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	LA21053	S½ 8-21-24 W4M N½ 5-21-24 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.

October 25th 2021
Date of signing

Signature

John Schooten and Sons
Corporate name (if applicable)

Cody Schooten
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)
Pen (AO comment: For clarification, the application is for 80 pens, 80 m x 65 m each. See site photo below)	80m x 65m
Catch Basin	200m x 90m x 3m

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

Existing facilities	Dimensions (m) (length, width, and depth)	NRCB USE ONLY
Pens	80m x 65m	Overall footprint of all pens: 1412 m x 650 m
Holding Pens (Barn A)	70m x 60m	
Barn A	70m x 40m	

NRCB USE ONLY

The holding pens and barns (Barn A-E) are not considered part of the manure collection area. It is assumed that they are populated only temporarily (See Technical Guideline Agdex 096-94, June 2018)

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)

Existing facilities continued	**Dimensions (m) (length, width, and depth)**	**NRCB USE ONLY**
Barn B	85m x 70m	
Barn C	50m x 75	
Barn D	50m x 65m	
Holding Pens (Barn D)	104m x 20m & 32m x 25m	
Barn E	54m x 75m & 58m x 20m	
Pond 1 (3555 m^3)	42m x 44m x 8m	confirmed
Pond 2 (11445 m^3)	56m x 70m x 8m	confirmed
Pond 3 (9443 m3)	50m x 60m x 8m	confirmed
Pond 4 (7605 m3)	60m x 70m x 8m	confirmed
Pond 5 (9443 m3)	60m x 70m x 8m	confirmed
Pond 6 (18630 m3)	50m 120m x 8m	confirmed
Pond 7 (2828 m3)	34m x 110m x 8m	confirmed

AO comment: These are the existing pens. The existing catch basins are located to the south of the feedlot pens (bottom of page). The wells are noted in blue with a white label added by myself to add clarity.

Notes:

1. Fresh Pond Calcs

76 Pens
x 325 Head – Approximately
x 20 Gallons per day
x 240 Days
= 118,560,000 Gallons Required

New Pond 120m x 605m x 11m at 3:1
121,290,314 Gallons

2. Effluent Pond Calcs
865m x 605m Catchment Area
10,360,381 Gallons Required as per:
agric.gov.ab.ca/app19/loadcatchbasin

New Pond 90m x 200m x 3m at 3:1
10,227,244 Gallons

For Discussion Only

Dennis Dirtworx LTD	
Earthview Rev 2	
Date May 2021	Drawn Dan Dyck
Scale NTS	Drawing #

Part 2 — Technical Requirements

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

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

Construction completion date for proposed facilities Approx 18 months from approval

Additional information

Construction will commence once approval has been granted.

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**
Finisher Cattle	(see Decision Summary LA21053)		75,000

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 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 25 day of October, 20 21.

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

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)

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: Old **Proposed 1:** New

Proposed 2: _____ **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?	☑ >1 m ☐ ≤ 1 m	☑ >1 m ☐ ≤ 1 m	☑ >1 m ☐ ≤ 1 m	☐ > 1 m ☐ ≤ 1 m	☒ YES ☐ NO ☐ YES with exemption	not in flood plain
Surface water information	How many springs are within 100 m of the manure storage facility or manure collection area?	0	0	0		☒ YES ☐ NO ☐ YES with exemption	None recorded in AEP database or observed during site visit
	How many water wells are within 100 m of the manure storage facility or manure collection area?	0	0	0		☒ YES ☐ NO ☐ YES with exemption	Wells 1 and 5 are 156 m north of pens Wells 2,3,4 are within 100m of existing facilities. None within 100m of new facilities (see below)
	What is the shortest distance from the manure collection or storage facility to a surface water body? (e.g., lake, creek, slough, seasonal)	150m to spring run off	250m to road ditch	850m to road ditch		☒ YES ☐ NO ☐ YES with exemption	65 m to ephemeral drain connected to Arrowwood Creek. 756 m from new facilities
Groundwater information	What is the depth to the water table?		10.8 m	10.8 m		☒ YES ☐ NO ☐ YES with exemption	Below 10.7 m drilling depth (see report)
	What is the depth to the groundwater resource/aquifer you draw water from?	67m				☒ YES ☐ NO ☐ YES with exemption	30.8 m (well 1476616)

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
New feedlot pens	low	low	LA21053
New catch basin	low	low	LA21053

ERST for **existing** facilities

Facility	Groundwater score	Surface water score	File number
Existing pens	Moderate	low	LA21053
Existing row of catch basins	Moderate	low	LA21053

ERST related comments:

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

WATER WELL AND SURFACE WATER INFORMATION

Well IDs: Well 1 (north): 1476616 | Well 2 (office) 237499 | Well 3 (Catch basin) 236945
Well 4 (feedlot pens) 237542 | Well 5 (north) 1305283

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 The proposed feedlot pens and catch basin are not within 100 m of a water well

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

Surface water ☒ N/A The proposed feedlot pens and catch basin are not within 30 m of a surface water body

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:

The feedlot pens and catch basin score in the lower range of the moderate risk category. The existing groundwater well monitoring requirements are carried over and expanded.

Only existing facilities - as permitted under development permit 98-0-12 are within 100m of a water well.

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 Natural Resources Conservation Board

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**
John Schooten and Sons	SE 5 21 24 4	745	Ag	1		Not required	
John Schooten and Sons	NE 8 21 24 4	981	Ag	1		Not required	
Tim Prince	NW 32 20 24 4	1500	Ag	1	1,435 m	yes	Yes with waiver
Ken Burke	SW 16 21 24 4	1150	Ag	1	1,044 m	yes	Yes with waiver

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)**
John Schooten and Sons	See Field Acres		Dark Brown / Irr		
Bernie Mcwilliams	See Spreading Agreement	3031	Dark Brown		
Ian Donovan	"	518	"		
Brett Brooks	"	463	"		
Rob Beagle	"	1352	"		
			Total	See analysis below	

* 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)

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

			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**
2163459 Alberta Ltd	section 6-21-24 W4		AG	1	1,850 m		yes
David Ray	SW 1-21-25 W4		AG	1	2,633 m		yes
Golden Valley Grain	E 4-21-24 W4		AG	1	2,076 m		yes

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)**
Robert Lee	See Spreading Agreement	372	Dark Brown		
David Bexte	"	235	Irr		
			Total	See analysis below	

* 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)

Name
Address
Legal Land
Location

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	75,000	33,442.5
	Feeders (450 - 900 lbs)	0.700	0.700	0.500	0.245		-
	Feeder Calves (<550 lbs)	0.700	0.700	0.275	0.135		-
	Other						-
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		-
	Other					-	-
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		-
	Other					-	-
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		-
	Other						-
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		-
	Other						-
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		-
	Other						-
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		-
	Other						-
Bison	Bison	0.600	0.700	1.000	0.420		-
	Other						-
Cervid	Elk	0.600	0.700	0.600	0.252		-
	Deer	0.600	0.700	0.200	0.084		-
	Other						-
Wild Boar	Feeders	2.000	0.800	0.140	0.224		-
	Sow (farrowing)	2.000	0.800	0.371	0.594		-
	Other						-
					Total		33,442.5

For New Operations

Dispersion Factor 1

Category	Odour Objective	Distance Feet	Distance Metres
1	41.04	6,033	1,839
2	54.72	8,045	2,452
3	68.4	10,056	3,065
4	109.44	16,089	4,904

For Expanding Operations

Dispersion Factor 1
Expansion Factor 0.77

Category	Odour Objective	Distance Feet	Distance Metres
1	41.04	4,646	1,416
2	54.72	6,194	1,888
3	68.40	7,743	2,360
4	109.44	12,389	3,776

Name	0
Address	0
Legal Land	
Location	0

Landbase Requirements (hectares) based on 2006 AOPA requirements

Category of Livestock	Type of Livestock	Number of Animals	Dark Brown & Brown (ha)	Grey Wooded (ha)	Black (ha)	Irrigated (ha)
Beef	Cows/Finishers (900+ lbs)	75000	9375	7800	5850	4650
	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		9375.0	7800.0	5850.0	4650.0
	Total Acres		23165.6	19273.8	14455.4	11490.2

Name	0
Address	0
Legal Land Location	0

Animal Units to Determine Affected Party Radius

Category of Livestock	Type of Livestock	Number of Animals	Animal Unit Factor	Animal Units
Beef	Cows/Finishers (900+ lbs)	75,000	1.1	68181.8
	Feeders (450 - 900 lbs)	-	2	0.0
	Feeder Calves (<550 lbs)	-	3.6	0.0
	Other	-		0.0
Dairy (*count lactating cows only)	*Free Stall – Lactating Cows with all associated dries, heifers, and calves	-	0.5	0.0
	*Free Stall – Lactating cows with Dry Cows only	-	0.6	0.0
	Free Stall – Lactating Cows only	-	0.7	0.0
	Tie Stall – Lactating cows only	-	0.5	0.0
	Loose Housing – Lactating cows only	-	0.5	0.0
	Dry Cow (Solid manure)	-	1	0.0
	Dry Cow (Liquid manure)	-	1	0.0
	Replacements – Bred Heifers (Breeding to Calving)	-	1.15	0.0
	Replacements - Growing Heifers (350 lbs to breeding)	-	1.9	0.0
	Calves (< 350 lbs)	-	5	0.0
	Other	-		0.0
Swine Liquid (*count sows only)	Farrow to finish *	-	0.56	0.0
	Farrow to wean *	-	1.5	0.0
	Farrow only *	-	1.9	0.0
	Feeders/Boars	-	5	0.0
	Growers/Roasters	-	8.5	0.0
	Weaners	-	18.2	0.0
	Other	-		0.0
Swine Solid (*Count sows only)	Farrow to finish *	-	0.56	0.0
	Farrow to wean *	-	1.5	0.0
	Farrow only *	-	1.9	0.0
	Feeders/Boars	-	5	0.0
	Growers/Roasters	-	8.5	0.0
	Weaners	-	18.2	0.0
	Other	-		0.0
Poultry	Chicken - Breeders - Solid	-	100	0.0
	Chicken - Layers - Liquid (includes associated pullets)	-	125	0.0
	Chicken - Layers - (Belt Cage)	-	150	0.0
	Chicken - Layers - (Deep Pit)	-	150	0.0
	Chicken - Pullets/Broilers	-	500	0.0
	Turkey - Toms/Breeders	-	50	0.0
	Turkey - Hens (light)	-	75	0.0
	Turkey - Broilers	-	100	0.0
	Ducks	-	100	0.0
	Geese	-	50	0.0
	Other	-		0.0
Horses	PMU	-	1	0.0
	Feeders > 750 lbs	-	1	0.0
	Foals < 750 lbs	-	3.3	0.0
	Mules	-	1	0.0
	Donkeys	-	1.5	0.0
	Other	-		0.0
Sheep	Ewes/Rams	-	5	0.0
	Ewes with lambs	-	4	0.0
	Lambs	-	21	0.0
	Feeders	-	10	0.0
	Other	-		0.0
Goats	Meat/Milk (per Ewe)	-	6	0.0
	Nannies/Billies	-	10	0.0
	Feeders	-	13	0.0
	Other	-		0.0
Bison	Bison	-	1	0.0
	Other	-		0.0
Cervid	Elk	-	1.7	0.0
	Deer	-	5	0.0
	Other	-		0.0
Wild Boar	Feeders	-	6	0.0
	Sow (farrowing)	-	1.25	0.0
	Other	-		0.0
	Total Animal Units			68181.8
	Affected Party Radius			4 miles

Affected Party radius is measured from the boundary of the parcel of land where the cfo is located to land that is within the affected party radius.

Minimum Distance Separation (MDS) Waiver (declaration)

Residence owner(s) information

ALL Names on land title: Ken Burke

Legal land location of residence(s): SW 16 21 24 4

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

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

[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 LA21053.

[redacted]

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

Ken Burke,

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

Date: Oct 25 - 2021

Minimum Distance Separation (MDS) Waiver (declaration)

Residence owner(s) information

ALL Names on land title: Tim Prince

Legal land location of residence(s): NW 32 20 24 4

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

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

[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** LA21053.

[redacted]

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

Tim Prince

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

Date: Oct 25/21

Minimum Distance Separation (MDS) Waiver (declaration)

Residence owner(s) information

ALL Names on land title: John Schooten and Sons

Legal land location of residence(s): SE 5 21 24 4

Telephone number(s)[1]: [redacted] Email address(es)[1]: schootenandsons@gmail.com

Address(es)[1] and Postal code(s)[1]: [redacted] T0L 0B0

[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** LA21053.

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

Cody Schooten John Schooten + Sons

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

Date: Oct 25 2021

Minimum Distance Separation (MDS) Waiver (declaration)

Residence owner(s) information

ALL Names on land title: John Schooten and Sons

Legal land location of residence(s): NE 8 21 24 4

Telephone number(s)[1]: [redacted] Email address(es)[1]: schootenandsons@gmail.com

Address(es)[1] and Postal code(s)[1]: [redacted] T0L 0B0

[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** LA 21053.

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

Cody Schooten John Schooten + Sons

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

Date: Oct 25 2021

NRCB | Natural Resources Conservation Board

Minimum Distance Separation (MDS) Waiver (declaration)

Applicant information NRCB application number: LA21053

Operator/operation name: John Schooten and Sons

Address: Box 148 Diamond City Postal Code: T0K 0T0

Legal land location of confined feeding operation: SE 8 21 24 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:
  150 Pens for Feeders/Finishers (Beef)

- My application for a new AOPA permit proposes the following changes to the existing livestock category, type and/or capacity at my CFO:
  75,000 head of Finishers (Beef)

- 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):
  76 Extra pens , 2 Hospitals , Processing Barn, Fresh Water Pond and Effluiant / Run off lagoon

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

Permit Applicant: _____ Date: October 25 2021
Signature

Residence owner(s) to initial: CS

SCHOOTEN & SONS
FEEDYARDS

Field Acres Mossleigh

Field	Land Location	Dryland Acres	Irrigated Acres	Classification
1	SW 7-21-24	30	130	IRR
2	NE 7-21-24	30	130	IRR
3	SE 7-21-24	30	130	IRR
6, 7	NE 8-21-24	32	140	IRR
8, 9, 10, 11	* 5-21-24	155	360	IRR
12, 13, 14, 15	* 9-21-24	77	560	IRR
16	SW 4-21-24	32	126	IRR
17, 18, 19, 20	* 22-21-24	140	480	IRR
21, 23	NW NE 33-20-24	55	250	IRR
22	SW 33-20-24	115		Dark Brown
24	SW 23-21-24	38	80	IRR
25, 26, 27	NW SW E 14-21-24	35	480	IRR
28, 29	NW NE 35-20-24	311		Dark Brown
30, 31	NW SW 32-20-24	48	248	IRR
32, 33, 34, 35	* 21-20-25	626		Dark Brown
36, 37, 38, 39	* 15-20-25	621		Dark Brown
40	NE 9-20-25	79		Dark Brown
41, 44	NW SW 10-20-25	250		Dark Brown
42, 43	NW SW 11-20-25	299		Dark Brown
Donovan 1/2	SW SE 31-20-24	310		Dark Brown
Total		3313	3114	

*Section

SCHOOTEN & SONS
FEEDYARDS

Manure Spreading Agreement

Bernie McWilliams agrees to allow John Schooten and Sons Custom Feedyards to spread manure on the following fields during 2022 - 2027 (calendar year).

Land Location	Acres	Soil zone
NE NW 35-20-25	320	Dark Brown
NW 1-21-25	160	"
SW 12-21-25	160	"
NE 34-20-25	160	"
NW 12-20-26	160	
NE 11-20-26	160	
25-20-26	610	
W½ 31-20 26	260	
W½ 36-20-26	320	
N½ 26-20-26	300	
35-20-26	510	

Listed: 3,120 acres dry

Signed: [redacted] Date: June 3/21

P.T.O

SCHOOTEN & SONS
FEEDYARDS

Manure Spreading Agreement

Bernie McWilliams agrees to allow John Schooten and Sons Custom Feedyards to spread manure on the following fields during _____(calendar year).

Land Location	Acres	Soil zone
3-21-26	600	Dark Brown
2-21-26	640	"
10-21-26	600	"
16-21-26	600	"
W ½ 15-21-26	320	"
NE 17-21-26	160	"
SE 22-20-26	150	"

Listed: 3,070 acres dry

Signed:_____ Date:_____

SCHOOTEN & SONS
FEEDYARDS

Manure Spreading Agreement

Bernie McWilliams agrees to allow John Schooten and Sons Custom Feedyards to spread manure on the following fields during _____ (calendar year).

Land Location	Acres	Soil zone
NE 17-20-26	150	Dark Brown
S½ 16-20-26	300	"
7-20-26	550	"
SW 6-20-26	160	"
SW 11-21-26	140	"

Listed: 1,300 acres dry

Signed:_____ Date:_____

SCHOOTEN & SONS
FEEDYARDS

Manure Spreading Agreement

Ian Donovan agrees to allow John Schooten and Sons Custom Feedyards to spread manure on the following fields during 2022 - 2027 (calendar year).

Land Location	Acres	Soil zone
SW SE 26-20-25	320	DARK Brown
NW NE 36-20-25	320	"
SW SE 9-21-25	320	"
NW NE 31-20-24	320	"

Listed: 1,280 acres dry

Signed: [redacted] Date: Jan 1 2021

SCHOOTEN & SONS
FEEDYARDS

Manure Spreading Agreement

Brett Brooks agrees to allow John Schooten and Sons Custom Feedyards to spread manure on the following fields during 2022 -2027 (calendar year).

Land Location	Acres	Soil zone
33-21-24	512	Dark Brown
20-21-24	632	"

Listed: 1,144 acres dry

Signed: [redacted] Date: June 4, 2021

SCHOOTEN & SONS
FEEDYARDS

Manure Spreading Agreement

Rob Bragle agrees to allow John Schooten and Sons Custom Feedyards to spread manure on the following fields during 2022 - 2027 (calendar year).

Land Location	Acres	Soil zone
NE - 10 - 21 - 25	160	"
SW - 19 - 21 - 24	160	"
NW SW NE 14 - 21 - 25	480	Dark Brown
NE NW SE 22 - 21 - 25	480	"
SW SE NE 15 - 21 - 25	480	"
NE SE 18 - 21 - 24	320	"
SW 17 - 21 - 24	160	"
NW NE 24 - 21 - 25	320	"
16 - 21 - 24	620	"
SW 15 - 21 - 24	160	"

Listed: 3,340 acres dry

Signed: [redacted] Date: June 2, 2021

SCHOOTEN & SONS
FEEDYARDS

Manure Spreading Agreement

Robert Lee agrees to allow John Schooten and Sons Custom Feedyards to spread manure on the following fields during 2022 - 2027 (calendar year).

Land Location	Acres	Soil zone
Section 5-21-25-W4	500 acres	
W½ 4-21-25-W4	200 acres	
E½ 8-21-25-W4	220 acres.	

Listed: 920 acres dry

Signed: [redacted]

Date: JUNE, 05, 2021

SCHOOTEN & SONS
FEEDYARDS

Manure Spreading Agreement

David Beattie agrees to allow John Schooten and Sons Custom Feedyards to spread manure on the following fields during 2022-2027 (calendar year)

Land Location	Acres	Soil zone
NE 10-21-24-W4	160 acres	Irrigated
NE 15-21-24-W4	160 acres	Irrigated
SE 15-21-24-W4	100 acres	Irrigated
NW 15-21-24-W4	160 acres	Irrigated

Listed: 580 acres irrigated

Signed: [redacted] Date: June 2, 2021

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

MINIMUM DISTANCE SEPARATION

Methods used to determine distance (if applicable): aerial pictures (google earth)

Margin of error (if applicable): +/- 2 m

Requirements (m): Category 1: 1,839 m Category 2: 2,452 m Category 3: 3,065 m Category 4: 4,904 m

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: 11,490acres irrig. or 23,165acres dry land

Land base listed: 3,694 acres irrigated and 17,487 acres dry land.

Area not suitable: _____

Available area: > 24,000 acres equivalent (see calculation)

Requirement met: ☒ YES ☐ NO

Calculation:
1 acre irrigated equals approximately 2 acres dry land.
Therefore the total land base listed equals: 7,388 + 17,487= 24,875 acres

Dry land= brown soil zone

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 _____

See Decision Summary LA21053 for details on the grandfathering determination.

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

ALL SIGNATURES IN FILE ☒ YES ☐ NO

DATES OF APPROVAL OFFICER SITE VISITS

July 7, 2021	

CORRESPONDENCE WITH MUNICIPALITIES AND REFERRAL AGENCIES

Date deeming letters sent: January 5, 2022

Municipality: Vulcan County

☒ 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: Siksika Nation ☐ N/A

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

Other: Wheatland County ☐ N/A

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

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 BASIN: Naturally occurring protective layer

*(complete a copy of this section for **EACH proposed** runoff control catch basin with a naturally occurring protective layer)*

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

1. Ditch and 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

All pens will run to a precast ditch, located in the centre of the feedlot.
This will run west to east into the effluent pond located on the east side of the feedlot.

Catch basin capacity

	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)
1.	200	90	3	18	3:1	3:1	3:1	24,336 m^3
2.								
3.								
							TOTAL CAPACITY	

Naturally occurring protective layer details

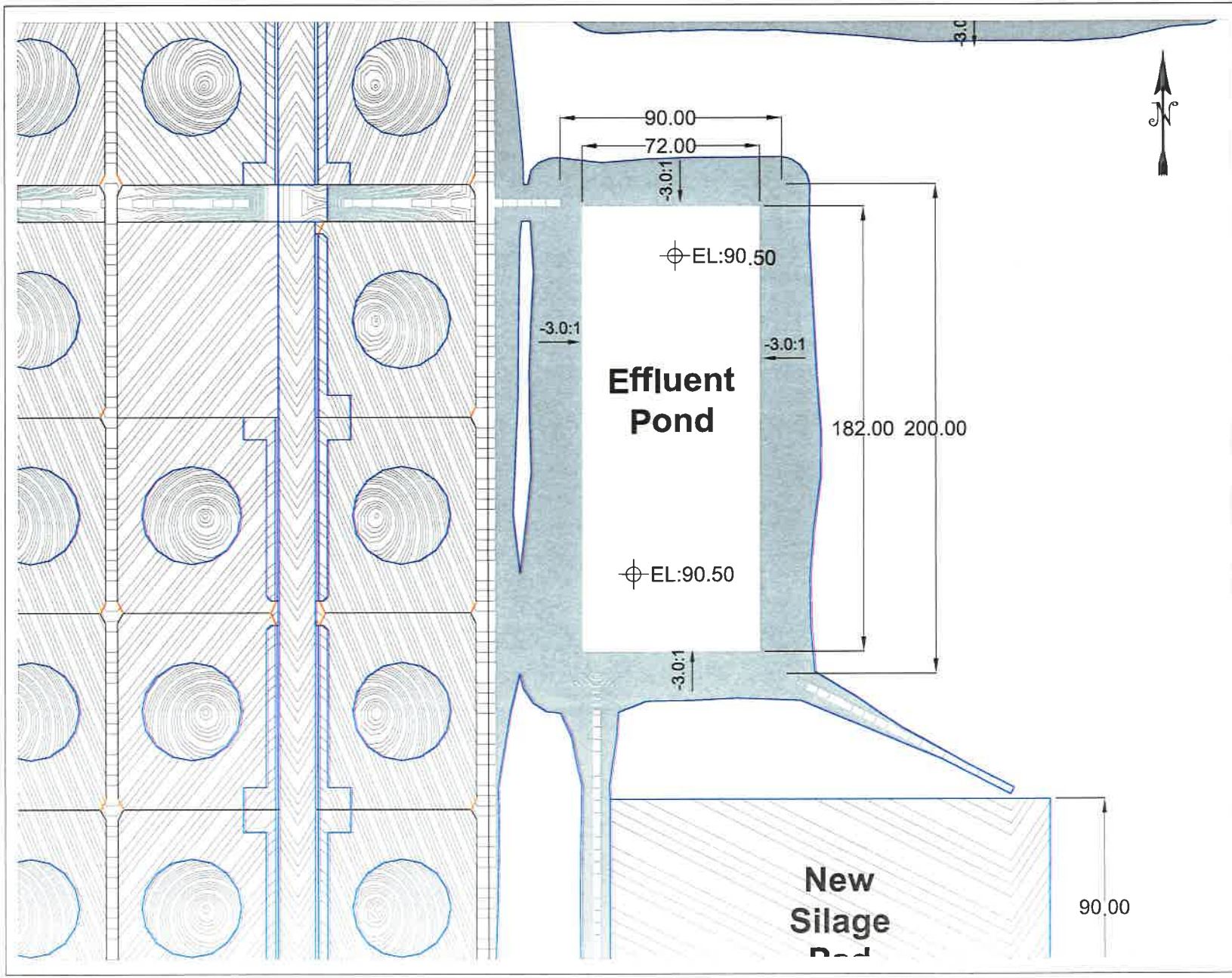
Thickness of naturally occurring protective layer	1.9 (m)	Provide details (as required) SC 28-21	
Soil texture	_____% sand	_____% silt	_____% clay
Hydraulic conductivity - naturally occurring protective layer	Depth and type of soil tested	Hydraulic conductivity (cm/s) 4.4E-07	Describe test standard used Modified falling head

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

If soil info differs per facility include additional soils page.

NRCB USE ONLY

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



Notes:

1. Effluent Pond Calcs

A yard in the Gliechen area 785m x 605m with paved surface requires 9,402,195 Gallon effluent pond according to agric.gov.ab.ca/app19/loadcatchbasin

Pond Design
200m x 90m x 3m @ 3:1
=10,277,244 Gallons

LA21053 TD Page 32 of 51

For Discussion Only

Dennis Dirtworx LTD

Effluent Pond

Date	Mar 2021	Drawn	Dan Dyck
Scale	NTS	Drawing #	

Catch Basin Storage Volume Calculator

Construction Dimensions of Catch Basin

*** Only cells in blue can be changed.**

Overall Dimensions of Catch Basin			Catch Basin Dimensions
Total Length*[4]	200.0	m	656 ft
Total Width*[4]	90.0	m	295 ft
Total Depth*[4]	3.0	m	10 ft
Design Capacity Depth	*2.50*	m	8 ft
End Slope*[4]	3	run:rise	3 run:rise
Side Slope*[4]	3	run:rise	3 run:rise
Length of Bottom	182.0	m	597 ft
Width of Bottom	72.0	m	236 ft
Capacity @ top of Bank	*46,494*	m^3	*Capacity @tob* *1,641,920* ft^3 *10,227,246 Imp. Gal.*

Design Capacity of Catch Basin (freeboard level)			Design Capacity (freeboard level)
Length (design capacity depth)	197.0	m	646 ft
Width (design capacity depth)	87.0	m	285 ft
Total Depth	*3.0*	m	*10* ft
Design Capacity Depth	2.50	m	8 ft
End Slope	3	run:rise	3 run:rise
Side Slope	3	run:rise	3 run:rise
Design Capacity (freeboard level)	**37,710**	m^3	1,331,716 ft^3
			8,295,037 Imp. Gal.
level)	*17,139*	m^2	*184,483* ft^2

CFO Name [1]	(Enter CFO Name Here)
Land Location [1]	XXXXXXXX

Paved Runoff Catchment Area(s)

Area [2]	Length (m)	Width (m)	Area (m^2)
1			0.0
2			0.0
3			0.0
4			0.0
5			0.0
		Total Area (m^2)	**0**

Unpaved Runoff Catchment Area(s)

Area [2]	Length (m)	Width (m)	Area (m^2)
6	6,400	65	416,000.0
7			0.0
8			0.0
9			0.0
10			0.0
		Total Area (m^2)	**416,000**

Rainfall (Select Town [3])

Vulcan 90

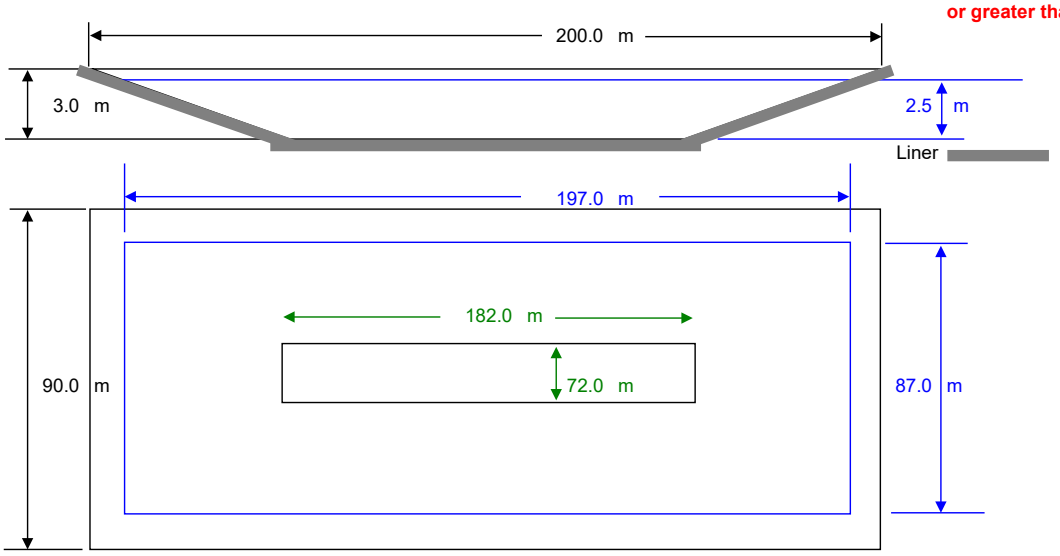
AOPA Design Rainfall **90 mm**

Minimum Catchbasin Storage Volume Required

24,336 m^3 ** **859417.73 ft^3**

5353169.5 Imp. Gal.

**** Design capacity of catch basin should be equal to or greater than, minimum storage volume required.**



Lines in Black - Overall catch basin dimensions

Lines in Blue - Design capacity depth dimensions (excludes freeboard)

NTS - Not To Scale

RUNOFF CONTROL CATCH BASIN: Naturally occurring protective layer (cont.)

NRCB USE ONLY

Catch basin calculator. Total volume @ freeboard level: 37,710 m3 Runoff capacity requirements met: ☒ YES ☐ NO

Calculation of the volume attached: ☒ YES ☐ NO

Depth to water table: below 10.7 m below ground Requirements met: ☒ YES ☐ NO

Depth to uppermost groundwater resource: 30.8 m Requirements met: ☒ YES ☐ NO

ERST completed: ☒ See ERST page for details

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

A total of 30 boreholes were drilled in the area of the proposed feedlot pens and catch basin, 5 within the area of the proposed catch basin.
The layering in the overall area is fairly uniform, dominated by till with clayloam texture. Boreholes 28, 12, 15, 18 report localized sand lensing in the upper 2 m of the boreholes.

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

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 **RUNOFF CONTROL CATCH BASIN CAPACITY SUMMARY (if applicable)**	
Facility 1	
Name / description: All existing catch basins together (individual dimensions and volume listed on page 2)	Capacity: 62,949 m^3
Facility 2	
Name / description: new catch basin	Capacity: 37,710 m^3
Facility 3	
Name / description	Capacity
Facility 4	
Name / description	Capacity
TOTAL CAPACITY	100,659 m^3
RUNOFF VOLUME FROM CONTRIBUTING AREAS	None
MEETS AOPA RUNOFF CONTROL VOLUME REQUIREMENTS	☒ YES ☐ NO

Catch Basin Storage Volume Calculator

Construction Dimensions of Catch Basin

*** Only cells in blue can be changed.**

Overall Dimensions of Catch Basin				Catch Basin Dimensions
Total Length*[4]			m	0 ft
Total Width*[4]			m	0 ft
Total Depth*[4]			m	0 ft
Design Capacity Depth	-	*0.50*	m	-2 ft
End Slope*[4]		3	run:rise	3 run:rise
Side Slope*[4]		3	run:rise	3 run:rise
Length of Bottom		-	m	0 ft
Width of Bottom		-	m	0 ft
Capacity @ top of Bank		-	m^3	*Capacity @tob* 0 ft^3 0 *Imp. Gal.*

Design Capacity of Catch Basin (freeboard level)				Design Capacity (freeboard level)
Length (design capacity depth)	-	3.0	m	-10 ft
Width (design capacity depth)	-	3.0	m	-10 ft
Total Depth		-	m	*0* ft
Design Capacity Depth	-	0.50	m	-2 ft
End Slope		3	run:rise	3 run:rise
Side Slope		3	run:rise	3 run:rise
Design Capacity (freeboard level)	-	**2**	**m^3**	- 53 ft^3
				- 330 Imp. Gal.
level)		*9*	m^2	*97* ft^2

CFO Name [1]	(Enter CFO Name Here)
Land Location [1]	XXXXXXX

Paved Runoff Catchment Area(s)

Area [2]	Length (m)	Width (m)	Area (m^2)
1			0.0
2			0.0
3			0.0
4			0.0
5			0.0
		Total Area (m^2)	**0**

Unpaved Runoff Catchment Area(s)

Area [2]	Length (m)	Width (m)	Area (m^2)
6	1,412	650	917,800.0
7			0.0
8			0.0
9			0.0
10			0.0
		Total Area (m^2)	**917,800**

Rainfall (Select Town [3])

Vulcan 90

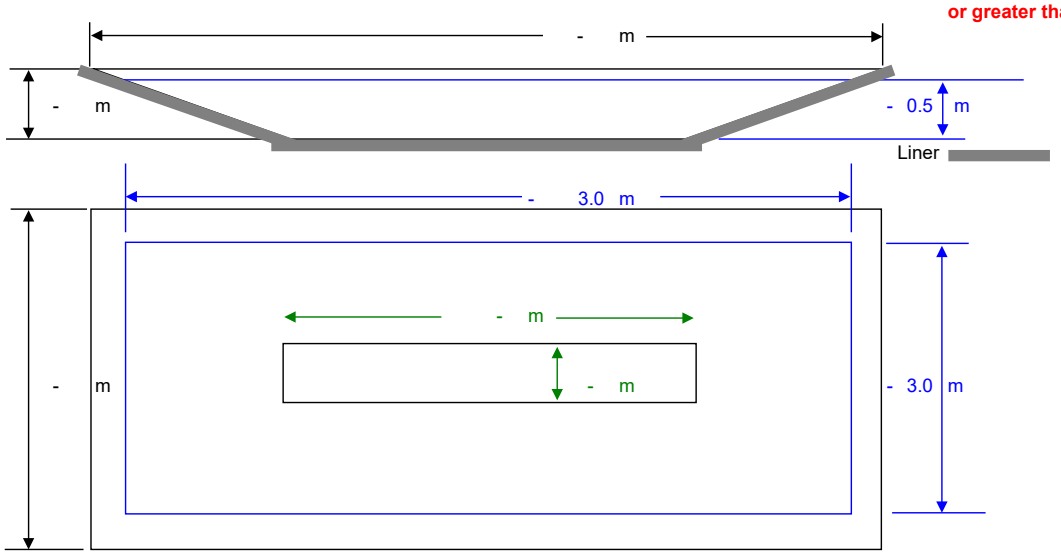
AOPA Design Rainfall **90 mm**

Minimum Catchbasin Storage Volume Required

53,691 m^3 ** 1896090.4 ft^3

11810430 Imp. Gal.

**** Design capacity of catch basin should be equal to or greater than, minimum storage volume required.**



Lines in Black - Overall catch basin dimensions

Lines in Blue - Design capacity depth dimensions (excludes freeboard)

NTS - Not To Scale

Calculation of the minimum catch basin volume for the existing feedlot pen area

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. Pens

2. _____

Manure storage capacity

	Length (m)	Width (m)	Depth below ground level (m)	**NRCB USE ONLY** Estimated storage capacity (m^3)
1.	815	605	1.1	
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

All pens will drain into a central catchment ditch which will divert the flow into the main effluent pond to the east.

Naturally occurring protective layer details

Thickness of naturally occurring protective layer	2.88 (m)	Provide details (as required) Test SC 15-21 SC 23-21 SC 30-21	
Soil texture	_____% sand	_____% silt	_____% clay
Hydraulic conductivity - naturally occurring protective layer	Depth and type of soil tested 1.1 - 3.8 0.9 - 3.9 0.4 - 3.0	Hydraulic conductivity (cm/s) SC 15-21 - 8.8 E-08 SC 23-21 - 2.9 E-08 SC 30-21 - 4.6 E-07	Describe test standard used Modified falling head

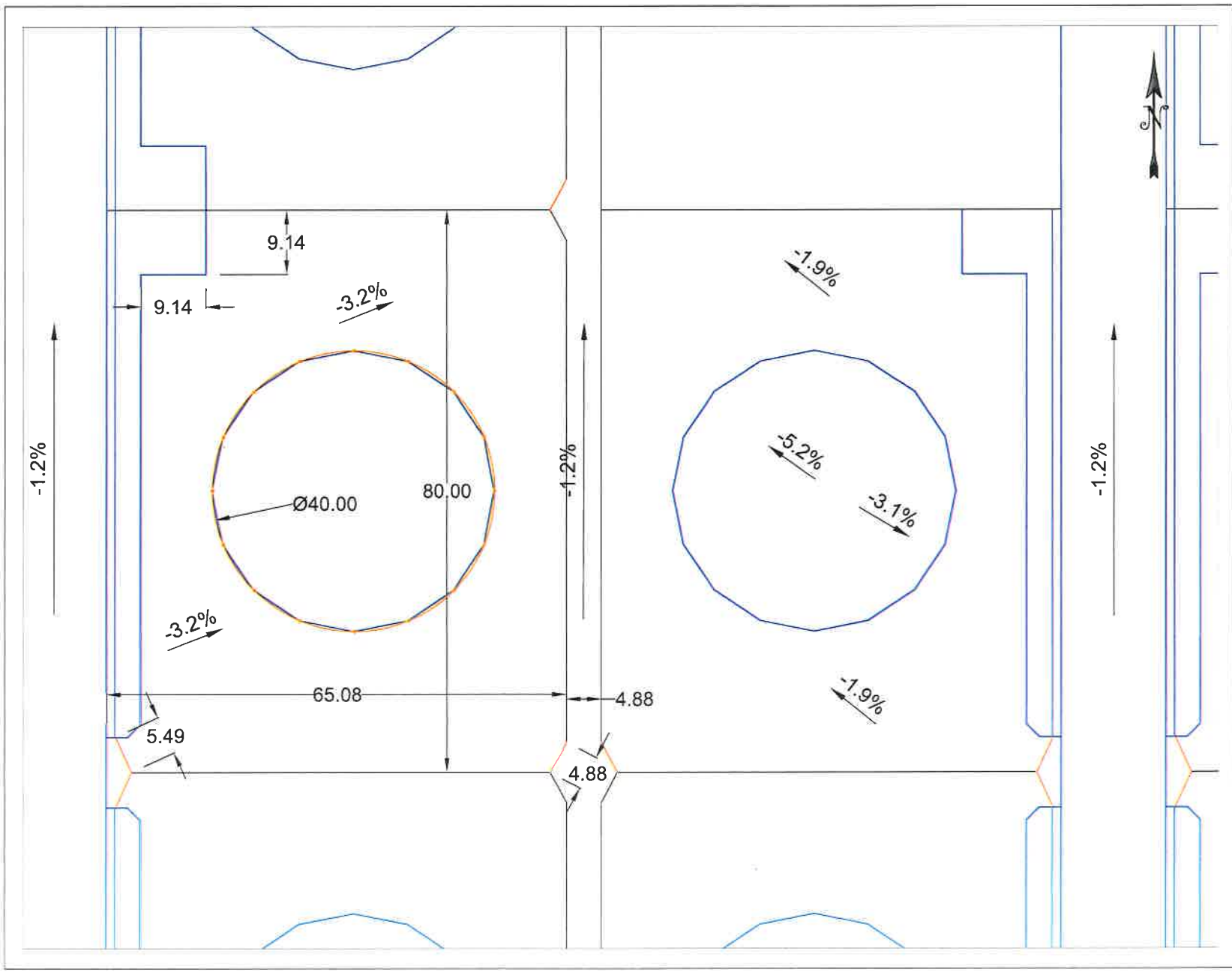
Additional information *(attach copies of soil test reports)*

NRCB USE ONLY

Requirements met: ☒ YES ☐ NO

Condition required: ☒ YES ☐ NO

Report attached: ☒ YES ☐ NO



Notes:

1. Rear Gates 16'
2. Front Gates 18'
3. Dimensioned In Metric

For Discussion Only

Dennis Dirtworx LTD

Typical Pen

Date	Mar 2021	Drawn	Dan Dyck
Scale	NTS	Drawing #	

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

NRCB USE ONLY

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

Depth to water table: below 10.7 m below ground Requirements met: ☒ YES ☐ NO

Depth to uppermost groundwater resource: 30.8 m Requirements met: ☒ YES ☐ NO

ERST completed: ☒ see ERST page for details

Surface water control systems

Requirements met: ☒ YES ☐ NO Details/comments:

Naturally occurring protective layer details

Layer specification comments (e.g. sand lenses; layering uniform or irregular; number and location of boreholes):

Fairly uniform layering of till material. Clay loam, medium stiff, moist (due to irrigation). Localized sand lenses or sandy loam soils (boreholes 28, 12, 15, 18, and 23) in the upper 2 m of the soil horizon.

20 May 2021

Wood File: BX30492

3102 – 12 Avenue South
Lethbridge, Alberta T1H 5V1
T: +1 403 327-7474
www.woodplc.com

Jon Schooten & Sons Custom Feedyard Ltd.
Box 148
Diamond City, AB T0K 0T0

Attention: Mr. Cody Schooten:

Re: Geotechnical Review and Evaluation
Proposed Feedlot Expansion
W½-08-021-24-W4M, near Mossleigh, 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 describes site soil conditions to support a permit application related to a series of proposed new pens in the SW quarter of Section 8 just north of the existing feedlot, and new pens encompassing about half of the NW quarter of Section 8 (see Figure 1). In addition, this report also encompasses the soil conditions associated with a proposed catch basin to be located along the east side of the proposed feedlot expansion (see Figure 1).

In order to demonstrate the suitability of the naturally existing soils for consideration as a naturally occurring protective layer to the groundwater, thirty (30) boreholes were advanced at the site on March 18, 2021 and May 5, 2021. The boreholes were advanced at the approximate locations illustrated on Figure 1 as SC1-21 to SC30-21.

The boreholes were advanced by a truck-mounted drill rig owned and operated by Chilako Drilling Services and extended to depths ranging between 3.0 m and 12.2 m below existing grades. The boreholes were logged by Larry Delong of Chilako Drilling Services.

In general, the natural mineral soils encountered within the boreholes comprised of medium plastic clay till, with minor and localized lacustrine fine sand loam deposits at the surface of several of the boreholes. While minor groundwater seepage below depths of 4.5 m to 10.8 m below grade was encountered, no groundwater resource (as defined by the AOPA) was identified within the 12.2 m drilling depth at the site.

In order to measure the permeability of the subsurface soils, 50 mm diameter PVC monitoring wells were constructed in five boreholes. Two monitoring wells were constructed in the area of the proposed catch basin (SC28-21 and SC29-31), while three of the monitoring wells were constructed in the proposed pen areas, and included boreholes SC15-21, SC23-21, and SC30-21, and. The pen area test wells were screened at depths of about 1.4 m to 3.9 m, while the two wells at the catch basin were screeded from 4.4 m to 6 m (SC29-21) and 5.7 m to 9.2 m (SC28-21).

Well saturation of the 50 mm diameter monitoring wells was carried out by filling the monitoring wells to the top for several consecutive days. After several days, the average 24-hour water drop at SC15-21 was

about 0.40 m, the average 24-hour water drop at SC23-21 was about 0.25 m, the average 24-hour water drop at SC28-21 was about 1.93 m, the average 24-hour water drop at SC29-21 was about 3.81 m, and the average 24-hour water drop at SC30-21 was about 1.98 m. During the testing, the wells were each protected from freezing.

In order to calculate the permeability of the screened portion of the clay till 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 sheets, attached. As outlined on the reports, the results of the *in situ* permeability testing indicate the following hydraulic conductivity, k_s, values:

- 8.8×10^{-8} cm/s at SC15-21;(pen area)
- 2.9×10^{-8} cm/s at SC23-21;(pen area)
- 6.6×10^{-8} cm/s at SC28-21;(catch basin area)
- 4.4×10^{-7} cm/s at SC29-21; (pen/catch basin area) and
- 4.6×10^{-7} cm/s at SC30-21 (pen area).

Using the measured permeability of the clay stratum, the following equivalent natural soil thicknesses at the monitoring well locations has been estimated:

- the 0.6 m of clay screened at SC15-21 is estimated to represent the equivalent of approximately 6.8 m of naturally occurring materials having a hydraulic conductivity of 1×10^{-6} cm/s (the reference standard in AOPA);
- the 1.6 m of clay screened at SC23-21 is estimated to represent the equivalent of 55 m of naturally occurring materials having a hydraulic conductivity of 1×10^{-6} cm/s;
- the 3.5 m of clay screened at SC28-21 is estimated to represent the equivalent of 53 m of naturally occurring materials having a hydraulic conductivity of 1×10^{-6} cm/s;
- the 1.6 m of clay screened at SC29-21 is estimated to represent the equivalent of 3.6 m of naturally occurring materials having a hydraulic conductivity of 1×10^{-6} cm/s; and
- the 1.6 m of clay screened at SC30-21 is estimated to represent the equivalent of 3.5 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-c) and for catch basins (minimum 5 m, Section 9.5-b).

It is noted that the two different levels were assessed at the proposed catch basin, to both assess the shallower clay and the deeper clay, with the intent of demonstrating suitability of the shallower clay for solid manure storage in that area in the event that the deeper clay (as screened in SC28-21) did not meet the AOPA requirements. In this case, SC28-21 did meet the requirements of the deeper clay for relative to catch basins, while SC29-21 met the requirements of the upper clay relative to solid manure storage.

Conclusion

Based on the results of the current investigation, 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 permitting the proposed pen and catch basin permitting at this site.

While the site meets the AOPA requirements for the naturally occurring protective layer, it is noted that minor lacustrine fine sand loam was noted within the upper 2 m of borehole SC29-21, located at the proposed catch basin. Accordingly, it is recommended that the catch basin excavation be reviewed at the time of construction, and any residual sand loam be subexcavated and replaced with compacted low-permeable clay.

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 21 May 2021

John Lobbezoo, P.Eng.
Associate Engineer, Geotechnical
Lethbridge & Medicine Hat Area Lead

Reviewed by:
Kevin Spencer, M.Eng., P.Eng.
Sr. Associate Geotechnical Engineer

PERMIT TO PRACTICE
Wood Environment & Infrastructure Solutions
Signature
Date 21 May 2021
PERMIT NUMBER: P-04546
The Association of Professional Engineers and Geoscientists of Alberta

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

SC29-21

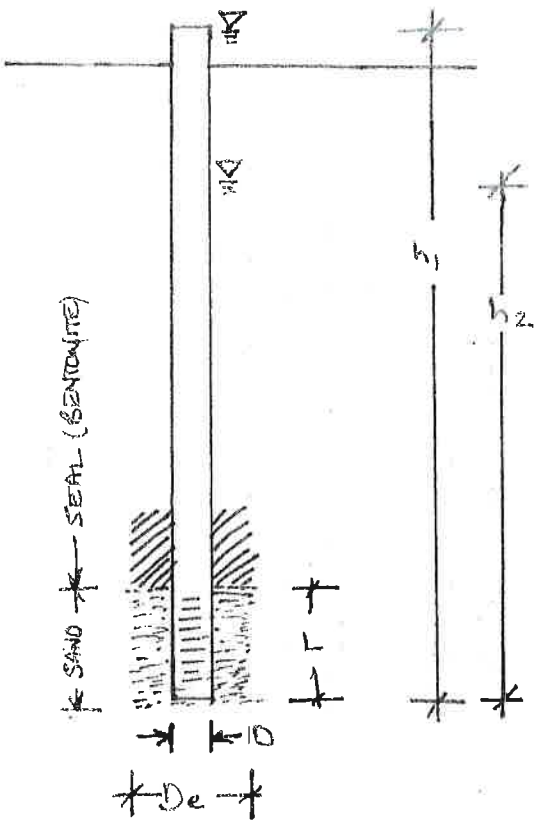
wood.

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)



SC29-21 - Schooten & Sons (Mossleigh)

Wood File: BX30492

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	6.60	initial height of water above base of hole (m)
	h2	2.79	final height of water above base of hole (m)
	t	24.0	time of test (h)

Ks = 4.4E-07 cm/sec

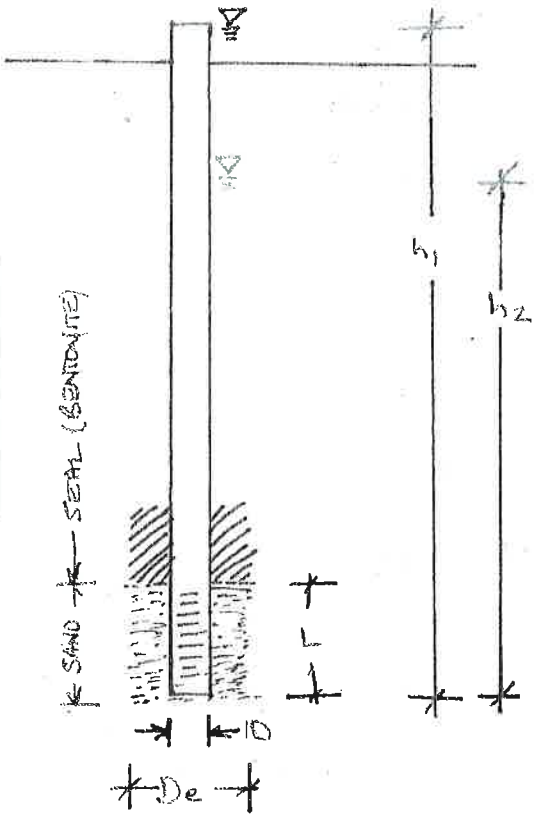
wood.

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)



SC15-21 - Schooten & Sons (Mossleigh)

Wood File: BX30492

INPUT VARIABLES	Terms	Value	Definition
	D	0.0520	diameter of standpipe (m)
	De	0.1500	diameter of borehole (m)
	L	0.60	length of sand section (m)
	h1	4.40	initial height of water above base of hole (m)
	h2	4.00	final height of water above base of hole (m)
	t	24.0	time of test (h)

Ks = 8.8E-08 cm/sec

SC23-21

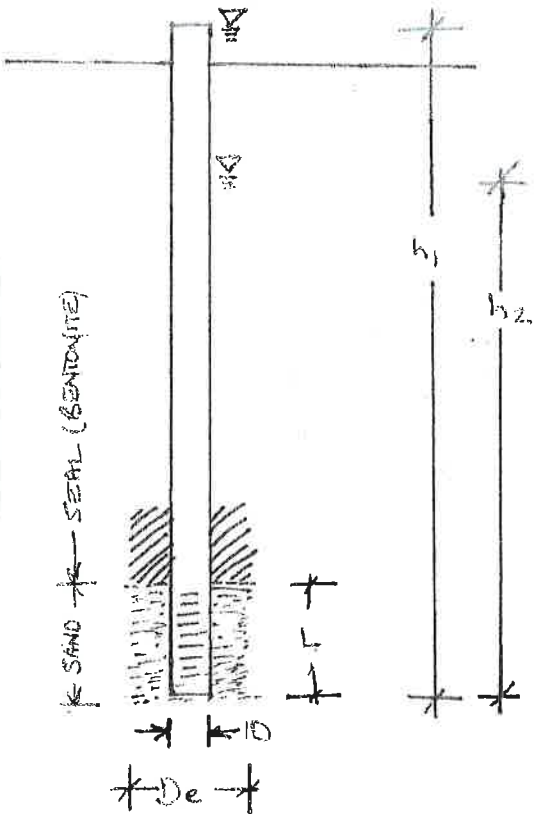
wood.

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)



SC23-21 - Schooten & Sons (Mossleigh)

Wood File: BX30492

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	4.50	initial height of water above base of hole (m)
	h2	4.25	final height of water above base of hole (m)
	t	24.0	time of test (h)

Ks = 2.9E-08 cm/sec

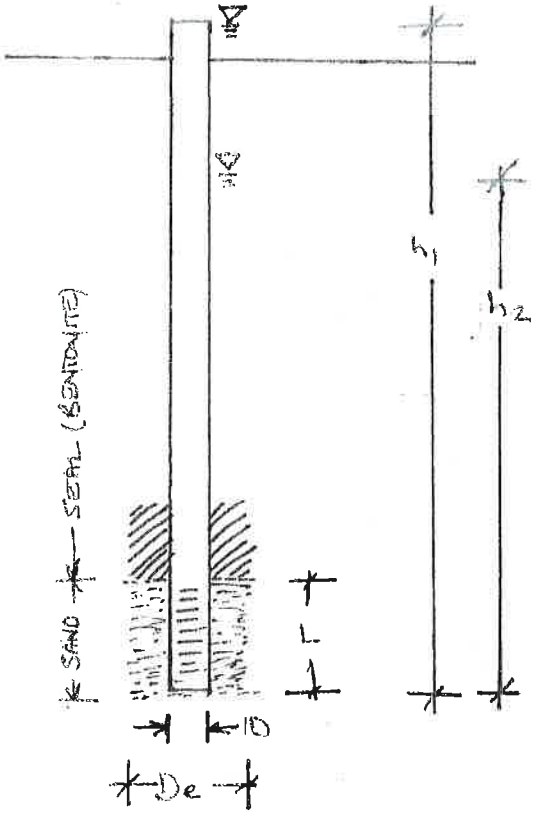
wood.

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)



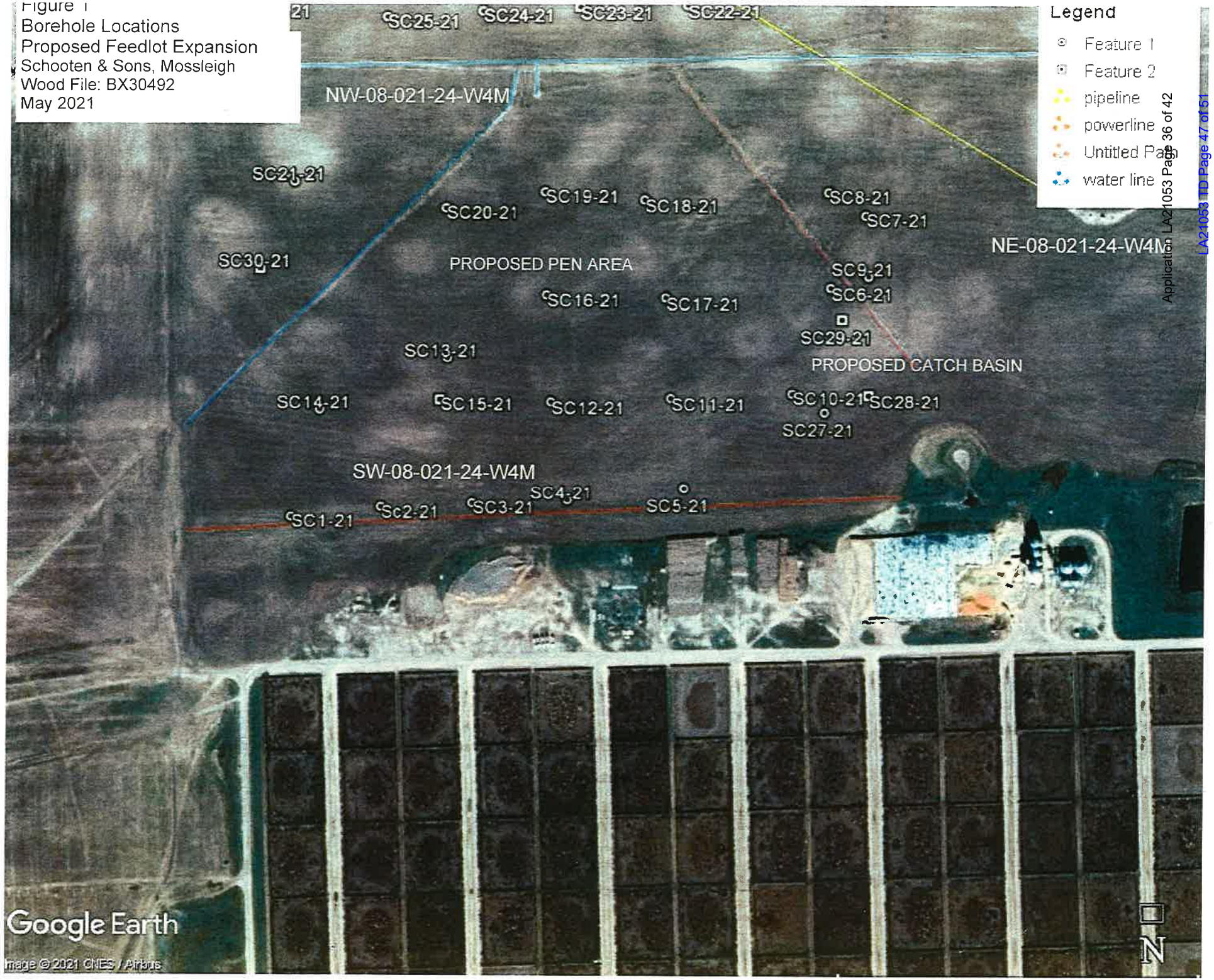
SC30-21 - Schooten & Sons (Mossleigh)

Wood File: BX30492

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	3.60	initial height of water above base of hole (m)
	h2	1.62	final height of water above base of hole (m)
	t	24.0	time of test (h)

Ks = 4.6E-07 cm/sec

Figure 1
Borehole Locations
Proposed Feedlot Expansion
Schooten & Sons, Mossleigh
Wood File: BX30492
May 2021



SOIL PROFILE AND PARENT MATERIAL DESCRIPTION (CONTINUED)

Hole #	Location	Depth	Texture	Moisture	Geological	Sample	Remarks
SC9-21	0338189	0-0.2	FSCL	F	Topsoil		
	5626774	0.2-1.1	FSCL	M	Lac		
	catch basin	1.1-4.3	CL	M	Till	1.5-3.0	Stiff, med plastic, brown
		4.3-5.5	CL-C	M	Till		Stiff, med plastic, brown, trace gravel
		5.5-9.2	CL-C	M	Till		Stiff, med--high plastic, dark gray
SC10-21	0338095	0-0.2	L-CL	F	Topsoil		
	5626651	0.2-0.5	VFSCL	D	Lac		
	pens	0.5-2.2	VFSCL	D	Lac		
		2.2-3.0	CL	SM	Till		Stiff, med plastic, brown, trace gravel
SC11-21	0337961	0-0.2	CL	F	Topsoil		
	5626654	0.2-1.5	CL	SM	Till		Stiff, med plastic, brown
	lower area	1.5-3.0	CL	M	Till		Stiff, med plastic, brown, oxidized along fractures
SC12-21	0337830	0-0.3	CL	F	Topsoil		
	5626657	0.3-1.5	FSCL	M	Lac		Olive brown
		1.5-2.1	CL	VM	Till		Firm, olive brown, VM-Sat sand lenses
		2.1-3.0	CL	M	Till		Stiff, med plastic, brown
SC13-21	0337717	0-0.2	FSL-FSCL	F	Topsoil		
	5626713	0.2-1.3	FSL-FSCL	M	Lac		
	high area	1.3-2.1	FSCL	M	Lac		Olive brown
		2.1-3.0	CL-C	M	Till		Stiff, med plastic, brown, high plastic clay layers
SC14-21	0337574	0-0.2	FSL	F	Topsoil		
	5626664	0.2-1.5	FSL	M	Lac		
		1.5-3.1	FSL	M	Lac		Silty
		3.1-4.5	CL	M	Till		V. firm-stiff, med plastic, brown
SC15-21	0337706	0-0.2	FSCL	F	Topsoil		
	5626768	0.2-1.1	FSCL	SM	Lac		Sand lenses
		1.1-3.8	CL	SM	Till		Stiff, med plastic, brown
							50mm H.C. well installed to 3.8m
							Screen: 3.8-3.3m
							Sand: 3.8-3.2m
							Bentonite: 3.2-0.0m
							Stickup: 0.6m
							Hole Diameter: 0.15m
SC16-21	0327831	0-0.2	FSL	F	Topsoil		
	5626766	0.2-0.9	FSL	SM	Lac		
		0.9-1.9	FSCL	SM	Lac		
		1.9-3.0	CL-C	SM	Till		Stiff, med plastic, dark brown, trace gravel
SC17-21	0337963	0-0.2	CL	M	Topsoil		
	5626765	0.2-1.5	CL	M	Till		Stiff, med plastic, gray, sand lensing
	low area	1.5-3.0	CL-C	M	Till		Stiff, med plastic, gray, sand lensing
SC18-21	0337947	0-0.2	SCL	M	Topsoil		
	5626875	0.2-0.4	SCL	D	Lac		
		0.4-1.5	CL	D	Till		Stiff, low plastic, brown, some sand, trace gravel
		1.5-3.0	CL-C	D	Till		Stiff, med plastic, dark brown, trace gravel sand lensing (M)

SOIL PROFILE AND PARENT MATERIAL DESCRIPTION (CONTINUED)

Hole #	Location	Depth	Texture	Moisture	Geological	Sample	Remarks
SC19-21	0337836	0-0.2	VFSL	D	Topsoil		
	5626890	0.2-1.6	VFSL	D	Lac		Silty
		1.6-3.0	CL-C	SM	Till		Stiff, med plastic, brown
SC20-21	0337724	0-0.2	FSL	M	Topsoil		
	5626879	0.2-1.1	FSL-FSCL	SM	Lac		
		1.1-3.0	CL	SM	Till		Stiff, med plastic, brown, silty
SC21-21	0337562	0-0.2	VFSL	M	Topsoil		
	5626950	0.2-0.7	VFSL	SM	Lac		
	high area	0.7-1.5	VFSCL	SM	Lac		
		1.5-2.2	CL	SM	Till		V. firm, low-med plastic, brown
		2.2-4.5	CL-C	SM	Till		Stiff, med plastic, dark brown, trace gravel
SC22-21	0338000	0-0.2	FSCL	M	Topsoil		
	5627088	0.2-0.7	FSCL-CL	SM	Lac		
	high area	0.7-3.0	CL	SM	Till		Stiff, med plastic, brown
SC23-21	0337886	0-0.2	SiL	D	Topsoil		Some sand
	5627091	0.2-0.4	SiL	D	Lac		Some sand
	NE of pivot	0.4-0.9	VFSL	D	Lac		
	point	0.9-3.9	CL	D	Till		Stiff, med plastic, brown
							50mm H.C. well installed to 3.9m
							Screen: 3.9-2.4m
							Sand: 3.9-2.3m
							Bentonite: 2.3-0.0m
							Stickup: 0.6m
							Hole Diameter: 0.15m
SC24-21	0337778	0-0.2	CL	M	Topsoil		
	5627094	0.2-0.7	CL	M	Lac		Sand lens @ 0.7m
		0.7-1.6	CL-C	M	Till		Stiff, med plastic, brown
		1.6-3.0	CL-C	M	Till		Stiff, med plastic, dark brown, some oxidation
SC25-21	0337672	0-0.2	FSL	M	Topsoil		
	5627095	0.2-1.0	FSL	SM	Lac		
		1.0-1.6	CL	SM	Till		
		1.6-3.0	CL-C	SM	Till		Stiff, med plastic, dark brown, trace gravel
SC26-21	0337555	0-0.2	CL	M	Topsoil		
	5627099	0.2-1.5	CL	SM	Till		V. firm, med plastic, brown
		1.5-3.0	CL	M	Till		Stiff, med plastic, brown
SC27-21	0338130	0-0.15	CL	M	Topsoil		
	5626628	0.15-0.6	FSCL	M	Eol		
	on a knell	0.6-1.1	CL	M	Till		
	~3.6m high	1.1-1.8	FSCL	M	Till		
	area	1.8-3.3	FSCL-CL	M	Till		Sand lensing, iron staining along fractures
		3.3-4.8	FSL	M	Till		
		4.8-7.1	CL-C	M	Till		Stiff, med plastic, brown, trace gravel
		7.1-7.7	C	M	Till		Stiff, med plastic, dark gray, basel till
		7.7-12.2	C	M	Till		Stiff, med plastic, dark brown, oxidized mixed with dark gray basel till
							sat along fractures
							Free water @ 10.8m at time of drilling
							25mm standpipe installed to 12.2m BGS

SOIL PROFILE AND PARENT MATERIAL DESCRIPTION (CONTINUED)

Hole #	Location	Depth	Texture	Moisture	Geological	Sample	Remarks
SC28-21	0338181	0-0.15	L	M	Topsoil		
	5656643	0.15-0.45	L	M	Eol		
	low	0.45-0.7	CL	M	Till		Sand lensing
	depressional	0.7-4.9	CL-C	M	Till		Stiff, med plastic, brown, trace gravel, oxidized along fractures
		4.9-6.8	C	M	Till	bulk	Stiff, med plastic, dark gray basel mixed with dark brown till
		6.8-9.7	C	M	Till	7.0-9.0	Stiff, med-high plastic, dark gray basel
		9.7-10.5	CL-C	M	Till		Stiff, med plastic, brown
		10.5-10.7	CL-C	M	Till		Stiff, med plastic, brown, sat along fractures
							50mm H.C. installed to 9.0m BGS
							Bentonite: 10.7-9.2m
							Screen: 9.0-6.0m
							Sand: 9.2-5.7m
							Bentonite: 5.7-0.0m
							Stickup: 0.3m
							Hole Diameter: 0.15m
SC29-21	0338156	0-0.15	FSL	M	Topsoil		
	5626729	0.15-1.5	FSL	M	Lac	0.2-1.5	
		1.5-2.0	FSCL	M	Lac		
		2.0-6.0	CL	M	Till	bulk	Stiff, med plastic, brown, bulk sample 3.0-4.5
							50mm H.C. well installed to 6.0m BGS
							Screen: 6.0-4.5m
							Sand: 6.0-4.4m
							Bentonite: 4.4-2.8m
							Stickup: 0.6m
							Hole Diameter: 0.15m
SC30-21	0337518	0-0.15	CL	M	Topsoil		
	5626824	0.15-0.4	CL	M	Till		
		0.4-3.0	CL-C	M	Till		Stiff, med plastic, brown
							50mm H.C. well installed to 3.0m BGS
							Screen: 3.0-1.5m
							Sand: 3.0-1.4m
							Bentonite: 1.4-0.0m
							Stickup: 0.6m
							Hole Diameter: 0.15m

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

SOIL PROFILE AND PARENT MATERIAL DESCRIPTION (CONTINUED)

Hole #	Location	Depth	Texture	Moisture	Geological	Sample	Remarks
SC28-21	0338181	0-0.15	L	M	Topsoil		
	5656643	0.15-0.45	L	M	Eol		
	low	0.45-0.7	CL	M	Till		Sand lensing
	depressional	0.7-4.9	CL-C	M	Till		Stiff, med plastic, brown, trace gravel, oxidized along fractures
		4.9-6.8	C	M	Till	bulk	Stiff, med plastic, dark gray basel mixed with dark brown till
		6.8-9.7	C	M	Till	7.0-9.0	Stiff, med-high plastic, dark gray basel
		9.7-10.5	CL-C	M	Till		Stiff, med plastic, brown
		10.5-10.7	CL-C	M	Till		Stiff, med plastic, brown, sat along fractures
							50mm H.C. installed to 9.0m BGS
							Bentonite: 10.7-9.2m
							Screen: 9.0-6.0m
							Sand: 9.2-5.7m
							Bentonite: 5.7-0.0m
							Stickup: 0.3m
							Hole Diameter: 0.15m
SC29-21	0338156	0-0.15	FSL	M	Topsoil		
	5626729	0.15-1.5	FSL	M	Lac	0.2-1.5	
		1.5-2.0	FSCL	M	Lac		
		2.0-6.0	CL	M	Till	bulk	Stiff, med plastic, brown, bulk sample 3.0-4.5
							50mm H.C. well installed to 6.0m BGS
							Screen: 6.0-4.5m
							Sand: 6.0-4.4m
							Bentonite: 4.4-2.8m
							Stickup: 0.6m
							Hole Diameter: 0.15m
SC30-21	0337518	0-0.15	CL	M	Topsoil		
	5626824	0.15-0.4	CL	M	Till		
		0.4-3.0	CL-C	M	Till		Stiff, med plastic, brown
							50mm H.C. well installed to 3.0m BGS
							Screen: 3.0-1.5m
							Sand: 3.0-1.4m
							Bentonite: 1.4-0.0m
							Stickup: 0.6m
							Hole Diameter: 0.15m

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