

Part 2 – Technical Requirements

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
<input checked="" type="checkbox"/> Approval <input type="checkbox"/> Registration <input type="checkbox"/> Authorization <input type="checkbox"/> Amendment	LA23044	NE 19-12-19 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 and that the information provided in this application is true to the best of my knowledge.

Aug - 8, 2024

Date of signing

Hutterian Brethren Church of Turin

Corporate name (if applicable)

Signature

Martin Waldner

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)
Pens C1, C2, C3, C4 (already constructed)	236 m x 83 m
Pens E1, E2, E3 (already constructed)	55 m x 34 m
Pens E4, E5, E6 (already constructed)	125 m x 55 m
Pens D1, D2, D3, D4, D5	275 m x 69 m
SE Catch Basin	161 m x 26 m x 4m

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

Existing facilities	Dimensions (m) (length, width, and depth)	NRCB USE ONLY
Feedlot pens - A & H Alley	269 m x 54 m	
Feedlot Pens - B Alley	244 m x 54 m	
Feedlotpens-S1 & S2	24 m x 30 m	
NRCB USE ONLY		

Part 2 – Technical Requirements

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DECLARATION AND ACKNOWLEDGMENT OF APPLICANT CONCERNING WATER ACT LICENCE

issued by Alberta Environment and Protected Areas (EPA) 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 EPA 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 EPA'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 EPA 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 EPA'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.
7. **Provide:** Water licence application number(s) _____

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 EPA under the *Water Act* for the development or activity proposed in this AOPA application.
2. **Provide:** Water license number(s) or water conveyance agreement details _____

Signed this 3 day of Sept, 2024.

Signature of Applicant or Agent

Part 2 – Technical Requirements

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 EPA 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** EPA'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 EPA 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 EPA'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.
7. **Provide:** Water license number(s) or water conveyance agreement details _____

Signed this ____ day of _____, 20____.

Signature of Applicant or Agent



Figure 1: Site Location Plan



Figure 2: Detailed Site Layout Plan

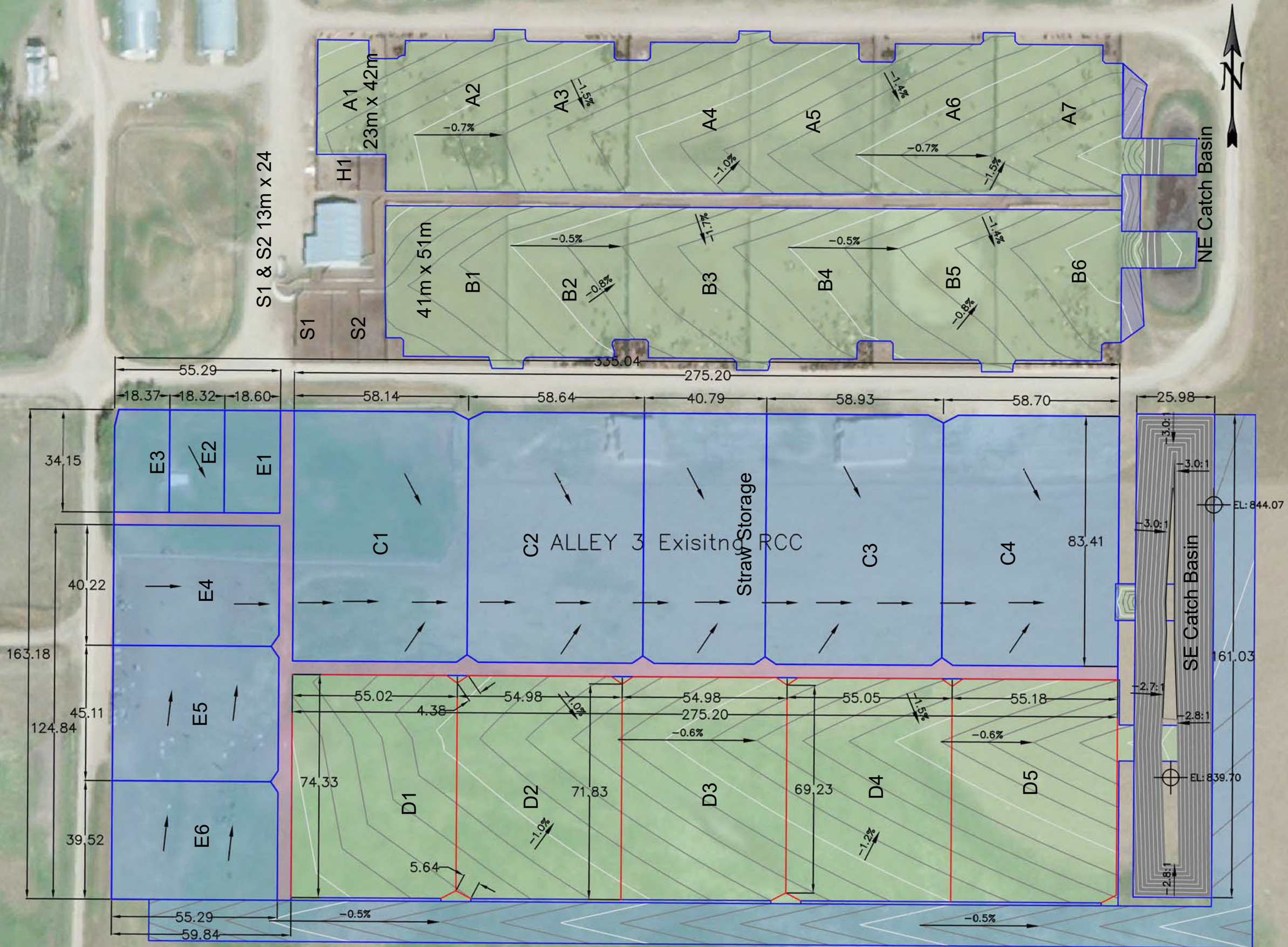


Figure 3: Detailed Pen & Catch Basin Plan

Part 2 – Technical Requirements

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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: Hog Manure Slurry Tank (SE30-12-19-W4)

Proposed 1: Proposed Feedlot Pens C1-C4, D1-D5, E1-E6

Proposed 2: Proposed SE Catch Basin

Proposed 3:

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?	<input checked="" type="checkbox"/> >1 m <input type="checkbox"/> ≤ 1 m	<input checked="" type="checkbox"/> >1 m <input type="checkbox"/> ≤ 1 m	<input checked="" type="checkbox"/> >1 m <input type="checkbox"/> ≤ 1 m	<input type="checkbox"/> > 1 m <input type="checkbox"/> ≤ 1 m	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES with exemption	
	Surface water information	How many springs are within 100 m of the manure storage facility or manure collection area?	0	0	0	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES with exemption	
	How many water wells are within 100 m of the manure storage facility or manure collection area?	0	0	0	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES with exemption		
	What is the shortest distance from the manure collection or storage facility to a surface water body? (e.g., lake, creek, slough, seasonal)	920 (Little Bow)	1,600 (Little Bow)	1,600 (Little Bow)	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES with exemption		
Groundwater information	What is the depth to the water table?	>5m	>10m	>10m	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES with exemption		
	What is the depth to the groundwater resource/aquifer you draw water from?	~10m	~15m	~15m	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES with exemption		

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

Groundwater resource includes a spring located approximately half way down the coulee slope, approximately 1km from the proposed facilities.

Part 2 – Technical Requirements

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

Neighbour name(s)	Legal land description	Distance (m)	NRCB USE ONLY				
			Zoning (LUB) category	MDS category (1-4)	Distance (m)	Waiver attached (if required)	Meets regulations
Hank Van Essen	NW-18-12-19 W4	1,950					
Bill Tucker	SW-13-13-20 W4	2,950					

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

Name of land owner(s)*	Legal land description	Usable area** (ha)	Soil zone ***	NRCB USE ONLY	
				Usable area (ha)	Agreement attached (if required)
See Attached					
Total					

* 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)

Goldridge Colony Land Base for Feedlot Manure Dispersion

Land Type	Owner	Reference	Legal Description					Area (ac)
Irrigation	HBC of Turin	L-W1	SE	34	13	20	W4	135
Irrigation	HBC of Turin	L-W3	NE	27	13	20	W4	135
Irrigation	HBC of Turin	L-W5	SE	27	13	20	W4	135
Irrigation	HBC of Turin	L-W2	NW	27	13	20	W4	135
Irrigation	HBC of Turin	L-W4	SW	27	13	20	W4	135
Irrigation	HBC of Turin	L-W7	NE	22	13	20	W4	135
Irrigation	HBC of Turin	L-W9	SE	22	13	20	W4	157
Irrigation	HBC of Turin	L-W6	NW	22	13	20	W4	135
Irrigation	HBC of Turin	L-W8	SW	22	13	20	W4	135
Irrigation	HBC of Turin	L-W11	NE	15	13	20	W4	135
Irrigation	HBC of Turin	L-W13	SE	15	13	20	W4	135
							Total Land Base	1507

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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. Proposed Pens C1-C4, D1-D5, E1-E6
2. _____

Manure storage capacity

	Length (m)	Width (m)	Depth below ground level (m)	NRCB USE ONLY Estimated storage capacity (m ³)
1.	275	163	--	
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

Site grading will be shaped to shed water away from the pens. Run-off from the pens will be captured into a new HDPE-lined catch basin to be constructed along the east side of the pens.

Naturally occurring protective layer details

Thickness of naturally occurring protective layer	Provide details (as required) Clay soils are present from ~1.0 to 1.5m depth in existing and proposed pen area See JLECS report P24034 dated 28 August 2024		
	_____ 1 _____(m)		
Soil texture	_____ 34 _____% sand	_____ 20 _____% silt	_____ 46 _____% clay
Hydraulic conductivity - naturally occurring protective layer	Depth and type of soil tested 0.5m - clay	Hydraulic conductivity (cm/s) 3.88 x 10(-7) cm/s	Describe test standard used In Situ - Single Ring Infiltrometer

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

NRCB USE ONLY

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

28 August 2024

J Lobbezoo Engineering & Consulting Services Ltd.

PO Box 96, Monarch, AB T0L1M0

JLECS File: P24034

Goldridge Farming Company Ltd.

PO Box 207

Turin, Alberta T0K 2H0

Attention: Mr. Martin Waldner

**Re: Geotechnical Review and Evaluation
NRCB Permitting of Existing & Proposed Feedlot Pens
NE-19-012-19-W4M, near Turin, Alberta**

As requested, J Lobbezoo Engineering & Consulting Services Ltd. (JLECS) 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 describes site soil conditions to support a permit application related to a series of existing and proposed feedlot pens in the southwest of NE-19-012-19-W4M (refer to Figure 1, attached).

In order to demonstrate the suitability of the existing soils for consideration as a naturally occurring protective layer to the groundwater, five test pits were advanced at the site on August 12, 2024. The test pits were advanced at the approximate locations denoted as TP1 to TP5 on Figure 1, attached.

The test pits were advanced by a track excavator operated by Goldridge Colony, and extended to depths ranging between 1.5 m and 1.8 m below existing grades. The test pits were logged by the JLECS engineer.

In general, clay fill was encountered at each of the test pits, extending to depth ranging between approximately 1.0 m and 1.5 m depth. The natural mineral soil encountered below the fill was comprised of sandy silt with traces of gravel. The test pits were each open and dry upon completion of the excavation.

Samples of the near surface clay fill were collected from each of the test pits, and were all subjected to analysis of soil texture, which was carried out by Down to Earth Laboratories in Lethbridge, Alberta. The results indicate a soil texture breakdown as outlined in the following Table 1. The laboratory report is attached, for reference.

Table 1: Soil Textural Analyses

Test Pit / Depth	% Sand	% Silt	% Clay
TP1 / 1.0 m	42	18	40
TP2 / 1.0 m	27	23	50
TP3 / 1.0 m	38	18	44
TP4 / 1.0 m	35	20	45
TP5 / 1.0 m	30	21	49

To assess the permeability of the near surface clay fill associated with the clay subgrade for the existing and proposed pens, permeability testing was carried out using a Single Sealed Ring Infiltrometer (SSRI). This testing was carried out at a depth of about 0.5 m below existing grade. The permeability testing apparatus was provided, set up, and monitored by JLECS. Tests were carried out at the locations TP1 and TP3 (see Figure 1). Details and results of the testing are summarized on the following Table 2. The associated calculations are appended.

Table 2: Details of *In Situ* SSRI Permeability Testing

Test # / Location	Diameter of Ring (cm)	Depth of Ring (cm)	Depth of Wetting Front (cm)	Standpipe Details (25mm diameter)			<i>In Situ</i> Permeability, k (cm/s)
				Initial Height of Water, h_1 (cm)	Final Height of Water, h_2 (cm)	Elapsed Time, t (hrs)	
TP1, Existing North Pen Area	32.0	13	~10	40	36	2	3.88×10^{-7}
TP3, Proposed South Pen Area	32.0	13	~10	41	38.5	2	2.32×10^{-7}

As indicated in Table 2, the results of the *in situ* testing indicated a coefficient of permeability, k , of about 2.3 to 3.9×10^{-7} cm/s. Based on the measured *in situ* permeability and a thickness of about 1.0 m of the near surface clay fill (as observed in the test pits), the existing near surface clay fill in the existing and proposed pen area represents an equivalent thickness of approximately 2.5 m of material having a permeability of 1×10^{-6} cm/s. This represents material protection in excess of the minimum requirements outlined by the AOPA for solid manure storage (minimum 2 m, Section 9.5-c).

Conclusion

Based on the results of the current investigation and permeability testing, it is JLECS’s opinion that the existing near surface clay at the site satisfies the AOPA requirements for permitting the proposed pens (solid manure storage).

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

Yours truly,

J Lobbezoo Engineering & Consulting Services Ltd.



John Lobbezoo, P.Eng.
Principal Geotechnical Engineer

PERMIT TO PRACTICE J LOBBEZOO ENGINEERING & CONSULTING SERVICES LTD.	
RM SIGNATURE:	_____
RM APEGA ID #:	_____ 110450 _____
DATE:	_____ 28 Aug 2024 _____
PERMIT NUMBER: P016456 The Association of Professional Engineers and Geoscientists of Alberta (APEGA)	

Attachments

- Figure 1 Site Plan & Test Pit Locations
- In Situ Permeability Test (SSRI) Calculations
- Down to Earth Labs Soil Texture Report
- Test Pit Summary Table



Image Credit: Government of Alberta

**Figure 1: Site Plan and Test Pit Locations
Existing & Proposed Feedlot Pens**

In situ Permeability Test (SSRI)

Test TP1 - north/existing pen area

Test TP3 - south/proposed pen area

Single Sealed Ring Infiltrometer

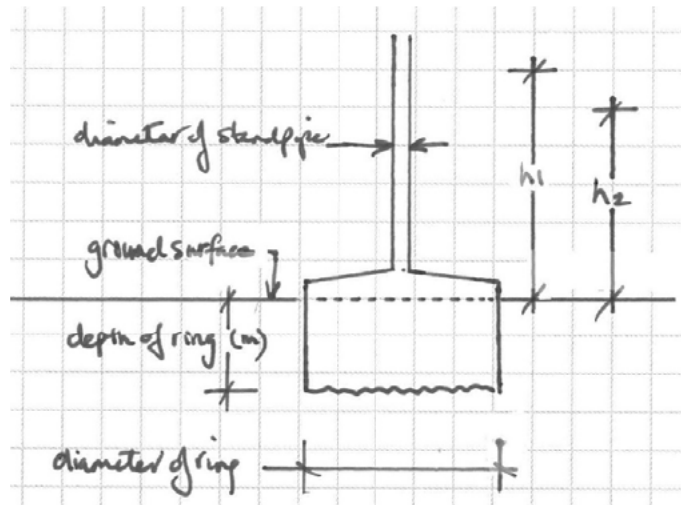
Single Sealed Ring Infiltrometer

diameter of ring	0.32 m	
diameter of standpipe	0.025 m	
Initial water column height, h_1	0.400 m	
Final water column height, h_2	0.360 m	
elapsed time	2 hrs	
depth of ring	0.13	= "l"
depth of wetting front	0.10 m	
area of ring, A :	0.080 m ²	
area of standpipe, a :	0.00049 m ²	
volume of water displaced:	1.9625E-05 m ³	

diameter of ring	0.32 m
diameter of standpipe	0.025 m
Initial water column height, h_1	0.410 m
Final water column height, h_2	0.385 m
elapsed time	2 hrs
depth of ring	0.13
depth of wetting front	0.10 m
area of ring, A :	0.080 m ²
area of standpipe, a :	0.00049 m ²
volume of water displaced:	1.23E-05 m ³

Falling head calculation: $k = 2.3 (a \cdot l / A \cdot t) \log (h_1 / h_2)$
 $k = 3.88E-09$ m/s
 $3.88E-07$ cm/s

Falling head calculation: $k = 2.3 (a \cdot l / A \cdot t) \log (h_1 / h_2)$
 $k = 2.32E-09$ m/s
 $2.32E-07$ cm/s



Standard Single Sealed Ring Infiltrometer Setup



Down To Earth Labs Inc.

The Science of Higher Yields

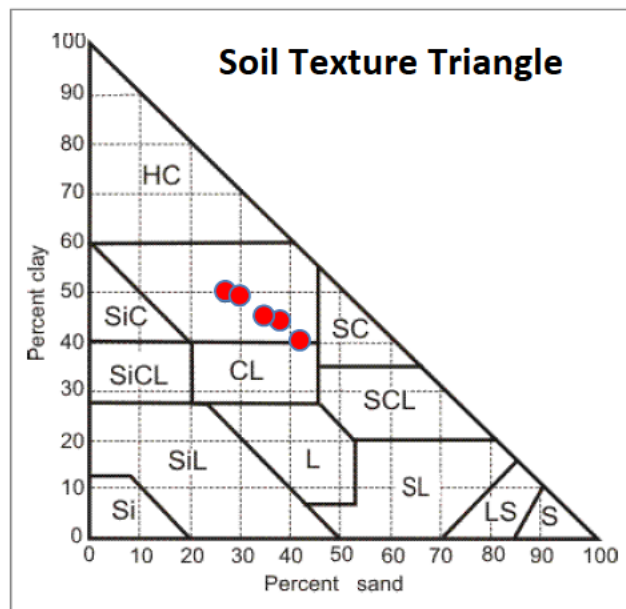
J. Lobbezoo Engineering +
Consulting Services
Box 96
Monarch, Alberta T0L 1M0

Report #: 184849
Report Date: 2024-08-14
Received: 2024-08-12
Completed: 2024-08-14
Test Done: ST

Project :
Goldridge Colony
PO:

3510 6th Ave North
Lethbridge, AB T1H 5C3
403-328-1133
www.downtoearthlabs.com
info@downtoearthlabs.com

		Sample ID: 240812M009	240812M010	240812M011	240812M012	240812M013
	Cust. Sample ID:	TP - 1	TP - 2	TP - 3	TP - 4	TP - 5
Analyte	Units	1.0	1.0	1.0	1.0	1.0
Sand	%	42.1	27.2	38.1	34.9	30.1
Silt	%	17.8	22.8	17.8	20.0	20.8
Clay	%	40.1	50.1	44.1	45.1	49.2
Soil Texture	-	Clay	Clay	Clay	Clay	Clay



Raygan Boyce - Chemist

Test Pit Summary Table

JLECS File: P24034

Project: Goldridge Colony, Existing & Proposed Feedlot Pens, NW-19-012-19-W4M

Date of Excavation: August 12, 2024

TP1		
<i>Depth (m):</i> 0.0 – 1.0	CLAY FILL –medium plastic, brown, stiff, moist	Single Ring <i>in situ</i> permeability test
1.0 – 1.5	SANDY SILT – low to non-plastic, compact, brown, damp	
1.5	End of Test Pit at 1.5 m depth <i>-test pit open and dry upon completion</i>	

TP2		
<i>Depth (m):</i> 0 – 1.2	CLAY FILL –medium plastic, brown, stiff, moist	
1.0 – 1.5	SANDY SILT – low to non-plastic, trace gravel, compact, brown, damp	
1.5	End of Test Pit at 1.5 m depth <i>-test pit open and dry upon completion</i>	

TP3		
<i>Depth (m):</i> 0 – 1.5	CLAY FILL –medium plastic, brown, stiff, moist	Single Ring <i>in situ</i> permeability test
1.5 – 1.8	SANDY SILT – low to non-plastic, compact, brown, damp	
1.8	End of Test Pit at 1.8 m depth <i>-test pit open and dry upon completion</i>	

TP4		
<i>Depth (m):</i> 0 – 1.2	CLAY FILL –medium plastic, brown, stiff, moist	
1.2 – 1.5	SANDY SILT – low to non-plastic, compact, brown, damp	
1.5	End of Test Pit at 1.5 m depth <i>-test pit open and dry upon completion</i>	

TP5		
<i>Depth (m):</i> 0 – 1.0	CLAY FILL –medium plastic, brown, stiff, moist	
1.0 – 1.5	SANDY SILT – low to non-plastic, compact, brown, damp	
1.5	End of Test Pit at 1.5 m depth <i>-test pit open and dry upon completion</i>	

Table Notes:

- test pit information to be read in conjunction with JLECS report P24012.
- test pits excavated on August 12, 2024, using a track excavator operated by Goldridge Colony
- see Figure 1 for test pit locations

Part 2 – Technical Requirements

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

RUNOFF CONTROL CATCH BASIN: Compacted soil liner

(complete a copy of this section for EACH proposed runoff control catch basin with a compacted soil liner)

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

1. Proposed SE Catch Basin _____
2. _____
3. _____

Determination of runoff area

Provide a plan and show how you calculated the area contributing to runoff for each catch basin

Total proposed pen & catch basin area is 375 m by 170 m = 63,750 m²

Design Rainfall = 85mm; Assume 1.0 runoff coefficient for RCC

Min. required capacity = 63,750 m² x 85 mm x 1.0 = 5,420 m³

Freeboard = 0.5 m

Catch basin capacity

	Length (m)	Width (m)	Depth (m)	Depth below ground level (m)	Slope run:rise			NRCB USE ONLY Calculated storage capacity (excl. 0.5 m freeboard) (m ³)
					Inside end walls	Inside side walls	Outside walls	
1.	160	26	4.3	4.3	3:1	3:1	n/a	
2.								
3.								
TOTAL CAPACITY								

Compacted soil liner details

Thickness of compacted soil liner	<u>0.5</u> (m)	Provide details (as required)	
Soil texture	<u>24</u> % sand	<u>24</u> % silt	<u>52</u> % clay
Atterberg limits	Plastic limit <u>21</u>	Liquid limit <u>52</u>	Plasticity index <u>31</u>
Hydraulic conductivity	Hydraulic conductivity (cm/s) 8.35 x 10(-9) cm/s (JLECS test report attached for reference)		
	Describe test standard used laboratory fixed wall falling head permeability test		

Catch Basin – Design and management requirements can be found in Technical Guideline Agdex 096-101

NRCB USE ONLY

- Requirements met: YES NO
- Condition required: YES NO
- Report attached: YES NO

PERMEABILITY TEST



CLIENT : Goldridge Sand & Gravel							
PROJECT : Materials Testing Services - Clay Liner Material							
JOB No. : P24034							
LOCATION : NE-19-012-19-W4M	SAMPLE: --						
BOREHOLE: Composite: Clay Liner Material	DEPTH : --						
DATE : 28-Jun-24	TECHNICIAN : JL						
SAMPLE DATA							
Sample Description : Medium Plastic Clay							
Sample Diameter (mm) : 101.6	Cross Section Area (cm ²) : 81.0						
Initial Sample Length (mm) : 116.4	Initial Volume (cm ³) : 943.2						
Final Sample Length (mm) : 116.4	Final Volume (cm ³) : 943.2						
Change in Volume (cm ³)							
MOISTURE DETERMINATION							
	Before	After					
Tare No. :							
Wt. Sample (wet + tare) (g)	301.5						
Wt. Sample (dry + tare) (g)	255.1						
Wt. Tare (g)	9.0						
Wt. Water (g)	46.4						
Wt. Sample (dry) (g)	246.1						
Moisture Content (%)	18.9%						
DENSITY DETERMINATION							
	Before	After					
Mould No.							
Wt. Sample (wet + mould) (g)	3923.3						
Wt. Mould (g)	2095.1						
Wt. Sample (wet) (g)	1828.2						
Volume Mould (cm ³)	943.2						
Wet Density (kg/m ³)	1938						
Dry Density (kg/m ³)	1631						
PERMEABILITY TEST DATA							
Date	Temp	h ₀	h ₁	Elapsed Time (sec)		Permeability (cm/s)	
				Time	Elapsed Time	Initial	Average
June 19, 2024	23	41.8		6:00 PM			
June 22, 2024	23		38.4	3:00 PM	248400.0	3.27E-08	
June 22, 2024	23	40.3		3:00 PM			
June 25, 2024	23		39.3	11:30 AM	246600.0	9.76E-09	2.12E-08
June 25, 2024	23	39.3		11:30 AM			
June 26, 2024	23		39.0	2:00 PM	95400.0	7.70E-09	8.73E-09
June 26, 2024	23	39.0		2:00 PM			
June 28, 2024	23		38.4	4:00 PM	180000.0	8.25E-09	7.98E-09
Coefficient of Permeability, k :						8.35E-09	cm/sec
REMARKS:							



Down To Earth Labs Inc.

The Science of Higher Yields

J. Lobbezoo Engineering +
Consulting Services
Box 96
Monarch, Alberta T0L 1M0

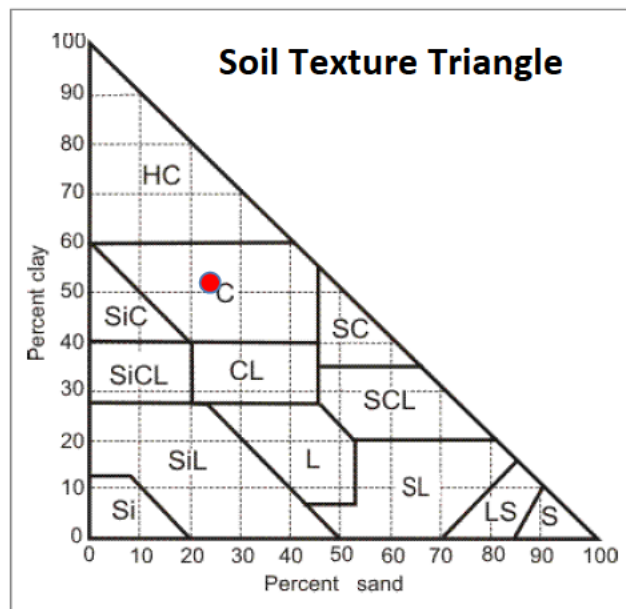
Report #: 179789
Report Date: 2024-06-24
Received: 2024-06-20
Completed: 2024-06-24
Test Done: ST

Project :
MISC
PO:

3510 6th Ave North
Lethbridge, AB T1H 5C3
403-328-1133
www.downtoearthlabs.com
info@downtoearthlabs.com

Sample ID: 240620M033
Cust. Sample ID: Goldridge

Analyte	Units	
Sand	%	24.2
Silt	%	24.0
Clay	%	51.8
Soil Texture	-	Clay



Raygan Boyce - Chemist

ATTERBERG LIMITS TEST RESULTS

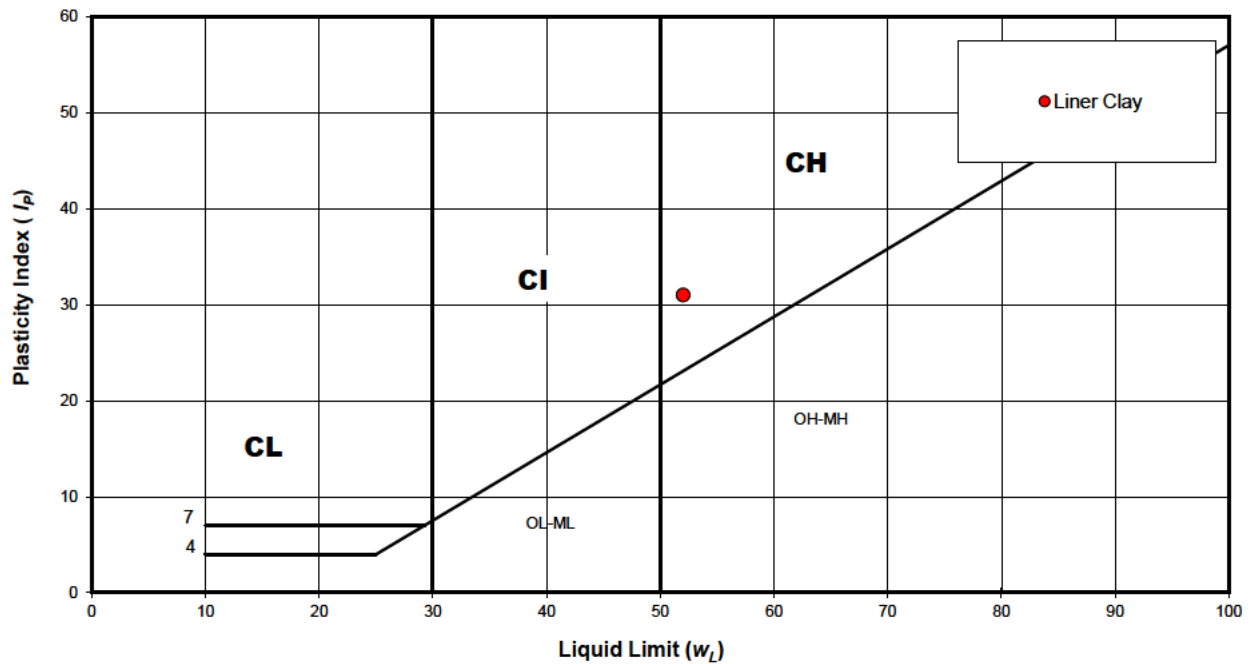
Hutterian Brethren Church of Turin

Proposed Catch Basin Liner

NE-19-12-19-W4M, near Turin, AB

Project No: P24034

Date: 3-Sep-24



Borehole/ Sample No.	Sample Depth (m)	Plasticity Index, I_p	Liquid Limit, w_L
Liner Clay	n/a	31	52

The following calculator may be used to design a catch basin based on catchment area and potential surface water runoff.

Name:

Land Location:

Units to be used for calculation:

Estimating Runoff Potential

1. Estimate the total area impacted with manure that will contribute to water runoff and any additional uplands that will drain to the catch basin. It may be easier to calculate the area in small pieces. Click the + to add more areas.

Area	Length (m)	Width (m)	Paved?	Area (m ²)
1	<input type="text" value="375"/>	<input type="text" value="170"/>	<input type="text" value="YES"/>	63750.00 +
Total Area				63750.00

2. Select the nearest city/town to obtain local rainfall data for a one day rainfall event with 1 in 30 year probability. A portion of the rainfall amount will be multiplied by the runoff area (above) to determine runoff volume.

Select Town:

Estimation of water runoff to be collected in the catch basin:

<input type="text" value="5418.75"/>	m ³
<input type="text" value="191361"/>	ft ³
<input type="text" value="1191958"/>	Imp. Gal

Calculating Catch Basin Volume:

3. Enter the dimensions of the proposed catch basin including length, width and total depth (0.5m will be subtracted for freeboard level). Side slopes and end slopes are set to 3 to 1 (run:rise). Berm width can be added for additional information.

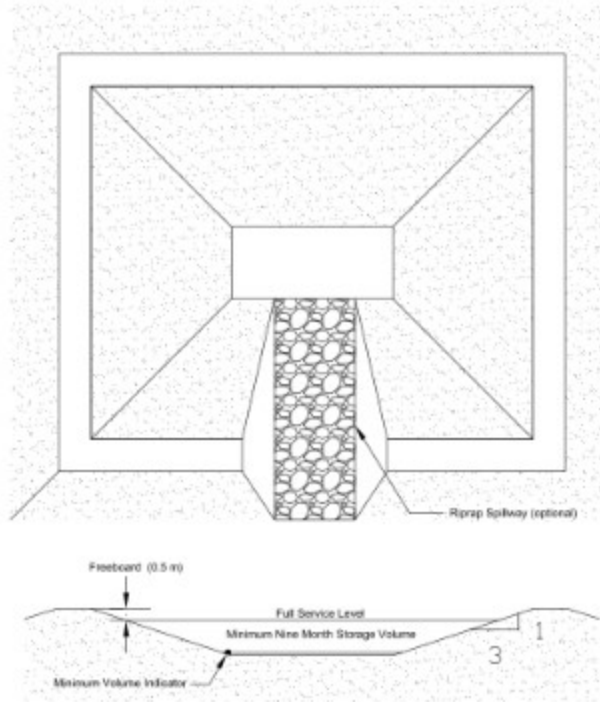
Construction Dimensions	Storage Dimensions
Length (m): <input type="text" value="180"/>	157.0
Width (m): <input type="text" value="26"/>	23.0
Depth (m): <input type="text" value="4.3"/>	3.8
<input type="button" value="Calculate"/>	

Evacuation Capacity:

<input type="text" value="8525"/>	m ³
<input type="text" value="301058"/>	ft ³
<input type="text" value="1875240"/>	Imp. Gal

Catch basin volume (minus freeboard):

<input type="text" value="6583"/>	m ³
<input type="text" value="232476"/>	ft ³
<input type="text" value="1448054"/>	Imp. Gal



Comparing Catch Basin Volume versus Runoff Potential:

Runoff potential:	<input type="text" value="5418.75"/>	m ³
Catch basin volume:	<input type="text" value="6583"/>	m ³

The catch basin dimensions meet the design requirements in AOPA