTRIENT ADVISORS

NEBRASKA PHOSPHORUS LOSS ASSESSMENT RATING

Livestock Operation: Bruns Feedlot, LLC
Crop Producer: Bruns Feedlot, LLC

Field ID: McGuires
Legal Desc: S15-T25N-R5E
Completion Date: July 2017

NUTRIENT ADVISORS

Prepared by: *Nutrient Advisors*

County	Wayne	
Field	McGuires	
Option	6628	
Erosion, S&R	0.6	
Sediment trap	None	
Field radius	1500.0	
Filter width	0-10 ft	
Enrichment	Tillage	
Land use	No-Till and Conservation Till without contouring High Residue Crop/Low residue Crop - ntmt	
Soil type	Belfore silty clay loam, 0 to 1 percent slopes	
Soil P ppm	34.0	
Applied P lbs	150.0 Surface Application, No Incorporation	
Irrigation	None	
Rate gpm		
Furrow slope%		
Manure	3.0	tons/acre over years
P-Index Value	0.5	
Rating	**Low**	

Land Application Area Agreement for Livestock Manure

This agreement made between the:

Livestock Operation: Bruns Feedlot LLC

1172 I Avenue	Pender	NE	68047	(402) 385 3650
(Address)	(City)	(State)	(Zip)	(Phone)

And

Landowner/Operator: Lonnie McGuire

58511 849th Rd	Pender	NE	68047	
(Address)	(City)	(State)	(Zip)	(Phone)

The Landowner/Operator is the owner of the following described Real estate, to wit:

Legal Description: W2 SW4 & W2 E2 SW4 S15 T25N R5E Site: 1

Total Acres: 120 Useable Acres: 112 Irrigated [ ] Dryland [X]

Legal Description: ______ Site: ______

Total Acres: ______ Useable Acres: ______ Irrigated [ ] Dryland [ ]

Legal Description: ______ Site: ______

Total Acres: ______ Useable Acres: ______ Irrigated [ ] Dryland [ ]

Legal Description: ______ Site: ______

Total Acres: ______ Useable Acres: ______ Irrigated [ ] Dryland [ ]

Legal Description: ______ Site: ______

Total Acres: ______ Useable Acres: ______ Irrigated [ ] Dryland [ ]

1. This agreement allows the said Livestock Operation to spread livestock manure on said landowners/operators property.
2. The Landowner/Operator hereby consents to the Operation spreading manure on said premises at such times as are mutually agreeable by the parties. The Operation may or may not spread manure in any given year of this agreement.
3. The livestock operator shall use current manure analysis to establish the amount of nutrients that shall be applied at normal agronomic rates within the parameters of the livestock operations Nutrient Management Plan.
4. Landowner/Operator shall be able to specify the quantity of manure and location on premises to spread manure, within the parameters of the livestock operations Nutrient Management Plan.
5. This agreement shall continue from year to year without further renewal, except if either party desires to cancel this Agreement they shall do so on or before September 1, of any given year.
6. Landowner/Operator agrees to provide the Livestock Operation with information, including crop yields, planned crop rotation and other commercial fertilizer applied (If any), which the Livestock Operation will need to know in order to apply the manure in an environmentally responsible manner.

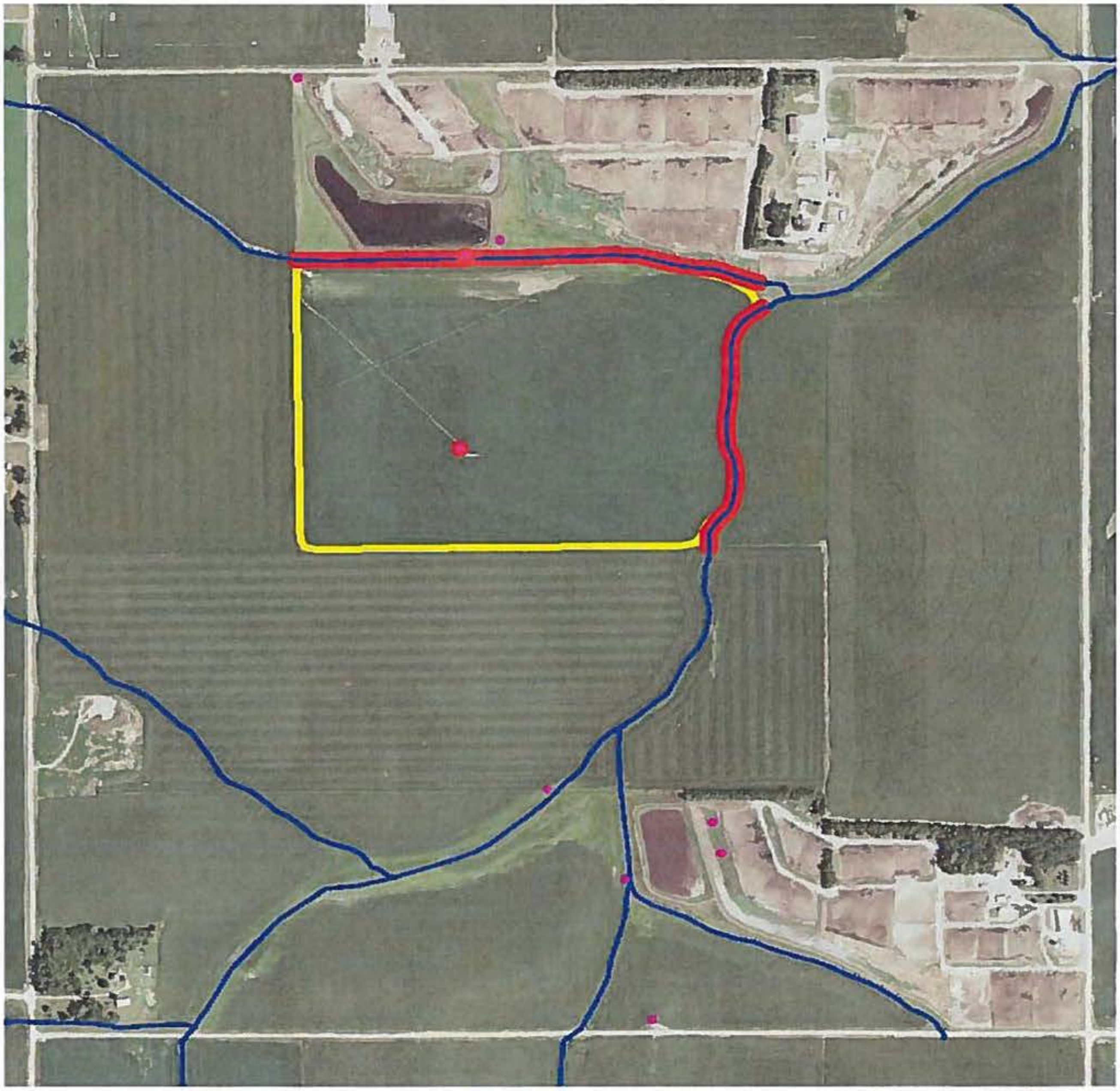
BY: [signature] Date: 3/25/13

Landowner/Operator (Authorized Representative)

Leon Bruns Date: 3-25-13

Livestock Operator (Authorized Representative)

Bruns Feedlot, LLC



Layer Key

- Boundary
- Registered Wells
- Setbacks
- Streams/Water
- Tile Inlets

Name: Site 2 SW Pivot

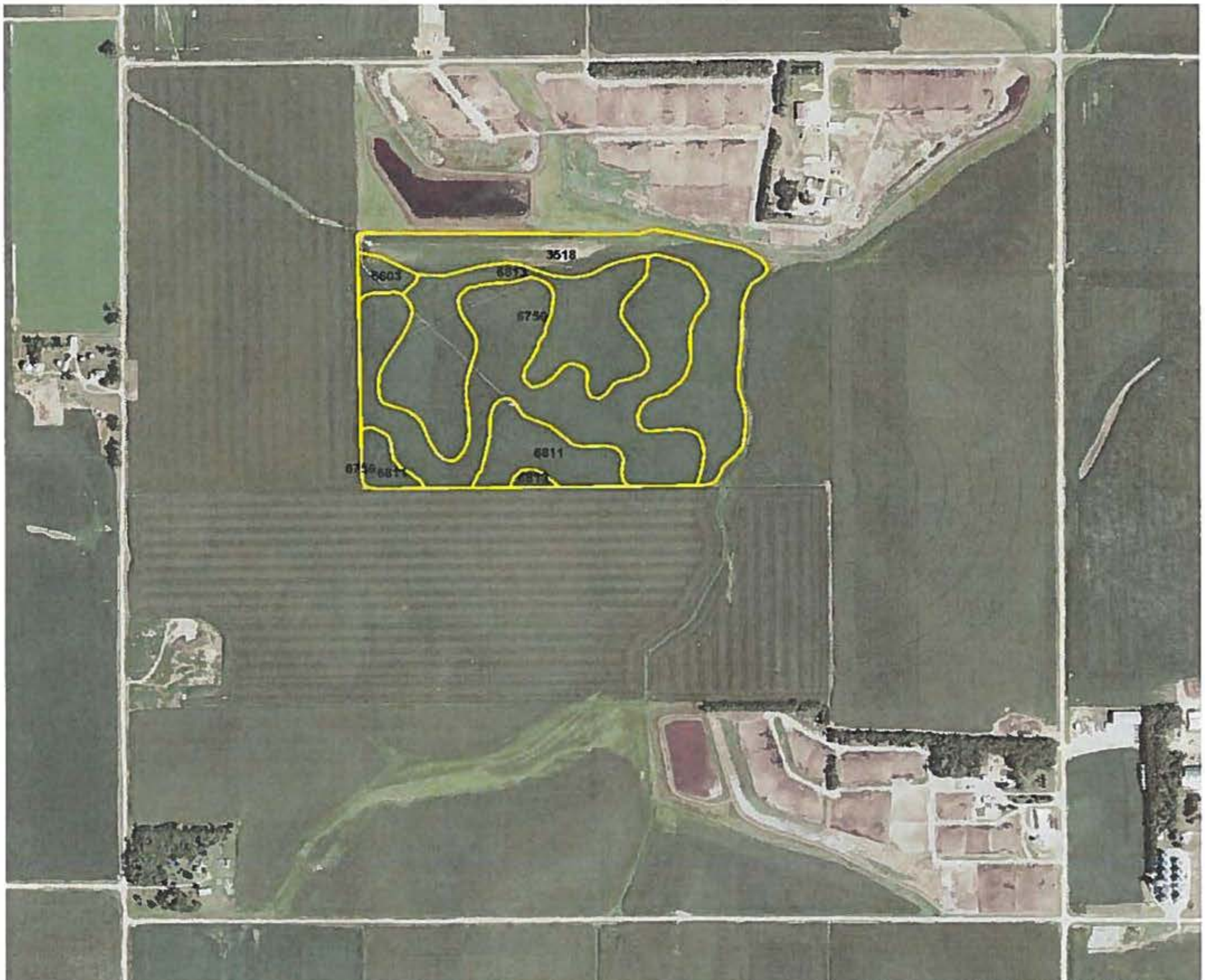
Landowner: Leon Bruns

Legal: SE1/4 NW1/4, E1/2 SW1/4 NE1/4 S11-T25N-R5E

Acres: 76.48

NUTRIENT ADVISORS

Bruns Feedlot, LLC



Area Symbol: NE173, Soil Area Version: 14

Code	Soil Description	Acres	Percent of field	Non-Irr Class *c	Irr Class *c	Productivity Index	SRPG
6756	Nora silt loam, 6 to 11 percent slopes, eroded	28.95	37.9%	IIIe	IVe	52	55
3518	Lamo silty clay loam, 0 to 2 percent slopes, occasionally flooded	19.45	25.4%	IIw	IIw	0	48
6813	Moody silty clay loam, 6 to 11 percent slopes	18.92	24.7%	IIIe	IVe	0	69
6811	Moody silty clay loam, 2 to 6 percent slopes	7.79	10.2%	IIe	IIIe	67	74
6603	Alcester silty clay loam, 2 to 6 percent slopes	1.37	1.8%	IIe	IIIe	90	
					Weighted Average	28.1	57.6

Name: Site 2 SW Pivot

Landowner: Leon Bruns

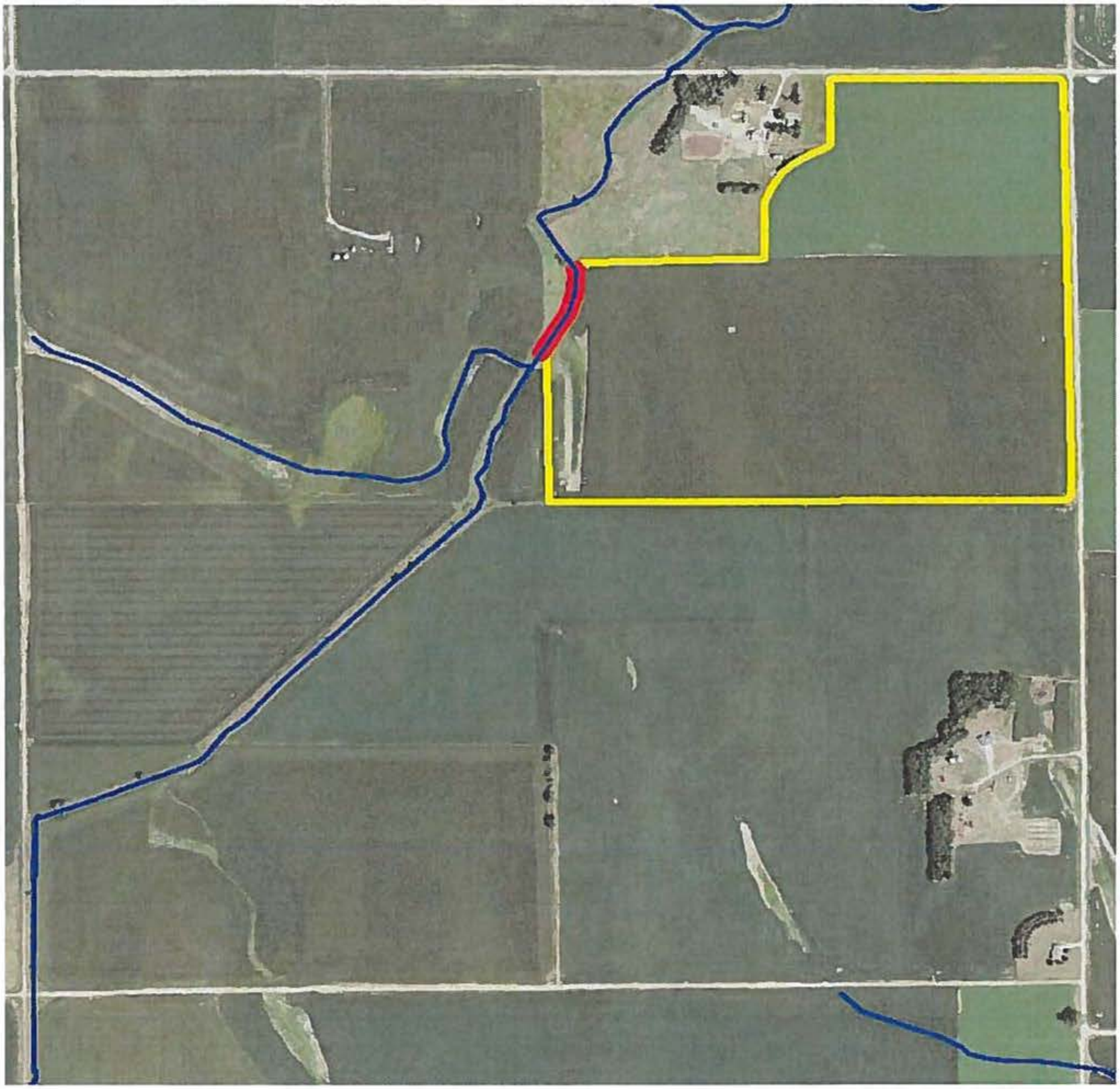
County: Thurston

Legal: SE1/4 NW1/4, E1/2 SW1/4 NE1/4 S11-T25N-R5E

Acres: 76.48

NUTRIENT ADVISORS

Bruns Feedlot, LLC



Layer Key

- Boundary
- Registered Wells
- Setbacks
- Streams/Water
- Tile Inlets

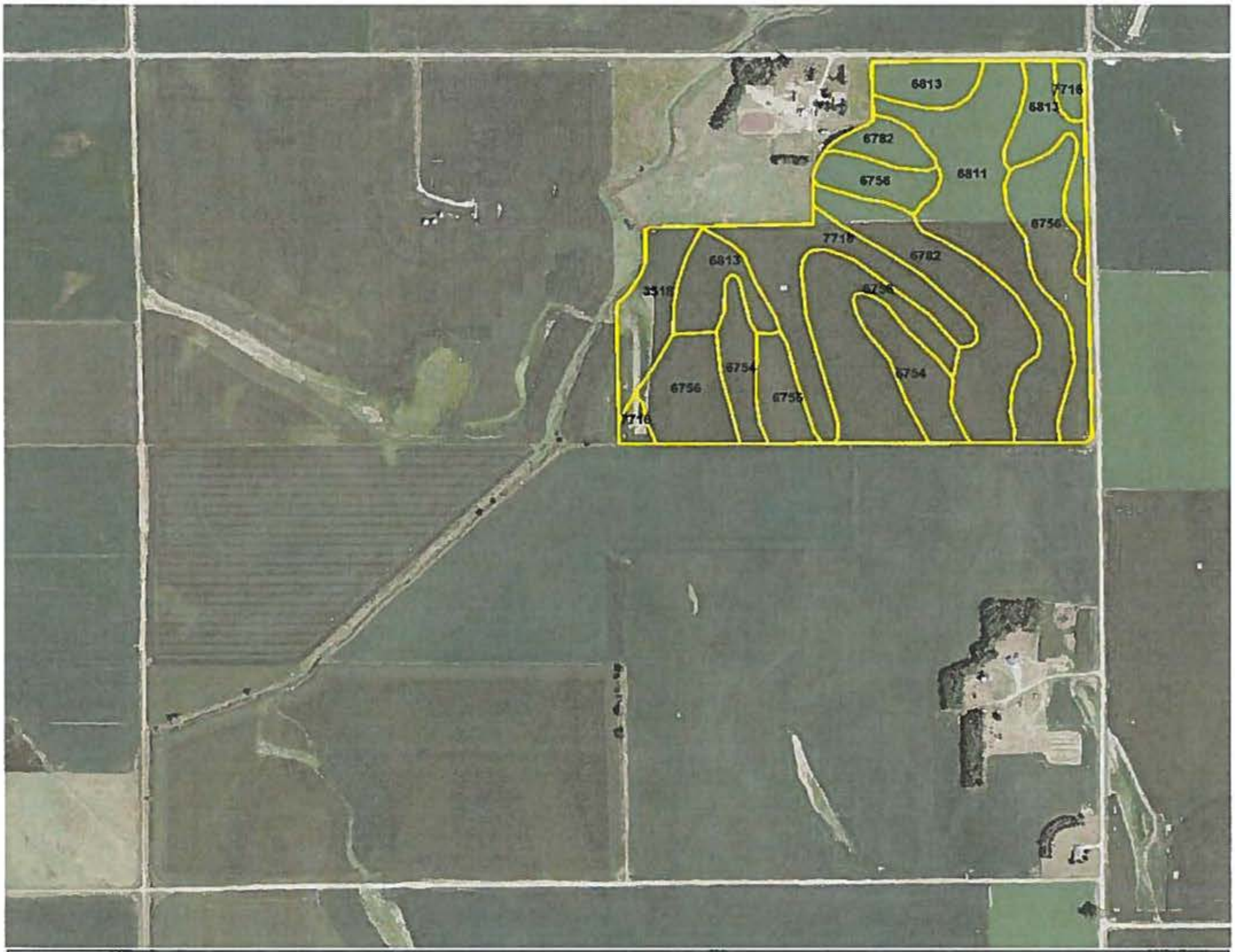
Name: Site 3 Joels 100

Landowner: Marilyn Hansen

Legal: E1/2 NE1/4, Pt. W1/2 NE1/4 S3-T25N-R5E

Acres: 108.10

Bruns Feedlot, LLC



Area Symbol: NE173, Soil Area Version: 14
Area Symbol: NE179, Soil Area Version: 15

Code	Soil Description	Acres	Percent of field	Non-Irr Class *c	Irr Class *c	Productivity Index	SRPG
6756	Nora silt loam, 6 to 11 percent slopes, eroded	34.30	31.7%	IIIe	IVe	52	64
6811	Moody silty clay loam, 2 to 6 percent slopes	18.21	16.8%	IIe	IIIe	67	73
6782	Nora-Moody silty clay loams, 6 to 11 percent slopes	15.30	14.2%	IIIe	IVe	0	65
6813	Moody silty clay loam, 6 to 11 percent slopes	12.93	12.0%	IIIe	IVe	0	67
7716	McPaul silt loam, occasionally flooded	12.91	11.9%	IIw	IIw	0	25
6754	Nora silt loam, 2 to 6 percent slopes, eroded	8.70	8.0%	IIe	IIIe	50	68
3518	Lamo silty clay loam, 0 to 2 percent slopes, occasionally flooded	5.75	5.3%	IIw	IIw	0	54
					Weighted Average	**31.8**	**61.1**

Name: Site 3 Joels 100

Landowner: Marilyn Hansen

County: Wayne

Legal: E1/2 NE1/4, Pt. W1/2 NE1/4
S3-T25N-R5E

Acres: 108.10

NUTRIENT ADVISORS

Land Application Area Agreement for Livestock Manure

This agreement made between the:

Livestock Operation: Bruns Feedlot, LLC

1172 I Rd	Pender	NE	68047	402-385-3650
(Address)	(City)	(State)	(Zip)	(Phone)

And

Landowner/Operator: Marylin Hansen

PO Box 234	Wakefield	NE	68784	
(Address)	(City)	(State)	(Zip)	(Phone)

The Landowner/Operator is the owner of the following described Real estate, to wit:

Legal Description: E2 NE4, Pt W2 NE4, S3 T25N R5E Site: 3

Total Acres: 131 Useable Acres: 100.2 Irrigated [ ] Dryland [X]

Legal Description: S2 NW4, S26 T25N R5E Site: 5

Total Acres: 80 Useable Acres: 80 Irrigated [ ] Dryland [X]

Legal Description: W2 SW4 & SW4 NW4, S2 T25NR5E Site: 6

Total Acres: 120 Useable Acres: 114.6 Irrigated [ ] Dryland [X]

Legal Description: Site:

Total Acres: Useable Acres: Irrigated [ ] Dryland [ ]

Legal Description: Site:

Total Acres: Useable Acres: Irrigated [ ] Dryland [ ]

1. This agreement allows the said Livestock Operation to spread livestock manure on said landowners/operators property.
2. The Landowner/Operator hereby consents to the Operation spreading manure on said premises at such times as are mutually agreeable by the parties. The Operation may or may not spread manure in any given year of this agreement.
3. The livestock operator shall use current manure analysis to establish the amount of nutrients that shall be applied at normal agronomic rates within the parameters of the livestock operations Nutrient Management Plan.
4. Landowner/Operator shall be able to specify the quantity of manure and location on premises to spread manure, within the parameters of the livestock operations Nutrient Management Plan.
5. This agreement shall continue from year to year without further renewal, except if either party desires to cancel this Agreement they shall do so on or before September 1, of any given year.
6. Landowner/Operator agrees to provide the Livestock Operation with information, including crop yields, planned crop rotation and other commercial fertilizer applied (if any), which the Livestock Operation will need to know in order to apply the manure in an environmentally responsible manner.

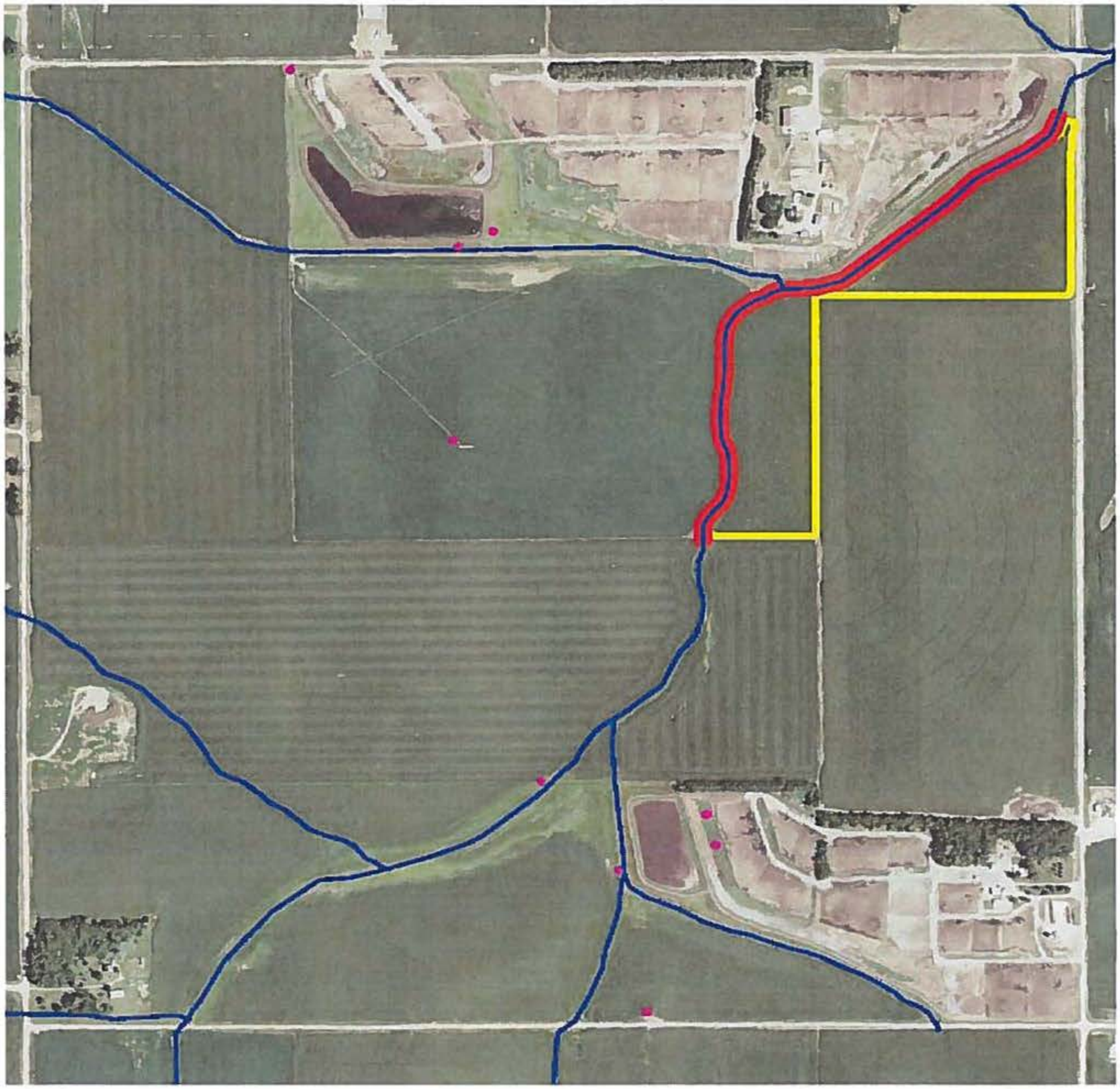
BY: Marilyn Hansen Date: 3-26-13

Landowner/Operator (Authorized Representative)

Leon Bruns Date: 3-25-13

Livestock Operator (Authorized Representative)

Bruns Feedlot, LLC



Layer Key

(yellow)	Boundary
(pink)	Registered Wells
(red)	Setbacks
(blue)	Streams/Water
(white)	Tile Inlets

Name: Site 4 E Corner

Landowner: Leon Bruns

Legal: Pt. NE1/4 NE1/4, W1/2 SW1/4 NE1/4 S11-T25N-R5E

Acres: 27.54

NUTRIENT ADVISORS

Bruns Feedlot, LLC

Area Symbol: NE173, Soil Area Version: 14							
Code	Soil Description	Acres	Percent of field	Non-Irr Class *c	Irr Class *c	Productivity Index	SRPG
3518	Lamo silty clay loam, 0 to 2 percent slopes, occasionally flooded	19.88	72.2%	IIw	IIw	0	48
6603	Alcester silty clay loam, 2 to 6 percent slopes	3.94	14.3%	IIe	IIIe	90	
6814	Moody silty clay loam, 6 to 11 percent slopes, eroded	3.48	12.6%	IIIe	IVe	0	66
6813	Moody silty clay loam, 6 to 11 percent slopes	0.24	0.9%	IIIe	IVe	0	69
					Weighted Average	12.9	43.6

Name: Site 4 E Corner

Landowner: Leon Bruns

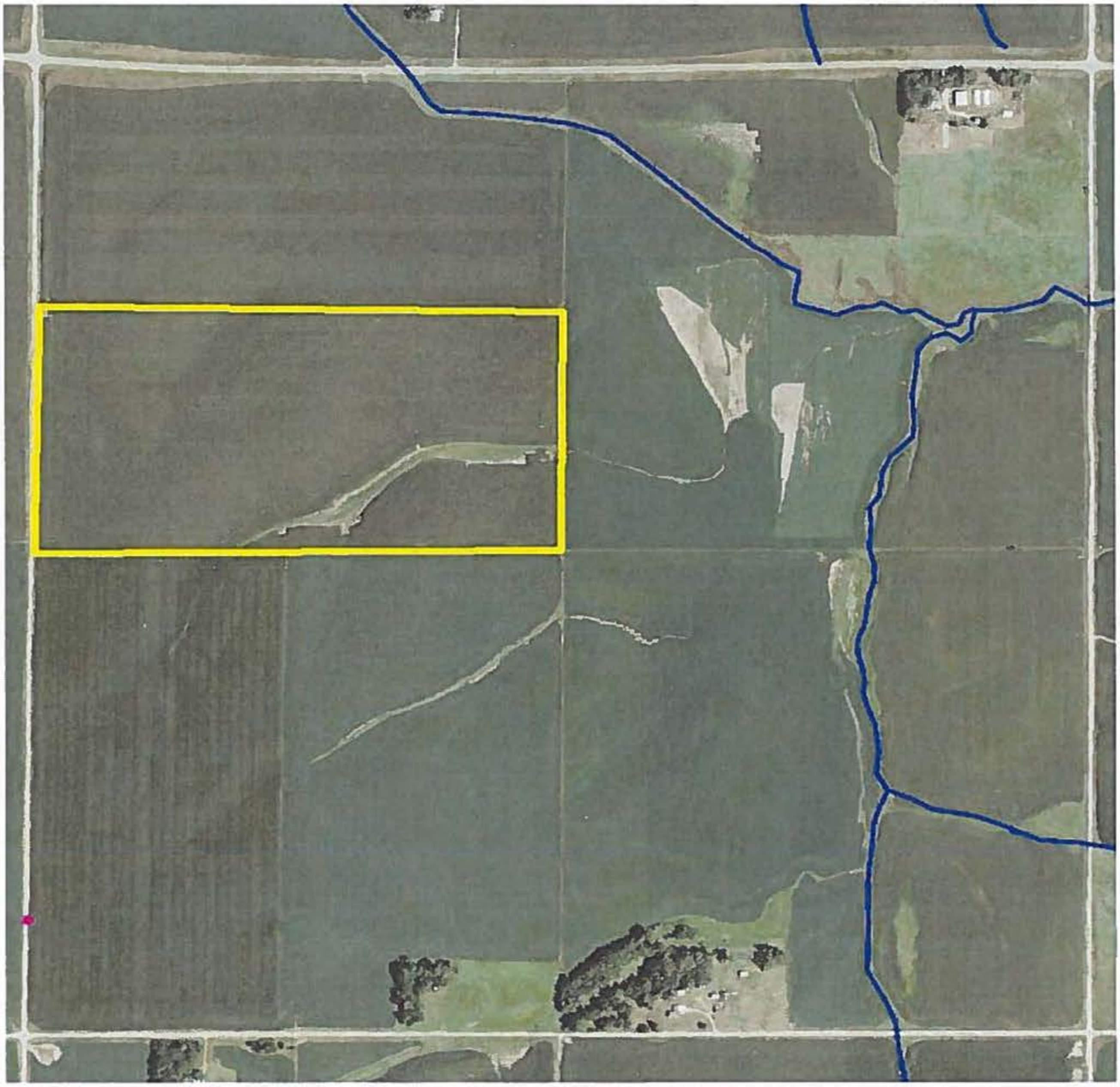
County: Thurston

Legal: Pt. NE1/4 NE1/4, W1/2 SW1/4 NE1/ S11-T25N-R5E

Acres: 27.54

NUTRIENT ADVISORS

Bruns Feedlot, LLC



Layer Key

- Boundary
- Registered Wells
- Setbacks
- Streams/Water
- Tile Inlets

Name: Site 5 S 80

Landowner: Marilyn Hansen

Legal: S1/2 NW1/4 S26-T25N-R5E

Acres: 80.06

NUTRIENT ADVISORS

Bruns Feedlot, LLC

Area Symbol: NE173, Soil Area Version: 14							
Code	Soil Description	Acres	Percent of field	Non-Irr Class *c	Irr Class *c	Productivity Index	SRPG
6603	Alcester silty clay loam, 2 to 6 percent slopes	19.34	24.2%	IIe	IIIe	90	
6756	Nora silt loam, 6 to 11 percent slopes, eroded	19.33	24.1%	IIIe	IVe	52	55
6630	Belfore-Moody silty clay loams, 1 to 3 percent slopes	19.31	24.1%	IIe	IIe	0	73
6813	Moody silty clay loam, 6 to 11 percent slopes	7.14	8.9%	IIIe	IVe	0	69
6814	Moody silty clay loam, 6 to 11 percent slopes, eroded	6.93	8.7%	IIIe	IVe	0	66
6687	Crofton silt loam, 6 to 11 percent slopes, eroded	6.32	7.9%	IVe	IVe	0	41
6754	Nora silt loam, 2 to 6 percent slopes, eroded	1.07	1.3%	IIe	IIIe	50	67
7772	Colo and Lamo silty clay loams, occasionally flooded	0.62	0.8%	IIw	IIw	0	54
					Weighted Average	35	47.3

Name: Site 5 S 80

Landowner: Marilyn Hansen

County: Thurston

Legal: S1/2 NW1/4 S26-T25N-R5E

Acres: 80.06

Land Application Area Agreement for Livestock Manure

This agreement made between the:

Livestock Operation: Bruns Feedlot, LLC

1172 I Rd	Pender	NE	68047	402-385-3650
(Address)	(City)	(State)	(Zip)	(Phone)

And

Landowner/Operator: Marylin Hansen

PO Box 234	Wakefield	NE	68784	
(Address)	(City)	(State)	(Zip)	(Phone)

The Landowner/Operator is the owner of the following described Real estate, to wit:

Legal Description: E2 NE4, Pt W2 NE4, S3 T25N R5E Site: 3

Total Acres: 131 Useable Acres: 100.2 Irrigated ☐ Dryland ☒

Legal Description: S2 NW4, S26 T25N R5E Site: 5

Total Acres: 80 Useable Acres: 80 Irrigated ☐ Dryland ☒

Legal Description: W2 SW4 & SW4 NW4, S2 T25NR5E Site: 6

Total Acres: 120 Useable Acres: 114.6 Irrigated ☐ Dryland ☒

Legal Description: ______ Site: ______

Total Acres: ______ Useable Acres: ______ Irrigated ☐ Dryland ☐

Legal Description: ______ Site: ______

Total Acres: ______ Useable Acres: ______ Irrigated ☐ Dryland ☐

1. This agreement allows the said Livestock Operation to spread livestock manure on said landowners/operators property.
2. The Landowner/Operator hereby consents to the Operation spreading manure on said premises at such times as are mutually agreeable by the parties. The Operation may or may not spread manure in any given year of this agreement.
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4. Landowner/Operator shall be able to specify the quantity of manure and location on premises to spread manure, within the parameters of the livestock operations Nutrient Management Plan.
5. This agreement shall continue from year to year without further renewal, except if either party desires to cancel this Agreement they shall do so on or before September 1, of any given year.
6. Landowner/Operator agrees to provide the Livestock Operation with information, including crop yields, planned crop rotation and other commercial fertilizer applied (if any), which the Livestock Operation will need to know in order to apply the manure in an environmentally responsible manner.

BY: Marilyn Hansen Date: 3-26-13

Landowner/Operator (Authorized Representative)

Leon Bruns Date: 3-25-13

Livestock Operator (Authorized Representative)

Bruns Feedlot, LLC

Layer Key

- Boundary
- Registered Wells
- Setbacks
- Streams/Water
- Tile Inlets

Name: Site 6 Marylin N40 & W80

Landowner: Marilyn Hansen

Legal: W1/2 SW1/4, SW1/4 NW1/4 S2-T25N-R5E

Acres: 114.60

NUTRIENT ADVISORS

Bruns Feedlot, LLC

Area Symbol: NE173, Soil Area Version: 14							
Code	Soil Description	Acres	Percent of field	Non-Irr Class *c	Irr Class *c	Productivity Index	SRPG
6756	Nora silt loam, 6 to 11 percent slopes, eroded	41.85	36.5%	IIIe	IVe	52	55
6811	Moody silty clay loam, 2 to 6 percent slopes	31.68	27.6%	IIe	IIIe	67	74
6813	Moody silty clay loam, 6 to 11 percent slopes	27.57	24.1%	IIIe	IVe	0	69
7772	Colo and Lamo silty clay loams, occasionally flooded	4.75	4.1%	IIw	IIw	0	54
6603	Alcester silty clay loam, 2 to 6 percent slopes	4.63	4.0%	IIe	IIIe	90	
6767	Nora silty clay loam, 6 to 11 percent slopes	4.12	3.6%	IIIe	IVe	0	63
					Weighted Average	41.1	61.6

Name: Site 6 Marylin N40 & W80

Landowner: Marilyn Hansen

County: Thurston

Legal: W1/2 SW1/4, SW1/4 NW1/4
S2-T25N-R5E

Acres: 114.60

NUTRIENT ADVISORS

Land Application Area Agreement for Livestock Manure

This agreement made between the:

Livestock Operation: Bruns Feedlot, LLC

1172 I Rd	Pender	NE	68047	402-385-3650
(Address)	(City)	(State)	(Zip)	(Phone)

And

Landowner/Operator: Maryiln Hansen

PO Box 234	Wakefield	NE	68784	
(Address)	(City)	(State)	(Zip)	(Phone)

The Landowner/Operator is the owner of the following described Real estate, to wit:

Legal Description: E2 NE4, Pt W2 NE4, S3 T25N R5E Site: 3

Total Acres: 131 Useable Acres: 100.2 Irrigated [ ] Dryland [X]

Legal Description: S2 NW4, S26 T25N R5E Site: 5

Total Acres: 80 Useable Acres: 80 Irrigated [ ] Dryland [X]

Legal Description: W2 SW4 & SW4 NW4, S2 T25NR5E Site: 6

Total Acres: 120 Useable Acres: 114.6 Irrigated [ ] Dryland [X]

Legal Description: ______ Site: ______

Total Acres: ______ Useable Acres: ______ Irrigated [ ] Dryland [ ]

Legal Description: ______ Site: ______

Total Acres: ______ Useable Acres: ______ Irrigated [ ] Dryland [ ]

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BY: Marilyn Hansen Date: 3-26-13

Landowner/Operator (Authorized Representative)

Leon Bruns Date: 3-25-13

Livestock Operator (Authorized Representative)

Bruns Feedlot, LLC

Layer Key

- Boundary
- Registered Wells
- Setbacks
- Streams/Water
- Tile Inlets

Name: Site 7 N40

Landowner: Mary Bruns

Legal: SE1/4 SW1/4 S2-T25N-R5E

Acres: 38.98

NUTRIENT ADVISORS

Bruns Feedlot, LLC

Area Symbol: NE173, Soil Area Version: 14							
Code	Soil Description	Acres	Percent of field	Non-Irr Class *c	Irr Class *c	Productivity Index	SRPG
6756	Nora silt loam, 6 to 11 percent slopes, eroded	19.77	50.7%	IIIe	IVe	52	55
6811	Moody silty clay loam, 2 to 6 percent slopes	12.80	32.8%	IIe	IIIe	67	74
6603	Alcester silty clay loam, 2 to 6 percent slopes	4.34	11.1%	IIe	IIIe	90	
6813	Moody silty clay loam, 6 to 11 percent slopes	2.07	5.3%	IIIe	IVe	0	69
					Weighted Average	58.4	55.9

Name: Site 7 N40

Landowner: Mary Bruns

County: Thurston

Legal: SE1/4 SW1/4 S2-T25N-R5E

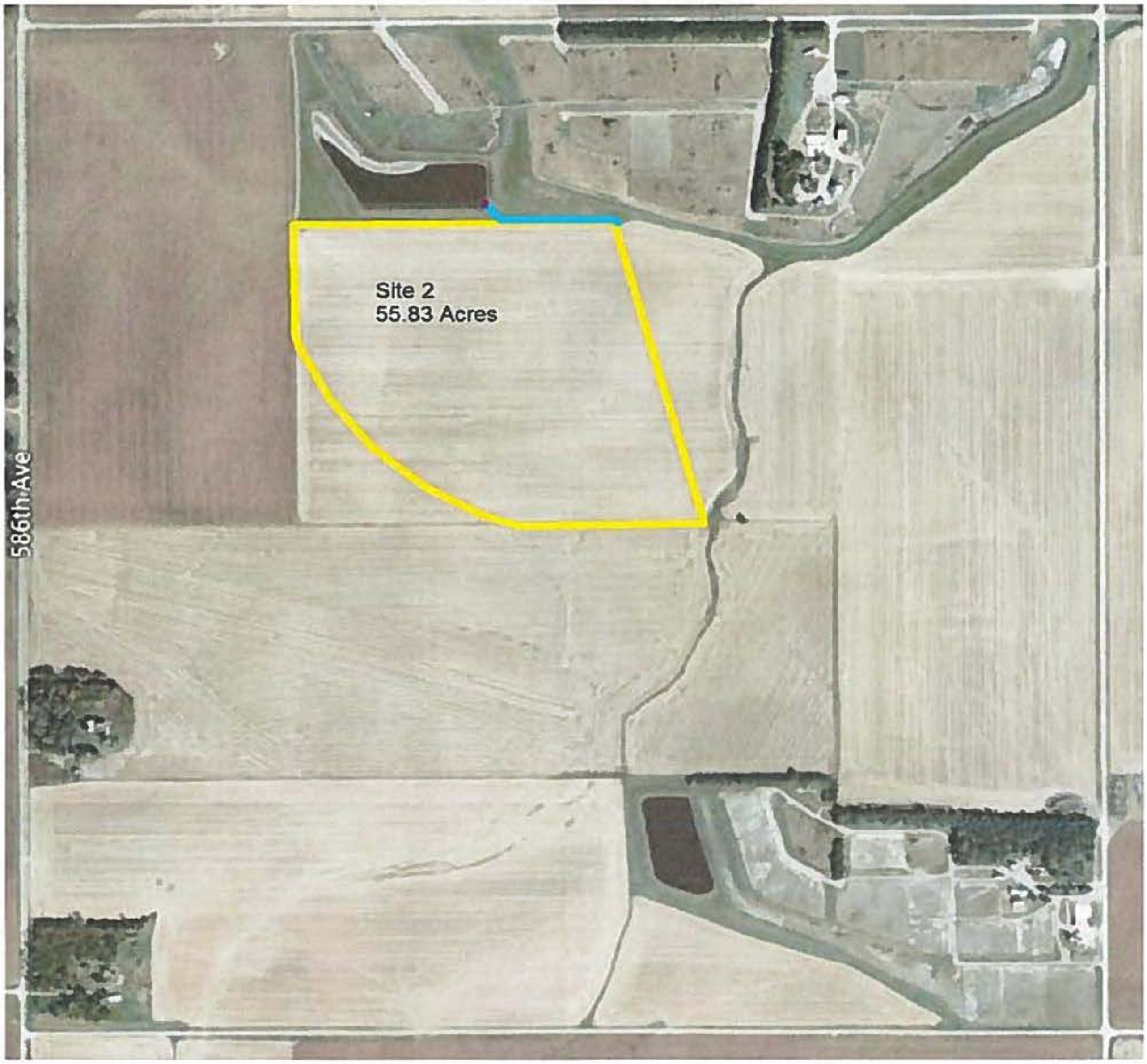
Acres: 38.98

NUTRIENT ADVISORS

Section 8

Effluent Distribution Plan

Effluent Distribution Plan



Layer Key

- Boundary
- Pump
- Surface Hose/Pipe
- Underground Pipe

Bruns Feedlot, LLC

County: **Thurston**

Township: Thayer

Legal: S11-T25N-R5E

NUTRIENT ADVISORS

Bruns Feedlot, LLC
Effluent Distribution Plan

Effluent water from the holding pond at Bruns Feedlot, LLC is dewatered to application site 2. This system uses an 800 gpm pump and power unit and connects to the center pivot irrigation system on site 2 via above ground pipe from the holding pond to the pivot point. This system has no fresh water capabilities.