# HS Jansen and Sons Ltd Nutrient Management Plan

# 2017

# 1. Introduction

This is a Nutrient Management Plan (NMP) for HS Jansen and sons, Hullcar Road, Spallumcheen BC for the 2017 cropping year (see Figure 1 for farm location). It contains information on all nitrogen sources on the farm, and nitrogen requirements for crops in 2017 based on estimated crop uptake and residual soil nitrate levels. It has been developed with the goal of a zero or negative nitrogen balance on all fields. This means that the supply of crop-available nitrogen in manure and other nitrogen inputs will be equal to or less than the estimated crop requirement for nitrogen.

A summary of 2017 planned nitrogen applications is found in Table 1.

This plan considers the agronomic balance of nitrogen only. The combination of residual levels of phosphorus and potassium in the soil and the amount in the planned manure applications will meet crop needs for these nutrients for 2017. Many of the fields farmed by HS Jansen currently have high to very high levels of plant-available phosphorus. Elevated soil phosphorus is a concern where there is hydraulic conductivity between fields and surface water such as where fields are located next to surface water or where ditches or tile drainage connects to surface water. Deep Creek runs adjacent to sections of three fields at HS Jansen, 103A Hullcar, 103C Island and 103B Doug's. There is potential for movement of phosphorus from these fields into Deep Creek during snowmelt if there is runoff and during freshet in Deep Creek when it can flood part of the fields. The farm's crop advisor is actively working with the operation to reduce residual soil phosphorus levels by increasing the acreage planted to alfalfa and by rotating alfalfa with corn silage.

This plan was prepared with the assistance of Doug Macfarlane, Certified Crop Advisor. He calculated nitrogen application rates based on crop requirements. His proposed application rates have been reviewed as part of preparation of this plan.

All calculated values used in this plan are derived from the Ministry of Agriculture's Nutrient Management Planner calculator Excel spreadsheet.

This Nutrient Management Plan describes cropping planned to be undertaken by HS Jansen and Sons in 2017. However, weather and other factors can result in changes to the cropping plan after this plan is submitted.

## Disclaimer

This plan has been developed based on a combination of research and industry-standard estimates from BC Ministry of Agriculture nutrient management materials, and farm-specific information where available. It is understood that even when industry-standard estimates are used to calculate application rates of manure, there is considerable imprecision in the process. This plan has been prepared with the goal of a zero nitrogen balance in all fields, and to ensure that the level of residual nitrate-N in soil in fall 2017 is low. However, no guarantee is made that this will be achieved in 2017. Results of post-harvest soil nitrate testing in fall 2017 will be used to further fine-tune manure application rates in 2018 as required.

Field ID	Crop N requirement (Table 7)	Planned n applicatio	nanure on rate	Crop- available N supplied in manure (Table 9)	N balance* (difference between crop requirement and supply) (Table 10)
	Lb/A	Liquid manure Imp. Gal/A	Solid manure Tons/A	Lb/A	N requirement less N supply
		Corn fie	lds (2017)		
104 Harold's	16	6,000	0	22	-6
105 Dixon Back	76	14,950	0	55	21
106 Dixon Front	80	14,950	0	55	25
109 Sylvia	11	5,000	0	18	-7
202 Reimer	68	17,960	0	37	146
401/2/3 Pivots Lavington	150	0	10	19	131
	•	Alfalfa fi	elds (2017)		
101 B,C Yard	0	0	0	0	0
101 Barns	313	23,950	0	88	225
103 A Hullcar Hall	305	29,950	0	110	195
103 B Doug's	294	29,950	0	110	184
103 C Island	68	18,359	0	68	0
201 Skelton	346	29,950	0	110	236
203 Hoekstra	261	0	0	0	261
205 Jessie	325	39,900	0	147	178
206 Ferguson	182	0	0	0	182
102 Sorensen	118	9,980	0	37	81

Table 1. Summary of 2017 Planned Manure Nitrogen Applications

\*In 2017 all fields will receive nitrogen close to or less than crop requirements. The supply of nitrogen in 2017 will be less than or very close to crop requirements.

## 2. Livestock on site 2017

HS Jansen and Sons is a dairy farm located in the Hullcar valley in Spallumcheen BC. As of the time of writing, they have 960 milking cows on site as well as 120 dry cows and 100 calves less than 3 months of age. The remainder of the operation's livestock (dry cows and heifers) are housed at the operation's second farm in Enderby. All manure from the Enderby farm is utilized on the land base of that farm. No manure effluent from the Hullcar operation is used at the Enderby farm.

## 3. Acreage report - 2017

HS Jansen will farm 1183 acres (479 hectares) of land in 2017. The fields are listed with areas and 2017 cropping information in Table 2 below. Fields are identified on Figure 2.

Cropping is summarized as follows:

- 510 acres (206 hectares) in corn silage.
- 672.8 acres (272 hectares) in alfalfa and alfalfa:grass, 100.6 acres (40.7 hectares) to be planted in spring 2017, remainder are 2 to 4 year old stands.

Field ID	А	rea	2016 Crop	2017 Crop
	ha	acres		
			Home farm (Hullcar)	
101 B,C Yard	3.7	9.3	Alfalfa-grass	Alfalfa-grass
101 Barns	18.7	46.8	Alfalfa/grass	Alfalfa/grass
102 Sorensen	40.2	100.6	Corn silage	Alfalfa (new seeding)
103 A Hullcar Hall	40.6	101.5	Alfalfa/grass	Alfalfa/grass
103 B Doug's	38.4	96	Alfalfa/grass	Alfalfa/grass
103 C Island	5	12.4	Corn silage	Grass
104 Harold's	44.1	110.3	Corn silage	Corn silage
105 Dixon Back	40.4	101	Alfalfa/grass	Corn silage
106 Dixon Front	6	15	Corn silage	Corn silage
109 Sylvia	29.4	73.5	Corn silage	Corn silage
202 Reimer	14.6	36.6	Corn silage	Corn silage
Total – home farm	284.5	703		
		Rer	nted land – Armstrong area	
201 Skelton	29.1	72	Alfalfa	Alfalfa
203 Hoekstra	12	30	Alfalfa	Alfalfa
205 Jessie	12	30	Alfalfa	Alfalfa
206 Ferguson	16	39.7	Alfalfa	Alfalfa
Total –rented land	69 5	171 7		
Armstrong area	05.5	1/1./		
	1		Lavington property	
401/2/3 Pivots	124.6	308	Corn silage	Corn silage
Lavington	127.0	500		
Total - Lavington	124.6	308		
Total acreage 2017	479	1183		

# Table 2. 2017 Acreage Report

# 4. Results of Ministry of Agriculture 2016 Post-harvest Soil Nitrate Study

Table 3 contains the results of the fall 2016 post-harvest nitrate soil testing at HS Jansen and Sons for the fields that will be farmed in 2017 (lab data in Appendix 1). Fifteen fields farmed by Jansen in 2016 were included in the fall 2016 study. All fields had residual soil nitrate-N in fall 2016 in the medium to very high category of environmental risk based on the BC Ministry of Agriculture (AGRI) scale that was

used to assess residual soil nitrate-N levels in the Hullcar area in fall 2016. Residual soil nitrate-N was measured to 90 cm in the soil.

Eight alfalfa fields were included in the study. All but one field had residual soil nitrate-N in the medium environmental risk range; the remaining field was in the high range. The management recommendation for fields within the medium risk range is to 'consider changes to nitrogen management'.

Seven fields that had been planted to corn silage in 2016 were included in the study. All but one field had residual soil nitrate-N in the high to very high environmental risk range; the remaining field was in the medium range. The management recommendation for fields in the high to very high range is to 'change nitrogen management' to reduce residual nitrate-N and environmental risk.

**Bulk density conversions:** Residual soil nitrate-N was converted from mg/kg to kg/ha assuming a soil bulk density of 1470 kg/m<sup>3</sup> to reflect the sandy texture of the soils in and around the HS Jansen property. The original conversions from mg/kg to kg/ha of soil residual nitrate-N made by Ministry of Agriculture staff in fall 2016 following the 2016 post-harvest soil nitrate survey assumed a soil bulk density of 1150 kg/m<sup>3</sup> to allow comparison to the data from the 2007 Ministry of Agriculture Okanagan soil survey. The higher bulk density used in this NMP has resulted in slightly higher total residual nitrate-N levels which resulted in a higher environmental risk rating for several fields.

These residual soil nitrate-N levels have been included when calculating manure application rates for 2017 in all fields.

Residual soil ammonium-N data has not been included in residual soil nitrogen levels. Soil residual levels of ammonium-N were low in fall 2016 in all but two fields, and there is currently no Ministry of Agriculture interpretation for residual soil ammonium-N.

				NO <sub>3</sub> -N by depth and	BC Ministry of
ri-J-J-ID	2016 6	Sampling	Nitrate-N	total to 90 cm	Agriculture
Field ID	2016 Crop	depth	(NO₃-N)	(assuming BD of 1470	Environmental
				kg/m <sup>3</sup> )	<b>Risk Rating</b>
		cm	mg/kg	kg/ha	
		ALFAL	FA FIELDS		
101 Barns	Alfalfa	0-15	20	44.1	Medium
		15-30	8	17.6	
		30-60	3	13.2	
		60-90	3	13.2	
Total				88.2	
103A (north)	Alfalfa	0-15	14	30.9	Medium
		15-30	5	11.0	
		30-60	3	13.2	
		60-90	2	8.8	
Total				63.9	
103A (south)	Alfalfa	0-15	18	39.7	Medium
		15-30	4	8.8	
		30-60	3	13.2	
		60-90	1	4.4	
Total				66.2	
103B (west)	Alfalfa	0-15	17	37.5	Medium
		15-30	6	13.2	
		30-60	3	13.2	
		60-90	3	13.2	
Total				77.2	
103B (east)	Alfalfa	0-15	13	28.7	Medium
		15-30	10	22.1	
		30-60	3	13.2	
		60-90	2	8.8	
Total				72.8	
105 Dixon Back	Alfalfa	0-15	10	22.1	Medium
		15-30	4	8.8	
		30-60	3	13.2	
		60-90	2	8.8	
Total				52.9	
201 Skelton	Alfalfa	0-15	14	30.9	Medium
		15-30	7	15.4	
		30-60	4	17.6	
		60-90	3	13.2	
Total				77.2	
205 Jessie	Alfalfa	0-15	22	48.5	High
		15-30	12	26.5	
		30-60	5	22.1	
		60-90	1	4.4	
Total				101.4	

Table 3. Soil residual nitrate-N levels from PHNT program – fall 2016 – Alfalfa Fields

Field ID	2016 Crop	Sampling depth	Nitrate-N (NO <sub>3</sub> -N)	NO <sub>3</sub> -N by depth and total to 90 cm (assuming BD of 1470 kg/m <sup>3</sup> )	BC Ministry of Agriculture Environmental Risk Rating
		cm	mg/kg	kg/ha	non noting
		SILAGE (	ORN FIFLDS	K6/110	
102 Sorensen	Silage corn	0-15	18	39.7	High
		15-30	17	37.5	
		30-60	11	48.5	
		60-90	9	39.7	
Total				165.4	
103C Island	Silage corn	0-15	30	66.2	Very high
		15-30	18	39.7	, 0
		30-60	9	39.7	
		60-90	14	61.7	
Total				207.3	
104 Harold's lower	Silage corn	0-15	14	30.9	Very high
		15-30	21	46.3	
		30-60	15	66.2	
		60-90	13	57.3	
Total				200.7	
104 Harold's upper	Silage corn	0-15	13	28.7	High
		15-30	13	28.7	
		30-60	10	44.1	
		60-90	9	39.7	
Total			;	141.1	
106 Dixon Front	Silage corn	0-15	10	22.1	Medium
		15-30	12	26.5	
		30-60	6	26.5	
		60-90	4	17.6	
Total			7	92.6	
109 Sylvia	Silage corn	0-15	23	50.7	High
		15-30	15	33.1	
		30-60	13	57.3	
		60-90	10	44.1	
Total				185.2	
202 Reimers	Silage corn	0-15	13	28.7	High
		15-30	14	30.9	
		30-60	10	44.1	
		60-90	12	52.9	
Total				156.6	

Table 3. Soil residual nitrate-N levels from PHNT program – fall 2016 – Corn Fields

\*Ministry of Agriculture (AGRI) Environmental Risk Rating: 0-49 kg/ha low, 50-99 kg/ha medium, 100-199 kg/ha high, 200+ kg/ha very high. Note: Residual nitrate-N in soil was calculated at a soil BD of 1470 kg/m<sup>3</sup>.

#### 5. Nitrogen from all sources in 2017

#### Manure production – October 2016 to September 2017

All manure from the milking herd and dry cows at HS Jansen and Sons is put through a manure separator. The effluent from the separator is stored in the effluent storage lagoons. The solids separated out are stockpiled in a concrete storage area. Solids are transported to the operation's Lavington fields and applied as a nutrient source to those fields.

**Liquid manure (effluent):** Total liquid manure production during the October 2016 to September 2017 period including all runoff from roofs and areas around the barns and precipitation in manure storages (Table 4): **99,941.6 tons (approx. 19.9 million Imperial gallons).** 

Solid manure: Total solid manure production October 2016 to September 2017 (Table 4): 2654 tons.

#### Worksheet 7.1. Annual Manure Production for Dairy Cattle and Waste Type of Milk Cow ÷ Number of Cows Milking 960 Days Grazing Average milk production per milked cow (lb/day) 72.3 Total Manure Primary Using % Slurry Generation Solid Typical Your Shurv Manure Solid/Lia Separated to Slurry Type of Anima Numbe Туре Solid fraction Numbe Separatio Milk Cow 960 960 페 Slurr 2.390 263 N Dry Cow 192 120 Slurry 279 31 比 Ŀ. Heifers (16 to 26 months) 317 0 Slurry 10 0 0 ⊵ Ŀ Heifers (7 to 15 months) 269 0 Slurry 15 0 0 м м Calves (4 to 6 months) 96 0 Slurry 20 0 0 Calves (0 to 3 months) E Ы 96 100 Slurry 9 20 20 Total 1.930 1.180 Total Daily Manure Production 2 689 302 Milk House Effluent (typically 0.75 to 1.5 ft3/day/milk cow): 4 ft<sup>3</sup>/dav/milk cow (ft3/day) 3,840 100 $1000 L = 35.3 ft^3$ PLUS Other Liquid Wastes (silage effluent, etc.) (ft<sup>3</sup>/day) 100 (ft<sup>3</sup>/day) PLUS Other Solid Wastes (spoiled feed, etc.) Assumed bulk density of solids 6629 402 (ft<sup>3</sup>/day) 580 (kg/m<sup>3</sup>) 89610 5438 (yd3/year) Manure and Waste Production 0.488 (tons/yd3) OR 2654 (tons/ve 75522 696000 Collection Size of Yard Areas That Runoff Needs to be Collected From (ft<sup>2</sup>) This applies only to rainwater that enters liquid manure handling systems. Size of Roof Area That Discharge to Yard Areas Listed Above 323000 (ft<sup>2</sup>) or That Discharge Directly Into the Manure Storage Unroofed Surface Area of Manure Storage Facilities 257500 (ft<sup>2</sup>) Floating crust on manure surface E No Venor Weather Data Site to be used (vd<sup>3</sup>/vear) 28975.5 How is this calculated? Total Rainwater Collection 244199 (tons/year Solid Total Weight Slurry Total Weight of Manure Produced of Man 99941 6 2654

## Table 4. Calculation of manure production October 2016 to September 2017

**Nitrogen content in manure**: samples of liquid and solid manure were collected in March and May 2017 from the effluent storage lagoon and stockpiled solid manure. The liquid manure contained on average 0.063% total nitrogen and 425 ppm of ammonium-N (average of March and May samples). The solid manure contained 0.35% total nitrogen and 204 ppm of ammonium-N. This lab data was entered into the NMP calculator and used to calculate the amount of nitrogen in the manure for 2017 (Table 5). Original lab data is found in Appendix 2.

Worksheet 4. Calculate Crop N	utrients in t	he Manure	Sources										
A	В	с	D	E	F	G	н	I	J	к	L	М	N
Manure Source				Manure Nitroge	n (N) Availabilit	y Calculation					Manure F	205 and K20	
and Application Method	Total nitrogen content (lab report)	Ammonium content (NH4-N) (lab report)	Organic nitrogen content (col. B – C /	N Mineralization factor (Table 6)	Organic nitrogen mineralized this cropping year (col. D x E)	Ammonia (NH <sub>4</sub> - N) retention factor (Table 7)	Ammonia (NH <sub>4</sub> - N) remaining after volatilization (col. C / 10 <sup>4</sup> x	Nitrate (NO3-N) content of manure (lab report)	First-year plant available nitrogen (col. F + H) +	Total P (lab report)	Total P <sub>2</sub> O <sub>5</sub> (col. K x 20 x	Total K (lab report)	Total K <sub>2</sub> O (col. M x 20 x 1.2)
	(%) <sup>a</sup>	(ppm) <sup>a</sup>	10 <sup>4</sup> ) x 20 (lb N/ton)	(select from drop- down list)	(lb N/ton)		20) x col. G (lb N/ton)	(ppm) <sup>a,b</sup>	(col. 1/ 10 <sup>4</sup> ) (lb N/ton)	(%) <sup>a</sup>	2.3) (Ib P <sub>2</sub> O <sub>5</sub> /ton)	(%) <sup>a</sup>	(lb K <sub>2</sub> O/ton)
Flush Lagoon	0.06	425	0.4	0.35	0.14	0.7	0.60		0.74	0.009	0.4	0.07	1.6
Dairy Solids	0.35	204	6.7	0.25	1.66	0.58	0.24		1.90	0.071	3.3	0.05	1.3
Settling Lagoon	0.14	682	1.4	0.35	0.50	0.7	0.95		1.46	0.030	1.4	0.08	1.9
			0.0		0.00		0.00		0.00		0.0		0.0
			0.0		0.00		0.00		0.00		0.0		0.0
			0.0		0.00		0.00		0.00		0.0		0.0
			0.0		0.00		0.00		0.00		0.0		0.0
			0.0		0.00		0.00		0.00		0.0		0.0

#### Table 5. Calculation of Nitrogen Content of Manure

#### Other sources of nitrogen on farm

**Fertilizer nitrogen:** No nitrogen fertilizer is planned to be used at HS Jansen and Sons in 2017 unless results of pre-sidedress nitrogen soil testing on silage corn fields how that there is insufficient nitrogen in the soil to provide the nitrogen required by the corn crop till harvest. If there is insufficient nitrogen in June when pre-sidedress samples are taken (if soil available N level is below 25-30 ppm), either manure effluent or nitrogen fertilizer will be applied at the rate required to meet corn requirements for the remainder of the growing season. This decision will be made by the crop advisor who does the soil testing and provides advice to HS Jansen and Sons.

**Irrigation water:** The farm irrigates with more than 10 wells located around the property. Six of these wells had nitrates above 1 mg/L when last sampled in 2015 (Table 6) (2015 data, not sampled in 2016)(Associated Environmental 2017).

The remainder of the farm's irrigation wells had below 1 mg/L of nitrate at the time of last sampling in 2015 and thus would be expected to contribute less than 2 kg per hectare of nitrate over the growing season.

Only project wells #7 and #8 are expected to contribute a measurable amount of nitrate to the soil and only on Field 109 Sylvia because this field is adjacent to these wells. On this field, it is expected that irrigation water will contribute approx. 23 lb/A (25.5 kg/ha) nitrate-N during each growing season (based on 12" or 30 cm of water irrigated on the field over the growing season). There is some dilution of the water from these two wells during irrigation because all of the farm's wells are linked together and typically several are operated at once. Therefore, this amount is half of the nitrate-N that would be contributed if the field was irrigated only with water from these two wells.

All other fields on the farm are irrigated with a blend of water from all the wells. Several of the farm's high volume wells draw from the deeper aquifer and this water has non-detectable levels of nitrate-N. This water will dilute the level of nitrate from wells with detectable levels. Therefore, it is expected that irrigation water will contribute less than 5 lbs/A on all other fields. This amount has not been considered when calculating nitrogen requirements.

Project well #	Well log or ID #	Nitrate-N concentration in irrigation water
		mg/L
Project well #7	na	21.5
Project well #8	na	12
Project well #12	WP25852	4.51
Project well #3	WP28038	3.27
Project well #13	WP25853	2.53
Project well #17	ID# 29867	2.34

#### Table 6. Nitrate-N contribution from irrigation wells

**Composted mortalities**: The operation composts mortalities on site in a separate composting area near the solids storage area. Mortalities, once composted, become part of the solid manure stream and are hauled with the manure solids to the farm's Lavington fields. The nutrients in the mortalities do not contribute any nitrogen to the Hullcar-area fields.

#### 6. Cropping and nitrogen requirements of crops in 2017

**2017 Crops:** 2017 cropping information is found in columns B, C and D of Table 7. Crop, estimated dry yield and protein content of crop as well as 2017 nitrogen application rates have been provided by Doug Macfarlane, CCA for HS Jansen.

Table 8 summarizes 2016 and 2017 crops and nitrogen recommendations for comparison between the two years.

**Crop nitrogen requirements for 2017**: Table 7, Column H contains the nitrogen application rate recommendations for 2017. This number is the estimated crop nitrogen uptake (column E) less the amount of residual nitrate in the 0 to 60 cm depth of the soil (column F, from fall 2016 PHNT results) and less the amount of nitrogen that is estimated to be released from soil organic matter in 2017 for each field (column G).

Column E contains the estimated crop nitrogen uptake values by field for 2017. These values are the product of crop dry yield by crop protein corrected for %N in protein (16% of protein is nitrogen).

Column F contains the residual soil nitrate from fall 2017 soil test results to 60 cm depth. Even though the new seedings of alfalfa:grass may not root deeper than 30 cm in 2017, it was felt that this was a conservative assessment of available nitrogen in soil.

Column G contains the nitrogen fertility factors by field which are an estimate of the amount of nitrogen which will be released from soil organic matter over the 2017 growing season. All fields farmed by HS Jansen have high fertility due to longterm application of manure to the land base. Several fields were given a higher fertility factor (estimated release of 90 lb/A) because they have been amended with manure at or higher than the agronomic rate for many years. One field (105, Dixon Back) was given the higher fertility factor because the alfalfa crop will be ploughed down in 2017 which is expected to release a significant amount of nitrogen.

Worksheet 1. Calculate the Crop	Nitrogen Ap	plication Re	ecommend	ations			
A	В	С	D	E	F	G	Н
Field Description	Ċ	crop Informatio	n	Crop Nitroge	Crop Nitrogen Application Recommend'n		
(name or number)	Crop type to be fertilized	Crop dry yield	Protein content of crop <sup>b</sup>	Crop Nitrogen (N) Uptake	Available soil nitrogen (nitrate plus ammonia) <sup>c</sup>	Nitrogen fertility factor	
		(estimated)	(estimated)	(col. C x D x 1.6 x 2)	(lab report)	(Table 1)	(col. E – F - G)
		(tons/ac) <sup>a</sup>	(%)	(lb N/ac)	(lb N/ac)	(lb N/ac)	(lb N/ac)
101 Barns Yard	Alf/Gra	7.0	21.0	470	67	90.0	313
102 Sorenson	Alf/Gra	5.0	20.0	320	112	90.0	118
103A Hullcar Hall	Alf/Gra	7.0	20.0	448	53	90.0	305
103B Dougs	Alf/Gra	7.0	20.0	448	64	90.0	294
103C Island	Grass	5.0	18.0	288	130	90.0	68
104 Harolds	corn sil	8.0	8.0	205	109	80.0	16
105 Dixon Back	corn sil	8.0	8.0	205	39	90.0	76
106 Dixon Front	corn sil	7.5	8.0	192	67	45.0	80
109 Sylvia	corn sil	7.5	8.0	192	126	55.0	11
201 Skelton	Alf/Gra	7.0	20.0	448	57	45.0	346
202 Reimer	corn sil	8.0	8.0	205	92	45.0	68
203 Heokstra	Alf/Gra	6.0	18.0	346	40	45.0	261
204 Granview Flats	Alf/Gra	4.5	15.0	216	86	0.0	130
205 Jessie	Alf/Gra	7.5	19.0	456	86	45.0	325
206 Ferguson	Alf/Gra	5.0	12.5	200	18	0.0	182
400 Lavington	corn sil	7.5	8.0	192	42	0.0	150

# Table 7. Crop nitrogen requirement calculations

Field ID	2016 N app rate	Fall 2016 rating*	2017 N app rate in manure	2016 Crop	2017 crop
	Avail N		Avail N		
	ID/A	Corp fields			
104 Harold's	97		2017)	Corp silago	Corp silago
	87		22	Corn shage	Corn silage
105 Dixon Back	22	IVI	55	Alfalfa/grass	Corn silage
106 Dixon Front	87	M	55	Corn silage	Corn silage
109 Sylvia	130	Н	18	Corn silage	Corn silage
202 Reimer	87 H		66	Corn silage	Corn silage
401/2/3 Pivots	9	NA	19	66 Corn silage Corn 19 Corn silage Corn	
Lavington	5		15	combildge	combildge
	Alfa	alfa and grass f	ields (2017)		
101 B,C Yard	NA	NA	NA	Alfalfa-grass	Alfalfa-grass
101 Barns	22	М	88	Alfalfa/grass	Alfalfa/grass
103 A Hullcar Hall	87	М	110	Alfalfa/grass	Alfalfa/grass
103 B Doug's	87	М	110	Alfalfa/grass	Alfalfa/grass
103 C Island	58	VH	68	Corn silage	Grass
201 Skelton	87	М	110	Alfalfa/grass	Alfalfa/grass
203 Hoekstra	0	NA	0	Alfalfa	Alfalfa
205 Jessie	36	Н	147	Alfalfa/grass	Alfalfa/grass
206 Ferguson	18	NA	0	Alfalfa	Alfalfa
102 Sorensen	18	Н	37	Corn silage	Alfalfa (new seeding)

Table 8. Cropping and crop nitrogen requirements – 2016 and 2017

\*Environmental risk factor based on soil post-harvest nitrate levels in fall 2016.

## 7. Planned application rate of manure in 2017

Table 9 contains the planned manure applications by field for 2017. The manure application rate is determined on a weight basis (tons/A) and converted to a volume basis (gallons/A) in the NMP calculator. The application rate is calculated from the crop requirement and the nitrogen content of the manure.

**Liquid manure (effluent):** Will be applied to eleven fields in 2017 at or close to the recommended application rates. There will be excess manure effluent which will be provided via the farm's pipeline systems to neighbours on a contract basis.

Alfalfa:grass fields will receive small applications of manure after first, second and possibly third cut to provide up to the recommended maximum application rate of manure.

Fields 203 Hoekstra and 206 Ferguson are located away from the farm and will not receive either manure effluent or manure solids in 2017.

Field ID	2017 N app rate in manure	2017 crop	2017 manu	re app rate*
	Avail. N		Effluent	Solids
	Lb/A		Gal/A	Tons/A
		Corn fields (201	.7)	
104 Harold's	22	Corn silage	6,000	0
105 Dixon Back	55	Corn silage	14,950	0
106 Dixon Front	55	Corn silage	14,950	0
109 Sylvia	18	Corn silage	5,000	0
202 Reimer	66	Corn silage	17,960	0
401/2/3 Pivots	10	Corp silago	0	10
Lavington	19	Corri silage		
	Alfalfa	and grass field	ls (2017)	
101 B,C Yard	NA	Alfalfa-grass	0	0
101 Barns	88	Alfalfa	23,950	0
103 A Hullcar Hall	110	Alfalfa	29,950	0
103 B Doug's	110	Alfalfa	29,950	0
103 C Island	68	Grass	18,500	0
201 Skelton	110	Alfalfa	29,950	0
203 Hoekstra	0	Alfalfa	0	0
205 Jessie	147	Alfalfa	39,900	0
206 Ferguson	0	Alfalfa	0	0
102 Sorensen	37	Alfalfa (new seeding)	10,000	0

Table 9. Planned manure applications for 2017

\*2017 manure application rates provided by D. Macfarlane, CCA

**Pre-sidedress nitrate testing for corn:** A pre-sidedress nitrate-N test will be done on all corn silage fields in June to confirm that there is sufficient available nitrogen for the corn crop to achieve normal yields. If soil available nitrogen levels are insufficient to meet crop requirements for the remainder of the growing season, manure effluent or chemical fertilizer will be applied to meet the deficit. This decision will be made by Doug Macfarlane, crop advisor for HS Jansen, and he will determine the application rate required.

## 8. Agronomic balance calculations – Crop requirements vs. nutrients to be applied

Table 10 shows the nitrogen balance for each field for 2017 (3<sup>rd</sup> from last column). Application rates for 2017 were planned to achieve a zero or better nitrogen balance. The table shows that, based on the assumptions used in the calculator, the available farm-specific data and the planned manure application rates, each field should have a zero or close to nitrogen balance in 2017. Post-harvest soil nitrate testing in fall 2017 will show how close to nitrogen balance each field is, and further adjustments to manure application rates will be made in 2018 as required.

Manure application rates on corn fields are designed to meet crop requirements and result in a zero or close to nitrogen balance. Manure application rates on alfalfa fields will supply less than crop requirements; alfalfa will fix the remainder from the atmosphere.

Worksheet 5. Estimate the Agrono	omic Balanc	e for Nitro	gen, Phosphorus and Potas	sium													
A	B	C Eight Size	D Manura Sauraa	E Manute Application	F	G	H H	I I	J	K	L	M Cron Nutriant	N	0	P	Q Relence (er	R
Field Description	crop type	Field Size	and Application Method	Rate			raliable nutre	and and and and	ai oi Applicai	1011		on estimat	ed soil nutrie	nt supply)	recomme	ndation minu	s available
															nutrients i	the year of a	application)
						Manure	Sources			Fertilizer							
			Show/Hide Show/Hide		N	Р	-0.	К,0	N	P204	K,0	N	P204	к,о	N <sup>a</sup>	P2O4 <sup>8</sup>	K <sub>2</sub> O <sup>8</sup>
(Worksheet 1, col. A)	(Worksheet 1,		Manure Manure	See note below for	(Col E x	First-year	(Col E x G x	(Col E x	Sum all plan	ned fertilizer ad	ditions for the	Worksheet 1	Worksheet	Worksheet	(col	(col	(col
	col. B)			guidance in determining rate <sup>a</sup>	4, col. J)	P availability coefficient *	col. L)	4, col. N)	year. Use v	/orksheet 6.1 t help.	o the right to	col. H)	2, col. I)	3, col. l)	M – F – J)	N – H – K)	0 – I – L)
			Click here for help to use the show/hide										1				
(name or number)		(ac)	(select from dron-down list)	(tons/ac)	(lb N/ac)		(Ib P O (se)	(Ib K O/ac)	(lb N/ac)	(b R O (sc)	(Ib K O(ac)	(lb N/ac)	(Ib P O (se)	/lb K O/ac)	(lb N/ac)	(Ib P O /sc)	(Ib K O(sc)
101 Barne Vard	Alf/Gra	56.2	Eluch Lacoon	120	88	0.75	(ID P209/aC) 35	(ID K20/40) 101	(io reac)	(ID P209/80)	(iD K <sub>2</sub> O/dc)	(10 14 00)	(ID P 209/dC)	(iD R <sub>2</sub> Orac)	(101400)	(ID P 205/ dC)	(ID K2O/dC)
101 barris 74/6	Alliona	50.2	Dainy Solide	0	0	0.75	0	0									
			Daily Solids	0	0	0.75	0	0									
			all manunas	Ŭ	88	n/a	35	101	0			313	24	0	225	_11	_101
102 Saransan	Alf/Gra	100.6	Eluch Lagoon	50	37	0.65	13	80	Ū			010		0			
102 50/2/30/1	All/ord	100.0	Dainy Solide	50	0	0.65	10	0									
			Daily Solids		0	0.65	0	0									
			all manures		37	n/a	13	80	0			118	43	0	81	30	-80
103A Hullcar Hall	Alf/Gra	101.6	Flush Lagoon	150	110	0.65	38	239						-	-		
			Dairy Solids		0	0.65	0	0									
			04		0	0.65	0	0									
			all manures		110	n/a	38	239	0			305	60	101	195	21	-138
103B Douqs	Alf/Gra	96.0	Flush Lagoon	150	110	0.75	44	239									
			Dairy Solids		0	0.75	0	0									
					0	0.75	0	0									
			all manures		110	n/a	44	239	0			294	24	0	184	-20	-239
103C Island	Grass	12,4	Flush Lagoon	92	68	0.50	18	146									
			Dairy Solids		0	0.50	0	0									
					0	0.50	0	0									
			all manures		68	n/a	18	146	0			68	23	72	0	5	-74
104 Harolds	corn sil	110.3	Flush Lagoon	30	22	0.65	8	48									
			Dairy Solids	0	0	0.65	0	0									
					0	0.65	0	0									
			all manures		22	n/a	8	48	0			16	37	0	-6	29	-48
105 Dixon Back	corn sil	101.0	Flush Lagoon	75	55	0.50	15	119									
			Dairy Solids	0	0	0.50	0	0									
			all manunas	0	0	0.50	15	110	0			74	27	115	21	22	4
10/ Nime Front		15.0	all manures	75	55	n/a	10	119	0			70	37	115	21	22	-4
106 Dixon Front	corn sii	15.0	Flush Lagoon	75	55	0.65	19	119									
			Dairy Solids	0	0	0.65	0	0									
			all manures		55	0.05 n/a	19	119	0			80	35	54	25	15	-65
109 Sylvia	corn sil	73.5	Elush Lagoon	25	18	0.85	8	40	Ŭ			00		51	20	10	00
105 09/114	corrisii	70.0	Dairy Solids	20	0	0.85	0	0									
			bully bollos		0	0.85	0	0									
			all manures		18	n/a	8	40	0			11	0	54	-7	-8	14
201 Skelton	Alf/Gra	72.0	Flush Lagoon	150	110	0.65	38	239									
			Dairy Solids		0	0.65	0	0									
					0	0.65	0	0									
			all manures		110	n/a	38	239	0			346	60	202	236	21	-37
202 Reimer	corn sil	36.6	Flush Lagoon	90	66	0.65	23	143									
			Dairy Solids		0	0.65	0	0									
				0	0	0.65	0	0					- <u>(</u>	407	-	-	-
			all manures		66	n/a	23	143	0			68	68	115	2	45	-28
203 Heokstra	Alf/Gra	30.0	Flush Lagoon		0	0.75	0	0			_				-		
			Dairy Solids	0	0	0.75	0	0							-		
			all manunas		0	0.75	0	0	0			241	10	84	241	10	84
204 Gramming Flats	A16/Cm-	114.0	Shigh Leasen		0	0.95	0	0	0			201	19	80	201	19	00
204 Granview Flats	Alt/Gra	114.0	Flush Lagoon	0	0	0.85	0	0			-						
			Durry Sollas	0	0	0.85	0	0									
			all manures		0	n/a	0	0	55			130	0	0	75	0	0
205 Taccia	Alf/Gra	30.0	Elush Lagoon	200	147	0.65	51	318				100		, , , , , , , , , , , , , , , , , , ,	10	Ť	
200 Jessie		00.0	Dairy Solids	200	0	0.65	0	0									
			oury condo		0	0.65	0	0			_			_			
			all manures		147	n/a	51	318	0			325	52	108	178	1	-210
206 Ferauson	Alf/Gra	39.7	Flush Lagoon		0	0.50	0	0									
			Dairy Solids	0	0	0.50	0	0									
					0	0.50	0	0									
			all manures		0	n/a	0	0	55			182	35	36	127	35	36
400 Lavington	corn sil	308.0	Flush Lagoon		0	0.65	0	0									
			Dairy Solids	10	19	0.65	21	13									
					0	0.65	0	0									
			all manures		19	n/a	21	13	0			150	43	108	131	22	95
Total		1296.9	1														

# Table 10. Agronomic balance calculations for 2017 cropping year

## 9. Timing of manure applications

Manure applications will occur throughout the growing season as required. On corn fields the bulk of the application will occur before planting. If required based on pre-sidedress nitrate testing a small additional application of effluent or chemical fertilizer will be made to ensure sufficient nutrients to meet crop requirements for the rest of the growing season. No manure will be applied to corn fields after harvest.

Alfalfa fields will receive an application of effluent after each cut up to the total indicated application rate.

All manure applications on perennial cropped fields will be complete by October 31<sup>st</sup>, the BC Ministry of Agriculture recommended deadline for manure application on perennial cropped land. Less than 50% of the annual nutrient demand will be applied during the September –October period on alfalfa/grass fields.

## 10. Method of manure application

Liquid manure will be applied by irrigation gun via the farm's dragline system. Solid manure will be applied by solid manure spreader. Both of these manure application methods allow accurate tracking of volumes of manure applied for record keeping.

#### 11. Tracking of manure applications

All manure applications made to HS Jansen's land base during 2017 will be tracked and recorded. One of the manure application guns currently has a flow meter, the others are scheduled to have flow meters installed during the summer. Effluent application rates are set by nozzle size and area covered, and gun travel speed. Flow rate volumes are used to confirm application rates. Volumes applied per acre on each field will be recorded and made available to the Director on request. This information will be used to confirm 2017 manure application rates.

#### 12. Setbacks

HS Jansen and Sons maintains the following setbacks when applying manure:

- 30 m (100 ft) from all wells, surface water and residences
- 10 m (30 ft) from roads and other buildings

#### 13. Other fertilizer application in 2017

No phosphorus or potassium fertilizer will be applied to fields owned or rented by HS Jansen in 2017. Other non-nitrogen fertilizer (sulphur and boron) as required based on soil test results will be applied in 2017.

#### 14. Irrigation rate

HS Jansen and Sons Hullcar operations are situated on soils with a texture of sand, sandy loam or loamy sand. These soils are rapidly permeable and have low moisture and nutrient holding capacity. Nitrate leaching can occur easily from these soils if irrigation water moves down below the crop rooting depth. For this reason, HS Jansen will irrigate according to soil moisture sensors to ensure that irrigation water

does not move deeper than 60 cm in the soil, the approximate crop rooting depth. Soil moisture monitors have been installed in several fields and more are scheduled to be installed in summer 2017.

# **15. Manure storage capacity**

HS Jansen and Sons has two manure storage facilities for liquid manure (effluent) and one storage area for separated manure solids (identified on Figure 3).

**Liquid storage:** The farm has two in-ground, HDPE-lined lagoons for liquid manure (effluent) storage. The smaller lagoon has dimensions 90 m by 45 m by 5.5 m deep with 3:1 slope on sides, and holds an estimated 6 million litres (1.32 million gallons). The larger lagoon has dimensions 160 m by 100 m by 7 m deep with 3:1 slope on lagoon sides, and holds an estimated 53 million litres (11.66 million gallons). Total storage capacity is estimated to be 59 million litres (13 million gallons). This storage capacity assumes a 1 m freeboard in each lagoon at all times. (Values from the 2016 Jansen EIA).

The farm currently has 960 milking cows plus 120 dry cows and 100 calves less than 3 months of age on site. This number of livestock plus runoff from roofs and yard areas and precipitation in manure storages is expected to produce 99,941.6 tons of effluent (19.9 million gallons) of manure effluent per year (calculated using the NMP calculator, see Table 4).

Based on these calculations, the farm appears to have sufficient storage to hold manure plus rainwater and runoff for up to 7.8 months which is sufficient for the typical minimum overwinter storage period of 6 months.

**Solid manure storage:** The farm has a concrete storage area of dimensions 58 m by 160 m or **9280 m<sup>2</sup>** in area. The pad slopes from the manure separator to liquid collection bins allowing separated solids to dry and the leachate from the solids to flow down the concrete pad and into the lagoon system. All leachate from the pad flows into the lagoons.

For a 12 month period, solids production is estimated at **2645 tons** (**4000 m**<sup>3</sup> based on BD of 600 kg/m<sup>3</sup>). If solids are piled 2 m high on the concrete storage slab, the area required for 12 months of storage is  $2000 \text{ m}^2$ .

Based on these calculations, the farm appears to have sufficient storage capacity for solid manure for more than 12 months of storage.

# 16. Post-harvest soil nitrate testing – fall 2017

After crop harvest in fall 2017, soil sampling will be done in each field to at least 60 cm depth to assess the accuracy of 2017 manure application rates. At this time, the 2017 manure application rates will be reviewed based on residual soil nitrate-N levels, and adjustments made to rates and timing as required for 2018.

# 17. Reference

Associated Environmental. 2017. Comprehensive Monitoring Program and Environmental Impact Assessment: HS Jansen and Sons Farms Ltd. February 2017 <u>http://www2.gov.bc.ca/gov/content/environment/air-land-water/site-permittingcompliance/hullcar-aquifer</u> Prepared by:

Kith Cluder Sand

**Consulting Agrologist** 

May 23, 2017

# Figure 1. Location Map – HS Jansen and Sons Hullcar Farm



Figure 2. Map of HS Jansen and Sons fields in Hullcar area and wells (see Figure 3 for wells close to farmstead)



Wells: Red = domestic wells Blue = irrigation wells



Figure 3. Close-up of HS Jansen barns, manure storages and wells close to farmstead

Wells: Red = domestic wells Orange = livestock watering wells Blue = irrigation wells

# Appendix 1. Fall 2016 PHNT Soil Data

#### Field 101 Barns



# Field 102 Sorensen

AthyDO 250 Report Dat	UG MACF 1546-3847 10286-11	ARLANE	W Date 2	117-01-0	9	ower Dod Farm Field	KOSZTOWIO CHOME CTOZ SORE SOI	NOEN L TES	ST REI	PORT		1	5213-WT	135			3	Factor 1
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HI01C			24	47764	1.8	27 M	53 (	1 1	138 H	425 M	42101	4 7.1	ł	25.5	24	13.9	82.7	12
H1010			38	47765	15	30.51	528	1 2	24 H	535H	3960	( T)	E	25.0	23	17.8	792	0.9
Sample Nanber	Sal ppm S	tr: INIC	Miles Billing Dama WECK	thi gin: N Kalu	Zac Dram	Manganeee Mo perit	, kysi Fergori	Cupper Caliper	Borgen Bippen	Solution Saithe produces	Sebauha 15P	Alteretives Alteretives	s Selandi Suki *	n Killig Ratio	ME C	ilotde 101	Sothan He port	Mohdorinea Mo ppm
HISOSA	22 W	40	18M	32					0.51		29H	405	0.03	0.35	44		43H	
计幻想	25-VL	45	17 M	31							60	617	0.0G	0.29	43		64H	
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Crop yeard is influenced by a number of factors in addition to seal fertility. No guarantee or warranty concerning grop performance is made by A.&.

#### Field 103A North



#### Field 103A South

Atta:DO	UG MACF) 1-545-3847	RLANE			Q	rower Code Fam Field	K0521906 CHOME 1:1034(SC	6 UTH)				0	5219-N11	23				
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H21C	16 VL	58	3VL	- 11							10 G	587	0.16	0.26	22		50 VH	
H21D	10 VL	- 36	1VL	4							BL.	369	0.0G	0.14	15		49 VH	
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#### Field 103B East



# Field 103B West

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Amy Di 25 Report Da	000 M 0 545 ( eb:201	ACEA 8947 8-11-1	RLANE	iet Date 21	117-03-2	9	nwn Code Fan Feld	HOME HOME LIGT THE SO	i dané tel IL TE	st REI	PORT			85219-W1	138			3	Page 1
Dampie	Light	e Luni	Deecp	t bepts	1.60	Organic	Photos	ona - P pp	F P	classium	Magnestur	Cadol	0.00	20	080	!	Name of Street	Barrie Barr	lurations
HT31A				4	58020	2.4	38.0	/ 80/		TAU M	200 M	10803		1 0000	12.7	- 34	14.7	308	20
H1918:				12	58001	11	201	201	20.1	DAM.	250 M	2410	2 (A	2	14.6	12	14.2	93.0	1.5
H131C				24	58097	2.0	714	101	a -	88 L	205 M	20001	1.2	8	12.0	LA	14.2	83.0	1.0
01514				38	59092	18	0 VL	81	11	89 M	230 M	21001	4 T.	8	13.2	1.7	14.8	82.1	1.8
Bumple Rumber		3uth px 11	er Lates	MENA Mathony Room MICO /	N pati	Drei Zh gan	Watgarees Mirgan	iron Fe ppm	Capper Ce ppn	Boron Bippen	Solonia Salta materia	talando SP	Alumbia Aligge	m bubued "SAL	ini KANg Ratio	DH1	CI access	Budun Napper	Molybourus Mo.ppm
HISTA	1	EV1	29	30 H	- 54					0.51	-	5.91	185	0.0 G	0.14	4Ê		30 M	
H1218	- 29	EVE.	29	1814	32							2 VL	\$25	0.00	0.12	45		40H	
HISIQ.	2	DVL	72	9L	.92							1.VL	499	0.00	0.10	22		48.8	
H131D	2	ŧL.	- 94	1410	- 55	_						- 3 ML	812	0.00	0.12	10	_	584	
OE V	C + VE	IY LOP	¥ 5+0	OW M+M	EDINE H	1 = 31004	VIC+VERY)	egel (C.C.	0+000	C.N+NO CENTRAL	KINAL MT -	WODERN	TE PENTO	-1000C, T	- PEYTQ-	10830,	17 + 18	VERE IV	er1p.10.00
THEY HAVE !	man				1	1	T	GR	PARTIN	- SUMP	DAKT	1	- 1		1	-		line	other Philade
Mare POO	0.02	100			-	-	-			-	-	-	-		+	-+	_	1.4	192000
Madler		-8	H	-				-		-	-	-	-		+	-+	-	- 12	Madam
Les		-8							-	-		-	-	_	-	-	-	-	1.04
VeryLa		-11								-		-	-		-	-	-		Verbrictere
		1.71		SP1	- R.			MI	- Ca	1	20		-	- 14	6	in l		-	
	_	_	_	_		_	1	NOR, FER	TILITY	GUIDELI	NEE (Itisla	4						- 0	
Zumpio Humber	Pas	Nya C	14	thiss	and Crop		Tied Goal	Lins Toesthore		P305	625	Mg	Qi .	1	26	*	F#	Ca	
ATTNA	Con	o Sila	ge We	stem Corri	Tdage 1	Western	25 tore	0.0	138	20	21	5	0	25					3.5
11410						10 C 10 C	Contraction of the	1 m m		- 1.X		1.2.12	- 32.5						

#### Field 104 Harold's Upper



#### Field 104 Harold's Lower

Adm DC 25	DUG NACEAR 8-545-3847	a.we				Farte	THOME	X DB LO	WER			2	44.13191	97.5			
Report Da	曲(因)(6-11-1	4 Pr	int Date:2	17-01-05	5		SO	LTES	ST REP	PORT						1	Page:1
langi+	LeastLand	Descal	t Depth	Lill	Organic	Phospie	inte - Pippi	n Po	(average)	Magnestat	i Caka	10	pH	CEC	Percer	ri Base Sa	and a second
Number HB1A HB1回 HB1C			6 12 24	50094 50095 5006	25 24 13	46M 50G 42M	Bray- 1060 10910 711		Kapa KSVH KSVH KOVH	350 H 380 H 405 VH	2120 M 1820 M 2000 M	m pH A 7.5 A 7.3 A 7.5	Extlet	14.7 13.4 15.0	69 23 41 27	9 723 6 677 5 666	1. 2 2
HBID			36	58097	13	350	58 6	1	51M	480 H	24401	1 7.9		场音	23 23	8 725	1
Sample Number	Suffe ppa S it	r NK	Nitro Nitro ppm NO3-	da gesi N Ibsiac	Zinc Zie ppm	Mangorase Min pura	lton Fo ppm	Capper Du gora	Borce Bipper	Soluble Solts mailten	Saturation Sub	Aluminum Alippin	Smith SAL	in K.Miji E Ratio	Chéorid KR CZ pom	<sup>6</sup> Sotian Nappri	Motybelies Mic ppr
H618 H618 H61C H61D	13 YL 14 VL 11 VL 12 VL	23 25 40 43	14M 21H 15M 13M	25 38 54 47					03VL		22H 22H 13H 15H	617 642 681 506	00G 01G 00G 00G	0.32 3 0.29 3 0.15 2 0.10 2	7 8 5 5	56H 66VH 74VH 65H	
SE V	L = VERY LOW	/ L #L	OW M = N	EDIUM H	E= HIGH	THE YERY	404 *	0 = 900	0, M = NAA	GRNAL, HIT :	- MODERAT	EPHYTO-1	FORIC, T =	PHYTO-T	DANC, BT = 1	EVERE P	1710-108
and the second	11111		_		-		GR	APHIC	SUMM	ARY					-1-	1000	And and and
may 1000	ore and	-	-	-	-		-		-	-	-	-	-	-	-	100	HIGH CHI
Median	1	H		-	-			-	-	-		-	-	-	-	17	Redon.
Low									-	-			_	-	-		Lin
Veyto	# ()								-					-		110	VeryLow
	21		631.0	H		8	01	C3	1	2	6 8	Mit	FR	Ci.	8		
						1	SOIL FER	TILITY	GUIDELI	ES (Ibs/s	ic l		_				
Sample Norder	Prevines Cr		lolan	died Crog		YWIG Soul	Lios TrasAcre	8	P205	K20	W2	CA.	5	Zn	dhi Fi	0	Ð
H61A	Com Silag	je We	stem Corr	Stage	Western Mart Die	28 toris	0.0	178	20	20	0	0	25				0.5

#### Field 105 Dixon Back



# Field 106 Dixon Front

Attn.DO	00G	WAC	EAR T	LANE			8	Fam Field	HOME	кт					004	19411	N				
Report D	da C	師の	1-08	Pr	int Date: 2	(17-03-2	E.		SO	LTE	ST REP	PORT									Page:1
Sarple	b	egai L	nd	Seetp	: Depth	Lin	Organic	Phorph	anue - Pipp	1	-	Mopresta	1 9	ician.	pě	1	EEC	P	ercent	Base Salt	rations
H01A H01B H01C				100	6 12 24	47757 47758 47759	2.0 2.8 1.1	53 G 47 M 40 M	(155) 1211 831	P	251 VH 184 H 161 H	195 H 185 H 195 M	138 124 189	OM OM OH	73 75 7.8	tratic i	92 83 116	7.0 5.7 3.6	17.6 18.5 14.0	73.7 74.5 81.5	19 1.6 1.1
HEID					38	47768	8.6	23 M	431	1	35M	260 M	346	0VH	8.0		25.0	12	t17	86.5	0.8
Sengle Number		5 ppn	afin 5 B	vec.	NEO NEO ION NOS	det Get N En/ac	Zinc To ppm	Mangariese Min upon	Rom Feippin	Coppe Culpter	r Boros 8 Sigan	Soluble Salts reside	Setural NP	ton Atur Al 1	diyani 3 ppre	Seturation "SAI"	e KMg Rolin E	NR	C1 C1	Sodium Na spri	Mulybdena Mogpm
H31A H31B H31C H31D		17 V 11 V 11 V 18 V		31 20 40 65	10 M 12 M 6 L 4 VL	18 22 22 14					0.2 11		351 461 73 31	5	65 36 71 28	0.1G 0.0G 0.0G 0.0G	0.40 1 0.31 4 0.26 1 0.2	92 40 23 18		40 VH 30 H 29 H 38 M	
XE V	Lel	ERY	Č8	1+1	OW M+N	EDIUM H	5+H0H	VH+YERY	Rôn *	0+00	00, M = MH	IONAL, MT	- MODER	ATE Pro	10-70	AUC, T=	Pin 10-1	ONC. 1	1.8	VERE PH	YTO-TOXX
		1.2		-					GR	APHI	C SUMN	ARY									
Very High ( High (100 Media	'Higt (00)	×.																	_	Very His	High ("High In ("GOCO) Meditare
Lave Very Lo	Ni.												-							1	Line Nery Low
			14.	and a	LULY .			ĸ	SOU FED	CR TH ITY	GISDEL #	Z (Bab	1	Mi		Fil	Di Di		8		1. 10 AU
Sample				_	heter	the Course		Valid Conel	Liss	in the second se	ince	and lines	and a	i.			74		5	- 24	
Hanber H31A H31A	00	lorn S lorn S	itag itag	e We	stem Con stem Con	Slage Slage	Western West Bk	29 tons 28 tons	0.0 0.0	206 205	20 55	20 150	0	0	10	1					0.5 0.5

Crop yield is influenced by a number of factors in addition to soil fertility. No guarantee or warranty concerning crop performance is made by A.B.L.

<u>Field</u>	109	<u>Sylvia</u>

Attn:DO: 255- Report Date	XG WACEA 646-3847 1428-16-11-1	RLANE 10 Pá	et Date:31	117-61-02	0	rower Code Faint Field	DED 1906E HOWE 109 SILVI SOI	, L TES	T REI	PORT			1219-MI	ENC:				Page:1
Sirgle	Level Land	Descar	Secto	Lei.	Organic	Phoiph	rsa - 2 gga	n Po	(interior)	Magnesian	Calley		pèl	CEC	P	Hitest	Dane Sat	urstices .
Number	cape rate	- yearys	- subst	Number	Matter	Bicarb	Buy	1	Kppm	Higher .	Capp	1 (H	6etir	mec/100g	58	% Mg	5.01	51.510
HEIA			6	56100	25	3/6	- 826	1 7	40H	465 H	2020 N	1.0		1/.9	34	21.6	73.9	13
HEIB			12	5810r	22	37.6	325		SOM	41014	233UW	18		10.7	25	21.8	14.3	18
HEAD			25	20108	17	32.10	023	1	29 M	200 H	31/0/1	80		211	15	21.6	152	1/
Hain.		_	20	20100	1/4	20 M	49)	l	841,	26019	330014	83		13.9	1,9	22.4	75.3	1.6
Sample Namber	Salt ppn S1	hr Delec	Nitrop para NOS	pen N Illistac	Zine: Zn opm	Ho ppie	kós Fegori	Copper Cuippin	Beton B port	5/20 88/20	Seturation 16P	Aluminuts Alumn	Saharati NAI 1	Rotio El	R	21 21 1018	Sodiare No pore	Notybdoau Mo ppm
HDIA	15 VI.	27	23 H	41					02W	-	34H	305	0.06	0.16 1	Ţ		-53H	
H918	15 VL	27	15 刻	27							20 H	382	0.00	0.11 3	8		64H	
HEIC	19.VL	.68	13.M	47							2714	291	0.0 G	0.07 2	9		83H	
H91D	25VL	- 90	10 M	36							4M	96	0.0G	0.04 2	2		79H	
QE VL	= YERY LO	W. F. = 10	cor M+M	EDISM H	+= )400 H	M=ABM (	90H	0 = 0000	N = HAP	KORVAL, MT :	= MODERAT	LPH/ITO-T	UNIC, T	8910-0	000C, 1	81 : H	IERE PA	erro-roaio
				1	10	115	GR	APHIC	SUMM	IARY	2.0	117		-				
Very High (18	990	- T		( ) ·											Т		Very	High CHigh
High / 600	01			200								-		1		_	14	#100001-th
Miduit	11							-									112	Median
100									-	_	_	-	_	-	-1	_	100	Line
VeryLow									-		-	-	_	-		-	100	Darg 1/m
	21	1000	(4,3 e	N	100	K	Mr	14	1	2	x. 1	den 1	14	Cr.		- 11	1.5	
					_	5	OIL FER	TILITY	GUIDELI	NES (Ibsia	(c)		1111					
Sample Namber	Presium C	ing.	1000	ded Crisp		THE DIRE	Elma TousiAcre	8	F208	120	10	Ça	5	D I	82	Fe	.01	5
H91A H91A	Com Sile Com Sile	ige Wes igo Wes	stem/Corr stem/Corr	Silage   Silage	Western West Blo	25 kors 25 kors	0.0	158 158	20 55	20 150	0 8	0	30 30	2				0.5 0.5

Crop yield is influenced by a number of factors in addition to soil letality. No guarantee or warranty concerning crop performance in made by A & L

#### Field 201 Skelton



#### Field 202 Reimer's

Attr:DO 250	UG MACFA 545-3547	RLANE			ିଜ	rower Cod Farn Field	4:05219066 htHOME dt202 REM	ERS				0	5219-N11	33				
Report Dat	#2016-11-	8 Pri	nt Date:2	017-01-0	£		SO	L TE	ST REI	PORT		_						Page:1
Sample	Lightan	Descpt	Depth	LO	Organic	Phasp?	iorun - P ppr	1 1	otaesium	Vagnesium	Calcie		pH .	CEC	P	forcunt B	Base Sal	atalices
1814			8	59102	3.0	47 M	1251	1	201 VH	240.H	1780.0	7.4	Indur	11.0	61	17.0	76.5	14
ALC: N			12	58:01	2.0	49.14	98.0	1.1	230/41	2901H	1790 M	79		12.6	4.8	10.2	80.4	45 21
HEIC.			74	58104	0.8	29 M	561	1	192H	325 H	1850 M	74		127	3.0	21.4	731	10 10
1810			35	58105	0.9	20 M	371	1	146M	340 H	2870 H	17		17.7	21	16.0	81.1	0.9
Sample Kamber	Salt ppri 51	a Isik	Man Nitro	ota gen Al Deslar	Zinc Zin para	Mangaooni Ma com	liton Feippin	Сорре Сж. рря	Boron Bippin	Solution Salta	Saturation 5/P	Akerinan Alapan	Seturation NAL	Ratio	CI ENS		Sodian Na pph	Wolybdarnan Wolppe
AB1A	914	16	13 M	23		we pres			0.2 M	1010.00	30 H	542	0.0G	0.37	42	ipe:	39H	_
481B	16 VL	29	14 M	25							20 H	624	01G	0.25	32		62 VH	
481C	19 YL	68	10 M	36							12H	601	0.0G	0.18	20		58 VH	
4810	20 VL	72	12 M	43							31.	281	0.0G	0.13	21		38M	
XE VL	≥VERYLO	V L≠LC	W H=N	EDIUM +	i = HIGH	AH = AEKA	HOH	6= 000	0, 10 = 10,0	IGINAL MT +	MODERAT	EPHYTO-T	C00E, 7 -	PHYTO-	10000;	8T = 3E	VERE PH	ALLO-TOXIC
							GR	APHI	C SUMM	IARY								
Very High (*)	1910		100								- 1			1			Vera	High ("High)
High (1900	(0)									_			_				150	1000018
Wedlam				-					-	-						_		Noder
Low					-				-	_					-	-	100	LIN
VeyLow	é.								1						-		1	Very Low
_		+311	12"	H		8	142	Ca	3	2	1	bi.	Fe	Ċ.		1.8	1	
					10		SOIL FER	TILITY	GUIDELI	NES (Ibs/a	c)							
Semple Sample	Previous C	198	\$10m	ded Crite		Tiefd Goal	Line Tops/fore	Ň	9201	K20	Ng .	Cir	6	Ln.	Mit 1	Fr	Ċa	в
HBIA	Com Sela	ge Wes	tem Com	n Såage	Western	25 tors	B.0	190	20	20	0	0	20					0.5
1244	Com Sile	de Wes	tem Con	Silana I	West Bit	25 tors	0.0	190	55	150	0	0.	20					65

# Field 203 Hoekstra

Report Det	te:2017-84-1	7 Prin	t Date:20	17-04-1			SO	L TES	ST REP	PORT								Page 1
Sample	Lecal Last	Descat	Death	Lié	Organic	Phosph	orus - P ope	i Pi	assian	Nagretian	Calci	101	pH	CEC	1	ercent B	Sase Sal	urations
2031A 2031B 2031C	1110.007		6 12 24	62876 62877 62878	4.2 2.3 2.0	47 G 41 H 38 H	104 H 		<u>Kopm</u> 197 VH 181 H 181 H	410 M 475 M 580 H	35501 42201 41201	n pH A 6.6 A 7.0 A 7.5	8.8	24.4 29.7 26.3	3.1 24 27	14.0 13.3 18.3	72.8 71.0 78.2	97 0/ 12.9 0/ 1.1
Sangla Namber	Suffi ppm S 1	r 1936 - 1	Mitro Nitrop Int NCC-I	te poei N Altes/ac	Zinc Zn ppm	Mangonese Me ppm	iron Fe ppm	Copper Ca ppm	Boron Bippes	Soluble Salta Insicra	Saturatio NP	Alammum Al open	Selarația Nați*	n K/Ng El	ER CI	Ci Opre	Sodian Na ppin	Nolybdies No pper
2031A 2031B 2031C	11 VL 16 VL 16 VL	20 29 58	6L 4VL 4VL	11 7 14	5.2H	41 H	78 VH	23H	05L	0.3 VL	24 H 25 H 5 M	550 420 417	0.1G 0.0G 0.0G	0.22 5 0.18 3 0.15 3	4 5 2	11L	20L 28L 58 M	
SE VL	L = VERY LOW	V L=LO	W M=M	echum a	= HIGH	VH = VERY)	GR	G = 600	), M = MAR SUMM	GINL NT :	MODERA	E PHYTO-	CXIC, T =	PHY10-1	0.00C, 1	57 - SE	VERE P	10-10.W
SE VL	L = VERY LOW	V L=10	W M=M	ECKUM 1	= HIGH	VH = VERY)	GR	6 = 600 APHIC	O, M = MAA SUMM	GINL NT :	MODERA	E PHYTO-1	CXIC, T =	PHYTOI	0000,1	ST = SE	VERE PS	High (Hig
Very High (19 High (1900	L = VERY LOV	V L=10	V M=M	EDIUM 7	= HIGH	VH = VERY)	GR	6 = 600 APHIC	D, M = WAR	GRAL MT =	MODERA	E PHYTO-	OWIC, T =	PHYTOI	0.000, 1	ST = SE	VERE P	High ("High
Xery High (%) High (%) Miediam	L = VERY LOV	V L=10	W M=M	EDIUM 7	I = NGK	VH = VERY)	GR	6 = 600 APHIC	O, M = WA SUMM	GRAL NT :	MODERN	E PHYTO	OWIC, T =	PHYTOI	0.000,	57 = 8E	VERE PS	High (Hig High (Hig Is (1900) Vectors
CE VL Very High (19 High (1500 Medium Low	L = VERY LOW	V L=L0	V M=M	EDRUM Y	I = NIGH	VH = VERY)	GR	G = GOO	D, M = MAR	GRAL MT :	MODERA		CWIC, T =	PHYTOI	0.000; 1	ST = SE	VERE PS	High (Hig Is (19000) Vedture Low
CE VL Very High (*) High (*GOC Medium Low Very Low	L = VERY LOW	V L=10	W M=M	ESIUM 1	I = HIGH	VH = VERY)	GR	G = GOO	D, M = WAR	GINL HT:	MODERA		OWIC, T =	PHYTOIT	0.000, 1	ST = SE	VERE P	High (Hig b (GOOD) Vedum Low Arry Low
SE VL Very High (19 High (1900 Miedium Low Very Live	L=VERYLOW Hight COD: I V PH	V L=L0	W M=M	EDIUM +	I NGK	VH = VERY)	GR	G = GOO	D, M = WA SUMM	GRAL, HT =		ME	CXIC, T =	PHYTO-D	2005,	57 = SE	VERE P	High (Hig High (Hig In (GOOD) Wedure Low Any Low
SE VL Very High (*90 High (*90 Medium Low Very Low Sectors	L = VERY LOW	v L=L0	W M=M	EDIUM P	iz NGH	VH = VERY) K	GR GR Mg SOIL FER	G = GOO APHIC Ca TILITY (	SUMM	GewL HT : IARY NES (Ibsia		NE PHYTO 1	CXOC, T =	PHYTO-D	2002,	57 - SE	VERE P	High (Hig High (GOOO) Wedaan Low Asty Low
Very High (*) High (*GOC Miedium Low Very Low	Le VERY LOX Hatta XOP F Previous C	v L=10	W M=M	EDIUM +	I THIGH	VH = VERVI	GR GR Mg SOIL FER Little Tom/Are	G = GOO APHIC Ca TILITY ( N	SUMM SUMM SUDELI 9205	GewL MT = IARY ARY VES (Ibsia K20	MODERN c) Mg	Mat Ca	F#	PHYTO-D Ca Zh	MD	ST = SE B Fa	VERE P	High (Hig High (GOOO) Viedhan Low Arry Low B

# Field 205 Jessie

UG MAG 1541-35	FAR	LANE				Fano Field	(HOME (205.)E38	IE .										
w28%	0-21	Rti	nt Date: 21	117-01-02	1		S0	L TE	ST REF	PORT						_	. 12	Paget 1
Legal L	mal	Descpt	Septi	Let	Crigonic	Phosphy	orum - Fipp	M 1	Potassium	Réglesier	a Calciu	1	H	CEC	P	ncaint B	Base Sep	inden
	-		6	27522	24	30M	( 101	4	211H	245.6	TUTCH	74	2416	12.6	43	16.5	78.1	11
			12	77573	13	221		2	130M	300H	1830.H	74		121	28	20.6	75.5	ŕ
			24	27534	11	32M	640		95M	465H	414014	84		25.0	18	155	877	
			36	27525	07	37H	601	Ê -	881	495 H	4160 H	8.6		25.4	0.9	18.2	81.9	1
- 4	de		Nitz	tu .	Ter	Mangamenti	ites.	Conne	- Brook	Soldin	Languages	Ibritan	Lineste	100	Ché	iride	4 diam	(b) h h h
101	5b	690	NRV)	DALES.	20.000	Manna	Fepper	Cappe	s Bapes	549	NP	Al para	5A1*	Ratio	8 J	2	Na ppen	No ppr
143	1	75	22 H	40		and pages			0.3 M		51	5倍	0.0G	0.27 3	N N	191	4611	
171	â.	31	12 M	22							9.14	569	0.06	0.14 2	5		37 H	
151	1	54	51	18							5 M	96	0.0G	0.06 2	3		57 M	
541	٩.	50	116	- 4							5M	95	0.0G	0.06 1	0		E7H	
= YERY	.DW	L=LC	帰 新言語	EDILM H	1= HGH	WENERY)	iei	6:00	00, W = WAR	GBAL, MT =	HODERAT	EPHITOT	COOC, 1=	PHYTO-T	0.00C, B	1435	FERE PH	YTO-TOR
							GP	APH	C SUMM	ARY					- 11			
iligit)	_																Very	High (14)
(0)								-		-							24	# (°GDG)
121		1.1								-				-			133	Vedam
			-									-				_		1.00
1.1																		laty Low
	21		501	1		I.	No	14	1	. 2)		Ma	8	-124		T		
	_						OIL FER	TILITY	GUIDELI	NES (Ibela	ic)							
Presig	n Cr	¢	-	ded Crog	;	Yest Gast	Lies Termiters	N	P205	120	Mg	Cr.	5	20	Ve	14	Çi	6
Atata			Ate	la :	-	7 tons	0.0	6	66	400	5	0	20					. 20
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Baster         Beylin           0         27522           24         30M           12         27523           24         27523           36         27252           24         27523           36         27252           24         27523           37         22           24         27523           37         21           36         27525           37         27           36         27525           37         27           36         27525           37         27           36         2752           37         37           37         12           384         34           390         Marganese           44/L         25           31         12           34         12           34/VL         25	OUNCEARLANE (S46-3647         Family HOLE         Family HOLE         Family HOLE           S46-3647         Prest 235-2858         SOIL TEST REF           Legal Land Description         End Marketer Bacter         Brance         Brance         Brance           Legal Land Description         End Marketer Bacter         Brance         Brance         Brance         Brance         Brance           12         27522         2.4         30M         C0M         2111           12         27523         1.3         22L         C0L         133 M           24         27524         1.1         32M         B46         95 M           301         27525         0.7         37 H         IOH         B81           Safter         Marcan         Date         Brance         Bacter         Bacter	COLUME/FARLANE IS46-3647         Family HOME Pendition         Family HOME Pendition         Family HOME Pendition           K25016-16-21         Print Date: 2017-01-05         SOIL TEST REPORT           Legal Land Descript         Bed/M Mundlew         Mundlew         Princeptonen         From Princeptonen	Garmer-Model Safe-Set7         Farmer-Model Features         Farmer-Model Features           SOIL TEST REPORT           Legal Land Descript         Farmer-Model Soils-16-21         Report Easter 2017-01-05         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Calabin: 2018-01           Sold Micro Calabin: 2018-01         Sold Micro Calabin: 2018-01           Sold MicroCalabin: 2018-01         Sold Mi	Col MACFARLANE ISME-SNAT         FarmeHONE ISME-SNAT         FarmeHONE ISME-SNAT         FarmeHONE ISME-SNAT         SOLL TEST REPORT           Legal Land Descript Televity Musclew Matter 6         Colspan="2">Official Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan="2"Colspan=	Game-Hole Isati-Stati-Stati         Fame-Hole Isati-Stati-Stati           Solic TEST REPORT           Legat Land Descript Televity Muscles Muscles Muscles Repar Land Descript Televity Muscles Muscles Muscles Backs Repar Land Descript Televity Muscles Muscles Muscles Backs Repar Land Descript Televity Muscles Muscles Muscles Backs Repar Land Descript Televity Repar Land Televity R	COLMACEARLANCE         Family HOME           SARCARE         Family HOME           SOLD TEST REPORT           Logat Land Description From Prophysical Sciences         Colspan="2">pH met Date 2017-01-05           Logat Land Description From Prophysical Sciences         Colspan="2">pH met Date 2017-01-05         Colspan="2">pH met Date 2017-01-05           Logat Land Description From Prophysical Prophysical Sciences         Colspan= Colspan="2">pH met Date 2017-01-05         Colspan="2">pH met Date 2017-01-05           Logat Land Description From Prophysical Prophysical Sciences         Colspan="2">Colspan="2">pH met Date 2017-01-05         Colspan= Colspan="2">pH met Date 2017-01-05         Colspan= Colspan= PH met Date 2017-01-05           Colspan= Colspan= PH met Date 2017-01-05         Colspan= Colspan= PH met Date 2017-01-05         Colspan= Colspan="2">PH met Date 2017-01-05           Colspan= PH met Date 2017-01-05         Colspan= PH met Date 2017-01-05         Colspan= PH met Date 2017-01-05           Solspan= PH met Date 2017-01-05         Colspan= PH met Date 2017-01-05         Colspan= PH met Date 2017-01-05           Solspan= PH met Date 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#### Field 206 Ferguson



# Appendix 2. Manure analyses – Spring 2017

# Lagoon liquid effluent March 2017

<section-header>   MANURE ANALYSIS     Distribution     Analysis   &lt;</section-header>	AS NUMBER: #15005 SAMPLE ID: 1 59 L	MANURE ANALYSIS		-
	SAMPLE ID. 1 593 L			DATE RECEIVED: 201
Production         RESOLT         PERI Labo GAL         With Labo           Dry Marker         0.3 %         3.3           Mithode         0.03 %         3.3           Mithode         0.00 %         2.1           Processions (Total)         0.000 %         0.000 %           Catalan         0.0000 %         0.01 %           Adapteriants on imported to an as is been.         1.3         0.0000 %           **** "As becomented as emported to to tak anoted.         One and takes (the total anoted.)         0.0000 %           Cotal and official anoted.         0.0000 %         0.0000 %         0.0000 %           Cotal another anoted.         Cotal another anoted.         Cotal another anoted.         Cotal another anoted.           Cotal another anoted.         Cotal anoted.         Cotal an		ANALYSIS	POUNDS	GATE PRINTED: 201 EATE PRINTED: 201 ESTIMATI
by Metre         0.3 %           Witsegen (Total)         0.000 %           Mitsegen (Total)         0.000 %           Phosephone (Total)         0.000 %           Orgen (Mater *         0.2 %           Catacor Mingraph (Total)         0.010 %           Cotacor Mingraph (Total)         0.010 %           Cotacor Mingraph (Total)         0.010	PARAMEICE	RESOLT	PER 1.668 GA	PER 1,000 1
Internet (1980)         0.000 %         2.1           Proceedings (1980)         0.000 %         0.000 %           Procession (1980)         0.000 %         0.000 %           Orgenic (1980)         0.000 %         0.000 %           *46 Procession are reported to orgenic all brass.         1.1         0.000 %           **46 Procession are reported to orgenic all brass.         1.1         0.000 %           **46 Procession are reported to orgenic all brass.         0.000 %         0.07           **46 Procession are reported to orgenic all brass.         0.000 %         0.07           **46 Procession are reported to orgenic all brass.         0.000 %         0.000 %           **46 Procession are reported to orgenic all brass.         0.0000 %         0.000 %      <	Dry Matter	0.3 %	2.44	
Phosphorus (Total)         0.0002 %         0           Protession (Fedd)         0.0002 %         1.2         0.3           Potassion (Fedd)         0.0003 %         3.4         3.1           Potassion (Fedd)         0.0003 %         3.4         3.1           Opprovide/Star (SCO)**         0.0032 %         3.4         3.1           Opprovide/Star *         0.0032 %         3.4         3.1           Calkan         0.0016 %         1.4         0.0016 %         0.7           *46 Procession are reported on on as its base.         ************************************	NH4-N	207 ppm	2.1	
Physical (First PC102)         D0120 %         1.2         0.3           Physical (First PC102)         0.0601 %         0.0601 %         0.1           Physical (First PC102)         0.0237 %         0.4         0.1           Cancer Physical (First PC10)         0.2 %         0.2 %         0.0000 %         0.0           Cancer Physical (First PC10)         0.1 1         0.0000 %         0.0         0.0           Addresses         0.0000 %         0.0         0.0         0.0         0.0         0.0           Cancer Physical (First PC10)         0.0000 %         0.0         0.0         0.0         0.0         0.0         0.0           Addresses         0.0000 %         0.0	Phosphorus (Total)	0.0682 %		
Раздани, (12 как (20)**         0.0001**           Ордан (12 как (20)**         0.215           Cancer. Margani, Malon (27.1)         0.0102**           Cancer. Margani, Malon (27.1)         0.0102**           Cancer.         0.0010**           Cancer.         0.0010**           ************************************	Phosphale (P as P205) **	0.0120 %	12	0.1
Compare Name         Courses         Add         Add           Copyrete Name         0.020 %         Add         Add           Copyrete Name         0.021 %         1.0         Copyrete Name         CopyretN	Potassium (Tetal)	0.0291 %		
Calebook         0.0152 %         1.4           Calebook         0.0152 %         1.4           Magnemism         0.00070 %         0.7	Organic Matter *	0.0037 %	2.4	3.1
Catelow         D0152 %         1.4           Magnanian         0.0000 %         0.7           **Al-Parameters are reported to an use to beam.         ************************************	Carbon Natiogen Ratio (C.N)	6:1	20.0	
Magnemiest       0.0070%       0.7         *44 Provensions are reported on an as is base.       ************************************	Calokini	0,0182 %	1,8	
<text><text><text><text><text><section-header></section-header></text></text></text></text></text>	Magnetium	0.9670 %	0.7	
MANURE ANALYSIS         MATERIACIONE - 2017-05.40           NAME DES 1228001         Date REPORTE: 2017-05.40           SARAMETOR         MARLITERS         POLISOS           SARAMETOR         MARLITERS         POLISOS         REFERENTIV MEDIANCE           Dys Metter         0.9 %         POLISOS         REFERENTIVA MEDIANCE           Dys Metter         0.9 %         POLISOS         REFERENCE           Mitegen (Tetal)         4.000 %         POLISOS         POLISOS           Mitegen (Tetal)         6.01 (pp.         8.4         POLISOS	Critici and Criticianski	e la cesse. Ota analiste, Grey a porten of these natrents will be availa , accende conflice/Manue_Analysis.pdf mais a charactery accentery to the conflict Const. <b>t May 2017</b>	the two year of application.	
Address of advances of advance	Control and a service of the service	n is cease. (of a analyticle . Griy a portion of these nutrients will be available . Griy a portion of these nutrients will be available . A second of comparison of the second of the available . A second of the	the two year of application. IDEAL and COMP STOREAL ST	,n <b>AL</b>
RARAMETER         ANALYTING         POLNOS         AVERABLITY           Dry Notter         0.9 %         molt 1.060 GAL         molt 1.060 GAL           Nitrogen (Tetal)         0.8 %         9.2         Mitrogen (Tetal)           Mitrogen (Tetal)         640 2 ppr         5.4         Phaghorus (Tetal)	Control of the second s	nia cessi. (nia analysis of page. 	the two year of application. Included and Convert STORDAL and Convert	1/ <b>AL</b> 1/ 3
Dry Noter         0.9 %           Nitrogen (Tetal)         4.082 %         9.2           NHA W         642 ppr         5.4           Phagherus (Tetal)         3.0117 %         5.4	Correct outstanding weekselding. Note information weekselding. The information Correct and the information weekselding. The information Correct and the information weekselding. The information Correct and Correct and Correct and Correct and Correct The information and correct	nia cesso. (na analysis of page. 	the the year of application. I DEDAL and OWN? S INC. MATCH MATCH DATE PAGE: MATCH DATE PAGE: MATCH DATE PAGE:	1/ 2010/641 9/7 2010/641 80/1112 2010/641 80/1112 2010/641 80/1112 2010/641 80/1112 2010/641
Hängen (fold)         8.00 %         9.2           Ante N         642 (pm)         6.4           Phagheoux (fold)         8.0117 %	Control of the second of the s	nia ceasa. (nia ceasa) (nia c	the the year of application.	1 / 3 CONTE: 20105 40 OPTIOL 20105 40
MMA-N 543 (ppn 8.4 Pholophorus (Total) 3.0117 %	CYTOP BOOKE  APPORT ADJ. CYTOP BOOKE  CYTOP BOOKE  CYTOP BOOKE  APPORT ADJ. CYTOP BOOKE APPORT ADJ. APPORT ADJ. APPORT ADJ. CYTOP APPORT APPORT ADJ. APPORT ADJ. APPORT ADJ. CYTOP APPORT APPORT AD	n is cases. (of a analyticle . Only a portion of these nutrients will be available . Only a portion of these nutrients will be available . A second of control of the second of control of the second	the the year of application. International Convertional States of Convertional Convertional States of Convertional Convertional Pages: Pa	1/3 1/3 001012 201-05-03 001012 201-05-10 001012 201-05-10 0010012 201-05-10 001012 201-05-10 001012 201-05-10 001012 201-05-10 001012 201-05-10 001012 201-05-10 00100 201-05-10 001000 201-05-10 00100000000000000000000000000000000
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Potestam (Tota) 0.0021%	Correct and Correction on retruggent available by, Note information availables: retraining Correct ages of the second Correct ages of the	nia zamio. Nar analysis. Civity a portion of these nutrients will be available. In an inverse of long. Interface of any interface of a spectrum of the second of Control of Control Inverse is a longer of the second of the second of Control of Control Interface is a longer of the second of the second of Control of Control Interface is a longer of the second of the second of Control of Control Interface is a longer of the second of the second of Control of Control Interface is a longer of the second of the second of Control of Control Interface is a longer of the second of the	All the year of application.	1 / 3 CONTE: 201-05-03 OPTIO: 201-05-03 OPTIO: 201-05-03 PETERMATE: 201-05-04 PETERMATE: 201-05-04 PETERMATE: 201-05-04 PETERMATE: 201-05-05 PETERMATE: 201-05-05 PETER
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Calcium 0.0617% 5.2	COTTON GOOD     COTTON GO	te team. (of a analytic for y a portion of these nutrients will be availed asternando convilient/Nerving_Analysis.pdf the May 2017 CANADA LABORATORIE Research a loader, on leaf of the gene do data free gene research and the second of the gene do data free gene research and the second of the second of the gene do data free gene research and the second of the second of the gene do data free gene do research and the second of the second of the gene do data free gene do research and the second of the second of the gene do data free gene do research and the second of the second	the the year of application.	1 / 3 CONVIL 201364 CONVIL 201364 SUTUD 2
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TO: ENLERAD BAY AG SERVICES FO TO MARYS EMERADO BAY BOAD VERVICH, BC VIH 2A7 CANADA CANADA KITIN: DOUG MACFARLANE	ORI HUS JANSEN AND SONS	Janken o Morch	2017
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	MANURE ANALYSIS		
B NUMBER: 818007 SAMPLE ID: 3 PA()		D D	ATE RECEIVED: 2017-03-22 ATE REPORTED: 2017-03-28 DATE PRINTED: 2017-03-28
PARAMETER	ANALYSIS RESULT	POUNDS PER TON	ESTIMATED AVAILABILITY PER TON
Dry Matter	18 %		
Nitrogen (Total)	0.353 %	7.t	
NH4-N	204 ppm	0.4	
Phosphorus (Total)	0,0714 %	0.077	
Phosphate (P as P205) **	0.1642 %	3.3	1.3
Potassium (Total)	0.0522 %	and the second sec	
Potash (K as K2O) **	0.0626 %	1.3	1.2
Organic Matter*	15.1 %		
Carbon:Nitrogen Ratio (C:N)	24:1		
Caldum	0.1890 %	3.8	
	0.0000 M		

\* All Parameters are reported on an as is bools. \*\*Available nutrients are reported as lotal evaluative. Only a partien of these nutrients will be available the year of application. For information on introgen available. http://www.aicanada.com/likes/Manure\_Analysis.pdf

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