



Nebraska Department of Environmental Quality

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MAR - 2 2020

Wastewater Section
1200 'N' Street, Suite 400, The Atrium
PO Box 98922
Lincoln, NE 68509-8922
Tel. 402/471-4220 / Fax 402/471-2909

Attachment 1

NE Dept of Environment and Energy
By: DEE158

CERTIFICATION OF ANNUAL LAND APPLICATION REPORT

A. Identification of Facility

Facility Name: AltEn, LLC NPDES Permit NE NE0137634
Mailing Address: 1344 County Road 10
City: Mead State: NE Zip Code: 68041

B. Agronomist that Prepared the Annual Report

Name of Agronomist: Andy Scholting - Nutrient Advisors Phone Number 402-372-2236
Mailing Address: 449 E Deere Street
City: West Point State: NE Zip Code: 68788

C. Certification of Annual Report

I certify that the AltEn, LLC facility, located
In Mead, Nebraska is in compliance with the requirements of the NPDES permit

I also certify, under penalty of law, that the annual report and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations.

Signature of Cognizant Official [Signature] Date 3/2/20

Printed Name Dean J Egr Title AD-NR Manager



20200027343

ALTEN, LLC

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MAR 2 2020

NE Dept of Environment and Energy
By: _____ Front Desk _____

2019 NPDES ANNUAL REPORT

NDEE IIS: 84069
NPDES Permit: NE0137634

Submitted by:



449 E. Deere Street ■ West Point, NE 68788 ■ Fax: 402.372.1942

Phone: 402.372.2236

www.nutrientadvisors.com



**NUTRIENT
ADVISORS**

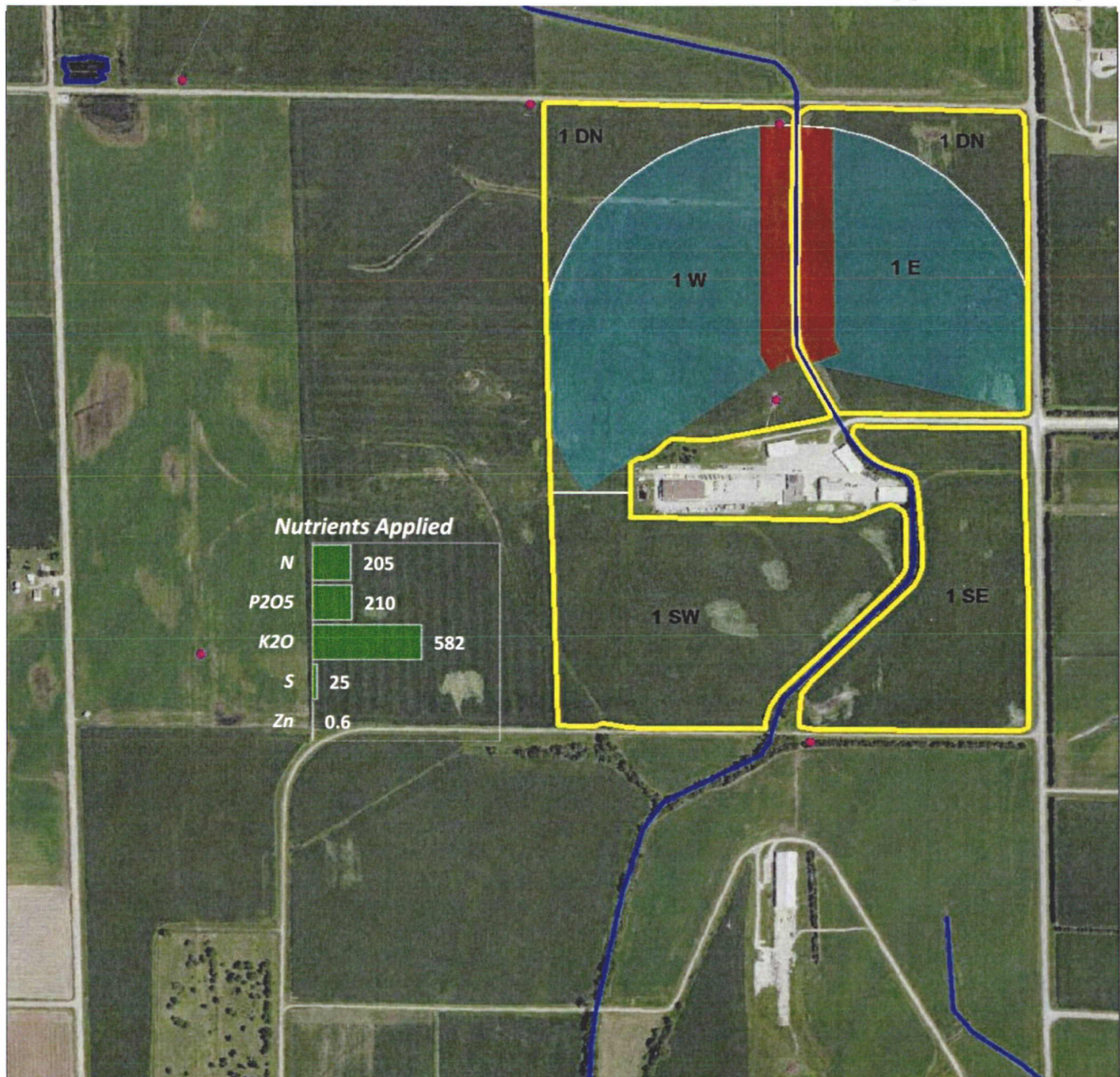
2019 Annual Report to NDEE

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 - Concerns/Problems
- Soil Testing Analysis
- Wastewater Analysis









449 E. Deere Street • West Point, NE 68788
Phone: 402.372.CAFO nutrientadvisors.com

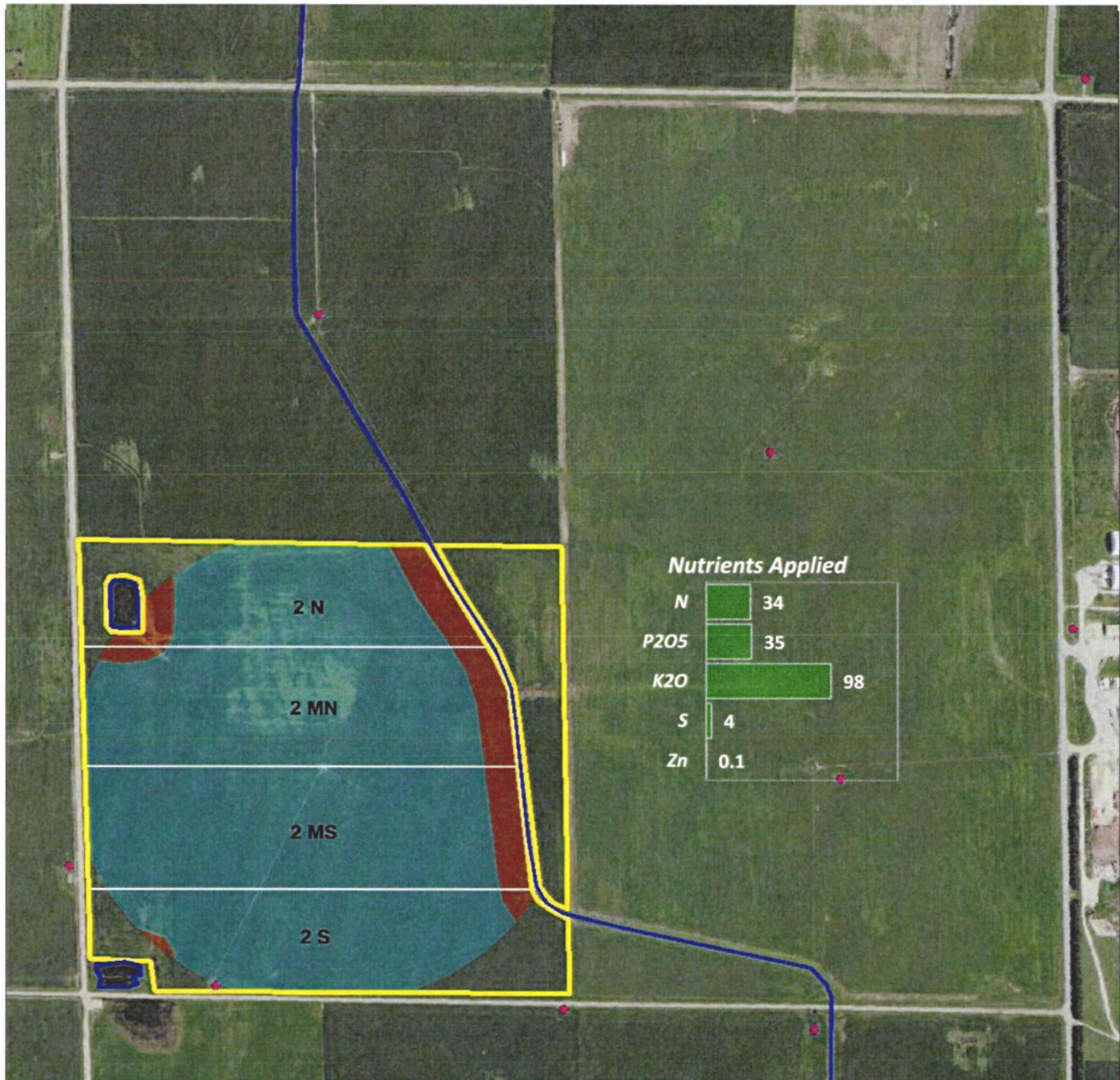
ALTEN**Waste Water Fertilizer Application Map**

***setbacks are maintained from concentrated surface water drainage, streams, wells, and tile inlets unless a 35' vegetative buffer exists, then 35' of buffer is sufficient.

Map Legend

-  applied area
-  field boundary
-  registered wells
-  application setbacks*
-  tile inlets
-  streams/water

Crop Producer: RAINIER RESOURCES**Field Name:** FIELD 1 - SITE 1**Acres:** 71.49**Legal Description:** W2 NE4, 14-14-8E**Product:** LAGOON WATER**Application Type:** Center Pivot Irrigation**Application Rate:** 2.68 Acre Inches**Application Date(s):** 5/2,6,6/8,24,25,7/28-30,8/9-10/19**Incorporation:** Sprinkler Irrigation

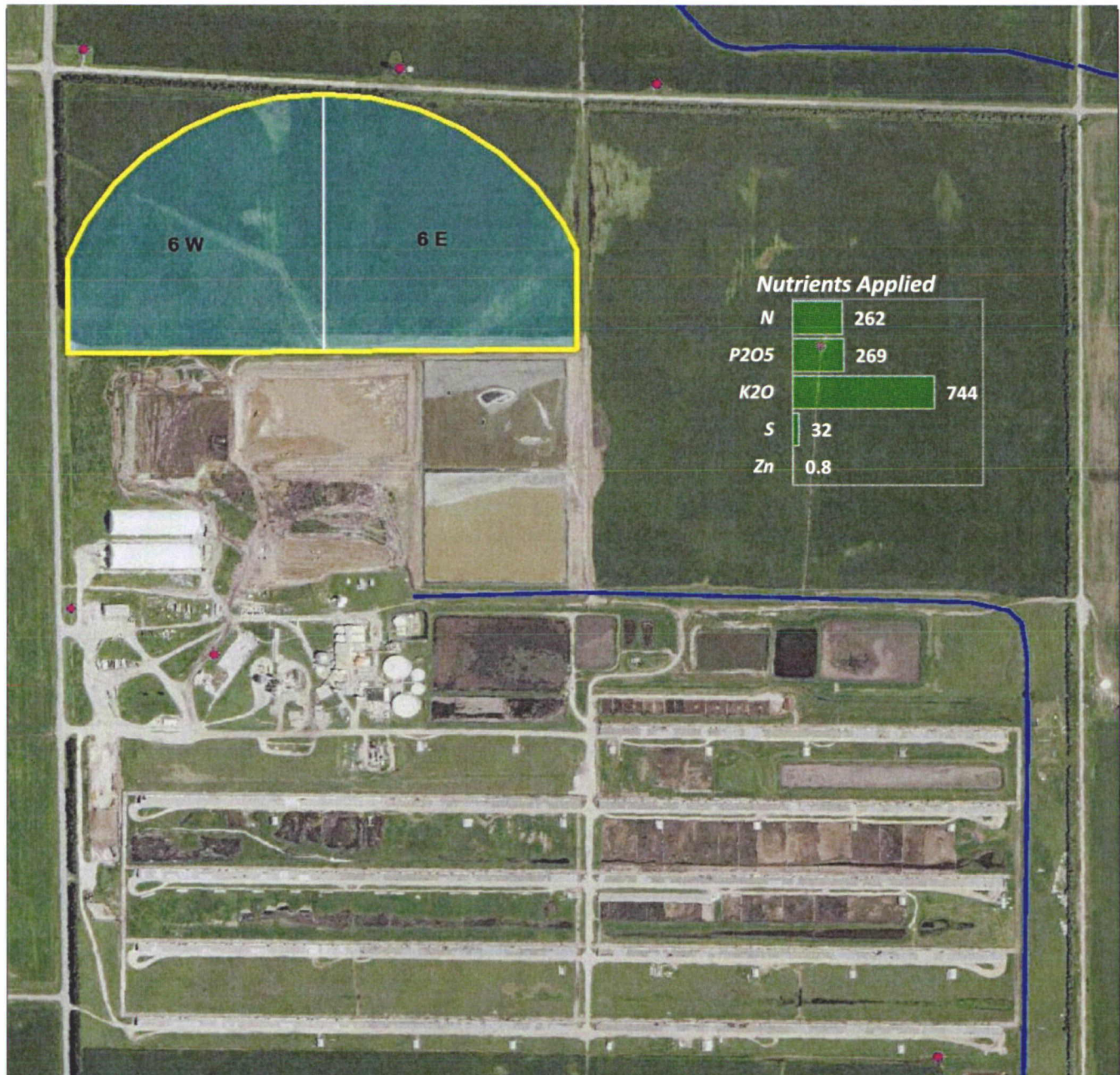
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- registered wells
- application setbacks*
- tile inlets
- streams/water

Crop Producer: RAINIER RESOURCES**Field Name:** FIELD 2 - SITE 2**Acres:** 111.10**Legal Description:** SW4, 11-14-8E**Product:** LAGOON WATER**Application Type:** Center Pivot Irrigation**Application Rate:** 0.45 Acre Inches**Application Date(s):** 8/7-9/19**Incorporation:** Sprinkler Irrigation

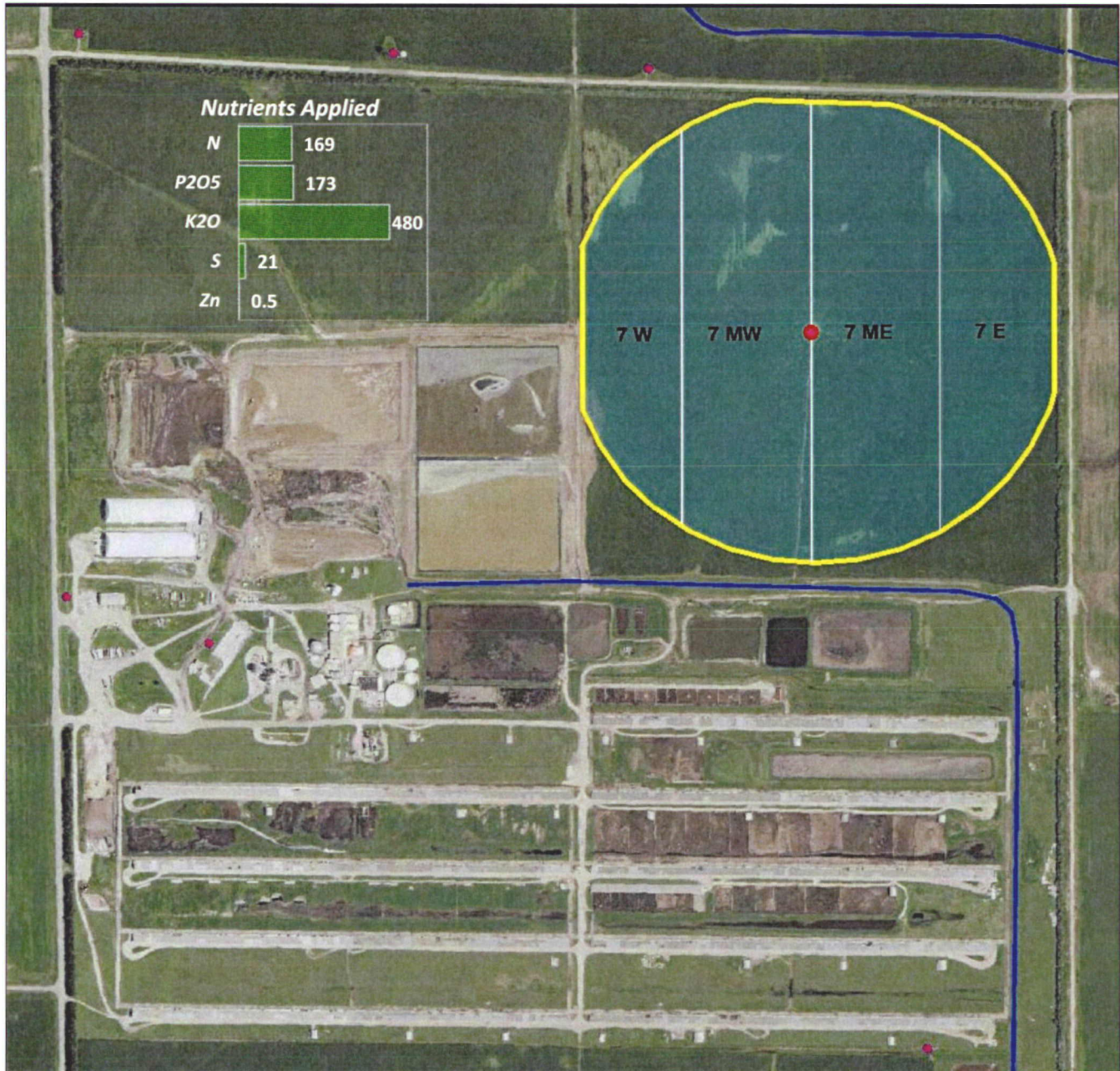
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Map Legend

- applied area
- field boundary
- registered wells
- application setbacks*
- tile inlets
- streams/water

Crop Producer: RAINIER RESOURCES**Field Name:** FIELD 6 - SITE 6**Acres:** 75.40**Legal Description:** N2 NW4, 12-14-8E**Product:** LAGOON WATER**Application Type:** Center Pivot Irrigation**Application Rate:** 3.43 Acre Inches**Application Date(s):** 4/23-25, 6/15, 17, 30-7/1, 19-21, 24-25, 8/2-3/19**Incorporation:** Sprinkler Irrigation

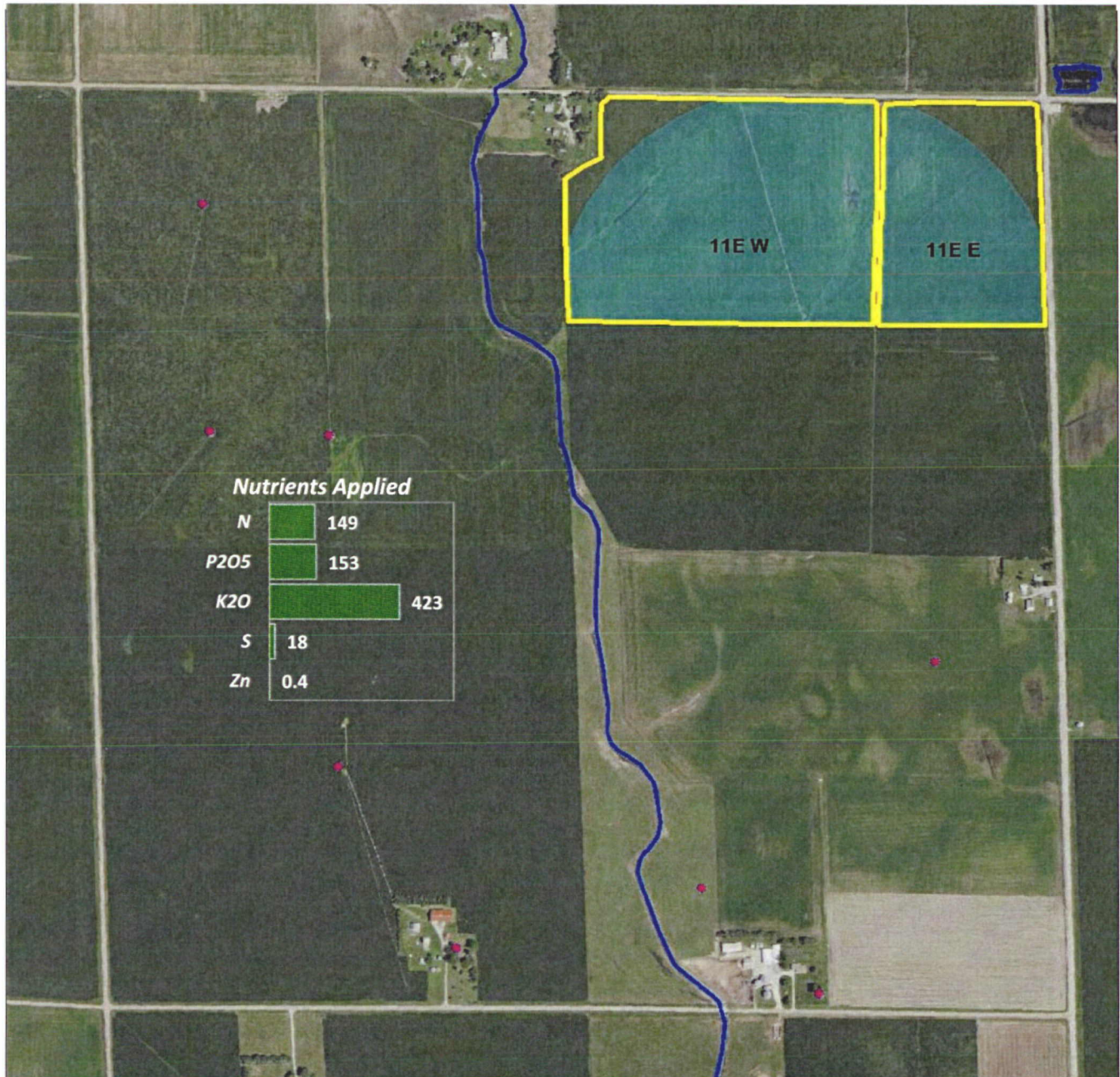
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Map Legend

- applied area
- field boundary
- registered wells
- application setbacks*
- tile inlets
- streams/water

Crop Producer: RAINIER RESOURCES**Field Name:** FIELD 7 - SITE 7**Acres:** 125.20**Legal Description:** NE4, 12-14-8E**Product:** LAGOON WATER**Application Type:** Center Pivot Irrigation**Application Rate:** 2.21 Acre Inches**Application Date(s):** 4/17,6/11,13,26,28-30,7/25-27,8/3-7/19**Incorporation:** Sprinkler Irrigation

ALTEN**Waste Water Fertilizer Application Map**

***setbacks are maintained from concentrated surface water drainage, streams, wells, and tile inlets unless a 35' vegetative buffer exists, then 35' of buffer is sufficient.

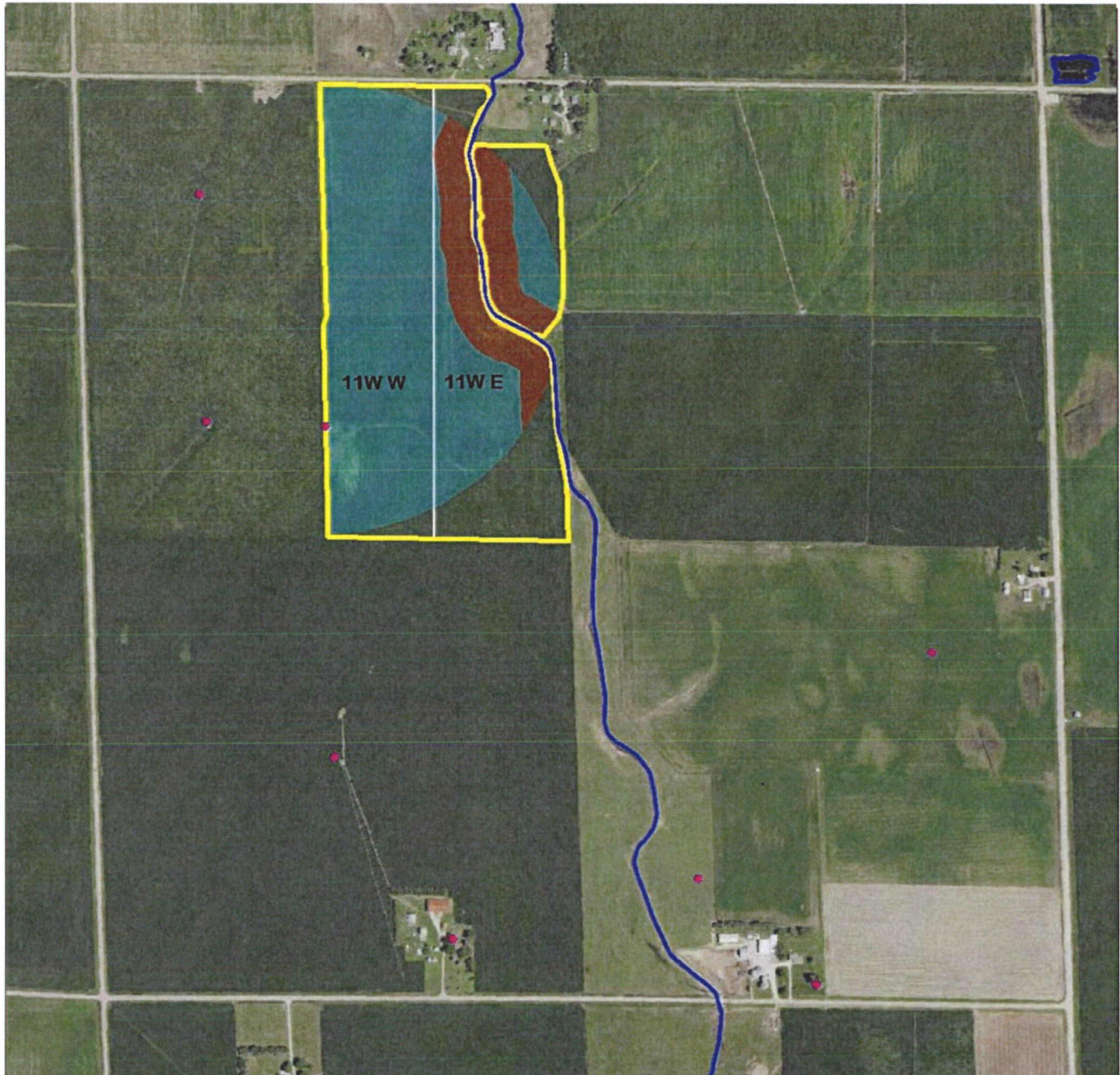
Map Legend

- applied area
- field boundary
- registered wells
- application setbacks*
- tile inlets
- streams/water

Crop Producer: RAINIER RESOURCES**Field Name:** FIELD 11E - SITE 11E**Acres:** 66.18**Legal Description:** N2 NE4, 15-14-8E**Product:** LAGOON WATER**Application Type:** Center Pivot Irrigation**Application Rate:** 1.95 Acre Inches**Application Date(s):** 4/26,30,7/3-4,18-19,8/1/19**Incorporation:** Sprinkler Irrigation







ALTEN

Waste Water Fertilizer Application Map



***setbacks are maintained from concentrated surface water drainage, streams, wells, and tile inlets unless a 35' vegetative buffer exists, then 35' of buffer is sufficient.

Map Legend

-  applied area
-  field boundary
-  registered wells
-  application setbacks*
-  tile inlets
-  streams/water

Crop Producer: RAINIER RESOURCES

Field Name: FIELD 11W - SITE 10

Acres: 47.30

Legal Description: E2 NW4, 15-14-8E

Product: LAGOON WATER

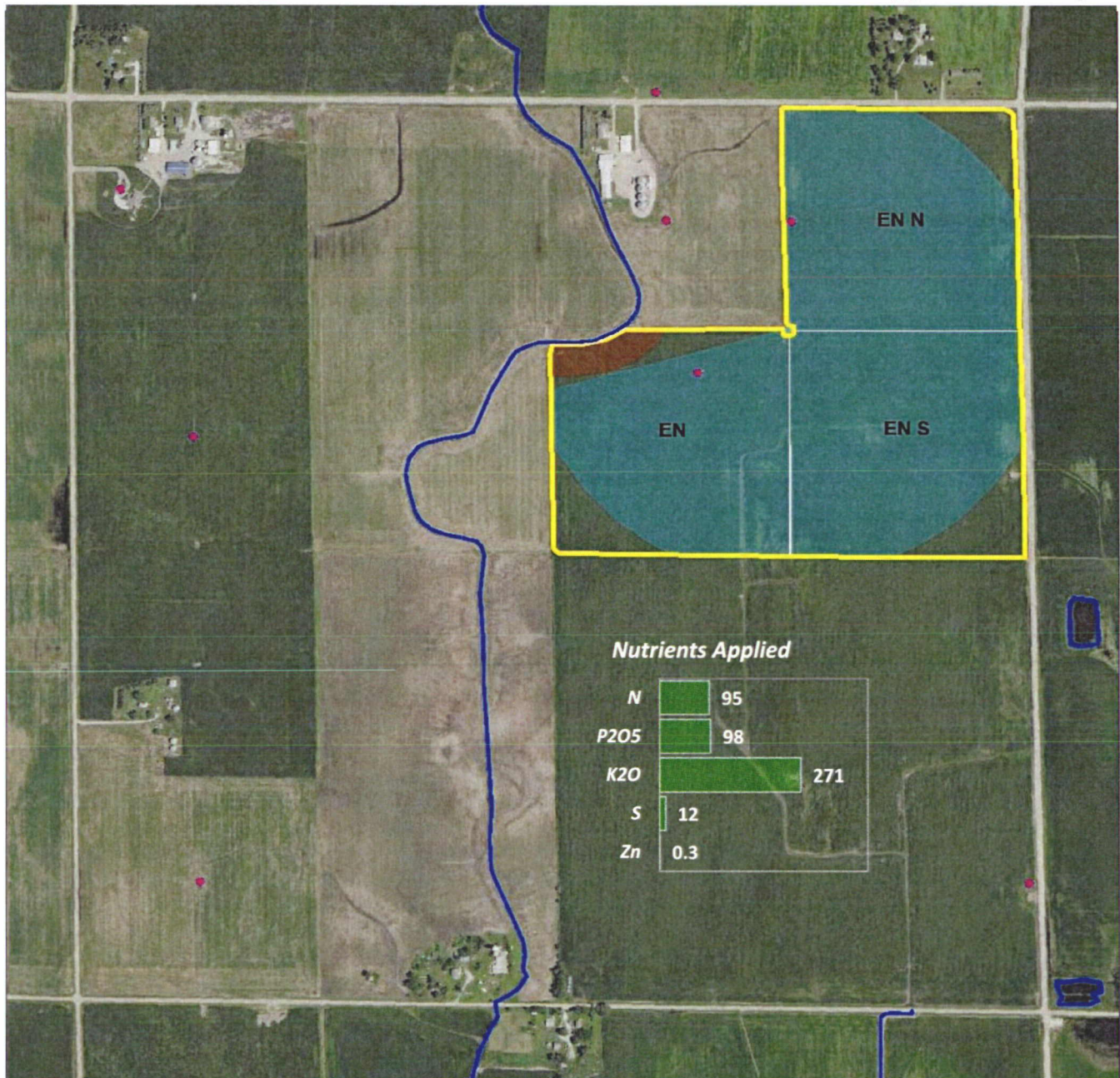
Application Type: Center Pivot Irrigation

Application Rate: 0.32 Acre Inches

Application Date(s): 7/31/2019

Incorporation: Sprinkler Irrigation



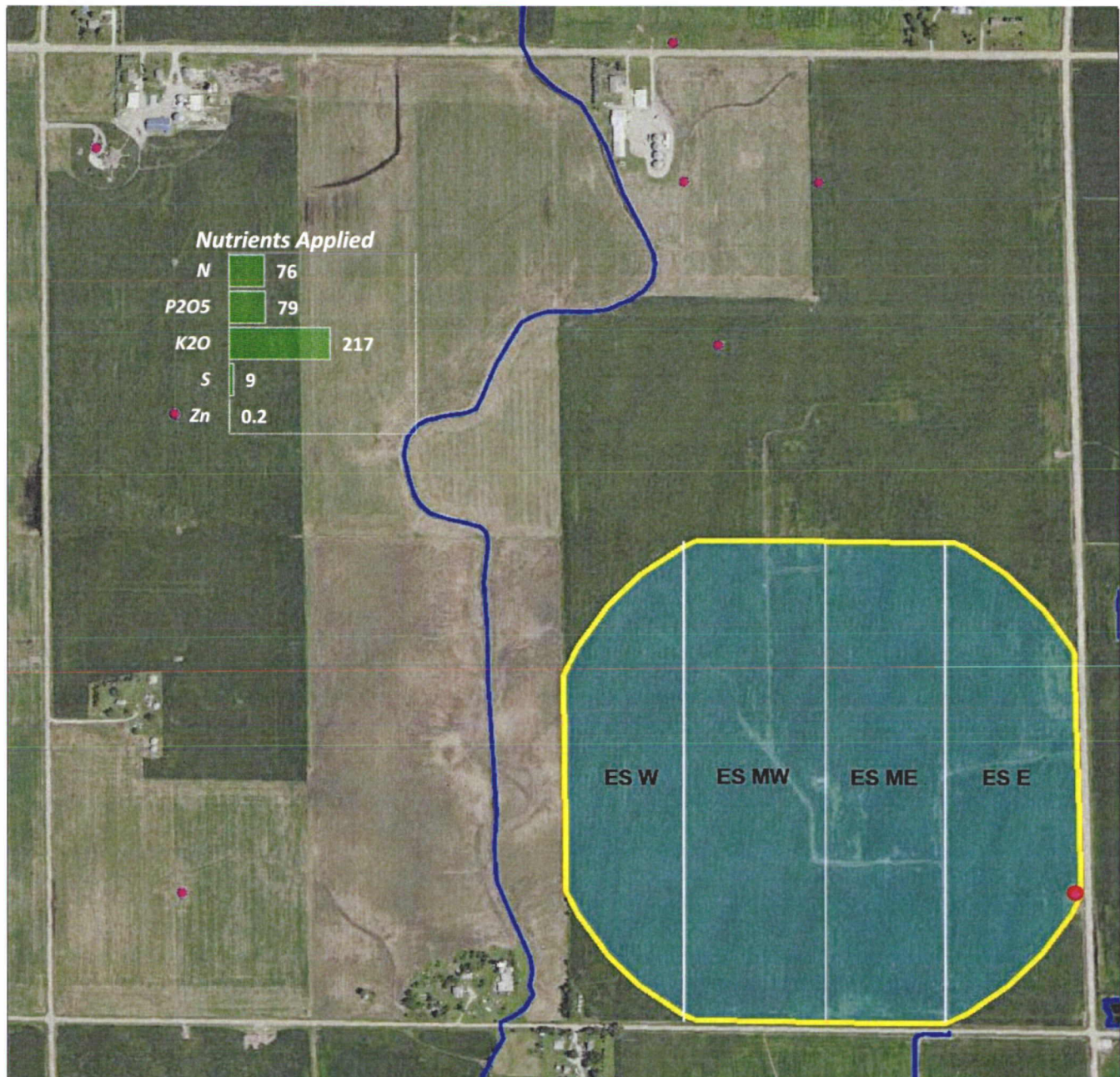
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Map Legend

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-  field boundary
-  registered wells
-  application setbacks*
-  tile inlets
-  streams/water

Crop Producer: DUANE JOHNSON**Field Name:** ERICKSON NORTH - SITE 4**Acres:** 99.95**Legal Description:** SW4 NE4 & E2 NE4, 10-14-8E**Product:** LAGOON WATER**Application Type:** Center Pivot Irrigation**Application Rate:** 1.25 Acre Inches**Application Date(s):** 7/13,14-15,16-17,18/19**Incorporation:** Sprinkler Irrigation

ALTEN**Waste Water Fertilizer Application Map**

***setbacks are maintained from concentrated surface water drainage, streams, wells, and tile inlets unless a 35' vegetative buffer exists, then 35' of buffer is sufficient.

Map Legend

- applied area
- field boundary
- registered wells
- application setbacks*
- tile inlets
- streams/water

Crop Producer: DUANE JOHNSON**Field Name:** ERICKSON SOUTH - SITE 13**Acres:** 139.50**Legal Description:** SE4, 10-14-8E**Product:** LAGOON WATER**Application Type:** Center Pivot Irrigation**Application Rate:** 1.00 Acre Inches**Application Date(s):** 7/7-9,10-13/19**Incorporation:** Sprinkler Irrigation

NUTRIENT BUDGET

Facility: ALTEN
Producer: RAINIER RESOURCES
Crop Year: 2019
Crop: Corn Silage
Previous Crop: Corn Silage

Field: FIELD 1 - SITE 1
Acres: 71.49
Legal: W2 NE4, 14-14-8E
Yield Goal: 30
Product ID: LAGOON WATER
Report No. 8642875

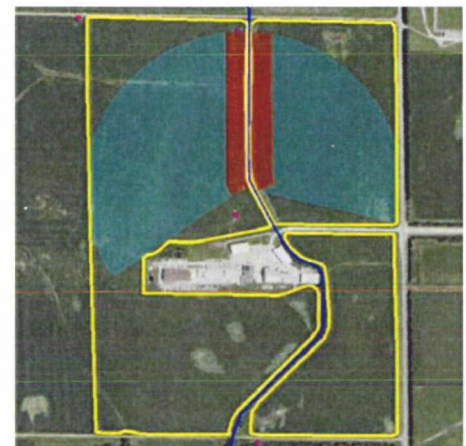


Soil Test Values - Averages in ppm

0-8" N	8-24" N	P	K	S	Zn	OM	pH
7.0	4.0	286.0	679.0	12.0	5.5	2.2	6.4

Waste Water Analysis Results in pounds per acre-inch

Ammonium N	Organic N	P ₂ O ₅	K ₂ O	S	Zn
134.00	26.60	78.50	217.00	9.29	0.23
50%	35%	- Nitrogen Conversion Rates (1st Year Availability)			
67.00	9.31	- Nitrogen # per acre-inch (1st Year Availability)			



Total Nitrogen Requirement 315

NITROGEN CREDITS

Irrigation Water N Credit	16.7
Organic N available from 2017 CY application	0.0
Organic N available from 2018 CY application	6.0
Previous Crop N Contribution	0.0
Total Soil Nitrate N from Surface & Subs	36.0
Current Year Nutrient Application Credits	

TOTAL CREDITS 58.7

Nutrient Application Requirements (#/ Acre)	256.3	0.0	0.0	20.7	0.0
	N	P	K	S	Zn

RECOMMENDED APPLICATION:

Nitrogen Based

		Lbs./acre of Nutrients				
Unit Description	Units/Acre	N	P ₂ O ₅	K ₂ O	S	Zn
Acre Inches	3.36	256	264	729	31	0.8

ACTUAL APPLICATION

Acre Inches		2.68		
Application Dates: 5/2,6,6/8,24,25,7/28-30,8/9-10/19				
Incorporation: Sprinkler Irrigation				
N	P ₂ O ₅	K ₂ O	S	Zn
205	210	582	25	0.6
50	0	0	0	0

Additional Nutrient Needs:

2020 Crop Organic N Available- 11 #/Acre
 2021 Crop Organic N Available- 5 #/Acre

NUTRIENT BUDGET

Facility: ALTEN
Producer: RAINIER RESOURCES
Crop Year: 2019
Crop: Corn Silage
Previous Crop: Corn Silage

Field: FIELD 2 - SITE 2
Acres: 111.10
Legal: SW4, 11-14-8E
Yield Goal: 30
Product ID: LAGOON WATER
Report No. 8642875

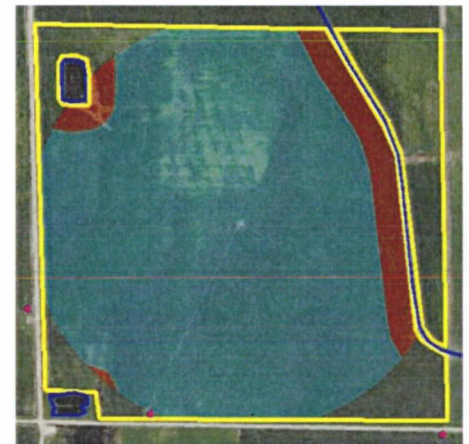


Soil Test Values - Averages in ppm

0-8" N	8-24" N	P	K	S	Zn	OM	pH
5.0	3.5	208.0	677.8	11.0	5.5	2.2	6.8

Waste Water Analysis Results in pounds per acre-inch

Ammonium N	Organic N	P ₂ O ₅	K ₂ O	S	Zn
134.00	26.60	78.50	217.00	9.29	0.23
50%	35%	- Nitrogen Conversion Rates (1st Year Availability)			
67.00	9.31	- Nitrogen # per acre-inch (1st Year Availability)			



Total Nitrogen Requirement 315

NITROGEN CREDITS

Irrigation Water N Credit	14.0				
Organic N available from 2017 CY application	0.0				
Organic N available from 2018 CY application	11.0				
Previous Crop N Contribution	0.0				
Total Soil Nitrate N from Surface & Subs	28.8				
Current Year Nutrient Application Credits					
TOTAL CREDITS	53.8				
Nutrient Application Requirements (#/ Acre)	261.2	0.0	0.0	23.1	0.0
	N	P	K	S	Zn

RECOMMENDED APPLICATION: Nitrogen Based

Unit Description	Units/Acre	Lbs./acre of Nutrients				
		N	P ₂ O ₅	K ₂ O	S	Zn
Acre Inches	3.42	261	269	743	32	0.8

ACTUAL APPLICATION

Acre Inches		0.45		
Application Dates:		8/7-9/19		
Incorporation:		Sprinkler Irrigation		
N	P ₂ O ₅	K ₂ O	S	Zn
34	35	98	4	0.1
225	0	0	19	0

Additional Nutrient Needs:

2020 Crop Organic N Available- 2 #/Acre
 2021 Crop Organic N Available- 1 #/Acre

NUTRIENT BUDGET

Facility: ALTEN
Producer: RAINIER RESOURCES
Crop Year: 2019
Crop: Corn Plus Stover
Previous Crop: Corn Silage

Field: FIELD 6 - SITE 6
Acres: 75.40
Legal: N2 NW4, 12-14-8E
Yield Goal: 275
Product ID: LAGOON WATER
Report No. 8642875



Soil Test Values - Averages in ppm

0-8" N	8-24" N	P	K	S	Zn	OM	pH
8.0	5.5	205.5	934.0	11.0	8.0	2.7	6.9

Waste Water Analysis Results in pounds per acre-inch

Ammonium N	Organic N	P ₂ O ₅	K ₂ O	S	Zn
134.00	26.60	78.50	217.00	9.29	0.23
50%	35%	- Nitrogen Conversion Rates (1st Year Availability)			
67.00	9.31	- Nitrogen # per acre-inch (1st Year Availability)			



Total Nitrogen Requirement 371.3

NITROGEN CREDITS

Irrigation Water N Credit	18.2
Organic N available from 2017 CY application	0.0
Organic N available from 2018 CY application	10.0

Previous Crop N Contribution	0.0
Total Soil Nitrate N from Surface & Subs	45.6

Current Year Nutrient Application Credits

TOTAL CREDITS 73.8

Nutrient Application Requirements (#/ Acre)	N	P	K	S	Zn
	297.4	0.0	0.0	56.1	0.0

RECOMMENDED APPLICATION:

Nitrogen Based

		Lbs./acre of Nutrients				
Unit Description	Units/Acre	N	P ₂ O ₅	K ₂ O	S	Zn
Acre Inches	3.90	297	306	846	36	0.9

ACTUAL APPLICATION

Acre Inches		3.43		
Application Dates: 4/23-25,6/15,17,30-7/1,19-21,24-25,8/2-3/19				
Incorporation:		Sprinkler Irrigation		
N	P ₂ O ₅	K ₂ O	S	Zn
262	269	744	32	0.8
35	0	0	24	0

Additional Nutrient Needs:

2020 Crop Organic N Available-	14	#/Acre
2021 Crop Organic N Available-	6	#/Acre

NUTRIENT BUDGET

Facility: ALTEN
Producer: RAINIER RESOURCES
Crop Year: 2019
Crop: Corn Silage
Previous Crop: Corn Silage

Field: FIELD 7 - SITE 7
Acres: 125.20
Legal: NE4, 12-14-8E
Yield Goal: 30
Product ID: LAGOON WATER
Report No. 8642875



Soil Test Values - Averages in ppm

0-8" N	8-24" N	P	K	S	Zn	OM	pH
6.3	4.0	294.5	1006.3	18.3	8.2	2.6	7.0

Waste Water Analysis Results in pounds per acre-inch

Ammonium N	Organic N	P ₂ O ₅	K ₂ O	S	Zn
134.00	26.60	78.50	217.00	9.29	0.23
50%	35%	- Nitrogen Conversion Rates (1st Year Availability)			
67.00	9.31	- Nitrogen # per acre-inch (1st Year Availability)			



Total Nitrogen Requirement 315

NITROGEN CREDITS

Irrigation Water N Credit	21.4
Organic N available from 2017 CY application	0.0
Organic N available from 2018 CY application	17.0

Previous Crop N Contribution	0.0
Total Soil Nitrate N from Surface & Subs	34.2
Current Year Nutrient Application Credits	

TOTAL CREDITS 72.6

Nutrient Application Requirements (#/ Acre)	242.4	0.0	0.0	5.7	0.0
	N	P	K	S	Zn

RECOMMENDED APPLICATION:

Nitrogen Based

Unit Description	Units/Acre	Lbs./acre of Nutrients				
		N	P ₂ O ₅	K ₂ O	S	Zn
Acre Inches	3.18	242	249	689	30	0.7

ACTUAL APPLICATION

Acre Inches		2.21		
Application Dates: 4/17,6/11,13,26,28-30,7/25-27,8/3-7/19				
Incorporation:		Sprinkler Irrigation		
N	P ₂ O ₅	K ₂ O	S	Zn
169	173	480	21	0.5
75	0	0	0	0

Additional Nutrient Needs:

2020 Crop Organic N Available- 9 #/Acre
 2021 Crop Organic N Available- 4 #/Acre

NUTRIENT BUDGET

Facility: ALTEN
Producer: RAINIER RESOURCES
Crop Year: 2019
Crop: Corn Silage
Previous Crop: Corn Silage

Field: FIELD 11E - SITE 11E
Acres: 66.18
Legal: N2 NE4, 15-14-8E
Yield Goal: 30
Product ID: LAGOON WATER
Report No. 8642875

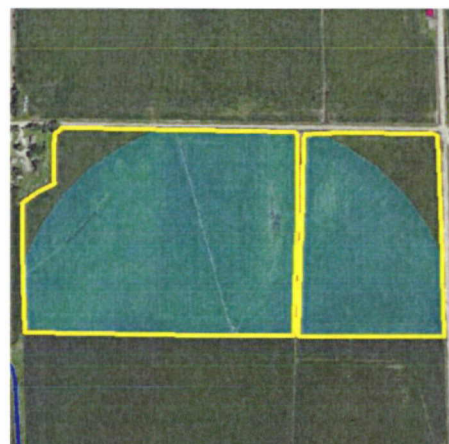


Soil Test Values - Averages in ppm

0-8" N	8-24" N	P	K	S	Zn	OM	pH
22.0	14.5	44.0	311.0	9.0	1.5	2.5	5.2

Waste Water Analysis Results in pounds per acre-inch

Ammonium N	Organic N	P ₂ O ₅	K ₂ O	S	Zn
134.00	26.60	78.50	217.00	9.29	0.23
50%	35%	- Nitrogen Conversion Rates (1st Year Availability)			
67.00	9.31	- Nitrogen # per acre-inch (1st Year Availability)			



Total Nitrogen Requirement 315

NITROGEN CREDITS

Organic N available from 2017 CY application 0.0
 Organic N available from 2018 CY application 12.0

Previous Crop N Contribution 0.0

Total Soil Nitrate N from Surface & Subs 122.4

Current Year Nutrient Application Credits

TOTAL CREDITS 134.4

Nutrient Application Requirements (#/ Acre)	180.6	0.0	0.0	27.9	0.0
	N	P	K	S	Zn

RECOMMENDED APPLICATION:

Nitrogen Based

Unit Description	Units/Acre	Lbs./acre of Nutrients				
		N	P ₂ O ₅	K ₂ O	S	Zn
Acre Inches	2.37	181	186	514	22	0.5

ACTUAL APPLICATION

Acre Inches		1.95		
Application Dates:		4/26,30,7/3-4,18-19,8/1/19		
Incorporation:		Sprinkler Irrigation		
N	P ₂ O ₅	K ₂ O	S	Zn
149	153	423	18	0.4
30	0	0	10	0

Additional Nutrient Needs:

2020 Crop Organic N Available- 8 #/Acre
 2021 Crop Organic N Available- 4 #/Acre

NUTRIENT BUDGET

Facility: ALTEN
Producer: DUANE JOHNSON
Crop Year: 2019
Crop: Corn
Previous Crop: Corn Silage

Field: ERICKSON NORTH - SITE 4
Acres: 99.95
Legal: SW4 NE4 & E2 NE4, 10-14-8E
Yield Goal: 275
Product ID: LAGOON WATER
Report No. 8642875



Soil Test Values - Averages in ppm

0-8" N	8-24" N	P	K	S	Zn	OM	pH
4.7	5.3	52.0	556.0	9.3	2.4	3.0	6.5

Waste Water Analysis Results in pounds per acre-inch

Ammonium N	Organic N	P ₂ O ₅	K ₂ O	S	Zn
134.00	26.60	78.50	217.00	9.29	0.23
50%	35%	- Nitrogen Conversion Rates (1st Year Availability)			
67.00	9.31	- Nitrogen # per acre-inch (1st Year Availability)			



Total Nitrogen Requirement 330

NITROGEN CREDITS

Organic N available from 2017 CY application 0.0
 Organic N available from 2018 CY application 0.0

Previous Crop N Contribution 0.0

Total Soil Nitrate N from Surface & Subs 36.8

Current Year Nutrient Application Credits

TOTAL CREDITS 36.8

Nutrient Application Requirements (#/ Acre)	293.2	0.0	0.0	32.6	0.0
	N	P	K	S	Zn

RECOMMENDED APPLICATION:

Nitrogen Based

Unit Description	Units/Acre	Lbs./acre of Nutrients				
		N	P ₂ O ₅	K ₂ O	S	Zn
Acre Inches	3.84	293	302	834	36	0.9

ACTUAL APPLICATION

Acre Inches		1.25		
Application Dates:		7/13,14-15,16-17,18/19		
Incorporation:		Sprinkler Irrigation		
N	P ₂ O ₅	K ₂ O	S	Zn
95	98	271	12	0.3
200	0	0	21	0

Additional Nutrient Needs:

2020 Crop Organic N Available- 5 #/Acre
 2021 Crop Organic N Available- 2 #/Acre

NUTRIENT BUDGET

Facility: ALTEN
Producer: DUANE JOHNSON
Crop Year: 2019
Crop: Corn
Previous Crop: Corn

Field: ERICKSON SOUTH - SITE 13
Acres: 139.50
Legal: SE4, 10-14-8E
Yield Goal: 275
Product ID: LAGOON WATER
Report No. 8642875



Soil Test Values - Averages in ppm

0-8" N	8-24" N	P	K	S	Zn	OM	pH
4.8	5.8	62.0	622.8	14.3	2.8	3.1	6.7

Waste Water Analysis Results in pounds per acre-inch

Ammonium N	Organic N	P ₂ O ₅	K ₂ O	S	Zn
134.00	26.60	78.50	217.00	9.29	0.23
50%	35%	- Nitrogen Conversion Rates (1st Year Availability)			
67.00	9.31	- Nitrogen # per acre-inch (1st Year Availability)			



Total Nitrogen Requirement 330

NITROGEN CREDITS

Previous Crop N Contribution	0.0
Total Soil Nitrate N from Surface & Subs	39.0
Current Year Nutrient Application Credits	
TOTAL CREDITS	39.0

Nutrient Application Requirements (#/ Acre)	291.0	0.0	0.0	20.8	0.0
	N	P	K	S	Zn

RECOMMENDED APPLICATION:

Nitrogen Based

		Lbs./acre of Nutrients				
Unit Description	Units/Acre	N	P ₂ O ₅	K ₂ O	S	Zn
Acre Inches	3.81	291	299	828	35	0.9

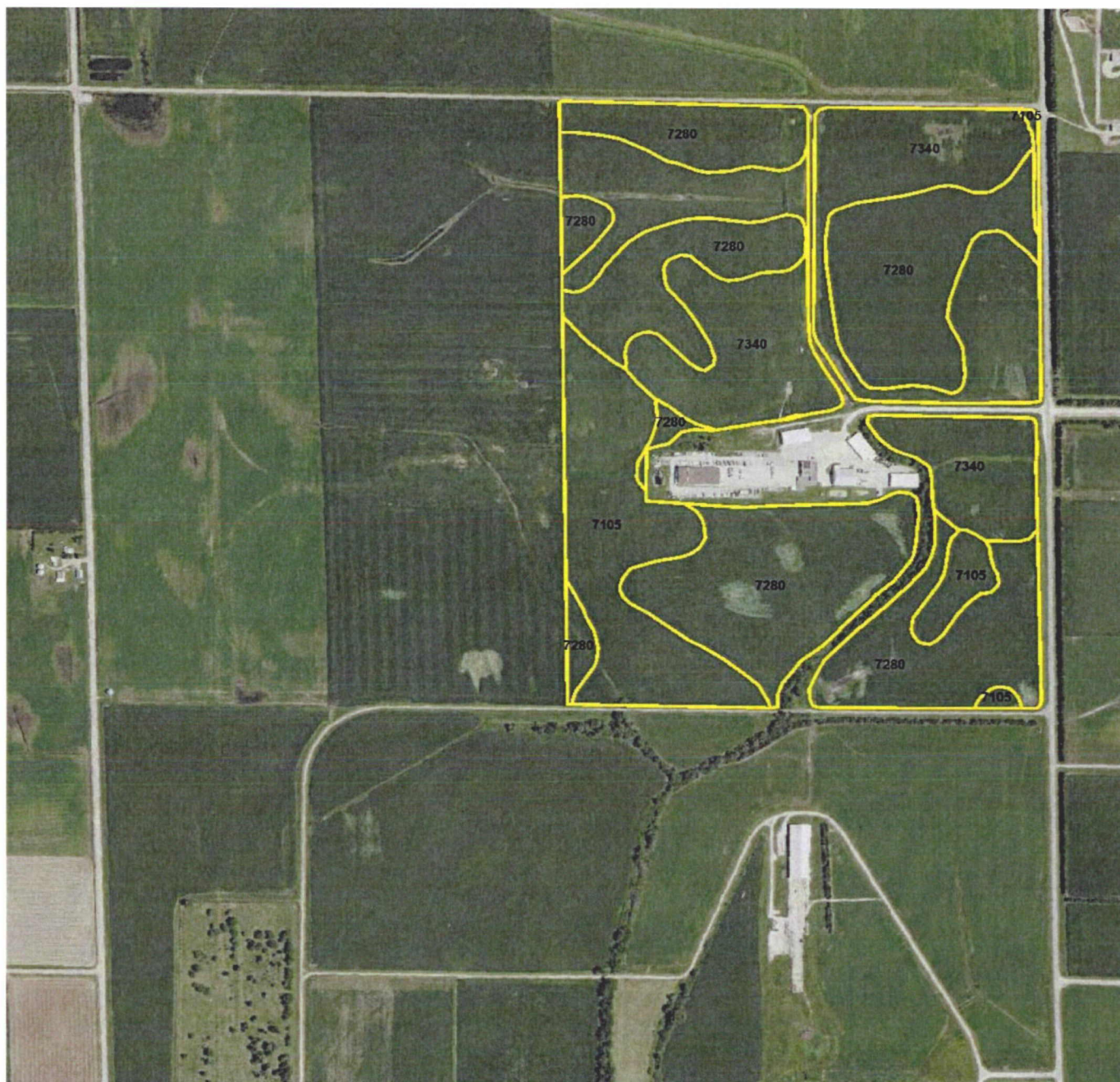
ACTUAL APPLICATION

Acre Inches		1.00		
Application Dates:		7/7-9,10-13/19		
Incorporation:		Sprinkler Irrigation		
N	P ₂ O ₅	K ₂ O	S	Zn
76	79	217	9	0.2
215	0	0	12	0

Additional Nutrient Needs:

2020 Crop Organic N Available- 4 #/Acre
 2021 Crop Organic N Available- 2 #/Acre

SOILS MAP



Area Symbol: NE155, Soil Area Version: 16

Code	Soil Description	Acres	Percent of field	Non-Irr Class *c	Irr Class *c	SRPG	*n NCCPI Soybeans
7280	Tomek silt loam, 0 to 2 percent slopes	95.90	48.7%	lw	lw	77	67
7340	Filbert silt loam, 0 to 1 percent slopes	69.44	35.2%	llw	llw	60	60
7105	Yutan silty clay loam, terrace, 2 to 6 percent slopes, eroded	31.70	16.1%	lle	lle	72	53
Weighted Average						70.2	*n 62.3



FACILITY: ALTEN
CROP PRODUCER: RAINIER RESOURCES
FIELD NAME: FIELD 1- SITE 1

ACRES: 197.00
LOCATION: NE4 & N2 SE4, 14-14-8E
COUNTY: SAUNDERS



SOILS MAP



Area Symbol: NE155, Soil Area Version: 16

Code	Soil Description	Acres	Percent of field	Non-Irr Class *c	Irr Class *c	SRPG	*n NCCPI Soybeans
7340	Filbert silt loam, 0 to 1 percent slopes	77.31	53.1%	IIw	IIw	60	60
7105	Yutan silty clay loam, terrace, 2 to 6 percent slopes, eroded	41.11	28.2%	IIe	IIe	72	53
7280	Tomek silt loam, 0 to 2 percent slopes	14.97	10.3%	Iw	Iw	77	67
3948	Fillmore silt loam, terrace, occasionally ponded	11.55	7.9%	IIw	IVw	47	68
3911	Scott silt loam, terrace, frequently ponded	0.76	0.5%	Vw		20	16
Weighted Average						63.9	*n 59.1



FACILITY: MEAD CATTLE COMPANY, LLC
CROP PRODUCER: RAINIER RESOURCES
FIELD NAME: FIELD 2-SITE 2

ACRES: 145.70
LOCATION: SW4, 11-14-8E
COUNTY: SAUNDERS



SOILS MAP



Area Symbol: NE155, Soil Area Version: 17

Code	Soil Description	Acres	Percent of field	Non-Irr Class *c	Irr Class *c	SRPG	*n NCCPI Soybeans
7340	Filbert silt loam, 0 to 1 percent slopes	41.66	48.0%	IIw	IIw	60	60
7105	Yutan silty clay loam, terrace, 2 to 6 percent slopes, eroded	36.46	42.0%	IIe	IIIe	72	53
7280	Tomek silt loam, 0 to 2 percent slopes	8.60	9.9%	Iw	Iw	77	67
3948	Fillmore silt loam, terrace, occasionally ponded	0.07	0.1%	IIIw	IVw	47	68
Weighted Average						66.7	*n 57.8



FACILITY: MEAD CATTLE COMPANY, LLC
CROP PRODUCER: RAINIER RESOURCES
FIELD NAME: FIELD 6- SITE 6

ACRES: 86.79
LOCATION: N2 NW4, 12-14-8E
COUNTY: SAUNDERS



SOILS MAP



Area Symbol: NE155, Soil Area Version: 12

Code	Soil Description	Acres	Percent of field	Non-Irr Class	Irr Class	SRPG
7105	Yutan silty clay loam, terrace, 2 to 6 percent slopes, eroded	73.44	46.7%		IIe	72
7340	Filbert silt loam, 0 to 1 percent slopes	68.67	43.6%		IIw	60
7280	Tomek silt loam, 0 to 2 percent slopes	7.86	5.0%		I	77
3948	Fillmore silt loam, terrace, occasionally ponded	7.43	4.7%		IIw	47
Weighted Average						65.8

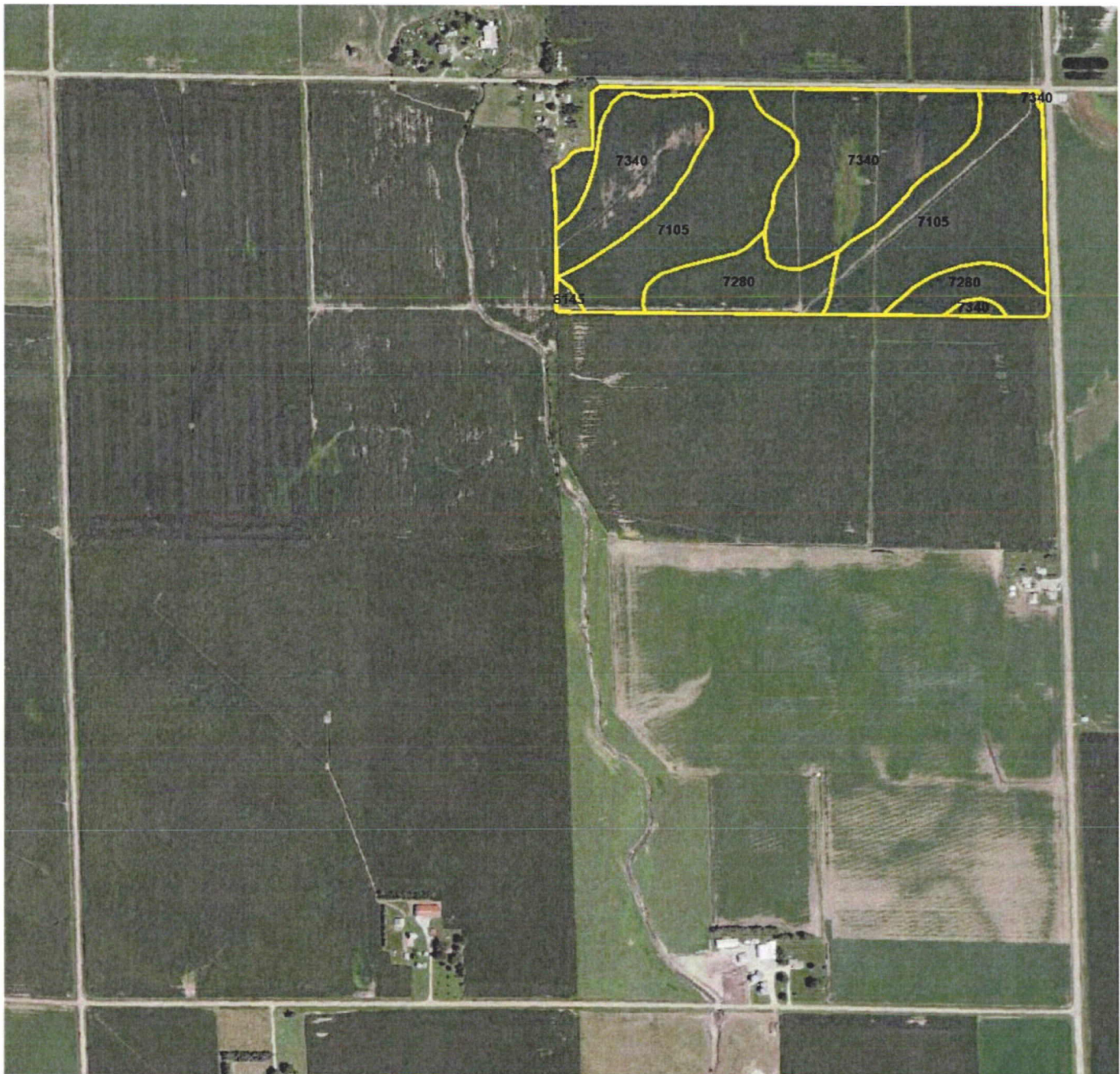


FACILITY: MEAD CATTLE COMPANY
CROP PRODUCER: RAINIER RESOURCES
FIELD NAME: FIELD 7- SITE 7

ACRES: 157.40
LOCATION: NW4, 12-14-8E
COUNTY: SAUNDERS



SOILS MAP



Area Symbol: NE155, Soil Area Version: 16

Code	Soil Description	Acres	Percent of field	Non-Irr Class *c	Irr Class *c	SRPG	*n NCCPI Soybeans
7105	Yutan silty clay loam, terrace, 2 to 6 percent slopes, eroded	35.73	47.0%	IIe	IIIe	72	53
7340	Filbert silt loam, 0 to 1 percent slopes	29.11	38.3%	IIw	IIw	60	60
7280	Tomek silt loam, 0 to 2 percent slopes	10.80	14.2%	Iw	Iw	77	67
8145	Pohocco-Pahuk complex, 6 to 11 percent slopes, eroded	0.41	0.5%	IIIe	IVe	47	40
Weighted Average						68	*n 57.6



FACILITY: ALTEN
CROP PRODUCER: RAINIER RESOURCES
FIELD NAME: FIELD 11E- SITE 11

ACRES: 76.05
LOCATION: N2 NE4, 15-14-8E
COUNTY: SAUNDERS



SOILS MAP



Area Symbol: NE155, Soil Area Version: 17

Code	Soil Description	Acres	Percent of field	Non-Irr Class *c	Irr Class *c	SRPG	*n NCCPI Soybeans
7105	Yutan silty clay loam, terrace, 2 to 6 percent slopes, eroded	55.24	47.8%	Ile	IIle	72	53
7340	Filbert silt loam, 0 to 1 percent slopes	36.90	31.9%	IIw	IIw	60	60
7280	Tomek silt loam, 0 to 2 percent slopes	18.38	15.9%	Iw	Iw	77	67
3948	Fillmore silt loam, terrace, occasionally ponded	3.18	2.8%	IIIw	IVw	47	68
8145	Pohocco-Pahuk complex, 6 to 11 percent slopes, eroded	1.90	1.6%	IIle	IVe	47	40
Weighted Average						67.9	*n 57.7



FACILITY: ALTEN

CROP PRODUCER: DUANE JOHNSON

FIELD NAME: ERICKSON NORTH - SITE 4

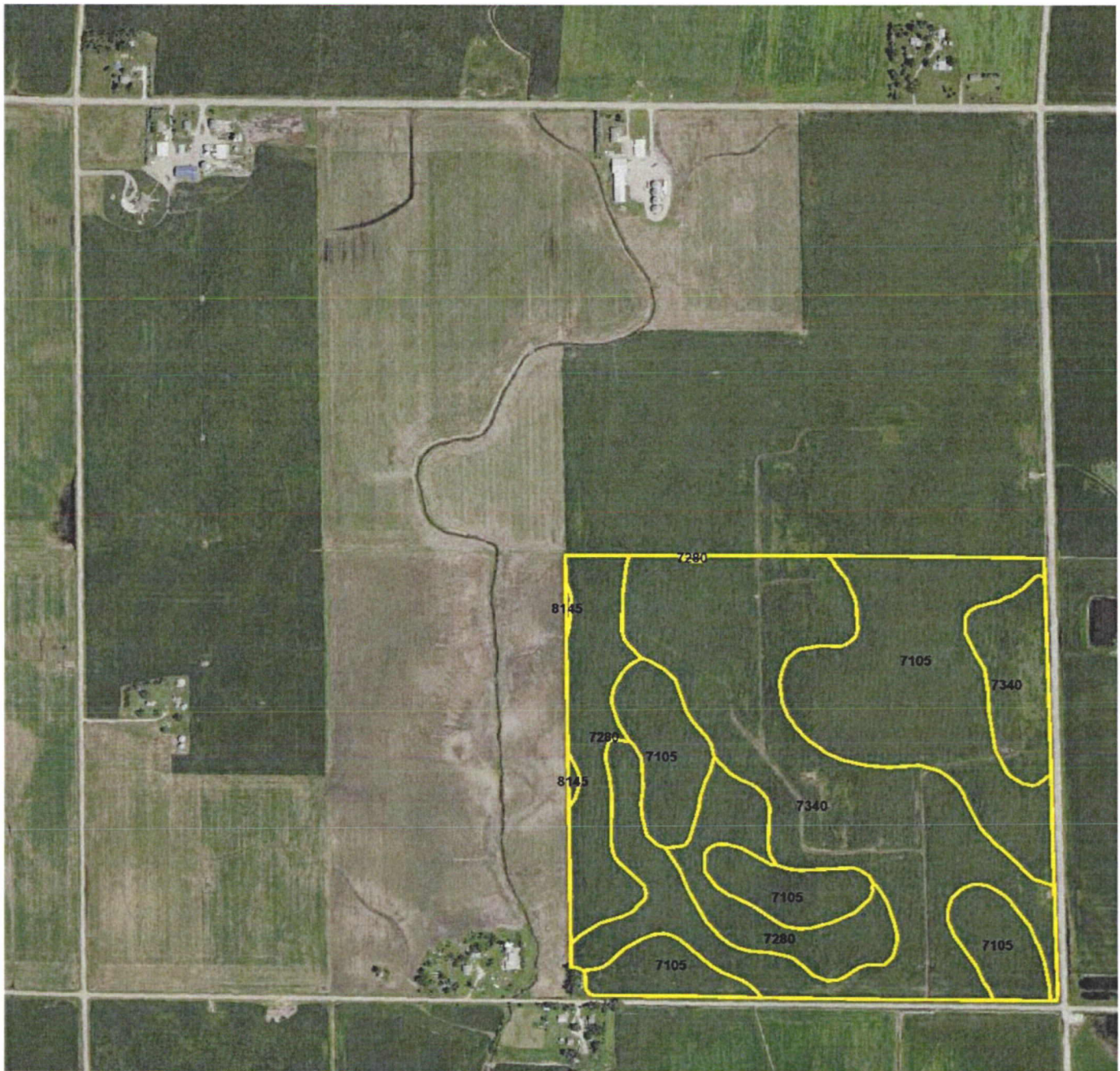
ACRES: 115.60

LOCATION: SW4 NE4 & E2 NE4, 10-14-8E

COUNTY: SAUNDERS



SOILS MAP



Area Symbol: NE155, Soil Area Version: 17

Cod e	Soil Description	Acres	Percent of field	Non-Irr Class *c	Irr Class *c	SRPG	*n NCCPI Soybeans
7340	Filbert silt loam, 0 to 1 percent slopes	71.79	46.3%	IIw	IIw	60	60
7105	Yutan silty clay loam, terrace, 2 to 6 percent slopes, eroded	56.40	36.4%	IIe	IIe	72	53
7280	Tomek silt loam, 0 to 2 percent slopes	26.16	16.9%	Iw	Iw	77	67
8145	Pohocco-Pahuk complex, 6 to 11 percent slopes, eroded	0.65	0.4%	IIe	IVe	47	40
Weighted Average						67.2	*n 58.6



FACILITY: ALTEN
CROP PRODUCER: DUANE JOHNSON
FIELD NAME: ERICKSON SOUTH - SITE 13

ACRES: 155.00
LOCATION: SE4, 10-14-8E
COUNTY: SAUNDERS



EFFLUENT LAND APPLICATION SUMMARY

ALTEN, LLC



Application Site	System Type	Acres applied	Date	Gallons Pumped	gallons per acre	Total Acre-Inches per Acre	Total Acre-Inches
W2 NE4, 14-14-8E	Center Pivot	71.49	5/2/2019	253,125	3,540.70	0.13	9.32
W2 NE4, 14-14-8E	Center Pivot	71.49	5/6/2019	553,500	7,742.34	0.29	20.38
W2 NE4, 14-14-8E	Center Pivot	71.49	6/8/2019	540,000	7,553.50	0.28	19.89
W2 NE4, 14-14-8E	Center Pivot	71.49	6/24/2020	205,250	2,871.03	0.11	7.56
W2 NE4, 14-14-8E	Center Pivot	71.49	6/25/2019	627,750	8,780.95	0.32	23.12
W2 NE4, 14-14-8E	Center Pivot	71.49	7/28-30/19	1,924,560	26,920.69	0.99	70.88
W2 NE4, 14-14-8E	Center Pivot	71.49	8/9-10/19	1,093,500	15,295.85	0.56	40.27
SW4, 11-14-8E	Center Pivot	111.10	8/7-9/19	1,350,000	12,151.22	0.45	49.72
N2 NW4, 12-14-8E	Center Pivot	75.40	4/23-25/19	1,093,500	14,502.65	0.53	40.27
N2 NW4, 12-14-8E	Center Pivot	75.40	6/15/2019	1,039,500	13,786.47	0.51	38.28
N2 NW4, 12-14-8E	Center Pivot	75.40	6/17/2019	405,000	5,371.35	0.20	14.91
N2 NW4, 12-14-8E	Center Pivot	75.40	6/30-7/1/19	1,039,500	13,786.47	0.51	38.28
N2 NW4, 12-14-8E	Center Pivot	75.40	7/19-21/19 & 7/24-25/19	2,411,640	31,984.62	1.18	88.81
N2 NW4, 12-14-8E	Center Pivot	75.40	8/2-3/19	1,039,500	13,786.47	0.51	38.28
NE4, 12-14-8E	Center Pivot	125.20	4/17/2019	1,755,000	14,017.57	0.52	64.63
NE4, 12-14-8E	Center Pivot	125.20	6/11/2019	438,750	3,504.39	0.13	16.16
NE4, 12-14-8E	Center Pivot	125.20	6/13/2019	40,500	323.48	0.01	1.49
NE4, 12-14-8E	Center Pivot	125.20	6/26/2019	219,375	1,752.20	0.06	8.08
NE4, 12-14-8E	Center Pivot	125.20	6/28-30/19	1,535,625	12,265.38	0.45	56.55
NE4, 12-14-8E	Center Pivot	125.20	7/25-27/19	1,755,000	14,017.57	0.52	64.63
NE4, 12-14-8E	Center Pivot	125.20	8/3-7/19	1,755,000	14,017.57	0.52	64.63
N2 NE4, 15-14-8E	Center Pivot	66.18	4/26-30/19	877,500	13,259.29	0.49	32.32
N2 NE4, 15-14-8E	Center Pivot	66.18	7/3-4/19	877,500	13,259.29	0.49	32.32
N2 NE4, 15-14-8E	Center Pivot	66.18	7/18-19/19	877,500	13,259.29	0.49	32.32
N2 NE4, 15-14-8E	Center Pivot	66.18	8/1/2019	875,000	13,221.52	0.49	32.22
SW4 NE4 & E2 NE4, 10-14-8E	Center Pivot	99.95	7/13-18/19	3,400,000	34,017.01	1.25	125.21
SE4, 10-14-8E	Center Pivot	139.50	7/7-9/19	1,890,000	13,548.39	0.50	69.60
SE4, 10-14-8E	Center Pivot	139.50	7/10-13/19	1,890,000	13,548.39	0.50	69.60

Total Gallons Pumped 31,763,075

Total Acre Inches Pumped 1169.74



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Agronomic Review

Crop Conditions

The application sites for AltEn wastewater were all in corn/corn silage production in 2019. All sites are quality silty clay loam soils with good productivity. The sites have been in row crop grain and/or silage production for many years. It was a challenging year for corn growth and production in Saunders county. The season started very wet and cold and remained generally wet throughout the growing season. The sites still averaged right at 28.5 tons/acre of corn silage.

Soil Conditions

The application sites are in sections 10, 11, 12, 14, & 15, T14N-R8E. The sites are nearly all silt loams and silty clay loams and have very little slope. This soil is good crop production and has excellent water holding and nutrient capacity. 2019 was generally a good crop growing season with adequate rainfall and heat.

Review of Soil Testing Data

Soil testing data prior to the 2019 crop year showed average to high levels of general fertility including Phosphorus and Potassium. Soil pH ranged from 5.0-7.0. Soluble Salt levels ranged from 0.2-0.7. Sodium Adsorption ratios ranged from 0.2-2.3. All of these indicate no yield limiting imbalances and that salts from effluent are not being applied at rates beyond what these soils/crop can utilize or tolerate. The chart below shows that ideal and concern levels for SAR.

Sodium adsorption ratio (SAR) is determined by saturated paste extraction and is reported as a special ratio of sodium to calcium plus magnesium.

This test evaluates the sodium content of soil. A value of 13 or greater indicates an excess of sodium will be adsorbed by the soil clay particles. Excess sodium can cause soil to be hard and cloddy when dry, to crust badly, and to take water very slowly.

The gypsum test is conducted if the SAR is greater than or equal to 15. Total gypsum is reported in meq (milliequivalent) $\text{CaSO}_4/100\text{g}$. If sufficient native gypsum is present, sodium-affected soils may be successfully treated without addition of amendments such as gypsum or sulfur. The gypsum supplies soluble calcium to replace the adsorbed sodium. Reclamation can proceed if drainage of the land is possible. A gypsum recommendation is provided if the gypsum test shows insufficient gypsum in sodic soils.

Table 1: Tolerance levels of Crops for soluble salts.	
Test values in mmhos/cm	Interpretation
0-2	Satisfactory for Crops
2-4	Affects sensitive Crops
4-8	High for many Crops
above 8	Very high for most Crops





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Review of Process Wastewater Data

The results of the wastewater analysis show that it is a quality source of Nitrogen fertilizer and carries high amounts of Potassium. The wastewater had a pH of 7.25. Nutrient parameters were consistent and manageable considering total application amounts ranging from 0.45 – 3.43 acre-inches per acre. The nutrient concentrations at these rates supplied a good rate of available Nitrogen however some sites required supplemental Nitrogen.

Agricultural Practices

Practices on the application site are generally grain crop or silage production. Sites are row crops and utilize conventional tillage systems in most years.

Concerns/Problems

The review of the annual soil tests and application data provided little cause for concern at this application site. Soil fertility levels, though high, are sustainable as long as wastewater does not contribute to over applications of Nitrogen which it did not for the 2019 crop year. Historic manure applications have supplied high organic matter which mineralizes plant available Nitrogen over time. Soil samples will continue to identify those credits and then utilize them in nutrient budgeting. High Potassium levels exist and have not caused any soil problems or crop productivity problems at this point. This will continue to be monitored.

Certification: I certify that the land application of wastewater from AltEn in 2019 crop year did not cause any detriments to the soils or the agronomic productivity of the application sites in sections 10, 11, 12, 14, 15 T14N-R8E.

Andrew Scholting, Certified Crop Advisor Cert.#29053

2/29/20

Date



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SOIL ANALYSIS REPORT by MIDWEST LABORATORIES
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NEW FOUR SUBSTRATE FORM																									
LAB NUMBER	SAMPLE IDENTIFICATION	ORGANIC MATTER	PHOSPHORUS						NEUTRAL AMMONIUM ACETATE (EXCHANGEABLE)						pH		CATION EXCHANGE CAPACITY	PERCENT BASE SATURATION (COMPUTED)							
			P ₁		P ₂		BICARBONATE P		K		Mg		Ca		Na			SOIL	BUFFER	% K	% Mg	% Ca	% H	% Na	
			L.O.I.		WEAK BRAY 1:7		STRONG BRAY 1:7											pH	INDEX	C.E.C.					
			PERCENT	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE		1:1		meq/100g					
33350638	1 DN	2.6		322		323				733		291		1680			5.6	6.6	16.6	11.3	14.6	50.6	23.5		
33350640	1 W	2.1		255		256				680		450		2436			6.6	6.8	18.8	9.3	19.9	64.8	6.0		
33350642	1 E	2.3		317		318				678		432		2355			6.2	6.7	19.4	9.0	18.6	60.7	11.7		
33350644	1 SW	2.3		330		331				746		452		2549			6.4	6.7	20.2	9.5	18.6	63.1	8.8		
33350646	1 SE	2.3		325		326				596		347		1793			5.6	6.6	17.5	8.7	16.5	51.2	23.6		

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ANALYSIS DATE MAY 17, 2019

REPORT DATE MAR 1, 2020

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SOIL ANALYSIS REPORT by MIDWEST LABORATORIES[VIEW YOUR SUBMITTAL FORM](#)[View Sodium Adsorption Ratio Report](#)

LAB NUMBER	SAMPLE IDENTIFICATION	ORGANIC MATTER L.O.I.	PHOSPHORUS			NEUTRAL AMMONIUM ACETATE (EXCHANGEABLE)				pH		CATION EXCHANGE CAPACITY C.E.C. meq/100g	PERCENT BASE SATURATION (COMPUTED)				
			P ₁	P ₂	BICARBONATE P OLSEN	POTASSIUM	MAGNESIUM	CALCIUM	SODIUM				% K	% Mg	% Ca	% H	% Na
			WEAK BRAY 1:7	STRONG BRAY 1:7		K	Mg	Ca	Na	SOIL pH	BUFFER INDEX						
			PERCENT RATE	ppm RATE	ppm RATE	ppm RATE	ppm RATE	ppm RATE	ppm RATE	1:1							
34587395	1	3.1		302	303		925	403	2119	5.4	6.4	22.8	10.4	14.7	46.5	28.4	

Sample ID	NITRATE-N (FIA)								DTPA Extraction									
	Surface			Sub 1			Sub 2			Total	SULFUR S ICAP	ZINC Zn	MANGANESE Mn	IRON Fe	COPPER Cu	BORON B	EXCESS LIME RATE	SOLUBLE SALTS 1:1
	ppm	lbs/A	depth IN	ppm	lbs/A	depth IN	ppm	lbs/A	depth IN	lbs/A	ppm RATE	ppm RATE	ppm RATE	ppm RATE	ppm RATE	ppm RATE		mmhos/cm
1	37	89	0-8							89	10	6.4						0.5

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Report Date		Feb 25, 2020		Date Received	
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		ALTEN			
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Sodium Adsorption Ratio Report					
Method		Calculated		Saturated Paste Extract	
Lab	Sample	Sodium	Sodium	Magnesium	Calcium
Number	ID	Adsorption Ratio	(water soluble)	(water soluble)	(water soluble)
Detection Limit			1.0	1.0	1.0
34587395	1	0.6	20 mg/L	14 mg/L	53 mg/L

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VIEW YOUR SUBMITTAL FORM																									
									NEUTRAL AMMONIUM ACETATE (EXCHANGEABLE)																
LAB NUMBER	SAMPLE IDENTIFICATION	ORGANIC MATTER		PHOSPHORUS					POTASSIUM		MAGNESIUM		CALCIUM		SODIUM		pH		CATION EXCHANGE CAPACITY	PERCENT BASE SATURATION (COMPUTED)					
				P ₁	P ₂		BICARBONATE P		K		Mg		Ca		Na		SOIL	BUFFER		% K	% Mg	% Ca	% H	% Na	
		L.O.I.		WEAK BRAY 1:7		STRONG BRAY 1:7		OLSEN										pH	INDEX	C.E.C.					
		PERCENT	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE	1:1		meq/100g					
33350621	2 N	2.2		234		235				595		428		2283				6.8		16.5	9.2	21.6	69.2		
33350624	2 MN	2.1		178		179		200		619		540		2560				7.0		18.9	8.4	23.8	67.8		
33350626	2 MS	2.3		292		293				708		451		2429				6.8		17.7	10.3	21.2	68.5		
33350628	2 S	2.3		128		131				789		487		2435				6.5	6.8	19.8	10.2	20.5	61.5	7.8	

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ANALYSIS DATE MAY 17, 2019

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LAB NUMBER	SAMPLE IDENTIFICATION	ORGANIC MATTER L.O.I. PERCENT RATE	PHOSPHORUS			NEUTRAL AMMONIUM ACETATE (EXCHANGEABLE)				pH		CATION EXCHANGE CAPACITY C.E.C. meq/100g	PERCENT BASE SATURATION (COMPUTED)				
			P ₁	P ₂	BICARBONATE P OLSEN	POTASSIUM	MAGNESIUM	CALCIUM	SODIUM	SOIL	BUFFER		% K	% Mg	% Ca	% H	% Na
			WEAK BRAY 1:7 ppm RATE	STRONG BRAY 1:7 ppm RATE	ppm RATE	K ppm RATE	Mg ppm RATE	Ca ppm RATE	Na ppm RATE	pH	INDEX						
34587396	2	3.3	230	231		871	432	2450		6.3	6.7	20.2	11.1	17.8	60.6	10.5	

Sample ID	NITRATE-N (FIA)									SULFUR S ICAP		DTPA Extraction												EXCESS LIME RATE	SOLUBLE SALTS 1:1 mmhos/ cm	CHLORIDE			
	Surface			Sub 1			Sub 2					Total	ZINC Zn	MANGANESE Mn	IRON Fe	COPPER Cu	BORON B												
	ppm	lbs/A	depth IN	ppm	lbs/A	depth IN	ppm	lbs/A	depth IN	lbs/A	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE									
2	62	149	0-8						149	18		8.2														0.7			30

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Report Date		Feb 25, 2020		Date Received	
May 15, 2019					
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Sodium Adsorption Ratio Report					
Method		Calculated		Saturated Paste Extract	
Lab		Sample		Sodium	
Number		ID		Magnesium	
Detection Limit		Adsorption Ratio		Calcium	
				(water soluble)	
				(water soluble)	
				(water soluble)	
1.0		1.0		1.0	
34587396		2		39 mg/L	
		1.0		20 mg/L	
				76 mg/L	

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LAB NUMBER		SAMPLE IDENTIFICATION		ORGANIC MATTER		PHOSPHORUS				POTASSIUM		MAGNESIUM		CALCIUM		SODIUM		pH		CATION EXCHANGE CAPACITY	PERCENT BASE SATURATION (COMPUTED)							
						P ₁		P ₂		BICARBONATE P		K		Mg		Ca		Na			SOIL	BUFFER	% K	% Mg	% Ca	% H	% Na	
						L.O.I.		WEAK BRAY 1:7		STRONG BRAY 1:7											pH	INDEX	C.E.C.					
						PERCENT	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE		ppm	RATE	1:1		meq/100g			
33350615		6 D		2.5			375		376				816		287		1696			5.5	6.5	17.6	11.9	13.6	48.2	26.3		
33350617		6 W		2.6			294		295				1025		440		2452			6.8		18.6	14.1	19.7	66.2			
33350619		6 E		2.7			117		154				843		450		2451			6.9		18.2	11.9	20.6	67.5			

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LAB NUMBER	SAMPLE IDENTIFICATION	ORGANIC MATTER L.O.I. PERCENT RATE	PHOSPHORUS			NEUTRAL AMMONIUM ACETATE (EXCHANGEABLE)				pH		CATION EXCHANGE CAPACITY C.E.C. meq/100g	PERCENT BASE SATURATION (COMPUTED)				
			P ₁	P ₂	BICARBONATE P OLSEN	POTASSIUM	MAGNESIUM	CALCIUM	SODIUM				% K	% Mg	% Ca	% H	% Na
			WEAK BRAY 1:7 ppm RATE	STRONG BRAY 1:7 ppm RATE	ppm RATE	K ppm RATE	Mg ppm RATE	Ca ppm RATE	Na ppm RATE	SOIL pH 1:1	BUFFER INDEX						
34587400	6	3.6	222	223		706	282	1619		5.2	6.0	18.8	9.6	12.5	43.1	34.8	

Sample ID	NITRATE-N (FIA)										DTPA Extraction										EXCESS LIME RATE	SOLUBLE SALTS 1:1 mmhos/cm	CHLORIDE ppm			
	Surface			Sub 1			Sub 2			Total	SULFUR S ICAP RATE		ZINC Zn		MANGANESE Mn		IRON Fe		COPPER Cu					BORON B		
	ppm	lbs/A	depth IN	ppm	lbs/A	depth IN	ppm	lbs/A	depth IN	lbs/A	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE				ppm	RATE	
6	20	48	0-8							48	9		6.0										0.3			2

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Report Date	Feb 25, 2020		Date Received	May 15, 2019	
Account 18237	Identification	Copy Number	2nd CopyTo	3rd CopyTo	
	ALTEN				
NUTRIENT ADVISORS SOIL	RAINIER RESOURCES				
449 E DEERE ST	FIELD 6				
WEST POINT,68788-	NA				
Sodium Adsorption Ratio Report					
Method		Calculated	Saturated Paste Extract		
Lab	Sample	Sodium	Sodium	Magnesium	Calcium
Number	ID	Adsorption Ratio	(water soluble)	(water soluble)	(water soluble)
Detection Limit			1.0	1.0	1.0
34587400	6	0.2	6 mg/L	10 mg/L	39 mg/L

ANALYSIS DATE SEP 24, 2018

ACCOUNT NO. 18237



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NUTRIENT ADVISORS SOIL
449 E DEERE ST
WEST POINT NE
68788-

MEAD CATTLE COMPANY LLC
RAINIER RESOURCES
FIELD 7-SITE 7

SOIL ANALYSIS REPORT by MIDWEST LABORATORIES
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LAB NUMBER		SAMPLE IDENTIFICATION		ORGANIC MATTER		PHOSPHORUS				POTASSIUM		MAGNESIUM		CALCIUM		SODIUM		pH		CATION EXCHANGE CAPACITY	PERCENT BASE SATURATION (COMPUTED)										
						P ₁	P ₂	BICARBONATE P	K		Mg		Ca		Na		SOIL	BUFFER	C.E.C.		% K	% Mg	% Ca	% H	% Na						
									WEAK BRAY 1:7	STRONG BRAY 1:7	OLSEN																	pH	INDEX	meq/100g	
												PERCENT	RATE	ppm	RATE	ppm										RATE	ppm				RATE
33350603	7 DN	2.5		342		343				839		409			2186				6.3	6.7	18.4	11.7	18.5	59.4	10.4						
33350605	7 W	2.7		298		299				980		409			2335				6.8		17.6	14.3	19.4	66.3							
33350607	7 MW	2.7		281		282		274		1088		447			2506		134		7.0		19.6	14.2	19.0	63.8		3.0					
33350609	7 ME	2.6		285		286		226		965		387			2269				7.0		17.0	14.6	19.0	66.4							
33350611	7 E	2.4		314		315		256		992		473			2454				7.0		18.8	13.5	21.0	65.5							
33350613	7 DS	3.2		400		401				972		361			2181				6.2	6.7	18.6	13.4	16.2	58.6	11.8						

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LAB NUMBER	SAMPLE IDENTIFICATION	ORGANIC MATTER L.O.I.	PHOSPHORUS			NEUTRAL AMMONIUM ACETATE (EXCHANGEABLE)				pH		CATION EXCHANGE CAPACITY C.E.C. meq/100g	PERCENT BASE SATURATION (COMPUTED)				
			P ₁	P ₂	BICARBONATE P OLSEN	POTASSIUM	MAGNESIUM	CALCIUM	SODIUM				% K	% Mg	% Ca	% H	% Na
			WEAK BRAY 1:7 ppm RATE	STRONG BRAY 1:7 ppm RATE	ppm RATE	K ppm RATE	Mg ppm RATE	Ca ppm RATE	Na ppm RATE	SOIL pH 1:1	BUFFER INDEX						
34587394	7	3.1	237	238		748	475	2217		5.6	6.5	22.2	8.6	17.8	49.9	23.7	

Sample ID	NITRATE-N (FIA)									SULFUR S ICAP		DTPA Extraction										EXCESS LIME RATE	SOLUBLE SALTS 1:1 mmhos/ cm RATE	CHLORIDE ppm		
	Surface			Sub 1			Sub 2			Total lbs/A	ppm RATE	ZINC Zn		MANGANESE Mn		IRON Fe		COPPER Cu		BORON B						
	ppm	lbs/A	depth IN	ppm	lbs/A	depth IN	ppm	lbs/A	depth IN			ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE				ppm	RATE
7	32	77	0-8						77	10		3.8											0.4			2

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May 15, 2019					
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		ALTEN			
NUTRIENT ADVISORS SOIL		RAINIER RESOURCES			
449 E DEERE ST		FIELD 7			
WEST POINT,68788-		NA			
Sodium Adsorption Ratio Report					
Method		Calculated		Saturated Paste Extract	
Lab		Sample		Sodium	
Number		ID		Magnesium	
Detection Limit		Adsorption Ratio		Calcium	
				(water soluble)	
				(water soluble)	
				(water soluble)	
34587394		7		1.0	
		0.2		1.0	
		6 mg/L		17 mg/L	
				59 mg/L	

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LAB NUMBER	SAMPLE IDENTIFICATION	ORGANIC MATTER L.O.I. PERCENT RATE	PHOSPHORUS			NEUTRAL AMMONIUM ACETATE (EXCHANGEABLE)				pH		CATION EXCHANGE CAPACITY C.E.C. meq/100g	PERCENT BASE SATURATION (COMPUTED)				
			P ₁	P ₂	BICARBONATE P OLSEN	POTASSIUM	MAGNESIUM	CALCIUM	SODIUM	SOIL	BUFFER		% K	% Mg	% Ca	% H	% Na
			WEAK BRAY 1:7	STRONG BRAY 1:7		K	Mg	Ca	Na	pH	INDEX						
			ppm RATE	ppm RATE	ppm RATE	ppm RATE	ppm RATE	ppm RATE	ppm RATE	1:1							
34587403	11E	3.0	32	51		390	333	1757		5.0	6.0	21.3	4.7	13.0	41.2	41.1	

Sample ID	NITRATE-N (FIA)								DTPA Extraction									
	Surface			Sub 1			Sub 2			Total	SULFUR S ICAP	ZINC Zn	MANGANESE Mn	IRON Fe	COPPER Cu	BORON B	EXCESS LIME RATE	SOLUBLE SALTS 1:1
	ppm	lbs/A	depth IN	ppm	lbs/A	depth IN	ppm	lbs/A	depth IN	lbs/A	ppm RATE	ppm RATE	ppm RATE	ppm RATE	ppm RATE	ppm RATE		mmhos/ cm
11E	52	125	0-8							125	11	2.4						0.6

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	ALTEN				
NUTRIENT ADVISORS SOIL	RAINIER RESOURCES				
449 E DEERE ST	FIELD 11 E				
WEST POINT,68788-	NA				
Sodium Adsorption Ratio Report					
Method		Calculated	Saturated Paste Extract		
Lab	Sample	Sodium	Sodium	Magnesium	Calcium
Number	ID	Adsorption Ratio	(water soluble)	(water soluble)	(water soluble)
Detection Limit			1.0	1.0	1.0
34587403	11E	1.4	51 mg/L	19 mg/L	73 mg/L

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ACCOUNT NO. 18237



NA

68788-

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NEW SODIUM ADSORPTION RATIO REPORT																										
LAB NUMBER	SAMPLE IDENTIFICATION	ORGANIC MATTER		PHOSPHORUS				NEUTRAL AMMONIUM ACETATE (EXCHANGEABLE)				pH		CATION EXCHANGE CAPACITY	PERCENT BASE SATURATION (COMPUTED)											
								POTASSIUM		MAGNESIUM										CALCIUM		SODIUM				
				P ₁		P ₂		BICARBONATE P		K		Mg			Ca		Na		SOIL	BUFFER	C.E.C.	% K	% Mg	% Ca	% H	% Na
				L.O.I.		WEAK BRAY 1:7		STRONG BRAY 1:7		OLSEN									pH	INDEX						
				PERCENT	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE		ppm	RATE	ppm	RATE	ppm	RATE	1:1		meq/100g			
34310323	EN N	2.7		46		63				525		413		2466				6.4	6.7	18.8	7.2	18.3	65.6	8.9		
34310325	EN S	3.1		64		93				583		407		2484				6.2	6.7	19.7	7.6	17.2	63.0	12.2		

Sample ID	NITRATE-N (FIA)										SULFUR S ICAP		DTPA Extraction										EXCESS LIME RATE	SOLUBLE SALTS 1:1		CHLORIDE		
	Surface			Sub 1			Sub 2			Total	ppm	RATE	ZINC Zn		MANGANESE Mn		IRON Fe		COPPER Cu		BORON B			mmhos/cm	RATE		ppm	
	ppm	lbs/A	depth IN	ppm	lbs/A	depth IN	ppm	lbs/A	depth IN				ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE						ppm
EN N	6	14	0-8	5	24	8-24				38	10		1.8													0.2		5
EN S	6	14	0-8	5	24	8-24				38	10		2.2													0.2		5

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Report Date	Feb 25, 2020		Date Received	Mar 5, 2019	
Account 18237	Identification	Copy Number	2nd CopyTo	3rd CopyTo	
	ALTEN				
NUTRIENT ADVISORS SOIL	DUANE JOHNSON				
449 E DEERE ST	ERICKSON N				
WEST POINT,68788-	NA				
Sodium Adsorption Ratio Report					
Method		Calculated	Saturated Paste Extract		
Lab	Sample	Sodium	Sodium	Magnesium	Calcium
Number	ID	Adsorption Ratio	(water soluble)	(water soluble)	(water soluble)
Detection Limit			1.0	1.0	1.0
34310323	EN N	1.0	22 mg/L	6 mg/L	29 mg/L
34310325	EN S	1.2	23 mg/L	4 mg/L	22 mg/L

Sample ID	NITRATE-N (FIA)										SULFUR S ICAP		DTPA Extraction										EXCESS LIME RATE	SOLUBLE SALTS		CHLORIDE
	Surface			Sub 1			Sub 2			Total			ZINC Zn		MANGANESE Mn		IRON Fe		COPPER Cu		BORON B			1:1		
	ppm	lbs/A	depth IN	ppm	lbs/A	depth IN	ppm	lbs/A	depth IN	lbs/A	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE		mmhos/cm	RATE	
EN	2	5	0-8	6	29	8-24				34	8		3.1											0.2		5

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Report Date	Feb 25, 2020		Date Received	Mar 5, 2019	
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	ALTEN				
NUTRIENT ADVISORS SOIL	EMIL ERICKSON				
449 E DEERE ST	ERICKSON N				
WEST POINT,68788-	NA				
Sodium Adsorption Ratio Report					
Method		Calculated	Saturated Paste Extract		
Lab	Sample	Sodium	Sodium	Magnesium	Calcium
Number	ID	Adsorption Ratio	(water soluble)	(water soluble)	(water soluble)
Detection Limit			1.0	1.0	1.0
34310327	EN	1.0	19 mg/L	4 mg/L	20 mg/L

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**NUTRIENT
ADVISORS**

ALLEN
EMIL ERICKSON
ERICKSON S
NA

NUTRIENT ADVISORS SOIL
449 E DEERE ST
WEST POINT NE
68788-

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New Soil Absorption Rate Report																													
LAB NUMBER	SAMPLE IDENTIFICATION	ORGANIC MATTER	PHOSPHORUS							NEUTRAL AMMONIUM ACETATE (EXCHANGEABLE)				pH		CATION EXCHANGE CAPACITY	PERCENT BASE SATURATION (COMPUTED)												
			P ₁		P ₂		BICARBONATE P			K		Mg		Ca			Na		SOIL	BUFFER	C.E.C.	% K	% Mg	% Ca	% H	% Na			
			L.O.I.		WEAK BRAY 1:7		STRONG BRAY 1:7			OLSEN																	pH	INDEX	meq/100g
			PERCENT	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm		RATE	1:1											
34310329	ES W	3.4		94		136				702		359		2321			6.6	6.9	17.4	10.3	17.2	66.7	5.8						
34310331	ES MW	2.8		84		126				649		382		2420			6.6	6.8	18.0	9.2	17.7	67.2	5.9						
34310333	ES ME	3.2		54		88				622		373		2434			6.6	6.8	18.0	8.9	17.3	67.6	6.2						
34310336	ES E	2.9		16		34				518		538		2971			6.9		20.7	6.4	21.7	71.9							

Sample ID	NITRATE-N (FIA)										SULFUR S ICAP		DTPA Extraction										EXCESS LIME RATE	SOLUBLE SALTS		CHLORIDE	
	Surface			Sub 1			Sub 2			Total			ZINC Zn		MANGANESE Mn		IRON Fe		COPPER Cu		BORON B			1:1			
	ppm	lbs/A	depth IN	ppm	lbs/A	depth IN	ppm	lbs/A	depth IN		ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE	mmhos/cm	RATE					
ES W	3	7	0-8	4	19	8-24				26	16		3.6											0.3		11	
ES MW	5	12	0-8	6	29	8-24				41	14		3.3												0.3		7
ES ME	5	12	0-8	7	34	8-24				46	13		2.6												0.3		10
ES E	6	14	0-8	6	29	8-24				43	14		1.7												0.3		6

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Report Date	Feb 25, 2020		Date Received	Mar 5, 2019	
Account 18237	Identification	Copy Number	2nd CopyTo	3rd CopyTo	
	ALTEN				
NUTRIENT ADVISORS SOIL	EMIL ERICKSON				
449 E DEERE ST	ERICKSON S				
WEST POINT,68788-	NA				
Sodium Adsorption Ratio Report					
Method		Calculated	Saturated Paste Extract		
Lab	Sample	Sodium	Sodium	Magnesium	Calcium
Number	ID	Adsorption Ratio	(water soluble)	(water soluble)	(water soluble)
Detection Limit			1.0	1.0	1.0
34310329	ES W	2.3	41 mg/L	4 mg/L	18 mg/L
34310331	ES MW	2.1	37 mg/L	4 mg/L	17 mg/L
34310333	ES ME	1.9	42 mg/L	6 mg/L	26 mg/L
34310336	ES E	1.8	36 mg/L	6 mg/L	21 mg/L

19-189-4280REPORT DATE
Jul 08, 2019RECEIVED DATE
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Jul 08, 2019**ALTEN
SCOTT TINGELHOFF
1344 COUNTY RD 10
MEAD NE 68041****Nutrient Land Application**For: (27354) ALTEN
Lagoon Water Analysis
104835Sample ID: **062519-NL** Lab Number: **8642875****Pounds of Nutrient AR**

Parameter	Analysis As Received	per 1000 gal	per acre-in	Method	Reviewer-Date
Ammoniacal Nitrogen	594 mg/L	5.02	134	SM 4500-NH3 C-(1997)	jdb5 2019-07-02 09:05:21
Organic nitrogen	118 mg/L	1.0	26.6	Calculation	Auto 2019-07-08 17:26:43
Total Kjeldahl nitrogen (TKN)	712 mg/L	6.02	160	PAI-DK01 *	jdb5 2019-07-02 09:05:21
Phosphorus (as P2O5)	348 mg/L	2.9	78.5	EPA 200.7	Auto 2019-07-08 17:26:43
Potassium (as K2O)	962 mg/L	8.1	217	EPA 200.7	Auto 2019-07-08 17:26:43
Sulfur (total)	41.2 mg/L	0.35	9.29	EPA 200.7	trh1 2019-07-08 17:26:43
Calcium (total)	46.0 mg/L	0.39	10.4	EPA 200.7	trh1 2019-07-08 17:26:43
Magnesium (total)	37.4 mg/L	0.32	8.43	EPA 200.7	trh1 2019-07-08 17:26:43
Sodium (total)	384 mg/L	3.24	86.6	EPA 200.7	trh1 2019-07-08 17:26:43
Iron (total)	0.93 mg/L	0.01	0.21	EPA 200.7	trh1 2019-07-08 17:26:43
Manganese (total)	0.093 mg/L	---	0.02	EPA 200.7	trh1 2019-07-08 17:26:43
Zinc (total)	1.00 mg/L	0.01	0.23	EPA 200.7	trh1 2019-07-08 17:26:43
Copper (total)	0.03 mg/L	---	0.01	EPA 200.7	trh1 2019-07-08 17:26:43
Conductivity	8.42 mS/cm			SM 2510 B-(1997)	jdb5 2019-07-02 09:05:21
pH	7.25 S.U.			SM 4500-H+ B-(2011)	jdb5 2019-07-02 09:05:21

First year availability of nitrogen is calculated based on pre-plant application with incorporation. Nitrogen available from previous year's application not considered. Total manure salts should not exceed 500 lbs/acre. Less than 500 lbs/acre if annual rainfall is less than 25 inches and/or the soil CEC is less than 12 meq/100g. Salt contributions from commercial fertilizer applications must also be considered. Soil test yearly to monitor phosphorus levels, organic matter, pH, and micronutrients. Spring soil test for residual nitrate - make accurate sidedress recommendations! Nitrogen availability will vary with methods of application and field conditions. The nitrogen availability values used on a manure management plan must comply with state regulations. These regulations vary from state to state.

The result(s) issued on this report only reflect the analysis of the sample(s) submitted.

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