Technical Document RA22027

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	RA22027	NE 14-47-23 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.

Dec 20 2022 — Date of signing

[redacted] — Signature

Darcor Holsteins Inc — Corporate name (if applicable)

Damien Rasmuson — Print name

GENERAL INFORMATION REQUIREMENTS

Proposed facilities: list all proposed confined feeding operation facilities and their dimensions. Indicate whether any of the proposed facilities are additions to existing facilities. (attach additional pages if needed)

Proposed facilities	Dimensions (m) (length, width, and depth)
Dairy Barn	73.5 x 37.5 x 2.4
Attached milkhouse for above	12 x 14.5 x 0
New calf barn	24.5 x 12 x 0
Expanded lagoon	70 x 40 x 5.5

Existing facilities: list **ALL** existing confined feeding operation facilities and their dimensions

Existing facilities	Dimensions (m) (length, width, and depth)	NRCB USE ONLY
		See next page

NRCB USE ONLY

The application is to convert a hog operation and expanded it into a dairy CFO.

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Existing facilities continued	**Dimensions (m) (length, width, and depth)**	**NRCB USE ONLY**
Hog barn - to demolish	13 x 14.5 x 1	
Hog barn - to demolish	36.5 x 12 x 1	
Hog barn - to demolish	23 x 10 x 1	
Hog barn - to become heated shop	20 x 8.5 x 1	
Hog barn - to become cold storage	15 x 8.5 x 1	
Hog barn - to sit empty or storage	45 x 10 x 1	
Grain bins/leg system	various	
open front shelter - to demolish	12 x 11 x 0	
open front shelter - approx 30 years old	10.5 x 10 x 0	Not a CFO facility
various equipment and storage sheds (no animals)		
EMS as per previous permit AO Comment: To be expanded and lined		

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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 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 depopulate the CFO and/or to cease further construction, or to remove "works" or "undertakings" (as defined in the *Water Act*).
6. **AS 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 20 day of December, 20 22. [redacted]

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 ____ day of _____, 20____. _____

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 depopulate the CFO and/or to cease further construction, or to remove "works" or "undertakings" (as defined in the *Water Act*).
6. **AS 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

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If a new facility is replacing an old facility, please explain what will happen to the old facility and when. ☐ **N/A**

Old facility has 6 components for hogs. Intend to decommision and demolish 3 of these. One will be converted to a heated shop. Two others will be converted to cold storage.

Construction completion date for proposed facilities End of 2026

Additional information

Tentative schedule is dirt work/site prep in summer and fall of 2023. General construction spring of 2024. High interest rates and contractor availibility could delay.

Livestock numbers: Complete only if livestock numbers are different from what was identified in the Part 1 application. Note: if livestock numbers increase in your Part 2 application, a new Part 1 application must be submitted which may result in a loss of priority for minimum distance separation (MDS).

Livestock category and type (Available in the Schedule 2 of the Part 2 Matters Regulation)	**Permitted number**	**Proposed increase or decrease in number (if applicable)**	**Total**
as in part 1			
Sows - Farrow to Isowean	440	- 440	0
Milking cows (plus dries/replacements)	0	190	190

The application is to convert a hog CFO into a dairy CFO and expand it . Part 2 Matters Regulation under AOPA. Section 1(1)(d)(i) of that regulation defines an “expansion” as the construction of additional facilities to confine more livestock.

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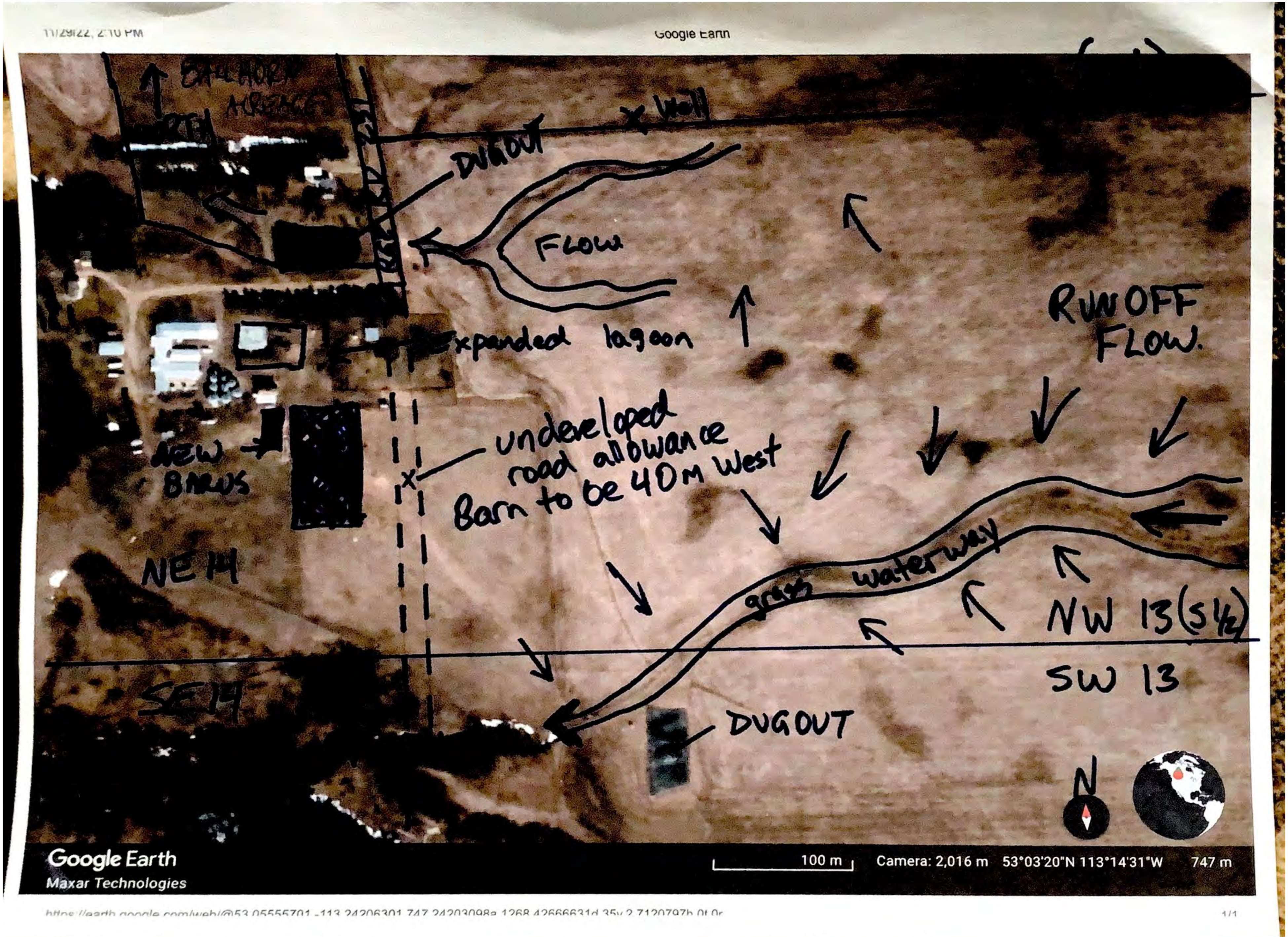
RR 23 1
TR 47 4
Coal Lake
Linden
1630m
sec 24
sec 23
Bilan 715M
TR 473
Carwell
1450m
Ballhorn
125m
Burkardt
1740m
Cridland
1450m
sec 13
1450m
RR 23 2
N
Google Earth
Maxar Technologies CNES / Airbus
1,000 m
Camera: 13,218 m 53°03'20"N 113°13'54"W
755 m


to cold storage + shop
37m
200m
new road
lagoon
to demolish
Dairy
40 m
road allowance
Calf barn
197m
NE 14-47-23-W4


11/29/22, 2:10 PM
Google Earth
DUGOUT
X Well
FLOW
expanded lagoon
undeveloped road allowance
X
Barn to be 40 m West
NEW BARNS
NE 14
RUNOFF FLOW.
grass waterway
NW 13(S½)
SW 13
SE 14
DUGOUT
N
Google Earth
Maxar Technologies
100 m
Camera: 2,016 m 53°03'20"N 113°14'31"W 747 m
1/1

https://earth.google.com/web/@53.05569487,-113.24611659,744.12356584a,691.9249993d,35y,2.7120797h,0t,0r

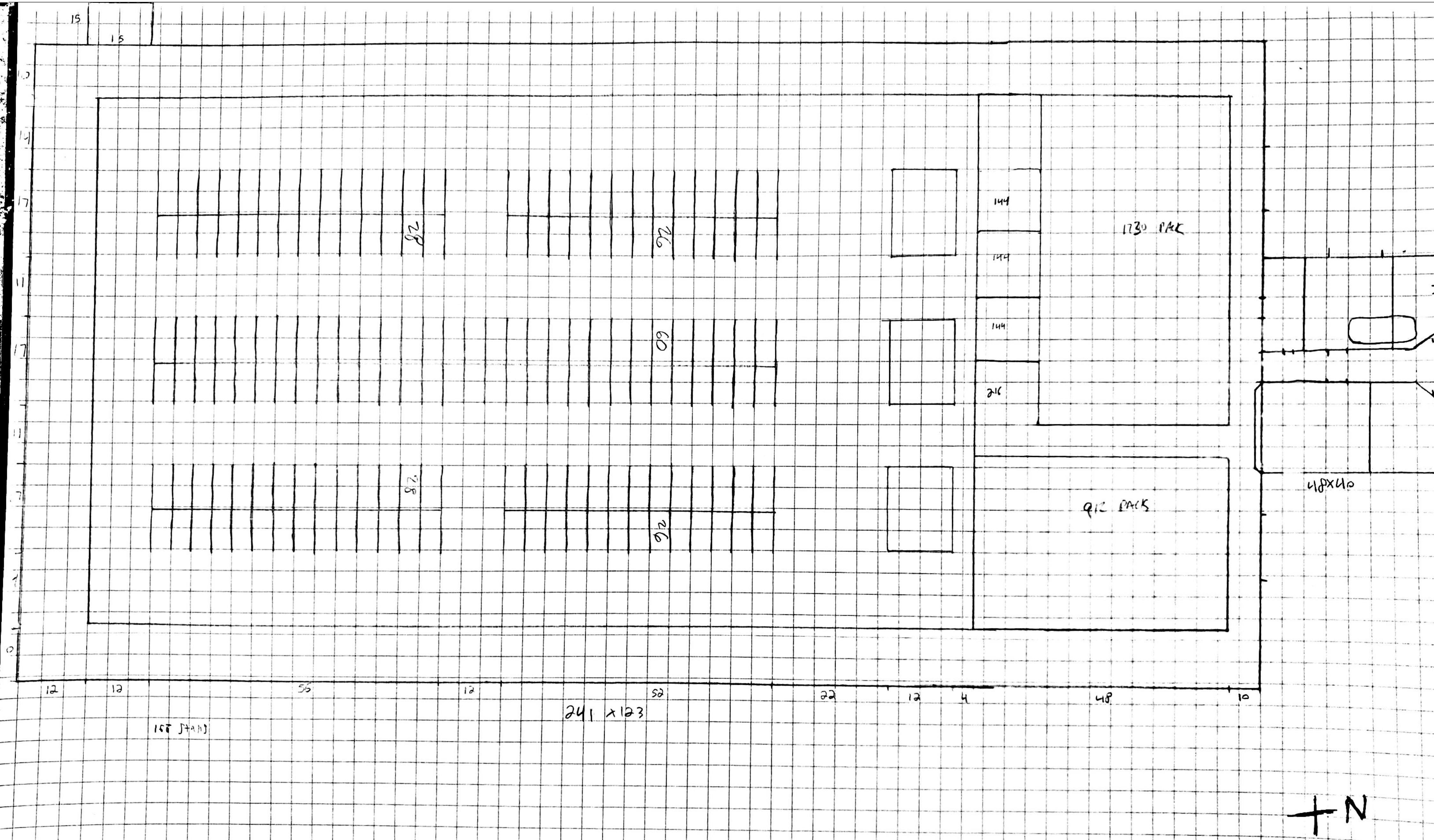
1/1

ENVIROWEST ENGINEERING

Title:

Borehole Locations
Site and Soil Assessment
NE¼-Sec.14-Twp.047-Rge.23-W4M
Wetaskiwin County, Alberta

Project No: 2211-43011	**Date:** December 12, 2022	**Figure No.:** 1.0
Scale:	**Prepared By:** E.Low	
Image Source: Google Earth Pro (June 18, 2020)		


15
15
144
144
144
216
1230 PAK
912 PACK
48x40
12
12
56
12
52
22
12
4
48
10
241 x123
N

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GENERAL ENVIRONMENTAL INFORMATION

(complete this section for the worst case of the existing facility which is the closest to water bodies or water wells and for each of the proposed facilities)

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

Existing: n/a none will have manure

Proposed 1: Dairy barn and milkhouse

Proposed 2: Calf barn

Proposed 3: Expanded lagoon

Facility and environmental risk information		Facilities				NRCB USE ONLY	
		Existing	Proposed 1	Proposed 2	Proposed 3	Meets requirements	Comments
Flood plain information	What is the elevation of the floor of the lowest manure storage or collection facility above the 1:25 year flood plain or the highest known flood level?	☐ >1 m ☐ ≤ 1 m	☑ >1 m ☐ ≤ 1 m	☑ >1 m ☐ ≤ 1 m	☑ > 1 m ☐ ≤ 1 m	☑ YES ☐ NO ☐ YES with exemption	>1 m of floodplain
Surface water information	How many springs are within 100 m of the manure storage facility or manure collection area?		None	None	None	☑ YES ☐ NO ☐ YES with exemption	None observed during site visits
	How many water wells are within 100 m of the manure storage facility or manure collection area?		None	None	None	☑ YES ☐ NO ☐ YES with exemption	WWs located more than 300 metres away
	What is the shortest distance from the manure collection or storage facility to a surface water body? (e.g., lake, creek, slough, seasonal)		111m	113m	37m	☑ YES ☐ NO ☐ YES with exemption	Dugout located 36 m of EMS. Coal Lake located more than 300 m of the proposed barns
Groundwater information	What is the depth to the water table?		>25m	>25m	>25m	☑ YES ☐ NO ☐ YES with exemption	8.5 m
	What is the depth to the groundwater resource/aquifer you draw water from?		>25m	>25m	>25m	☑ YES ☐ NO ☐ YES with exemption	UGR identified at 11.9 m in WW ID# 235864

Additional information (attach supporting information, e.g. borehole logs, records, etc. you consider relevant to your application)

NRCB USE ONLY

ENVIRONMENTAL RISK SCREENING INFORMATION

ERST for **proposed** facilities

Facility	Groundwater score	Surface water score	File number
Liquid manure storage	Low	Low	RA22027
Dairy barn	Low	Low	RA22027
Calf barn	Low	Low	RA22027

ERST for **existing** facilities

Facility	Groundwater score	Surface water score	File number
There are no existing CFO facilities as the applicant is proposing to decommission them or convert them into heated shop or cold storages			

ERST related comments:

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NRCB USE ONLY

WATER WELL AND SURFACE WATER INFORMATION

Well IDs: 235864 and 1780309 _____ _____ _____

_____ _____ _____

Surface water related concerns from directly affected parties or referral agencies: ☑ YES ☐ NO

Groundwater 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

Surface water ☑ N/A

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

Water Well Exemption Screening Tool ☑ N/A

Water Well ID	Preliminary Screening Score	Secondary Screening Score	Facility

Groundwater or surface water related comments:

There are no water wells at the proposed location of the CFO. The closest water wells are located more than 300 metres to the east (NW 13-47-23 W4M)

Coal Lake is located more than 300 metres west of the proposed CFO facilities. There is a dugout/pond located 36 metres north of the liquid manure storage.

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

			NRCB USE ONLY				
Neighbour name(s)	**Legal land description**	**Distance (m)**	**Zoning (LUB) category**	**MDS category (1-4)**	**Distance (m)**	**Waiver attached (if required)**	**Meets regulations**
Ballhorn	NE 14-47-23-W4	125	CR (*)	2	125	Yes	Yes (with waiver)
Bilan	SW 24-47-23-W4	715	CR(*)	2	715		Yes
Cridland	SW 14-47-23-W4	1230	Agricultural	1	1,175		Yes
Carwell	NW 14-47-23-W4	1450	CR(*)	2	1,450		Yes
Burkhardt	SE 13-47-23-W4	1740	Agricultural	1	1,700		Yes

(*) CR: Country residential

LAND BASE FOR MANURE AND COMPOST APPLICATION (complete only if an increase in livestock or manure production will occur)

				NRCB USE ONLY	
Name of land owner(s)*	**Legal land description**	**Usable area** (ha)**	**Soil zone *****	**Usable area (ha)**	**Agreement attached (if required)**
Darcor/Rasmuson	NE/NW/SW 24-47-23-W4	194	Black	174	
Darcor/Rasmuson	SW 13-47-23-W4	15	Black	15	
Darcor/Rasmuson	NW 13-47-23-W4	32	Black	32	
Darcor/Rasmuson	SE 23-47-23-W4	28	Black	25	
			Total	246 hectares	

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

** Available manure spreading area (excluding setback areas from residences, common bodies of water, water wells, etc. as identified in Agdex 096-5 Manure Spreading Regulations)

*** Brown, dark brown, black, grey wooded, or irrigated

Additional information (attach any additional information as required)

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MINIMUM DISTANCE SEPARATION

Methods used to determine distance (if applicable): Google Earth

Margin of error (if applicable): _____

Requirements (m): Category 1: 342 Category 2: 457 Category 3: 571 Category 4: 913

Technology factor: ☐ YES ☑ NO

Expansion factor: ☐ YES ☑ NO

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

LAND BASE FOR MANURE AND COMPOST APPLICATION

Land base required: 176 hectares

Land base listed: 269 hectares

Area not suitable: 23 hectares

Available area 246 hectares Requirement met: ☑ YES ☐ NO

Land spreading agreements required: ☐ YES ☑ NO

Manure management plan: ☐ YES ☑ NO If yes, plan is attached: ☐

PLANS

Submitted and attached construction plans: ☑ YES ☐ NO

Submitted aerial photos: ☑ YES ☐ NO

Submitted photos: ☐ YES ☑ NO

GRANDFATHERING

Already completed: ☑ YES ☐ NO ☐ N/A

If already completed, see Registration RA05042

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NRCB USE ONLY

ALL SIGNATURES IN FILE ☑ YES ☐ NO

DATES OF APPROVAL OFFICER SITE VISITS

January 31, 2023	
February 6, 2023	

CORRESPONDENCE WITH MUNICIPALITIES AND REFERRAL AGENCIES

Date deeming letters sent: January 12, 2023

Municipality: County of Wetaskiwin

☑ 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: AltaGas Utilities (Apex) ☐ N/A

☑ letter sent ☐ response received ☐ written/email ☐ verbal ☑ no comments received

Other: _____ ☑ N/A

☐ letter sent ☐ response received ☐ written/email ☐ verbal ☐ no comments received

NRCB | Natural Resources Conservation Board

Minimum Distance Separation (MDS) Waiver (declaration)

Applicant information NRCB application number: _____

Operator/operation name: Parlor Holsteins / Damien Rasmuson

Address: [redacted] Postal Code: [redacted]

Legal land location of confined feeding operation: NE 14-47-23-W4

I have requested the residence owner(s) named below to waive the required minimum distance separation (MDS) to their residence for the *Agricultural Operation Practices Act* (AOPA) permit application identified above. In making this request, I have provided the owner(s) with an opportunity to review my permit application and a copy of the Natural Resources Conservation Board (NRCB) Fact Sheet "Minimum Distance Separation (MDS) Waivers" available on the NRCB website at www.nrcb.ca. I have also explained:

- The MDS requirement set out in section 3 of the Standards and Administration Regulation of AOPA. I have advised the owner(s) that section 3(6)(a) of the Standards and Administration Regulation allows this requirement to be waived by the owners of residences, if they agree in writing to grant a waiver;
- That my proposed development does not meet the required MDS to the owner's residence; and,
- That this waiver applies only to this application as described. An increase in livestock capacity, annual manure production, level of odour production, change to the site plan or change to a facility that would increase the MDS would require a new waiver.

Following is a summary of the proposed development:

- The current scope of my confined feeding operation (CFO), including the type, number, and category of livestock, if any, is:
  440 Sow farrow to isowean
- My application for a new AOPA permit proposes the following changes to the existing livestock category, type and/or capacity at my CFO:
  change to 190 dairy cows + associated
- The proposed new CFO facility(ies), or changes to the existing CFO facilities, including manure storage, manure storage volume and any other pertinent details, if any, are (attach a site layout plan if available):
  expand EMS
  demolish some hog barns, build new dairy barn + calf barn

I the applicant understand that the waiver is not valid unless ALL registered owners of the residence sign this document.

Permit Applicant: [redacted] Date: Dec 16/2022
Signature

Residence owner(s) to initial: _____

Minimum Distance Separation (MDS) Waiver (declaration)

Residence owner(s) information

ALL Names on land title: Tom Bullhorn

Legal land location of residence(s): NE 14-47-23-W4

Telephone number(s)[1]: [redacted] Email address(es)[1]: [redacted]

Address(es)[1] and Postal code(s)[1]: [redacted]

[1] ***Please note that personal contact information is for NRCB use ONLY and not publicly released***

I am/we are the legal landowner(s) of a residence(s) located at the above noted legal land location/address:

- I/we have read the NRCB Fact Sheet "Minimum Distance Separation (MDS) Waivers";
- I/we have discussed this application with the applicant and understand its potential impacts to our residence(s);
- I/we understand that the application **does not** meet the MDS requirement to my/our residence(s), under the *Agricultural Operation Practices Act* (AOPA);
- **I/we understand that this waiver is not valid unless signed by ALL parties identified on the land title as owners;**
- **I/we are not obligated to waive the MDS requirement to our residence(s);**
- I/we understand that if I/we choose to waive the MDS requirement, I/we can revoke the waiver, by providing written notice to the NRCB approval officer, as set out in the "Minimum Distance Separation (MDS) Waivers" Fact Sheet; and
- I/we understand that this waiver is a public document.

Having considered my/our rights, I/we hereby waive the MDS requirement to my/our residence, with respect to **application number** RA05042.

[redacted]

Signatures of **all** residence owner(s) on title

Tom Bullhorn

Printed names of **all** residence owner(s) on title

Date: Dec 16/2022

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LIQUID MANURE STORAGE: Synthetic liner

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

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

1. manure lagoon
2. _____

Manure storage capacity *(use one row in the table for **EACH** cell of the synthetic lined storage, attach additional pages if you require more rows)*

	Length (m)	Width (m)	Total depth (m)	Depth below ground level (m)	Slope run:rise			NRCB USE ONLY	
					Inside end walls	Inside side walls	Outside walls	Calculated storage capacity (excl. 0.5 m freeboard) (m^3)	Filled in lower ¼? Y/N
1.	70	40	5.5	5	3:1	3:1	4:1	6,095	Y
2.									
							TOTAL CAPACITY	6,095	

Surface water control systems

Describe the run-on and runoff control system

Earthen berm around the perimeter. Minimum .5m high with a 4:1 slope to the outside of lagoon.

Sealing

Describe sealing practices for piping, etc. that penetrates the liner

Inlet pipe to be sealed with Bentonite seal

NRCB USE ONLY

Requirements met: ☑ YES ☐ NO

Liner protection

Describe how the inside walls, bottom and outside walls are protected from erosion

Not required with a HDPE liner

Describe how the physical integrity of the liner will be maintained from other damage

Fence surrounding lagoon. Ramp to be double layer HDPE

NRCB USE ONLY

Requirements met: ☑ YES ☐ NO

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LIQUID MANURE STORAGE: Synthetic liner (cont.)

Synthetic liner details

Provide synthetic liner material details

HDPE 60. See attached

Additional information *(attach copies of design/engineering reports)*

NRCB USE ONLY

Requirements met: ☑ YES ☐ NO

Condition required: ☑ YES ☐ NO

Report attached: ☑ YES ☐ NO

NRCB USE ONLY

Liquid manure storage volume calculator attached: ☑ YES ☐ NO

Depth to water table: 8.5 m

Depth to uppermost groundwater resource: 11.9 m

Requirements met: ☑ YES ☐ NO

Requirements met: ☑ YES ☐ NO

ERST completed: ☑ see ERST page for details

Surface water control systems

Requirements met: ☑ YES ☐ NO

Details/comments:

Synthetic liner requirements

Leakage detection system required: ☐ YES ☑ NO

If yes, please explain why.

Construction plans approved by professional engineer: ☐ YES ☑ NO

Will liner be installed by manufacturer approved contractor and qualified third party?: ☑ YES ☐ NO

Preparation of liner bed (comments):

If a permit is issued by the Board after a review of this decision I would recommend to include a condition in the permit requiring the permit holder to provide a construction completion report for the synthetic lined liquid manure storage

Condition required: ☑ YES ☐ NO

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LIQUID MANURE COLLECTION AND/OR STORAGE: In-barn - Concrete liner

*(complete a copy of this section for **EACH** proposed in-barn liquid manure storage facility with a concrete liner)*

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

1. Dairy Barn (alleys)
2. Dairy Barn collection pit
3. Dairy Barn pump pit

Manure storage capacity *(use one row in the table for **EACH** in-barn storage. Attach additional pages if you require more rows)*

	Length (m)	Width (m)	Total depth (m)	Depth below ground level (m)	**NRCB USE ONLY** Calculated storage capacity (m^3)
1.	73.5	37.5	0	0	
2.	34	1	1	1	34
3.	5	3.75	2.4	2.4	45
				TOTAL CAPACITY	79

Concrete liner details

Scrape alleys or unslatted portions of barn floors (if applicable)	Concrete thickness 5 inch	Method of sulphate protection Type 50	
	Concrete strength 32 MPa	Concrete reinforcement size and spacing 10mm rebar 16 inch grid	
In-barn manure pit floors	Concrete thickness 5 inch	Method of sulphate protection Type 50	
	Concrete strength 32 MPa	Concrete reinforcement size and spacing 10mm rebar 16 inch grid	
In-barn manure pit walls	Concrete thickness 6 inch	Method of sulphate protection Type 50	
	Concrete strength 32 MPa	Horizontal reinforcement size and spacing 10mm rebar 12 inch grid	Vertical reinforcement size and spacing 10 mm rebar 12 inch grid

LIQUID MANURE COLLECTION AND/OR STORAGE: In-barn - Concrete liner (cont.)

Describe how the joints at the junction of the pit walls, pit floors and any other joints will be sealed
Sikaflex or equivilant product

Describe sealing practices for piping, etc. that penetrates the liner
Sikaflex or equivilant product

Concrete requirements can be found in Technical Guideline Agdex 096-93
Guideline minimums:
Solid manure: 25MPa (D)
Solid manure (wet): 30MPa (C)
Liquid manure: 32MPa (B)
Category A is required to be engineered
Method of sulphate protection:
Type 50 or Type 10 with fly ash or equivalent

NRCB USE ONLY

Requirements met: ☑ YES ☐ NO
Condition required: ☑ YES ☐ NO

Additional information

NRCB USE ONLY

Liquid manure storage volume calculator attached: ☑ YES ☐ NO

Depth to water table: 8.5 m — Requirements met: ☑ YES ☐ NO

Depth to uppermost groundwater resource: 11.9 m — Requirements met: ☑ YES ☐ NO

ERST completed: ☑ see ERST page for details

Concrete liner requirements

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

If a permit is issued by the Board after a review of this decision I would recommend to include a condition in the permit requiring the permit holder to provide written proof that the construction concrete liners in the dairy barn meets the regulations.

Last updated February 26, 2021

NRCB USE ONLY

LIQUID MANURE STORAGE VOLUME CALCULATOR (if applicable)

Facility 1			
Name / description	Liquid manure storage	Capacity	6,095 m^3
Facility 2			
Name / description	Dairy barn collection pit	Capacity	34 m^3
Facility 3			
Name / description	Dairy barn pump pit	Capacity	45 m^3
Facility 4			
Name / description		Capacity	
		TOTAL CAPACITY	6,174 m^3
		REQUIRED 9 MONTH STORAGE CAPACITY	5,130 m^3
		MEETS THE REQUIREMENTS FOR A MINIMUM OF 9 MONTHS STORAGE	☑ 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 - Concrete liner

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

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

1. New calf barn

2. _____

Manure storage capacity

	Length (m)	Width (m)	Depth below grade to the bottom of the liner (m)	**NRCB USE ONLY** Estimated storage capacity (m^3)
1.	24.5	12	0	
2.				
			TOTAL CAPACITY	

☑ I plan to use a short-term solid manure storage (STMS) as part of my manure storage and handling plan for this CFO. The AOPA requirements for STMS are set out in the NRCB Short-Term Solid Manure Storage Requirements Fact Sheet.

Surface water control systems

Describe the run-on and runoff control system

Small ditches sloped to the North on either long side of building to direct rainfall away

Liner protection

Describe how the physical integrity of the liner will be maintained

4 inches of 32 MPa Type 50 concrete with 10mm rebar on 16 inch grid will ensure adequate physical and chemical protection.

NRCB USE ONLY

Requirements met: ☑ 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 - Concrete liner (cont.)

Concrete liner details

Concrete thickness 4 inches	Method of sulphate protection: Type 50 concrete
Concrete strength 32 MPa	Concrete reinforcement size and spacing 10mm rebar on 16 inch grid

Concrete requirements can be found in Technical Guideline Agdex 096-93
Guideline minimums:
Solid manure: 25MPa (D)
Solid manure (wet): 30MPa (C)
Method of sulphate protection:
Type 50 or Type 10 with fly ash or equivalent

NRCB USE ONLY

Requirements met:	☐ YES	☑ NO
Condition required:	☑ YES	☐ NO
Report attached:	☐ YES	☑ NO

Additional information *(attach as required)*

NRCB USE ONLY

Nine month manure storage volume requirements met ☐ YES ☑ YES With STMS ☐ NO

Depth to water table: 8.5 m Requirements met: ☑ YES ☐ NO

Depth to Uppermost groundwater resource: 11.9 m Requirements met: ☑ YES ☐ NO

ERST completed: ☑ see ERST page for details

Surface water control systems

Requirements met: ☑ YES ☐ NO Details/comments:

Concrete liner details

If a permit is issued by the Board after a review of this decision I would recommend to include a condition in the permit requiring the permit holder to provide written proof that the construction concrete liner in the calf barn meets Technical Guideline Agdex 096-93 - Non-Engineered Concrete Liners for Manure Collection and Storage Areas.

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

LAYFIELD CONSTRUCTION PRODUCTS

US 800-277-8298
CAN 866-567-7112

Nonwoven Geotextiles

1. Product Description

Needle-punched nonwoven geotextiles are made from polypropylene fibres that are tangled together in a needle-punching process. The fibres may be made in continuous or short lengths and achieve their strength by interlocking. Needle-punched nonwoven geotextiles have excellent water flow rates and are used for filtration of soil fines. Needle-punched nonwoven geotextiles have been used in drainage applications, including trench drains (also known as french drains). It can also be used for wrapping a perforated pipe, erosion protection, separation of a road sub-base and base course, and combined with three-dimensional structures to create prefabricated drains. They are also commonly used with geomembranes to provide a protective cushion. Needle-punched nonwoven primary functions: filtration; separation; protection; drainage.

Looking for something else? We've got you covered.

Looking for a more economical solution for soil separation?

Show me more geotextile products

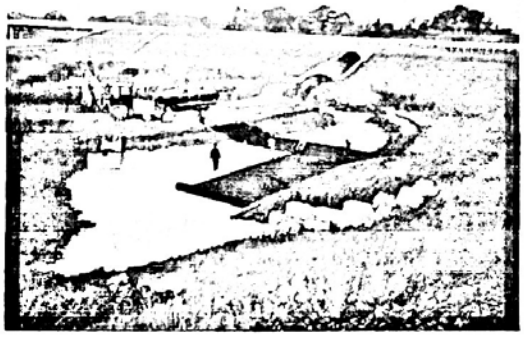
Reach out to one of our experts

2. Technical Data

Materials information is on page 2.

3. Installation

General Installation: Place the roll of needle-punched nonwoven geotextile at the top of the slope/grade and roll down grade, over lap successive and adjacent rolls by 450mm minimum. Do not allow vehicles to drive directly on the geotextile. Geotextile should be stored such that it is protected from rain and direct sunlight. Geotextile Filtration for Trench Drain (French Drain): Cut the geotextile to width and install such that there is sufficient material to wrap around the drain system with a overlap at the top the width of the trench. *Other Uses: Please contact your local* Layfield Representative for installation instructions for all other uses.



4. Availability and Cost

Available from Layfield or distributors. Call
425-254-1075 *Pacific time*
780-453-6731 Mountain time, or
905-761-9123 Eastern time

5. Manufactured For

Layfield USA Corp.
Layfield Canada Ltd.

6. Warranty

Products sold will meet Layfield's published specifications at time of sale. Full warranty details are available from Layfield.

7. Maintenance

Once geotextiles and geogrids are installed and carefully backfilled they do not require ongoing maintenance.

8. Filing Systems

9.

27 Nov 2018	Non-Woven Needle-Punched Geotextiles - US Values									
	ASTM	LP3.5	LP4	LP4.5	LP6	LP7	LP8	LP10	LP12	LP16
Grab Tensile (lbs)	D4632	90	100	120	160	180	205	250	300	380
Elongation (%)	D4632	50	50	50	50	50	50	50	50	50
Tear (lbs)	D4533	40	45	50	60	75	80	100	115	140
CBR Punc (lbs)	D6241	250	250	310	410	450	500	700	800	1025
AOS (sieve)	D4751	50	70	70	70	70	80	100	100	100
Permittivity (sec-1)	D4491	2.0	2.0	1.7	1.5	1.4	1.4	0.8[3]	0.8[3]	0.7
Water Flow (gpm/ft^2)	D4491	145	140	120	110	100	90	75	65	50
UV (500 hrs)	D4355	70%	70%	70%	70%	70%	70%	70%	70%	70%
Roll Size (ft)		15 x 360	15 x 360	15 x 360	15 x 300[2]	15 x 300[2]	15 x 300[2]	15 x 300	15 x 300	15 x 150
Roll Weight[1] (lbs)		160	167	190	202	220	250	308	400	250

Note[1]: Typical values. All other values are minimum average roll values (MARV).
Note[2]: LP6, LP7, and LP8 may be 15 x 360 ft depending on inventory.
Note[3]: LP10 also available in 1.2 and LP12 in 1.0

10.

27 Nov 2018	Non-Woven Needle-Punched Geotextiles - Metric Values									
	ASTM	LP3.5	LP4	LP4.5	LP6	LP7	LP8	LP10	LP12	LP16
Grab Tensile (N)	D4632	401	445	533	711	800	911	1,112	1,330	1,690
Elongation (%)	D4632	50	50	50	50	50	50	50	50	50
Tear (N)	D4533	178	200	222	267	333	356	444	511	623
CBR Punc (N)	D6241	1110	1110	1380	1820	2000	2220	3114	3510	4560
AOS (microns)	D4751	250	212	212	212	212	180	150	150	150
Permittivity (sec-1)	D4491	2.0	2.0	1.7	1.5	1.4	1.4	0.8[3]	0.8[3]	0.7
Water Flow ($l/min/m^2$)	D4491	5,900	5,689	4,885	4,480	4,074	3,657	3,056	2,650	2,035
UV (500 hrs)	D4355	70%	70%	70%	70%	70%	70%	70%	70%	70%
Roll Size (m)		4.57 x 110	4.57 x 110	4.57 x 110	4.57 x 91.4	4.57 x 91.4	4.57 x 91.4	4.57 x 91.4	4.57 x 91.4	4.57 x 45.7
Roll Weight[1](kg)		73	78	86	92	99	113	140	181	112

WE PROTECT

www.LayfieldConstructionProducts.com
customerservice@layfieldgroup.com

LAYFIELD

Geomembrane [HDPE Textured]

Property	ASTM	HDPE 60 TEXTURED SST	HDPE 60 TEXTURED DST
Thickness (min.avg)	D5199	57 mil 1.42 mm	57 mil 1.42 mm
Thickness, Lowest Individual for 8 out of 10 values	D5199	54 mil 1.35 mm	54 mil 1.35 mm
Thickness, Lowest Individual for 10 out of 10 values	D5199	51 mil 1.35 mm	51 mil 1.35 mm
Sheet Density	D792	0.940	0.940
Tensile Properties (min. avg) ASTM D 638; Modified Type IV Die	*Stress at Yield*	*126 ppi* 22 kN/m	*126 ppi* 22 kN/m
	Stress @ Break	90 ppi 16 kN/m	90 ppi 16 kN/m
	Strain @ Yield	12%	12%
	Strain @ Break	100%	100%
Tear Resistance (min. avg)	D1004	42 lbs 187 N	42 lbs 187 N
Puncture Resistance (min. avg)	D4833	90 lbs 400 N	90 lbs 400 N
Dimensional Stability	D1204 (Max)	± 2%	± 2%
Oxidative Induction Time	D3895	> 100 mins	> 100 mins
High Pressure Oxidative Induction Time (HPOIT)	D5885	> 400 mins	> 400 mins
Stress Cracking	D5397	400 hrs	400 hrs
Carbon Black Content	D1603	2.0 - 3.0%	2.0 - 3.0%
Carbon Black Dispersion	D5596	CAT 1 or 2	CAT 1 or 2
Oven Aging-% HPOIT retained after 90 days	D5721	80%	80%
UV Resistance- % HPOIT retained after 1600 hr	GRI GM-11 D5885	50%	50%
Roll Dimensions (Rolls dimensions may vary ± 1%)			
Roll Width	-	22.5 feet 6.86 mtrs	22.5 feet 6.86 mtrs
Roll Length	-	560 feet 170 mtrs	540 feet 165 mtrs

[1] Tests results meet or exceed GRI GM13 standard specification
[2] SST- Single Sided Textuted; DST- Double Sided Textured

Disclaimer: Layfield Environmental Systems assumes no liability for the accuracy or completeness of this information or for the ultimate use by the purchaser. Layfield Environmental Systems disclaims any and all express, implied, or statutory standards, warranties or guarantees, including without limitation any implied warranty as to merchantability or fitness for a particular purpose or arising from a course of dealing or usage of trade as to any equipment, materials, or information furnished herewith. This document should not be construed as engineering advice.

ENVIROWEST
ENGINEERING

P.O. Box 4248
Ponoka, AB.
T4J 1R6
Telephone: 403-783-8229
Facsimile: 403-783-5222

December 12, 2022

Darcor Holsteins Inc.
Attn: Darrin and Damien Rasmuson

Delivered via Email: [redacted]

Re: Site and Soil Assessment
NE-14-047-23-W4M
Wetaskiwin County, Alberta

Dear Darren and Damien,

Envirowest Engineering (Envirowest) was retained to conduct a Site and Soil Assessment for the proposed construction of a liquid manure storage facility. The current operation is under NRCB Approval RA05042. The assessment was completed to determine conditions beneath the proposed construction area and assess soil properties for the construction of proposed facilities. The proposed operation, herein referred to as "the Site," is located on NE-14-047-23-W4M in Wetaskiwin County.

The assessment has been completed in accordance with the standards and regulations associated with the amended Agricultural Operation Practices Act and associated regulations which govern all new and modified confined feeding operations.

Scope of Work and Analysis

Investigative boreholes were drilled using a truck-mounted rotary auger to the east of the current lagoon on December 8, 2022. Boreholes were completed to depths between 6 and 10.5 meters below ground surface (mbgs). Sand/weathered bedrock was found as shallow as 8.5 meters below grade within the proposed liquid manure storage lagoon. An uppermost groundwater resource (UGR) was conservatively determined to be at 8.5 mbgs, no further assessment was completed.

Conclusions

The following conclusions are based on the discussed scope of the construction. It is recommended that the lagoon liner be constructed of a synthetic liner.

Liquid Manure Storage Sizing

The new lagoon is to be constructed in an area east of the current lagoon. The new liquid manure storage lagoon was designed for 190 milking cows with dries and replacements for approximately 9 months storage, which will have the following specifications:

- To provide the required capacity the new lagoon should be 70 m in length x 40 m in width. The overall depth has been designed as 5.5 m. The overall capacity of the lagoon will be 7,414 cubic metres (1.6 million imperial gallons) which accounts for the required 0.5 m of freeboard, a storage capacity of 6,095 cubic meters, approximately 9 months storage. The sizing is based on an inside end and side wall slope of 3:1 (run/rise).
- The bottom of the liner must be not less than 1.0 m above the top of an aquifer and the shallow groundwater level. Shallow groundwater was not encountered during the assessment.
- The overall depth of 5.5 m will be achieved through a below grade depth of 5.0 m. The above-grade dykes will prevent runoff from entering the facility. The outside dyke walls should be completed to at slope of 4:1. The crest of the dyke should be sloped slightly outward to direct rainfall away from the storage facility.
- The inlet pipe to the lagoon should be located in the bottom 1/4 of the lagoon. The annulus around the inlet pipe should be sealed with a bentonite sealer.

Synthetic Liner Recommendations

It is recommended that the manure storage lagoon be constructed with a synthetic liner. The bottom of the lagoon should be not more than 7.5 meters below grade as at borehole 22BH01.

Two types of synthetic liner which are readily available in the market and are suitable for such an installation are polyvinyl chloride (PVC) and high density polyethylene (HDPE). Both materials are resistant to degradation from animal manures. The suitability of these materials in this application will be somewhat dependent on the intended operation of the facility. Operational practices for the lagoon will need to be considered to determine the potential for mechanical damage to the liner. Some suppliers also offer specially blended materials for such an installation. The use and suitability of these materials should be discussed directly with the supplier.

PVC is a flexible material which is more easily installed and repaired than liners constructed of polyethylene material. Seams in PVC liners can be completed in the field without special equipment. These liners require a soil covering, generally 30 cm thick, to protect them from degradation from ultraviolet light, cold temperatures and mechanical damage. This presence of such a soil cover can be troublesome on the sidewalls due to gravitational sloughing and liquid drawdown. Additional care is required during installation to avoid liner damage during construction of the backfill layer.

Liners constructed of HDPE are more rigid and more resistant to damage. Both seams completed in the field and repairs to the liner require the use of special equipment to “weld” the material. The material is not degraded by ultraviolet light and does not require a soil backfill.

Should damage occur to the liner after installation, repair can be time consuming and costly, particularly with respect to HDPE liners. The liner construction should consider areas of high risk (areas of manure removal and agitation) to reduce the potential for damage. There are various methods for securing these higher risk areas such as double liner installation or concrete filled geofabrics which allow equipment to enter and exit the lagoon with less risk of damage.

Liner material is available in a range of thicknesses from 20 mil to 100 mil (1 mil= 0.001 inches or 1 mm = 39 mils). The selection of liner thickness should consider material availability, cost, durability and operational procedures. Thicker liners are less prone to damage but are more costly.

Based on the liquid level fluctuation in the lagoon and the need to periodically access the lagoon for manure and solid withdrawal, a HDPE liner is recommended as no soil covering is required. A thickness of 60 mil is suggested to reduce the potential for liner damage. The thickness of the material could be reduced to 40 mil with additional design consideration in high risk areas of the lagoon.

On site preparation is required for the installation of a synthetic liner. The sub-grade must be compacted and stable. It should be smooth and uniform, must be free of sharp fragments, stones, roots or other material which could damage the liner and should not have any rapid changes in elevation. Care is required during the installation of synthetic liners to ensure damage does not result from vehicular activity or improper installation. Supervision by the supplier is recommended.

Applicable material and workmanship warranties should be discussed prior to installation.

To improve the sub-grade preparation and to again reduce the risk of liner damage, a geotextile may be installed under the geomembrane liner. The placement of this textile over the sub-grade provides a clean working area for field seams, provides added puncture resistance when loads are applied, improves the geomembrane to soil interface and can allow for the lateral and upward escape of subsurface water and gases that rise up beneath the geomembrane during its service life.

Upward moving water is caused by high groundwater levels. Upward moving gases are caused by biodegradation of organic material in the subsurface soils and from rising water table levels which expel the air from the soil voids. Vapour “strips” can be placed to allow for trapped vapours to be released from beneath the liner.

Following installation of the liner, each seam and repair area should be tested to ensure a complete seal has been achieved. The supplier/installer should provide an installation report detailing the testing of the material, the seams and any required repairs.

Closure

Envirowest Engineering is pleased to submit the report to Darrin and Damien Rasmuson of Darcor Holsteins Inc.. The information and conclusions contained in this report are for their sole use and such parties as may be normally involved in the approval process for such a facility. No other party is to rely upon the information contained within the report without the express written authorization of Envirowest Engineering.

Envirowest Engineering is not responsible for any damages that may be suffered as the result of any unauthorized use of, or reliance on, this report. Envirowest Engineering has performed the work and made the findings and conclusions set out in the report in a manner consistent with the level of care and skill normally exercised by members of the environmental engineer profession practicing under similar conditions at the time the work was performed. Envirowest Engineering accepts no responsibility for any deficiency, misstatement or inaccuracy in this report resulting from misinformation from any individuals or parties that provided information as part of this report.

We trust that this report meets your present needs. Please feel free to contact the undersigned with any questions or should you require additional information.

Respectfully submitted,

Prepared and Reviewed by:
Emily J. Low, P.Eng
Envirowest Engineering

PERMIT TO PRACTICE
2206165 ALBERTA LTD.
RM SIGNATURE: _____
RM APEGA ID #: 110373
DATE: December 12, 2022
PERMIT NUMBER: P014810
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

2206165 Alberta Ltd. o/a Envirowest Engineering
Association of Professional Engineers and Geoscientists of Alberta
Permit to Practice No. P14810

Attachments: Figure 1.0: Borehole Locations
Borehole Logs

ENVIROWEST ENGINEERING

Title:

Borehole Locations
Site and Soil Assessment
NE¼-Sec.14-Twp.047-Rge.23-W4M
Wetaskiwin County, Alberta

Project No: 2211-43011	**Date:** December 12, 2022	**Figure No.:** 1.0
Scale:	**Prepared By:** E.Low	
Image Source: Google Earth Pro (June 18, 2020)		

ENVIROWEST ENGINEERING

LOG OF BORING 22BH01

Site and Soil Assessment
NE-14-047-23 W4M
Wetaskiwin County, Alberta

Project Number: 2211-43011
Modified ASTM D2487/D2488

Driller: : Ever Green Drilling
Drilling Method: : Truck Mounted Auger
Drill Date : December 8, 2022
Logged By: : Emily Low P.Eng.

Well:
Elev.:

Depth in Meters	Gastech Reading (ppm) 0 100 200 300 400 500	VOC Reading	GRAPHIC	DESCRIPTION	Water Level
0.0 – 1.3				CLAYEY SILT, trace sand, damp, firm, brown	
1.3 – 8.5				SANDY CLAY, very firm, damp, mottled, medium plasticity	
8.5 – 10.5				SANDY CLAY, weathered bedrock, dry, yellow brown	

12-12-2022 Z:\Operations\Client Data\43011 Darcor Holsteins\22BH01.bor

ENVIROWEST ENGINEERING

LOG OF BORING 22BH02

Site and Soil Assessment
NE-14-047-23 W4M
Wetaskiwin County, Alberta

Project Number: 2211-43011
Modified ASTM D2487/D2488

Driller: : Ever Green Drilling
Drilling Method: : Truck Mounted Auger
Drill Date : December 8, 2022
Logged By: : Emily Low P.Eng.

Well:
Elev.:

Depth in Meters	Gastech Reading (ppm) 0 100 200 300 400 500	VOC Reading	GRAPHIC	DESCRIPTION	Water Level
0.0				CLAYEY SILT, trace sand, damp, firm, brown	
1.3				SANDY CLAY, very firm, damp, mottled, medium plasticity	
6.0					

12-12-2022 Z:\Operations\Client Data\43011 Darcor Holsteins\22BH02.bor

ENVIROWEST ENGINEERING

LOG OF BORING 22BH03

Site and Soil Assessment
NE-14-047-23 W4M
Wetaskiwin County, Alberta

Project Number: 2211-43011
Modified ASTM D2487/D2488

Driller: : Ever Green Drilling
Drilling Method: : Truck Mounted Auger
Drill Date : December 8, 2022
Logged By: : Emily Low P.Eng.

Depth in Meters	Gastech Reading (ppm) 0 100 200 300 400 500	VOC Reading	GRAPHIC	DESCRIPTION	Well: 22MW01 Elev.:	Water Level
0.0				CLAYEY SILT, trace sand, damp, firm, brown		
1.3				SANDY CLAY, very firm, damp, mottled, medium plasticity		
6.0					Bentonite, Solid, Sand, Screen	

12-12-2022 Z:\Operations\Client Data\43011 Darcor Holsteins\22BH03.bor