Technical Document LA19004

Part 2 — Technical Requirements

NRCB Natural Resources Conservation Board

Application under the *Agricultural Operation Practices Act* for a confined feeding operation, manure collection area and/or manure storage facility(ies)

NRCB USE ONLY	Application number	Legal land description
☑ Approval ☐ Registration ☐ Authorization ☐ Amendment	LA19004	~~SW 04-008-26 W4M~~ NW 33-007-26 W4M

APPLICATION DISCLOSURE

This information is collected under the authority of the *Agricultural Operation Practices Act* (AOPA), and is subject to the provisions of the *Freedom of Information and Protection of Privacy Act*. This information is public unless the NRCB grants a written request that certain sections remain private.

Any construction prior to obtaining an NRCB permit is an offence and is subject to enforcement action, including prosecution.

I, the applicant, or applicant's agent, have read and understand the statements above, and I acknowledge that the information provided in this application is true to the best of my knowledge.

31/01/2019
Date of signing

Signature

P+H Wessels Farms Ltd
Corporate name (if applicable)

Pieter Wessels
Print name

GENERAL INFORMATION REQUIREMENTS

Proposed facilities. List all proposed confined feeding operation facilities and their measurements, including if it is an addition to a an existing facility (attach additional pages if needed)

Proposed manure collection areas & manure storage facilities		Dimensions (m)
~~existing pens~~	removed from application	~~185 m x 90 m~~
~~catch basin #1~~	removed from application	~~34 m x 30 m x 4 m~~
proposed pens		190m x 223 m
catch basin #2		40 x 40 x 5 m

Existing facilities. List **ALL** existing confined feeding operation facilities and their measurements (use additional pages if needed)

Existing barns, manure collection areas & manure storage facility	Dimensions (m)	NRCB USE ONLY

AO Note: as per the email from Pieter Wessels (page 2 of this document) the applicant has removed catch basin #1 and existing pens (referred to as feedlot pens #1 from their application). The pens (located on SW 04-008-26 W4M) will continue to be used as a seasonal feeding and bedding site (the requirements of which are outlined in NRCB Fact Sheet "Distinguishing Between Confined Feeding Operations and Seasonal Feeding & Bedding Sites (For Cattle Operations)".

NRCB USE ONLY

From: Pieter & Henriette Wessels
To: Adria Snowdon
Date: July-04-19 1:57:26 PM

Hi Adria

After assessing the suitability of our proposed location for a catch basin for the existing corrals on the north quarter we now have to look at adjusting the size and/or location.

For now,because of this we only like to continue working on permitting the new pens on the south quarter.These new pens are for 2500 beef finishers.

The original application will be split up in two parts now.

Pieter Wessels

AO Note: The catch basin and existing corrals referred to in this email are the ones located on SW 4-8-26 W4M. As stated throughout this technical document and Decision Summary LA19004 these facilities will no longer be considered as part of this application. In order to apply for any additional CFO facilities in the future, P & H Wessels Farms Ltd. must apply for the appropriate NRCB permits.

Gerald and Rita Beekman give Pieter and Henriette Wessels (P & H Wessels Farms Ltd) permission to expand their feedlot on their parcel of land NW33-7-26 W OF 4

Gerald Beekman
Rita Beekman

Date 20/6/2019.

the proposed feedlot on NW33-7-26 W4 is being considered as a new CFO.

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If a new facility is replacing an old facility, what will be done with the old facility and when? ☐ N/A

November 30, 2022

Proposed construction completion date: NOV 30 2021

Additional information:

* Building new CFO
* ~~Change use from seasonal to CFO.~~

P & H Wessels Farms Ltd. indicate the pens on SW 4-8-26 W4M will continue to be used as a seasonal feeding and bedding site. They are reminded that if they wish to change from this use to a CFO in the future, an additional NRCB permit would be required.

Livestock Numbers: (include all livestock)
Note: Livestock numbers in this table will be used when processing the application)

Livestock type/ category	Existing number	Change in number (if applicable)	Total
beef finishers	0	~~+ 5000~~ 2500	~~5000~~ 2500

AO Note: animal numbers have been updated at the request of the ~~applicant (as per the email on page 2 of this document) with removal of~~ catch basin #1 and existing pens (feedlot pens #1) from the application.
New numbers: Existing numbers: 0
~~change in number: 2500~~
Total: 2500 beef finishers (in feedlot pens #2)


water wells
Catch basin #1 removed from application
catch basin #1
water well
Well ID 103473
Well ID 2028608
Well ID 103472
SW 4-8-26 W4M
Feedlot Pens #1 (removed from application)
existing pens
80
264
proposed pens
Feedlot Pens 2
Catch basin #2
catch basin #2
NW 33-7-26 W4M
© 2015 Google
Image © Alberta MD s and Counties
Google
2012
Imagery Date: 6/10/2015 49°36'51.01" N 113°28'22.55" W elev 3643 ft

Part 2 — Technical Requirements

NRCB Natural Resources Conservation Board

Application under the *Agricultural Operation Practices Act* for a confined feeding operation, manure collection area and/or manure storage facility(ies)

DECLARATION AND ACKNOWLEDGMENT OF APPLICANT CONCERNING *WATER ACT* LICENCE

issued by Alberta Environment and Parks (AEP) for a confined feeding operation (CFO)

Date and sign (or check) one of the following four options

OPTION 1: Applying through the NRCB for both the AOPA permit and the *Water Act* licence

☐ I **DO** want my water licence application coupled to my AOPA permit application.

Signed this ____day of _____, 20____. _____

Signature of Applicant or Agent

OPTION 2: Processing the AOPA permit and *Water Act* licence separately

1. I (we) acknowledge that the CFO will need a new water licence from AEP under the *Water Act* for the development or activity proposed in this AOPA application.
2. I (we) request that the NRCB process the AOPA application **independently of** AEP's processing of the CFO's application for a water licence.
3. In making this request, I (we) recognize that, if this AOPA application is granted by the NRCB, the NRCB's decision will not be considered by AEP as improving or enhancing the CFO's eligibility for a water licence under the *Water Act*.
4. I (we) acknowledge that any construction or actions to populate the CFO with livestock pursuant to an AOPA permit in the absence of a *Water Act* licence will **not** be relevant to AEP's consideration of whether to grant the *Water Act* licence application.
5. I (we) acknowledge that any such construction or livestock populating will be at the CFO's sole risk if the *Water Act* licence application is denied or if the operation of the CFO is otherwise deemed to be in violation of the *Water Act*. This risk includes being required to de-populate the CFO and/or to cease further construction, or to remove "works" or "undertakings" (as defined in the *Water Act*).
6. **CHECK IF RELEVANT** ☐ I (we) acknowledge that the CFO is located in the South Saskatchewan River Basin and that, pursuant to the *Bow, Oldman and South Saskatchewan River Basin Water Allocation Order* [Alta. Reg. 171/2007], this basin is currently closed to new surface water allocations.

Signed this ____ day of _____, 20____. _____

Signature of Applicant or Agent

OPTION 3: Additional water licence not required

1. I (we) declare that the CFO will not need a new licence from AEP under the *Water Act* for the development or activity proposed in this AOPA application.

Signed this 25 day of January, 20 19. _____

Signature of Applicant or Agent

OPTION 4: Uncertain if *Water Act* licence is needed; acknowledgement of risk (for existing CFOs only)

1. At this time, I (we) do not know whether a new water licence is needed from AEP under the *Water Act* for the development or activity proposed in this AOPA application.
2. If a new *Water Act* licence is needed, I (we) request that the NRCB process the AOPA application **independently of** AEP's processing of the CFO's application for a water licence.
3. In making this request, I (we) recognize that, if this AOPA application is granted by the NRCB, the NRCB's decision will not be considered by AEP as improving or enhancing the CFO's eligibility for a water licence under the *Water Act*.
4. I (we) acknowledge that any construction or actions to populate the CFO with additional livestock pursuant to an AOPA permit in the absence of a *Water Act* licence will **not** be relevant to AEP's consideration of whether to grant my *Water Act* licence application, if a new water licence is needed.
5. I (we) acknowledge that any such construction or livestock increase will be at the CFO's sole risk if the *Water Act* licence application is denied or if the operation of the CFO is otherwise deemed to be in violation of the *Water Act*. This risk includes being required to de-populate the CFO and/or to cease further construction, or to remove "works" or "undertakings" (as defined in the *Water Act*).
6. **CHECK IF RELEVANT** ☐ I (we) acknowledge that the CFO is located in the South Saskatchewan River Basin and that, pursuant to the *Bow, Oldman and South Saskatchewan River Basin Water Allocation Order* [Alta. Reg. 171/2007], this basin is currently closed to new surface water allocations.

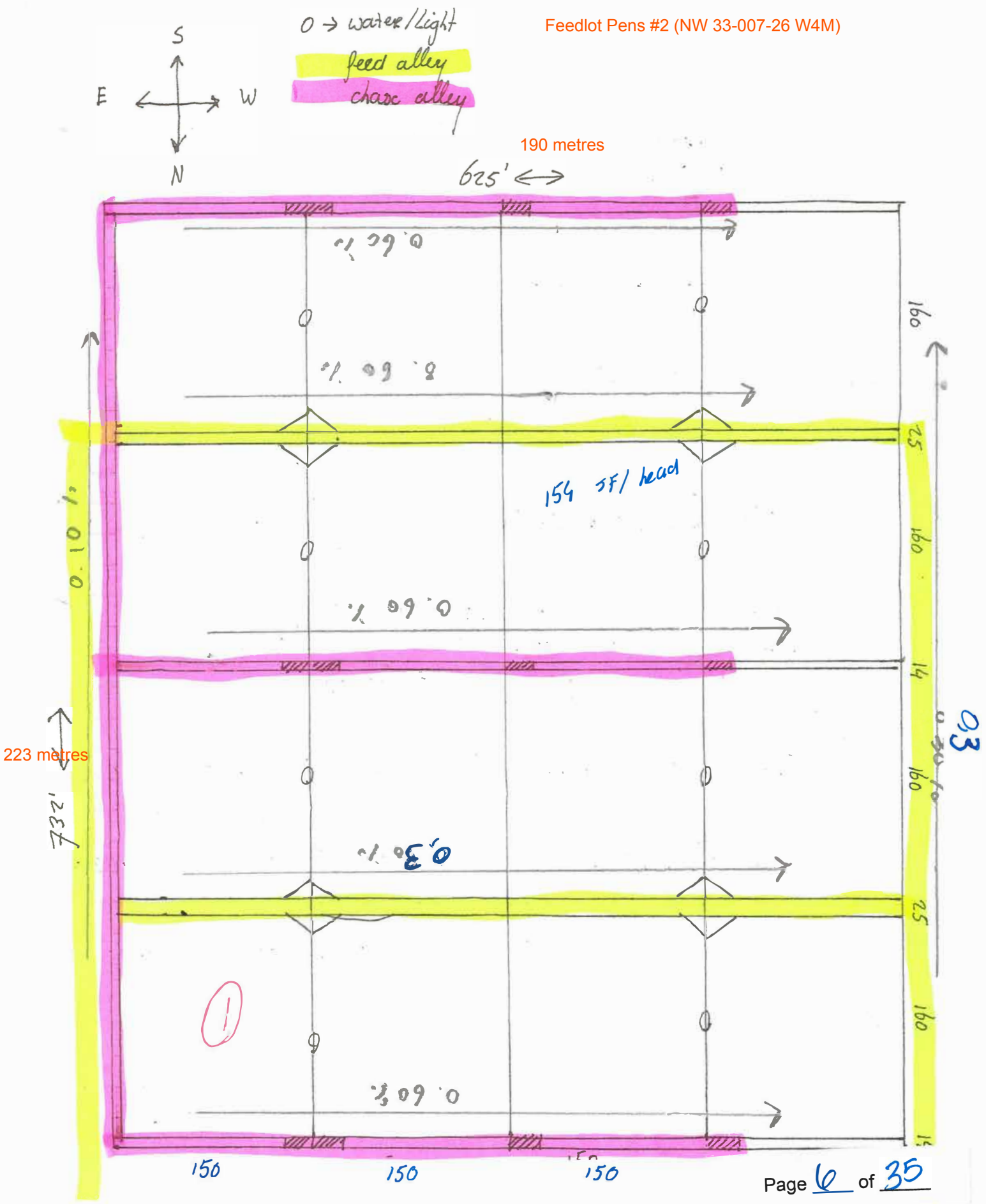
Signed this ____ day of _____, 20____. _____

Signature of Applicant or Agent

NRCB USE ONLY

Wessels Farms

Feedlot Pens #2 (NW 33-007-26 W4M)



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GENERAL WATER INFORMATION – PROPOSED pens **Use the proposed manure storage facility that is closest to a common body of water or water well**			**NRCB USE ONLY** **Comments**	**Meets regulations**
Proposed facility name proposed pens				
Flood plain information What is the elevation of the floor of the lowest **proposed** manure storage or collection facility above the 1:25 year flood plain or the highest known flood level?	5+ (m)	☒ Estimated ☐ From records	site is not located on a flood plain. confirmed during site visit	☒ YES ☐ NO ☐ YES with exemption
Springs, wells, and surface water information a. How many springs are within 100 m of **proposed** manure storage facilities or manure collection areas?		0	confirmed during site visit	☒ YES ☐ NO ☐ YES with exemption
b. How many water wells are within 100 m of **proposed** manure storage facilities or manure collection areas?		0	confirmed during site visit	☒ YES ☐ NO ☐ YES with exemption
c. What is the shortest distance from a **proposed** manure collection or storage facility to a surface water body? (ie, lake, creek, slough, seasonal, etc.)		300 m	305 m from a drainage at SW 4-8-26 W4M based on google earth imagery.	☒ YES ☐ NO ☐ YES with exemption
Groundwater information a. What is the depth to bedrock?	4.5+ (m)	☐ Estimated ☐ Measured ☒ Drilling reports	N/A	
b. What is the depth to the water table?	4.5+ (m)	☐ Estimated ☐ Measured ☒ Drilling reports	>1m	☒ YES ☐ NO ☐ YES with exemption
c. What is the shallowest depth to the uppermost groundwater resource?	9.2 (m)	☐ Estimated ☐ Measured ☒ Drilling reports	9.14 m	☒ YES ☐ NO ☐ YES with exemption

Additional information: (attach borehole logs and records, as required)

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GENERAL WATER INFORMATION – PROPOSED **Use the proposed manure storage facility that is closest to a common body of water or water well**			**NRCB USE ONLY** **Comments**	**Meets regulations**
Proposed facility name catbasin ~~#1~~ & #2			AO note: catch basin #1 has been removed from the application	
Flood plain information What is the elevation of the floor of the lowest **proposed** manure storage or collection facility above the 1:25 year flood plain or the highest known flood level?	5' (m)	☑ Estimated ☐ From records	site is not located on a flood plain. confirmed during site visit	☒ YES ☐ NO ☐ YES with exemption
Springs, wells, and surface water information a. How many springs are within 100 m of **proposed** manure storage facilities or manure collection areas?		0	confirmed during site visit	☒ YES ☐ NO ☐ YES with exemption
b. How many water wells are within 100 m of **proposed** manure storage facilities or manure collection areas?		2	0 wells, Catch basin #1 no longer part of application	☒ YES ☐ NO ☐ YES with exemption
c. What is the shortest distance from a **proposed** manure collection or storage facility to a surface water body? (ie, lake, creek, slough, seasonal, etc.)		80 m 330 metres	510 m from adrainage at SW 4-8-26 W4M based on google earth imagery.	☒ YES ☐ NO ☐ YES with exemption
Groundwater information a. What is the depth to bedrock?	0 (m)	☐ Estimated ☐ Measured ☑ Drilling reports	N/A	
b. What is the depth to the water table?	g.l.t (m)	☐ Estimated ☐ Measured ☑ Drilling reports	>1m	☒ YES ☐ NO ☐ YES with exemption
c. What is the shallowest depth to the uppermost groundwater resource?	g.l.t (m)	☐ Estimated ☐ Measured ☑ Drilling reports	9.14 m	☒ YES ☐ NO ☐ YES with exemption

Additional information: (attach borehole logs and records, as required)

Water Well Drilling Report

View in Imperial | Export to Excel

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

GIC Well ID 103472
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 1989/07/14

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
BEEKMAN, GERALD	P.O. BOX 711 FT MACLEOD				

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	SW	4	8	26	4				

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 49.615062 Longitude -113.473431
How Location Obtained
Map

Elevation m
How Elevation Obtained
Not Obtained

Drilling Information

Method of Drilling
Cable Tool

Proposed Well Use
Unknown

Type of Work
New Well-Decommissioned
View Decommissioning Report

Plugged 1989/06/07
Plugged with Unknown
Amount

Formation Log

Measurement in Metric

Depth from ground level (m)	Water Bearing	Lithology Description
8.23		Clay
16.76		Blue Shale
30.48		Sandstone
33.53		Shale
38.10		Brown Shale

Yield Test Summary

Measurement in Metric

Recommended Pump Rate L/min

Test Date	Water Removal Rate (L/min)	Static Water Level (m)

Well Completion

Measurement in Metric

Total Depth Drilled	Finished Well Depth	Start Date	End Date
38.10 m		1989/06/05	1989/06/07

Borehole

Diameter (cm)	From (m)	To (m)
0.00	0.00	38.10

Surface Casing (if applicable)

Size OD : 0.00 cm
Wall Thickness : 0.000 cm
Bottom at : 0.00 m

Well Casing/Liner

Size OD : 0.00 cm
Wall Thickness : 0.000 cm
Top at : 0.00 m
Bottom at : 0.00 m

Perforations

From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval(cm)

Perforated by

Annular Seal

Placed from 0.00 m to 0.00 m
Amount

Other Seals

Type	At (m)

Screen Type

Size OD : 0.00 cm

From (m)	To (m)	Slot Size (cm)

Attachment
Top Fittings
Bottom Fittings

Pack

Type
Grain Size
Amount

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
UNKNOWN NA DRILLER

Certification No
1

Company Name
H&H DRILLING

Copy of Well report provided to owner
Date approval holder signed

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GIC Well ID 103472
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 1989/07/14

GOWN ID

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
BEEKMAN, GERALD	P.O. BOX 711 FT MACLEOD				

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	SW	4	8	26	4				

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 49.615062 Longitude -113.473431
How Location Obtained: Map

Elevation m
How Elevation Obtained: Not Obtained

Additional Information

Measurement in Metric

Distance From Top of Casing to Ground Level cm
Is Artesian Flow
Rate L/min
Is Flow Control Installed
Describe

Recommended Pump Rate L/min
Recommended Pump Intake Depth (From TOC) m
Pump Installed
Type
Depth m
Make
H.P.
Model (Output Rating)

Did you Encounter Saline Water (>4000 ppm TDS)
Depth m
Gas
Depth m
Well Disinfected Upon Completion
Geophysical Log Taken
Submitted to ESRD

Sample Collected for Potability
Submitted to ESRD

Additional Comments on Well

Yield Test

Taken From Ground Level | Measurement in Metric

Test Date	Start Time	Static Water Level
		m

Method of Water Removal

Type
Removal Rate L/min
Depth Withdrawn From m

If water removal period was < 2 hours, explain why

Water Diverted for Drilling

Water Source	Amount Taken	Diversion Date & Time
	L	

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
UNKNOWN NA DRILLER

Certification No
1

Company Name
H&H DRILLING

Copy of Well report provided to owner

Date approval holder signed

Water Well Drilling Report

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View in Imperial | Export to Excel

GOWN ID

GIC Well ID 103473
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 1989/07/14

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
BEEKMAN, GERALD	P.O. BOX 711 FT MACLEOD				

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	SW	4	8	26	4				

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 49.615062 Longitude -113.473431
How Location Obtained
Map

Elevation m
How Elevation Obtained
Not Obtained

Drilling Information

Method of Drilling
Cable Tool

Proposed Well Use
Domestic

Type of Work
New Well

Formation Log

Measurement in Metric

Depth from ground level (m)	Water Bearing	Lithology Description
4.57		Clay
9.14		Blue Shale
19.81		Sandstone

Yield Test Summary

Measurement in Metric

Recommended Pump Rate 90.92 L/min

Test Date	Water Removal Rate (L/min)	Static Water Level (m)
1989/06/16	90.92	7.01

Well Completion

Measurement in Metric

Total Depth Drilled	Finished Well Depth	Start Date	End Date
19.81 m		1989/06/13	1989/06/16

Borehole

Diameter (cm)	From (m)	To (m)
0.00	0.00	19.81

Surface Casing (if applicable)
Steel
Size OD : 16.84 cm
Wall Thickness : 0.478 cm
Bottom at : 3.05 m

Well Casing/Liner
Plastic
Size OD : 13.97 cm
Wall Thickness : 0.635 cm
Top at : 3.05 m
Bottom at : 19.81 m

Perforations

From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval(cm)
16.76	19.81	0.318		25.40

Perforated by Machine

Annular Seal Driven
Placed from 0.00 m to 3.05 m
Amount

Other Seals

Type	At (m)

Screen Type
Size OD : 0.00 cm

From (m)	To (m)	Slot Size (cm)

Attachment
Top Fittings
Bottom Fittings

Pack
Type
Grain Size
Amount

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
UNKNOWN NA DRILLER

Certification No
1

Company Name
H&H DRILLING

Copy of Well report provided to owner
Date approval holder signed

Water Well Drilling Report

View in Imperial | Export to Excel

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GIC Well ID 103473
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 1989/07/14

GOWN ID

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
BEEKMAN, GERALD	P.O. BOX 711 FT MACLEOD				

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	SW	4	8	26	4				

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 49.615062 Longitude -113.473431
How Location Obtained: Map

Elevation m
How Elevation Obtained: Not Obtained

Additional Information

Measurement in Metric

Distance From Top of Casing to Ground Level cm
Is Artesian Flow
Rate L/min
Is Flow Control Installed
Describe

Recommended Pump Rate 90.92 L/min
Recommended Pump Intake Depth (From TOC) 17.37 m
Pump Installed Yes
Type SUB
Depth m
Make
H.P. 1
Model (Output Rating)

Did you Encounter Saline Water (>4000 ppm TDS)
Depth m
Gas
Depth m
Well Disinfected Upon Completion
Geophysical Log Taken
Submitted to ESRD

Sample Collected for Potability
Submitted to ESRD

Additional Comments on Well

Yield Test

Taken From Ground Level
Measurement in Metric

Test Date	Start Time	Static Water Level
1989/06/16	12:00 AM	7.01 m

Depth to water level

Pumping (m)	Elapsed Time Minutes:Sec	Recovery (m)

Method of Water Removal

Type Bailer & Pump
Removal Rate 90.92 L/min
Depth Withdrawn From 17.37 m

If water removal period was < 2 hours, explain why

Water Diverted for Drilling

Water Source	Amount Taken	Diversion Date & Time
	L	

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
UNKNOWN NA DRILLER

Certification No
1

Company Name
H&H DRILLING

Copy of Well report provided to owner

Date approval holder signed

Water Well Drilling Report

View in Imperial | Export to Excel

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GOWN ID

GIC Well ID 2028608
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2011/01/18

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
BEEKMAN, GERALD	P.O. BOX 711	FORT MACLEOD	ALBERTA	CANADA	T0L 0Z0

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	3	4	8	26	4				

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 49.614380 Longitude -113.469470
How Location Obtained
Hand held autonomous GPS 20-30m

Elevation 1097.28 m
How Elevation Obtained
Hand held autonomous GPS 20-30m

Drilling Information

Method of Drilling
Rotary - Mud

Proposed Well Use
Stock

Type of Work
New Well

Formation Log

Measurement in Metric

Depth from ground level (m)	Water Bearing	Lithology Description
0.61		Topsoil
1.83		Dark Clay
2.44		Gray Clay
5.18		Brown Sand
8.84		Sandstone
10.06		Shale
10.36		Sandstone
11.58		Shale
22.25	Yes	Sandstone
22.56		Shale

Yield Test Summary

Measurement in Metric

Recommended Pump Rate 68.19 L/min

Test Date	Water Removal Rate (L/min)	Static Water Level (m)
2007/04/30	113.65	7.47

Well Completion

Measurement in Metric

Total Depth Drilled	Finished Well Depth	Start Date	End Date
22.56 m	19.51 m	2007/04/26	2007/04/30

Borehole

Diameter (cm)	From (m)	To (m)
20.32	0.00	5.18
15.56	5.18	22.56

Surface Casing (if applicable)
Steel
Size OD : 16.84 cm
Wall Thickness : 0.478 cm
Bottom at : 5.79 m

Well Casing/Liner
Plastic
Size OD : 12.55 cm
Wall Thickness : 0.655 cm
Top at : 4.57 m
Bottom at : 19.51 m

Perforations

From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval(cm)

Perforated by

Annular Seal Bentonite Chips/Tablets
Placed from 4.57 m to 11.58 m
Amount

Other Seals

Type	At (m)
Driven	0.00
Shale Trap	11.58

Screen Type Stainless Steel
Size OD : 12.70 cm

From (m)	To (m)	Slot Size (cm)
17.98	19.51	0.051

Attachment Attached To Casing
Top Fittings Coupler Bottom Fittings Plug

Pack
Type Natural Grain Size
Amount

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
DAVE MANDEL

Certification No
61332A

Company Name
OUTLAW DRILLING

Copy of Well report provided to owner
Yes

Date approval holder signed
2007/04/30

Water Well Drilling Report

View in Imperial | Export to Excel

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

GIC Well ID 2028608
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2011/01/18

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
BEEKMAN, GERALD	P.O. BOX 711	FORT MACLEOD	ALBERTA	CANADA	T0L 0Z0

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	3	4	8	26	4				

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 49.614380 Longitude -113.469470
How Location Obtained
Hand held autonomous GPS 20-30m

Elevation 1097.28 m
How Elevation Obtained
Hand held autonomous GPS 20-30m

Additional Information

Measurement in Metric

Distance From Top of Casing to Ground Level 91.44 cm
Is Artesian Flow
Rate L/min
Is Flow Control Installed
Describe

Recommended Pump Rate 68.19 L/min
Recommended Pump Intake Depth (From TOC) 15.24 m
Pump Installed Depth m
Type Make H.P.
Model (Output Rating)

Did you Encounter Saline Water (>4000 ppm TDS) Depth m
Gas Depth m
Well Disinfected Upon Completion
Geophysical Log Taken
Submitted to ESRD
Sample Collected for Potability Submitted to ESRD

Additional Comments on Well

ALSO BENTONITE FROM 0 - 17', THIS WELL WAS DRILLED TO REPLACE AN EXISTING WELL THAT COLLAPSED, THERE IS A 10' PIECE OF PVC BELOW SCREEN

Yield Test

Taken From Top of Casing
Measurement in Metric

Test Date	Start Time	Static Water Level
2007/04/30	11:30 AM	7.47 m

Method of Water Removal

Type Pump
Removal Rate 113.65 L/min
Depth Withdrawn From 21.34 m

If water removal period was < 2 hours, explain why

Depth to water level

Pumping (m)	Elapsed Time Minutes:Sec	Recovery (m)
7.47	0:00	10.24
8.15	1:00	8.41
8.38	2:00	8.28
8.59	3:00	8.15
8.66	4:00	8.10
8.71	5:00	8.08
8.74	6:00	8.03
8.84	7:00	8.00
8.86	8:00	7.98
8.92	9:00	7.92
8.97	10:00	7.85
9.02	12:00	7.85
9.07	14:00	7.80
9.20	16:00	7.75
9.30	20:00	7.72
9.45	25:00	7.64
9.53	30:00	7.64
9.58	35:00	
9.63	40:00	
9.68	50:00	
9.83	60:00	
9.96	75:00	
10.11	90:00	
10.19	105:00	
10.24	120:00	

Water Diverted for Drilling

Water Source	Amount Taken		Diversion Date & Time
SE-28-9-24-W4	2727.66	L	2007/04/26 8:00 AM

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
DAVE MANDEL

Certification No
61332A

Company Name
OUTLAW DRILLING

Copy of Well report provided to owner
Yes

Date approval holder signed
2007/04/30

Technical Document

NRCB Natural Resources Conservation Board

Application under the *Agricultural Operation Practices Act* for a confined feeding operation, manure collection area and/or manure storage facility(ies)

WELL INFORMATION:

Well IDs: 103472 _____ 103473 _____ 2028608 _____

_____ _____ _____

Surface water related concerns from directly affected parties or referral agencies: ☒ YES ☐ NO concerns addressed in Appendix B and C of Decision Summary LA19004

Ground water related concerns from directly affected parties or referral agencies: ☒ YES ☐ NO

Water Wells N/A

If applicable, exemption for 100 m distance requirements applied: ☐ YES ☒ NO Condition required: ☐ YES ☒ NO

LA19004

Surface Water N/A

If applicable, exemption for 30 m distance requirements applied: ☐ YES ☒ NO Condition required: ☐ YES ☒ NO

ERST for **proposed** facilities

Facility	Groundwater score	Surface water score	File Number
Catch Basin #2	low	low	LA19004
Feedlot Pens #2	low	low	LA19004

ERST for **existing** facilities

Facility	Groundwater score	Surface water score	File Number
	Application is for a new CFO on NW 33-7-26 W4M		

Groundwater or surface water related comments, see next page

Groundwater or surface water related comments:

See discussion in Decision Summary LA19004 for further details

Part 2 — Technical Requirements

NRCB Natural Resources Conservation Board

Application under the *Agricultural Operation Practices Act* for a confined feeding operation, manure collection area and/or manure storage facility(ies)

DISTANCE OF ANY MANURE STORAGE FACILITY (EXISTING OR PROPOSED) TO NEIGHBOURING RESIDENCES

Name	Legal Land Description	Distance (m)	Zoning (LUB) Category	MDS Cat (1-4)	Distance (m)	Meets Regulations
Rick Beusekom	SW 33-7-26	850	Rural Gen	1	860 m	yes
Marc Meach	SE 32-7-26	1000	Rural Gen	1	1000 m	yes
Donna Friesen	SE 4-8-26	750	Rural Gen	1	755 m	yes

Methods used/margins of error to determine distance:

Additional information:

NRCB USE ONLY

Methods used to determine distance (if applicable): Google earth imagery

Margin of error (if applicable): _____

Requirements: Category 1: 531m Category 2: 709m Category 3: 886m Category 4: 1,417m

MDS numbers for 2500 finishers:

Technology factor: ☐YES ☒NO

Expansion factor: ☐YES ☒NO

Waivers required: ☐YES ☒NO # _____

Waivers attached: ☒ Waivers in file: ☐

MDS related concerns from directly affected parties or referral agencies: ☐YES ☒NO

Comments:

Name
Address
Legal Land
Location

AO note: update in numbers due to removal of feedlot pens #1 and catch basin #1, and resulting change in livestock numbers (from 5000 to 2500 finishers total)

MDS Spreadsheet based on 2006 AOPA Regulations

Category of Livestock	Type of Livestock	Factor A	Technology Factor	MU	LSU Factor	Number of Animals	LSU
Beef	Cows/Finishers (900+ lbs)	0.700	0.700	0.910	0.446	5000	2,229.5
	Feeders (450 - 900 lbs)	0.700	0.700	0.500	0.245		-
	Feeder Calves (<550 lbs)	0.700	0.700	0.275	0.135		-
							-
Dairy (*count lactating cows only)	*Free Stall – Lactating Cows with all associated dries, heifers, and calves	0.800	1.100	2.000	1.760		-
	*Free Stall – Lactating cows with Dry Cows only	0.800	1.100	1.640	1.443		-
	Free Stall – Lactating Cows only	0.800	1.100	1.400	1.232		-
	Tie Stall – Lactating cows only	0.800	1.000	1.400	1.120		-
	Loose Housing – Lactating cows only	0.800	1.000	1.400	1.120		-
	Dry Cow (Solid manure)	0.800	0.700	1.000	0.560		-
	Dry Cow (Liquid manure)						
	Replacements – Bred Heifers (Breeding to Calving)	0.800	0.700	0.875	0.490		-
	Replacements - Growing Heifers (350 lbs to breeding)	0.800	0.700	0.525	0.294		-
	Calves (< 350 lbs)	0.800	0.700	0.200	0.112		-
							-
Swine Liquid (*count sows only)	Farrow to finish *	2.000	1.100	1.780	3.916		-
	Farrow to wean *	2.000	1.100	0.670	1.474		-
	Farrow only *	2.000	1.100	0.530	1.166		-
	Feeders/Boars	2.000	1.100	0.200	0.440		-
	Growers/Roasters	2.000	1.100	0.118	0.260		-
	Weaners	2.000	1.100	0.055	0.121		-
							-
Swine Solid (*Count sows only)	Farrow to finish *	2.000	0.800	1.780	2.848		-
	Farrow to wean *	2.000	0.800	0.670	1.072		-
	Farrow only *	2.000	0.800	0.530	0.848		-
	Feeders/Boars	2.000	0.800	0.200	0.320		-
	Growers/Roasters	2.000	0.800	0.118	0.189		-
	Weaners	2.000	0.800	0.055	0.088		-
							-
Poultry	Chicken - Breeders - Solid	1.000	0.700	0.010	0.007		-
	Chicken - Layers - Liquid (includes associated pullets)	2.000	1.100	0.008	0.018		-
	Chicken - Layers - (Belt Cage)	2.000	0.700	0.008	0.011		-
	Chicken - Layers - (Deep Pit)	2.000	0.700	0.008	0.011		-
	Chicken - Pullets/Broilers	1.000	0.700	0.002	0.001		-
	Turkey - Toms/Breeders	1.000	0.700	0.020	0.014		-
	Turkey - Hens (light)	1.000	0.700	0.013	0.009		-
	Turkey - Broilers	1.000	0.700	0.010	0.007		-
	Ducks	1.000	0.700	0.010	0.007		-
	Geese	1.000	0.700	0.020	0.014		-
							-
Horses	PMU	0.650	0.700	1.000	0.455		-
	Feeders > 750 lbs	0.650	0.700	1.000	0.455		-
	Foals < 750 lbs	0.650	0.700	0.300	0.137		-
	Mules	0.600	0.700	1.000	0.420		-
	Donkeys	0.600	0.700	0.670	0.281		-
							-
Sheep	Ewes/Rams	0.600	0.700	0.200	0.084		-
	Ewes with lambs	0.600	0.700	0.250	0.105		-
	Lambs	0.600	0.700	0.050	0.021		-
	Feeders	0.600	0.700	0.100	0.042		-
							-
Goats	Meat/Milk (per Ewe)	0.700	0.700	0.170	0.083		-
	Nannies/Billies	0.700	0.700	0.140	0.069		-
	Feeders	0.700	0.700	0.077	0.038		-
							-
Bison	Bison	0.600	0.700	1.000	0.420		-
							-
Cervid	Elk	0.600	0.700	0.600	0.252		-
	Deer	0.600	0.700	0.200	0.084		-
							-
Wild Boar	Feeders	2.000	0.800	0.140	0.224		-
	Sow (farrowing)	2.000	0.800	0.371	0.594		-
							-

Total 2,229.5

Animal numbers: 2500 finishers
LSU: 1,114.8

For New Operations

Dispersion Factor: 1

Category	Odour Objective	Distance Feet	Distance Metres	
1	41.04	2,245	684	531
2	54.72	2,994	913	709
3	68.4	3,742	1,141	886
4	109.44	5,988	1,825	1,417

updated MDS distances for 2500 finishers

For Expanding Operations

Dispersion Factor: 1
Expansion Factor: 0.77

Category	Odour Objective	Distance Feet	Distance Metres	
1	41.04	1,729	527	409
2	54.72	2,305	703	546
3	68.40	2,882	878	682
4	109.44	4,610	1,405	1,091

updated MDS distances for 2500 finishers (with expansion factor)

Part 2 — Technical Requirements

NRCB Natural Resources Conservation Board

Application under the *Agricultural Operation Practices Act* for a confined feeding operation, manure collection area and/or manure storage facility(ies)

LAND BASE FOR MANURE AND COMPOST APPLICATION (for approvals and registrations only)

Name of landowner(s)*	Legal Land Description	Area ** (usable hectares)	Soil Zone	NRCB USE ONLY Area unsuitable:
				See following pages
See attached.	1160 686			
	TOTAL			

*If you are **not** the registered land owner, please attach copies of land use agreements signed by all landowners.

** Available manure spreading area (do not include required setback areas from residences, common bodies of water, water wells, etc.) (to convert from acres to hectares divide acres by 2.47)

Additional information: (attach copies of all signed land use agreements)

NRCB USE ONLY

land base requirement for 2500 finishers

Land base required: 481. 8 acres (black)

Land base listed: 1721.3 acres (black)

Area not suitable: 131.3 acres

Available area 1590 acres (black) Requirement Met: ☒ YES ☐ NO

Land spreading agreements required: ☒ YES ☐ NO If yes, Agreements in file: ☐ Agreements attached: ☒

Manure Management Plan: ☐ YES ☒ NO Plan attached: ☐ Plan in file: ☐

Sent:
To:
Subject: Fields suitable for manure Wessels farms

Goodmorning Adria,

Thank you for making it work to do a site visit at our farm yesterday with Joe.

Here is a list of our own acres that we can use for spreading manure.

		AO checked (confirmed suitable for spreading)
SW 33-7-26 W4	146.29 acr	125 acres (black)
E 1/2 5-8-26 W4	210 acr	200 acres (black)
NW 4-8-26 W4	50 acr	65 acres (black)
SW 4-8-26 W4	95 acr	80 acres (black)

If you are looking for any more info or have questions you can also contact me

Have a good day.

Manure Spreading Agreement

GAF Farms Ltd agree to allow P+H Woods (applicant) to spread manure on the following fields during 2019 – 2025 (calendar year).

AO checked (confirmed suitable for spreading)

Land location	Acres	Suitable for spreading	Soil zone
SE 33-7-26-W	~~150~~ 160	150	125 acres (black)
SE 29-7-26 W	~~120~~ 160	120	132 acres (black)
SW 24-7-26-W	~~150~~ 160	150	138 acres (black)

Signed: [signature]

Date: Jan 30, 2019

Manure Spreading Agreement

Beekman

Gerald & Rita agree to allow P & H Wessels (applicant) to spread manure on the following fields during 10 years (calendar year).
2019 to 2030.

AO Note (confirmed suitable for spreading):

Land location	Acres	Suitable for spreading	Soil zone
	630	620	Thin Black
Section 32, 76 WM			Thin Black
SW-33-76-WM	150	150	Thin Black

615 acres (black)

120 acres (black)

Signed: Gerald Beekman

Date: R. Beekman

Name	0
Address	0
Legal Land	
Location	0

Proposed livestock Numbers:

AO note: update in numbers due to removal of feedlot pens #1 and catch basin #1, and resulting change in livestock numbers (from 5000 to 2500 finishers total). See values in red below for landbase requirements.

Landbase Requirements (hectares) based on 2006 AOPA requirements

Category of Livestock	Type of Livestock	Number of Animals 2500	Dark Brown & Brown (ha)	Grey Wooded (ha)	Black (ha)	Irrigated (ha)
Beef	Cows/Finishers (900+ lbs)	~~5000~~	~~625~~	~~520~~	~~390~~	~~310~~
	Feeders (450 - 900 lbs)	0	0	0	0	0
	Feeder Calves (<550 lbs)	0	-	-	-	-
	Other	0				
Dairy (*count lactating cows only)	*Free Stall – Lactating Cows with all associated dries, heifers, and calves	0	0	0	0	0
	*Free Stall – Lactating cows with Dry Cows only	0	-	-	-	-
	Free Stall – Lactating Cows only	0	-	-	-	-
	Tie Stall – Lactating cows only	0	-	-	0	0
	Loose Housing – Lactating cows only	0	-	-	-	-
	Dry Cow (Solid manure)	0	-	-	-	-
	Dry Cow (Liquid manure)	0	-	-	-	-
	Replacements – Bred Heifers (Breeding to Calving)	0	-	-	-	-
	Replacements - Growing Heifers (350 lbs to breeding)	0	-	-	-	-
	Calves (< 350 lbs)	0	-	-	-	-
	Other	0				
Swine Liquid (*count sows only)	Farrow to finish *	0	-	0	-	-
	Farrow to wean *	0	-	-	-	-
	Farrow only *	0	-	-	-	-
	Feeders/Boars	0	-	0	0	0
	Growers/Roasters	0	-	-	-	-
	Weaners	0	-	-	-	-
	Other	0				
Swine Solid (*Count sows only)	Farrow to finish *	0	-	-	-	-
	Farrow to wean *	0	-	-	-	-
	Farrow only *	0	-	-	-	-
	Feeders/Boars	0	-	-	-	-
	Growers/Roasters	0	-	-	-	-
	Weaners	0	-	-	-	-
		0				
Poultry	Chicken - Breeders - Solid	0	-	-	-	-
	Chicken - Layers - Liquid (includes associated pullets)	0	-	0	0	0
	Chicken - Layers - (Belt Cage)	0	-	-	-	-
	Chicken - Layers - (Deep Pit)	0	-	-	-	-
	Chicken - Pullets/Broilers	0	-	0	0	0
	Turkey - Toms/Breeders	0	0	0	0	0
	Turkey - Hens (light)	0	-	-	-	-
	Turkey - Broilers	0	-	-	-	-
	Ducks	0	0	0	0	0
	Geese	0	0	0	0	0
	Other	0				
Horses	PMU	0	0	0	0	0
	Feeders > 750 lbs	0	-	0	-	-
	Foals < 750 lbs	0	-	-	-	-
	Mules	0	-	-	-	-
	Donkeys	0	-	-	-	-
	Other	0				
Sheep	Ewes/Rams	0	-	0	0	0
	Ewes with lambs	0	-	-	-	-
	Lambs	0	-	-	-	-
	Feeders	0	-	-	-	-
	Other	0				
Goats	Meat/Milk (per Ewe)	0	0	0	0	0
	Nannies/Billies	0	-	-	-	-
	Feeders	0	-	-	-	-
	Other	0				
Bison	Bison	0	0	0	0	0
	Other	0				
Cervid	Elk	0	0	0	0	0
	Deer	0	0	0	0	0
	Other	0				
Wild Boar	Feeders	0	-	0	0	0
	Sow (farrowing)	0	-	-	-	-
	Other	0				

Total Hectares		625.0	520.0	390.0	310.0
updated numbers:		312.5	260.0	195.0	155.0
Total Acres		1544.4	1284.9	963.7	766.0
		772.2	642.5	481.8	383.0

← landbase requirements, updated for 2500 finishers

Technical Document

Application under the *Agricultural Operation Practices Act* for a confined feeding operation, manure collection area and/or manure storage facility(ies)

ALL SIGNATURES IN FILE: ☒ Yes ☐ No

DATES OF APPROVAL OFFICER SITE VISITS:

February 1, 2019	

CORRESPONDENCE WITH MUNICIPALITIES AND REFERRAL AGENCIES:

Date deeming letters sent February 20, 2019

Municipality: Municipal District of Willow Creek

☒ Letter sent ☒ Response received ☒ written/email ☐ verbal ☐ no comments received

Alberta Health Services:

☒ Letter sent ☒ Response received ☒ written/email ☐ verbal ☐ no comments received

Alberta Environment and Parks: ☐ N/A

☒ Letter sent ☒ Response received ☒ written/email ☐ verbal ☐ no comments received

Alberta Transportation: ☐ N/A

☒ Letter sent ☒ Response received ☒ written/email ☐ verbal ☐ no comments received

Alberta Regulatory Services: ☐ N/A

☐ Letter sent ☐ Response received ☐ written/email ☐ verbal ☐ no comments received

Other: _____

☐ Letter sent ☐ Response received ☐ written/email ☐ verbal ☐ no comments received

Other: _____

☐ Letter sent ☐ Response received ☐ written/email ☐ verbal ☐ no comments received

Technical Document

Application under the *Agricultural Operation Practices Act* for a confined feeding operation, manure collection area and/or manure storage facility(ies)

PLANS

Submitted and attached construction plans ☒ YES ☐ NO

Submitted aerial photos ☒ YES ☐ NO

Submitted photos ☐ YES ☒ NO

GRANDFATHERING:

On this application: ☐ Yes ☒ No

Comments:

Application is for a new CFO on NW 33-7-26 W4M

On a previous application/decision: ☐ Yes ☒ No If yes, list application/decision number _____

Comments:

DEEMING CAPACITY:

☐ Yes ☒ No

Comments:

LIQUID MANURE STORAGE: Earthen manure storage (EMS): Compacted soil liner

NRCB USE ONLY

Liner specification comments (e.g. compaction, moisture content, thickness):

Liner is for a catch basin, not an earthen manure storage

synthetically lined catch basin (alternative to compacted soil liner) - 40 mil HDPE textured geomembrane or equivalent, see specs provided by the supplier (Layfield) near end of this technical document.

Protective liner requirements met: ☒ YES ☐ NO Condition required: ☐ YES ☐ NO

Comments:

Based on the specs provided by the supplier (Layfield, this information is located near the end of this document), the proposed synthetic liner is suitable for this project as per Section 9(6b) of AOPA Standards and Administration Regulation.

Leakage detection system required: ☒ YES ☐ NO If yes, please explain why.

Comments:

A leakage detection system condition, including reporting requirements will be included because of coarsely grained soils throughout the site and to ensure that the liner continues to meet AOPA requirements. This system must be built in accordance with the manufacturer's requirements and recommendations and as approved by the NRCB in writing.

Filled within bottom quarter: NA ☐ YES ☐ NO

Part 2 — Technical Requirements

NRCB Natural Resources Conservation Board

Application under the *Agricultural Operation Practices Act* for a confined feeding operation, manure collection area and/or manure storage facility(ies)

SOLID MANURE, COMPOST & COMPOSTING MATERIALS: Barns, feedlots & storage facilities - Naturally occurring protective layer

*(complete a copy of this section for **EACH** barn, feedlot and storage facility for solid manure, composting materials or compost with a naturally occurring protective layer for the liner)*

Facility description / name *(as indicated on site plan)*

1. ~~existing pens~~ (Feedlot Pens #1 removed from application) 2. proposed pen (Feedlot pens #2)

Manure storage capacity

	Length (m)	Width (m)	Estimated storage capacity (m^3)	Depth below grade of the top protective layer surface (m)
1.	~~185 x 90~~	90	1 year	0 removed from application
2.	191 AO Note: 190 m	223	1 year	0

NRCB USE ONLY

Depth to water table: >1 metre Requirements met: ☒ YES ☐ NO

Depth to UGR: 9.14 metres Requirements met: ☒ YES ☐ NO

ERST completed: ☒ YES ☐ NO

Groundwater risk level: Low Surface Water risk level: Low

UGR: Uppermost Groundwater Resource as defined under AOPA's *Standards and Administration Regulation*.

Surface water control systems

☐ Under roof: Surface water will be controlled by the walls and roof of the building and by the finished landscaping.

☒ Outdoor: Describe the run-on and runoff control system proposed for feedlots and outdoor manure storage facilities:

* Building and directing water into catchbasins
* Sloping to prevent Run on

NRCB USE ONLY

Requirements met: ☒ YES ☐ NO Details/comments:

SOLID MANURE, COMPOST & COMPOSTING MATERIALS: Barns, feedlots & storage facilities - Naturally occurring protective layer (cont.)

Naturally occurring protective layer details Feedlot pens # 2 (proposed pens)

a. Naturally occurring protective layer	Thickness of naturally occurring protective layer: 1.5 (m)	Provide details.	
b. Soil texture	% sand	% silt	% clay
c. Hydraulic conductivity - naturally occurring protective layer	Material tested: ~~W6-19~~ Borehole: PW3.18 Depth: 1.8 (m)	Hydraulic conductivity (cm/s): 3.6 x-10 7.0 x 10^{-7} cm/s	Describe test standard used

Additional information: *(attach copies of soil test reports)*

See attached report

AO note: as per the attached engineering report at the end of this document, the naturally occurring protective layer meets AOPA requirements. The naturally occurring protective layer was determined to be 2.6 m thick with a hydraulic conductivity of 7.0 x 10^{-7}cm/s, results from permeability testing at borehole W6-19.

NRCB USE ONLY

Protective layer specification (e.g. sand lenses; layering uniform or irregular; number and location of boreholes).
Comments:

see attached report

Protective layer requirements met: ☒ YES ☐ NO Condition required: ☐ YES ☒ NO

Comment:

Part 2 — Technical Requirements

NRCB Natural Resources Conservation Board

Application under the *Agricultural Operation Practices Act* for a confined feeding operation, manure collection area and/or manure storage facility(ies)

RUNOFF CONTROL CATCH BASINS: Synthetic liner

*(complete a copy of this section for **EACH** manure storage facility with a synthetic liner)*

Facility description / name *(as indicated on site plan)*

1. ~~catch basin~~ 1 Removed from application
2. catch basin 2
3.

Determination of minimum required catch basin volume

Show your calculations for determining the minimum required catch basin volume	Provide details: see attached.

Catch basin capacity

	Length (m)	Width (m)	Depth (m)	Slope run:rise			Estimated storage capacity (excl. freeboard) (m^3)	Depth below grade of the bottom of the synthetic liner (m)
				Inside end walls	Inside side walls	Outside walls		
1.	~~34~~	~~30~~	~~4~~	~~3~~	~~3~~		~~1313~~	removed from application
2.	40	40	5	3	3		2759	
3.								
						TOTAL CAPACITY		

NRCB USE ONLY

Catch basin calculator (calculation attached). Total volume @ freeboard level 2,759 Requirements met: ☒ YES ☐ NO

Depth to water table: >1 metre Requirements met: ☒ YES ☐ NO

Depth to UGR: 9.14 metres Requirements met: ☒ YES ☐ NO

ERST completed: ☒ YES ☐ NO

Groundwater risk level: Low Surface Water risk level: Low

UGR: Uppermost Groundwater Resource as defined under AOPA's *Standards and Administration Regulation*.

Part 2 — Technical Requirements

NRCB Natural Resources Conservation Board

Application under the *Agricultural Operation Practices Act* for a confined feeding operation, manure collection area and/or manure storage facility(ies)

RUNOFF CONTROL CATCH BASINS: Synthetic liner (cont.)

Synthetic liner details

a. Synthetic liner	Thickness and type of liner material :	Provide liner material details:
HDPE 40	40 mil	see attached

Additional information:

NRCB USE ONLY

Liner requirements met: ☒ YES ☐ NO

Condition required: ☒ YES ☐ NO

Comments: Condition requiring completion report

Leakage detection system required: ☒ YES ☐ NO

If yes, please explain why.

Comments: drilling reports indicate coarse-grained soils dispersed at varying depths throughout the site

Construction plans approved by professional engineer: ☒ YES ☐ NO

Installed by approved contractor: ☒ YES ☐ NO

Preparation of liner bed (comments):

LAYFIELD

Geomembrane [HDPE 40 Textured (SS) Black]

Our HDPE 40 geomembranes are designed in accordance with the Geomembrane Research Institute GM 13 standard. It is manufactured to meet the properties of GRI GM13 textured High Density Polyethylene and has been extensively used in a variety of containment applications. HDPE geomembranes have low permeability, good ultra violet resistance properties and excellent chemical resistance. HDPE 40 is a field assembled lining material that must be installed by trained installers. HDPE is used in a multitude of applications as a landfill liner, pond linings, and water containment projects.

Property	ASTM	HDPE 40 Textured[1] Black Single Sided (SS)
Thickness nom. (min.avg)	D5994	40 mil (36 mil) 1.00 mm (0.915 mm)
Thickness	D5994 Lowest Individual for 8 out of 10 values Lowest individual for any of the 10 values	 36 mil/0.93 mm 34 mil/0.88 mm
Asperity Height (min.ave)	D 7466	16 mil 0.4 mm
Sheet Density (minimum)	D792	≥0.940 g/cc
Dimensional Stability	D 1204	±2%
Tensile Properties (min. avg) ASTM D 6693; Modified Type IV Die Gage length break: 2" (50 mm) Gage length yield: 1.3" (33 mm)	Tensile Strength @ Break Tensile Strength @ Yield	60 ppi 10 kN/m 84 ppi 15 kN/m
	Tensile Elongation @ Break Tensile Elongation @ Yield	100% 12%
Tear Resistance (min. avg)	D1004	28 lbs 125 N
Puncture Resistance (min. avg)	D4833	60 lbs 267 N
High Pressure Oxidative Induction Time (HPOIT)	D5885	400 mins
Stress Cracking	D5397	500 hrs
Carbon Black Content[1]	D1603	2.0-3.0 %
Carbon Black Dispersion[2]	D5596	CAT 1 or 2
Oven Aging **85° C,** HPOIT retained after 90 days	D5721 D D5885	80%
UV Resistance- % HPOIT retained after 1600 hrs	D7238 D5885	50%
Typical Roll Dimensions (Rolls dimensions may vary ± 1%)		
Roll Width	-	22.5 feet 6.86 mtrs
Roll Length	-	780 feet 237.8 mtrs

[1]*This product is designed and manufactured to meet the GRI GM13 specification*

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Catch Basin #2

Catch Basin Dimensions Calculator

Construction Dimensions of Catch Basin	Metric		English Units	
Size of Catch Basin			**Capacity of Catch Basin**	
Length*$_4$	40.0	m	131.23	Feet
Width*$_4$	40.0	m	131.23	Feet
Total Depth*$_4$	5.0	m	16.40	Feet
Water Depth	4.50	m	14.76	Feet
End Slope*$_4$	3	run:rise	3	run:rise
Side Slope*$_4$	3	run:rise	3	run:rise
Length of Bottom	10.0			
Width of Bottom	10.0			
Total Capacity @ top of Bank	**3,500**	**m^3**	**123,601**	**ft^3**
			769,892	**Imp. Gal.**

* Only cells in blue can be changed.

Storage Volume of Catch Basin at Design Capacity (without freeboard)			Volume at Freeboard	
Length (Top of liquid level)	37.0	m	121.39	Feet
Width (Top of liquid level)	37.0	m	121.39	Feet
Depth	5.0	m	16.40	Feet
Water Depth	4.50	m	14.76	Feet
End Slope	3	run:rise	3	run:rise
Side Slope	3	run:rise	3	run:rise
Total Volume@ freeboard depth	**2,759**	**m^3**	**97,416**	**ft^3**
			606,785	**Imp. Gal.**
Surface Area of Liquid Manure	**1,369**	**m^2**	**14,736**	**ft^2**

Name$_1$	Test		
Land Location$_1$	1-1-4-W5		
Area$_2$	Length (m)	Width (m)	Area (m^2)
1	225	192	43,200
2			0
3			0
4			0
5			0
		Total Area	43,200

Select Town$_3$: Fort Macleod 90

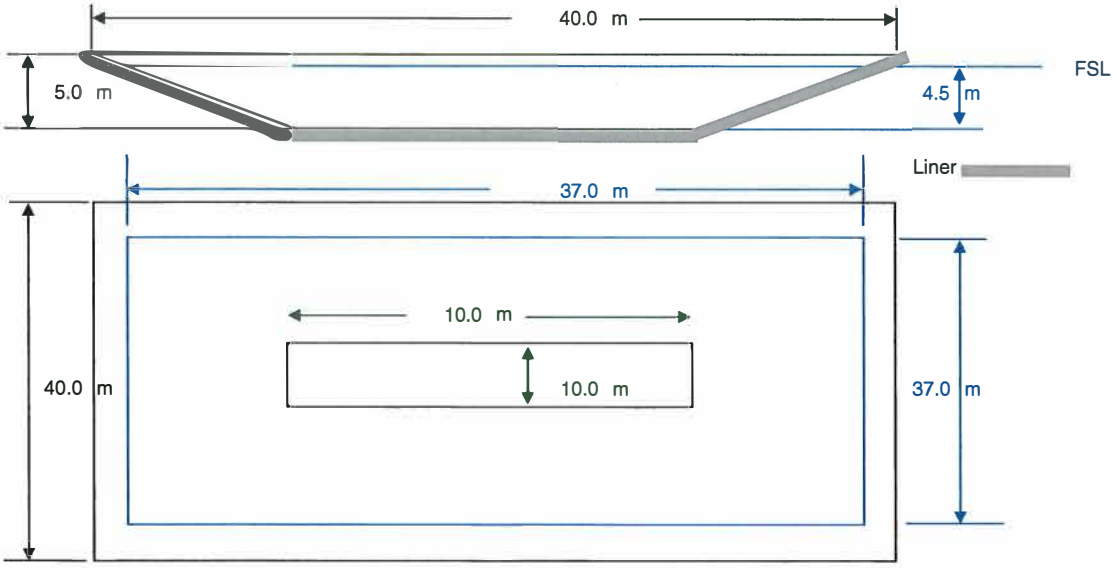
Design Rainfall: 90 mm

Catch Basin Design Volume

2,527 m^3 **89,247 ft^3**

555,906 Imp. Gal.

** Storage volume should be same or slightly greater than design storage volume.



Lines in Black - Catch basin dimension

Lines in Blue - full level

NTS - Not Drawn To Scale

469 – 40 Street S
Lethbridge, Alberta T1J 4M1
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January 24, 2019
Wood File: BX30576

Pieter Wessels
P & H Wessels Farms Ltd.
Box 1511
Fort Macleod, AB T0L 0Z0

Dear Mr. Wessels:

Re: Geotechnical Review and Evaluation
Proposed Feedlot Pens
NW 33-7-26-W4, near Fort Macleod, Alberta

As requested, Wood Environment & Infrastructure Solutions (Wood) has carried out a geotechnical review and evaluation of the above captioned site relative to the required protection of the groundwater resource, as required by the Agricultural Operation Practices Act, AB Reg. 267/2001 (hereinafter referred to as "AOPA"). This letter encompasses the soil conditions associated with proposed feedlot pens (see Figure 1).

In order to demonstrate the suitability of the natural soils for consideration as a naturally occurring protective layer, ten boreholes were advanced at the site in January 2019. The boreholes were advanced at the approximate locations illustrated on Figure 1.

The boreholes were advanced by a truck-mounted drill rig owned and operated by Chilako Drilling Services and extended to depths of 3.0 m to 8.0 m below existing grades. The boreholes were logged by Larry Delong of Chilako Drilling Services (see attachments).

In general, the natural mineral soils encountered within the boreholes were clay overlying coarse grained sand and gravel soils at depth. No groundwater resource (as defined by the AOPA) was identified within the 8.0 m drilling depth at the site.

In order to demonstrate the permeability of the subsurface soils, a 50 mm diameter PVC monitoring well was constructed in borehole W6-19. The test well was screened from 2.6 m to 1.0 m depth. Well saturation of the 50 mm diameter monitoring wells was carried out by filling the monitoring well to the top for several consecutive days. After several days, the average 1-hour water drop in the standpipe at W6-19 from a set height of 1 m from the top of the well was measured to be about 100 mm.

In order to calculate the permeability of the screened portion of the clay till stratum at the test well locations, a modified falling head test (as outlined in the USBR Engineering Geology Field Manual Volume 2 [2001]) was used. The input variables and output data are outlined on the In Situ Permeability Test report, attached. As outlined on the report, the results of the *in situ* permeability testing indicate a hydraulic conductivity, k_s, of 7.0×10^{-7} cm/s.

Using the measured permeability of the clay stratum, the 2.6 m portion of clay which has been screened at borehole W6-19 has been estimated to represent an equivalent of about 3.7 m of naturally occurring materials having a hydraulic conductivity of 1×10^{-6} cm/s.

This represents natural material protection in excess of the minimum requirements outlined by the AOPA for solid manure storage (minimum 2 m, Section 9.5-a).

Conclusion

Based on the results of the current investigation and permeability testing, and our understanding of the site and proposed development at the site, it is Wood's opinion that the naturally occurring materials at the site satisfy the AOPA requirements for a naturally occurring 'protective layer' for the proposed pens.

Given the presence of sand and gravel at depth, it is noted that the subsurface soils would not meet the requirements as a naturally occurring liner for a catch basin. Accordingly, a compacted clay liner or synthetic (i.e., HDPE) liner would be required for a catch basin.

We trust that this report satisfies your present requirements. Should you have any questions, please contact the undersigned at your convenience.

Yours truly,

Wood Environment and Infrastructure Solutions,
A Division of Wood Canada Limited

PROFESSIONAL ENGINEER ALBERTA
JOHN LOBBEZOO
Jan 24, 2019

John Lobbezoo, P.Eng.
Associate Engineer, Geotechnical
Branch Manager, Lethbridge & Medicine Hat

Co-Authored by:
Bogdan Masala, E.I.T.
Geotechnical Services

Permit to Practice No. P-4546

Attachments
- Figure 1 Borehole Locations
- In Situ Permeability Test Calculations (W6-18)
- Soil Profile and Parent Material Description, Chilako Drilling Services

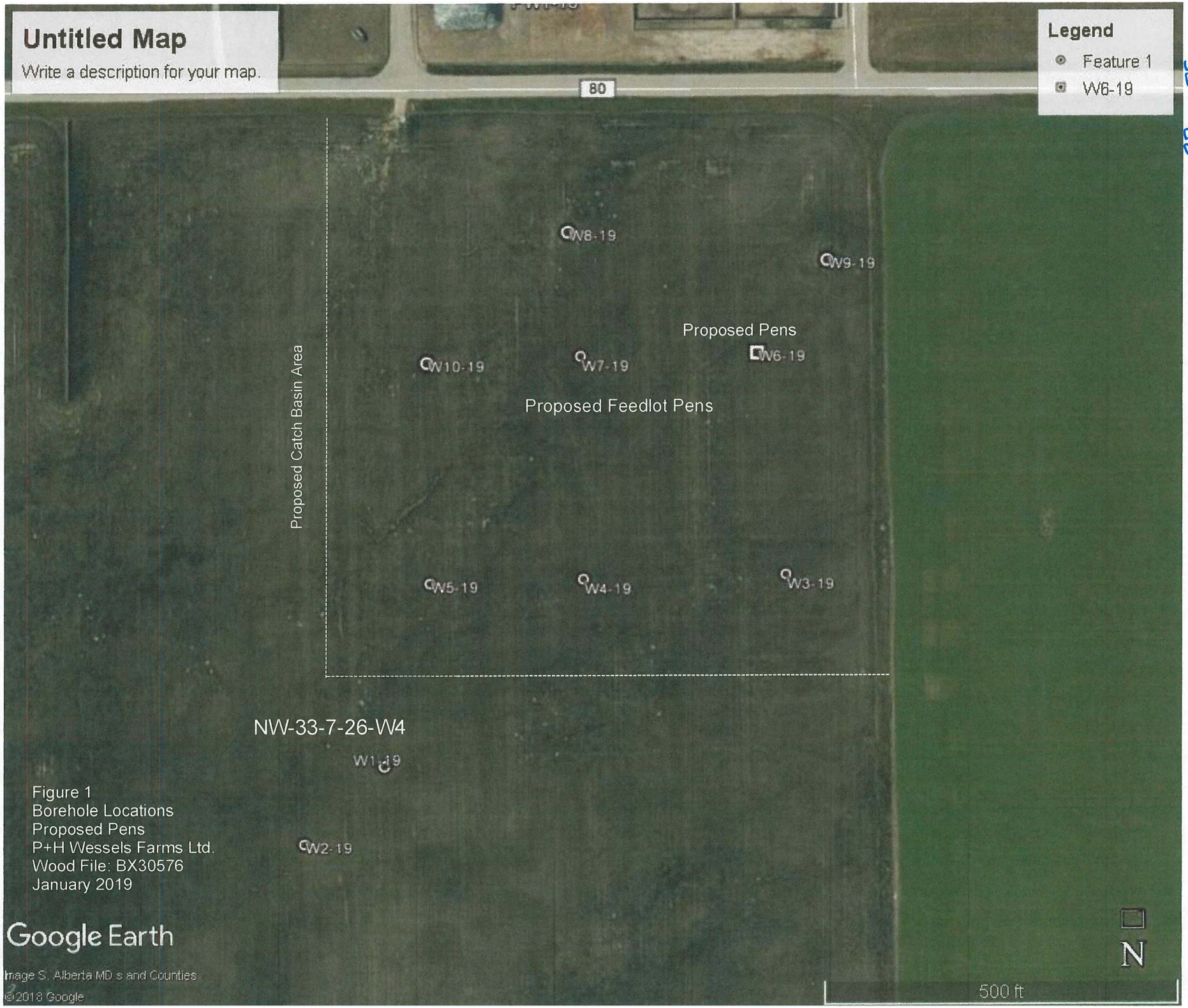


Figure 1
Borehole Locations
Proposed Pens
P+H Wessels Farms Ltd.
Wood File: BX30576
January 2019

W6-19

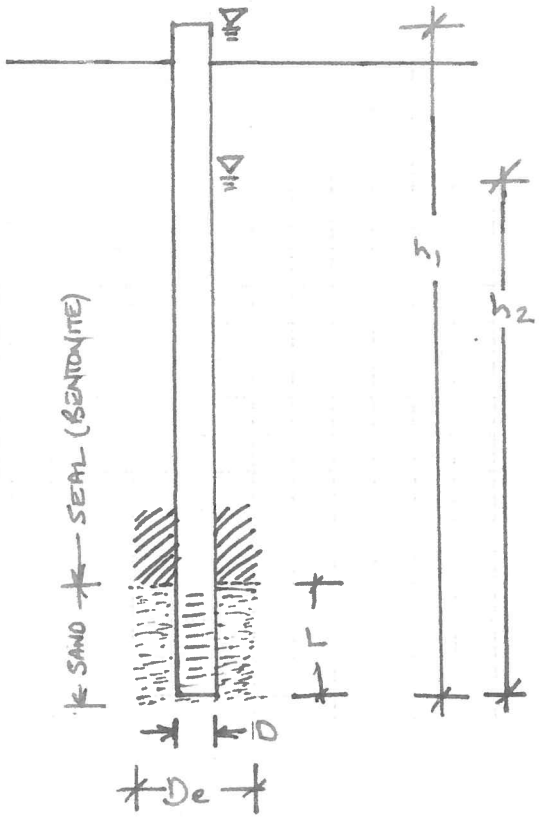
wood.

In Situ Permeability Test

Modified Falling Head Permeability Equation

$$K_s = \frac{r^2}{2\ell\Delta t}\left[\frac{\sinh^{-1}\frac{\ell}{r_e}}{2}\ln\left[\frac{2H_1-\ell}{2H_2-\ell}\right]-\ln\left[\frac{2H_1H_2-\ell H_2}{2H_1H_2-\ell H_1}\right]\right]$$

taken from USBR Engineering Geology Field Manual Volume 2 (2001)



W6-19 - P+H Wessels Farms - NW 33-7-26-W4

Wood File: BX30576

INPUT VARIABLES	Terms	Value	Definition
	D	0.0520	diameter of standpipe (m)
	De	0.1500	diameter of borehole (m)
	L	1.60	length of sand section (m)
	h1	2.10	initial height of water above base of hole (m)
	h2	2.00	final height of water above base of hole (m)
	t	1.0	time of test (h)

Ks = 7.0E-07 cm/sec

CHILAKO DRILLING SERVICES LTD

Box 942 Coaldale, Alberta, T1M 1M8
(403) 345-3710

SOIL PROFILE AND PARENT MATERIAL DESCRIPTION

Site Location: NW33-7-26W4, Wessel Date: 3-Jan-19

Hole #	Location	Depth	Texture	Moisture	Geological	Sample	Remarks
W1-19	0321498	0-0.15	SCL	D	Fluv		Lower depressional area
	5498090	0.15-0.7	CL	D	Fluv		
		0.7-8.0	S+Gr	D	Fluv		
W2-19	0321462	0-0.15	SCL	D	Fluv		Lower depressional area
	5498057	0.15-0.6	CL	D	Fluv		
		0.6-6.0	S+Gr	D	Fluv		
W3-19	0321462	0-0.15	CL	D	Fluv		Upper slope
	5498163	0.15-2.0	CL	D	Fluv		
		2.0-3.0	S+Gr	D	Fluv		
W4-19	0321587	0-0.15	CL	D	Fluv		Lower slope
	5498168	0.15-1.5	CL	D	Fluv		
		1.5-3.0	S+Gr	D	Fluv		
W5-19	0321521	0-0.15	CL	D	Fluv		Lower slope
	5498168	0.15-1.5	CL	D	Fluv		
		1.5-3.0	S+Gr	D	Fluv		
W6-19	0321667	0-0.15	CL	D	Till		Upper slope
	5498262	0.15-3.0	CL	D	Till		Stiff, trace gravel 50mm H.C. well installed to 2.6m Bentonite: 3.0-2.6m Screen: 2.6-1.1m Sand: 2.6-1.0m Benonite: 1.0-0.0m Stickup: 0.5m Hole Diameter: 0.15m
W7-19	0321591	0-0.15	CL	D	Till		Low slope
	5498264	0.15-1.5	CL	D	Till		
		1.5-3.0	S+Gr	D	Fluv		
W8-19	0321591	0-0.15	CL	D	Till		Knoll (possible borrow area)
	5498264	0.15-3.5	CL	D	Till		Trace gravel
		3.5-4.5	S+Gr	D	Fluv		
W9-19	0321699	0-0.15	CL	D	Till		Knoll (possible borrow area)
	5498300	0.15-3.4	CL	D	Till		Some gravel
		3.4-4.0	S+Gr	D	Fluv		
W10-19	0321525	0-0.15	CL	D	Till		Low slope
	5498264	0.15-1.5	CL	D	Till		
		1.5-3.0	S+Gr	D	Fluv		

Legend:

L	Loam
C	Clay
S	Sand
Gr.	Gravel
Si	Silt
F	Fine (sand)
VF	Very Fine (sand)

Eg. VFSCL = Very Fine Sandy Clay Loam