

# Technical Document RA24038



## 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)

<b>NRCB USE ONLY</b> <input type="checkbox"/> Approval <input type="checkbox"/> Registration <input checked="" type="checkbox"/> Authorization <input type="checkbox"/> Amendment	Application number	Legal land description
	RA24038	N1/2 23-45-27 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.

July 15, 2024

Date of signing

Signature

Joel Lozeau

Corporate name (if applicable)

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)
expansion of outdoor pen (pen 1)	120 x 20
pen 4 (new pen)	43 x 200
pen 5 (new pen)	43 x 200
pen 6 (new pen)	43 x 200
Uninsulated Lamb Building	40 x 70

Catch basin 180 x 55 x 0.5

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

Existing facilities	Dimensions (m) (length, width, and depth)	NRCB USE ONLY
lambing barn	108 x 18 x 21	
outdoor 3 wall shed / pen 1	76 x 43	
pole shed	40 x 8	

**NRCB USE ONLY**

Existing CFO, facilities confirmed.



# Part 2 – Technical Requirements

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

Construction completion date for proposed facilities \_\_\_\_\_

**Additional information**

The lambing barn has a completely concrete floor

No change in animal numbers.

**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
Ewes with lambs	1500	0	1500

## 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 15 day of July, 2024.

\_\_\_\_\_  
*Signature of Applicant or Agent*

## 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)

### **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*

NE-23-45-27-W4

County setback = 40 METERS  
near Wetaskiwin County No. 10 — Division No. 11



WW = Water well    Manure Collection Area 110 m away from Water Wells

1 of 1



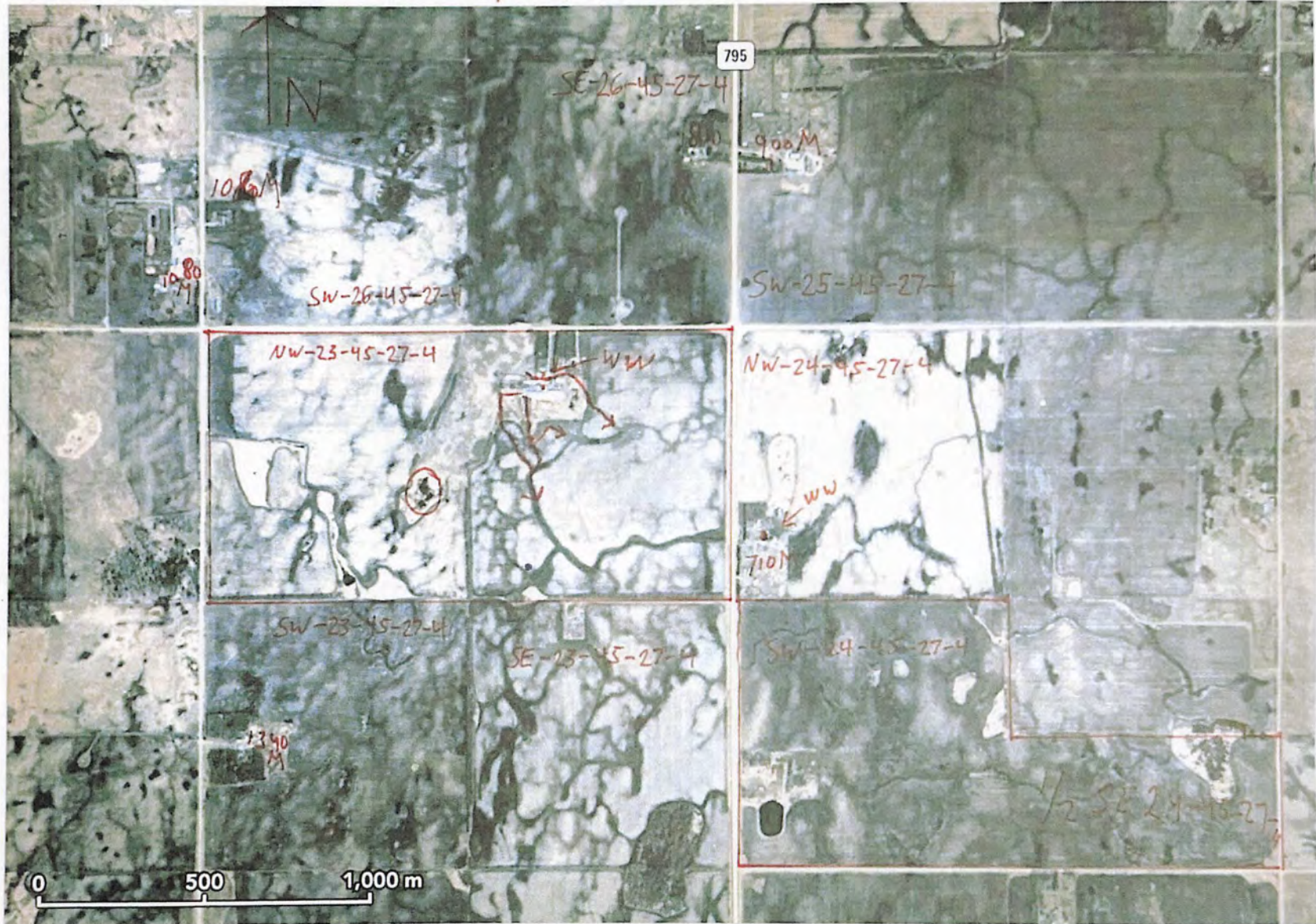




NE-23-45-27-W4

WW = Water well (3 total)

near Wetaskiwin County No. 10 — Division No. 11



O = common body of water (389 Meters from Lambing BARN)    ↘ = RUN OFF PATTERNS<sup>1 OF 1</sup>

# 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: Lambing barn

Proposed 1: pen 4

Proposed 2: 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 checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> 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	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES with exemption	None known
	How many water wells are within 100 m of the manure storage facility or manure collection area?	2	0	0	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES with exemption	Confirmed	
	What is the shortest distance from the manure collection or storage facility to a surface water body? (e.g., lake, creek, slough, seasonal)	440 M	45	55	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES with exemption	45 m slough	
Groundwater information	What is the depth to the water table?	5 M	5m	5	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES with exemption	Confirmed	
	What is the depth to the groundwater resource/aquifer you draw water from?	15 M	15m	15	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES with exemption	25.91 m based on lithology	

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

# 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**  
**ENVIRONMENTAL RISK SCREENING INFORMATION**

**ERST** for **proposed** facilities

Facility	Groundwater score	Surface water score	File number
New facilities meet AOPA requirements See Decision Summary			

**ERST** for **existing** facilities

Facility	Groundwater score	Surface water score	File number
Lambing barn	Low	Low	RA23003
Pens	Low	Low	RA23003

**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:           ID 132223                     Type text here            
          ID 132221          

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

**Water wells**  N/A  
 If applicable, exemption for 100 m distance requirements applied:  YES  NO Condition required:  YES  NO

**Surface water**  N/A  
 If applicable, exemption for 30 m distance requirements applied:  YES  NO Condition required:  YES  NO

**Water Well Exemption Screening Tool**  N/A

Water Well ID	Preliminary Screening Score	Secondary Screening Score	Facility

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**Groundwater or surface water related comments:**

Applicant has provided adequate land base

## 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
Kathy Henschal	SW-25-45-27-4	1000	AG	Cat 1	908 m	N/A	Yes
C Gulick & B Hofstra	SE-26-45-27-4	900	RR	Cat 1	841 m		
Gloria Tabler	NW-24-45-27-4	800	CR	Cat 2	694 m		
Gary White	SW-23-45-27-4	1200	RR	Cat 1	1290 m		
Kevin Schmidt	SW-26-45-27-4	1000	AG	Cat 1	949 m		

### 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)
Gerke & Foekje Baarda	NE-23-45-27-4	56	Black		
Gerke & Foekje Baarda	NW-23-45-27-4	57	Black		
Gerke & Foekje Baarda	SW-24-45-27-4	55	Black		
Gerke & Foekje Baarda	1/2 SE-26-45-27-4	28	Black		
Applicant has provided adequate land base 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)**

# Part 2 – Technical Requirements

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## NRCB USE ONLY

### MINIMUM DISTANCE SEPARATION

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

Margin of error (if applicable): N/A

Requirements (m): Category 1: 260 m Category 2: 347 m Category 3: 434 m Category 4: 694 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: \_\_\_\_\_

Land base listed: \_\_\_\_\_

Area not suitable: \_\_\_\_\_

Available area: \_\_\_\_\_

Application for Authorization additional land not required as previously met.

Requirement met:  YES  NO

Land spreading agreements required:  YES  NO

Manure management plan:  YES  NO

If yes, plan is attached:

### PLANS

Submitted and attached construction plans:  YES  NO

Submitted aerial photos:  YES  NO

Submitted photos:  YES  NO

### GRANDFATHERING

Already completed:  YES  NO  N/A

If already completed, see \_\_\_\_\_

Application RA05040 was for an expansion to an existing dairy. Application RA23003 was to convert to a sheep operation and at this application the site was treated as a new CFO. See Decision Summary Registration RA23003.

# 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**

August 29, 2024	

**CORRESPONDENCE WITH MUNICIPALITIES AND REFERRAL AGENCIES**

Date deeming letters sent: September 4, 2024

**Municipality:** Wetaskiwin County

letter sent       response received       written/email       verbal       no comments received

**Alberta Health Services:** N/A ✓

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:** Apex utilities  N/A

letter sent       response received       written/email       verbal       no comments received

**Other:** \_\_\_\_\_  N/A

letter sent       response received       written/email       verbal       no comments received

# 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)

## 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)

- 2950 m<sup>3</sup>
1. \_\_\_\_\_ 1 pen (addition)
  2. \_\_\_\_\_ 4-6 pen
  3. \_\_\_\_\_ barn new lamb building

### Manure storage capacity

each

	Length (m)	Width (m)	Depth below ground level (m)	NRCB USE ONLY Estimated storage capacity (m <sup>3</sup> )
1.	120	20	0	
2.	200	43	0	
3.	40	70	TOTAL CAPACITY 0	

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  
 Natural clay area, and run-off goes into our field to the south

### Naturally occurring protective layer details

Thickness of naturally occurring protective layer	_____ (m)	Provide details (as required) Please see site and soil assesment from Envirowest engineering for this info.		
Soil texture	_____ % sand	_____ % silt	_____ % clay	
Hydraulic conductivity - naturally occurring protective layer	Depth and type of soil tested	Hydraulic conductivity (cm/s)	Describe test standard used	
		4.1 x 10 <sup>-7</sup>		

Additional information (attach copies of soil test reports)

NRCB USE ONLY	
Requirements met:	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
Condition required:	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
Report attached:	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO



# Part 2 – Technical Requirements

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## 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: > 5m Requirements met:  YES  NO

Depth to uppermost groundwater resource: 25.91 m Requirements met:  YES  NO

ERST completed:  see ERST page for details

Application meets AOPA technical requirements.

### 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):  
Engineering report provides details on construction.

# 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: 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. 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  
Please see attached site and soil assesment from Envirowest Engineering for this info.

\*Natural area in pens to be used as catch basin. Shallow area, slope is minimal to bottom.

### Catch basin capacity

	Length (m)	Width (m)	Total depth (m)	Depth below ground level (m)	Slope run:rise			NRCB USE ONLY Calculated storage capacity (excl. 0.5 m freeboard) (m <sup>3</sup> )
					Inside end walls	Inside side walls	Outside walls	
1.	180	55	0.5	0	*see comment			
2.				0				
3.								
TOTAL CAPACITY								2950 m <sup>3</sup>

### Naturally occurring protective layer details

Thickness of naturally occurring protective layer	_____ (m)	Provide details (as required) Please see site and soil assesment from Envirowest engineering for this info.	
Soil texture	_____ % sand	_____ % silt	_____ % clay
Hydraulic conductivity - naturally occurring protective layer	Depth and type of soil tested	Hydraulic conductivity (cm/s) <u>4.1 x 10<sup>-7</sup></u>	Describe test standard used

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

## 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: Naturally occurring protective layer (cont.)

#### NRCB USE ONLY

Catch basin calculator. Total volume @ freeboard level: 2950 m<sup>3</sup> Runoff capacity requirements met:  YES  NO

Calculation of the volume attached:  YES  NO

Depth to water table: > 5m Requirements met:  YES  NO

Depth to uppermost groundwater resource: 25.91 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):

Applicant to follow engineers report

Engineers report provides estimate for water retention with free board of natural catch basin located on site. Runoff collection requirements are met. Catch basin calculator shows even more storage available. Volume requirements are met.

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

## Part 2 – Technical Requirements

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<b>NRCB USE ONLY</b>	
<b>RUNOFF CONTROL CATCH BASIN CAPACITY SUMMARY (if applicable)</b>	
<b>Facility 1</b>	
Name / description Catch basin	Capacity 2950 m3
<b>Facility 2</b>	
Name / description	Capacity
<b>Facility 3</b>	
Name / description	Capacity
<b>Facility 4</b>	
Name / description	Capacity
<b>TOTAL CAPACITY</b>	2950 m3
<b>RUNOFF VOLUME FROM CONTRIBUTING AREAS</b>	52,000 m2 (2495m3)
<b>MEETS AOPA RUNOFF CONTROL VOLUME REQUIREMENTS</b>	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO



**SITE AND SOIL ASSESSMENT**

Proposed Ewe Operation – Solid Manure Storage  
N½-23-045-27 W4M

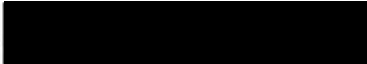
County of Wetaskiwin, Alberta



**Site and Soil Assessment  
Proposed Ewe Operation – Solid Manure Storage  
N½-23-045-27 W4M  
County of Wetaskiwin, Alberta**

Prepared For: Joel Lozeau

Delivered via Email:



Prepared By: Envirowest Engineering  
Box 4248, Ponoka, AB, T4J 1R6  
(403) 783-8229

Report Date: May 1, 2024

Project Number: 2311-43051

**Private and Confidential**



## Table of Contents

1.0 Introduction and Scope of Work .....	1
2.0 Assessment Results.....	2
3.0 Liner Assessments .....	5
3.1 Natural Barrier Assessment (Solid Manure Storage) .....	5
3.2 Natural Barrier Assessment (Catch Basin).....	5
4.0 Conclusions .....	6
5.0 Design and Construction Considerations .....	7
5.1 Solid Manure Storage .....	7
5.2 Catch Basin Sizing (Retention Area).....	7
6.0 Closure.....	8
7.0 Qualifications of Assessors .....	9
8.0 References .....	10

### List of Tables

Table 1: Soil Properties Results .....	3
--	---

### Appendices

- A. Figures
- B. Borehole Logs
- C. Certificate of Analysis



## **1.0 Introduction and Scope of Work**

Envirowest Engineering (Envirowest) was retained by Joel Lozeau to conduct a Site and Soil Assessment for the proposed construction of pens for 1500 ewes. The assessment included proposed solid manure storage within pens and associated catch basin, and within an uninsulated barn.

The assessment was completed to determine conditions beneath the proposed construction area and assess soil properties for construction of proposed facilities. The operation, herein referred to as “the Site,” is located on N½-23-045-27 W4M in Wetaskiwin County.

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

### **Scope of Work**

Five investigative boreholes were drilled using a truck-mounted rotary auger and completed to a maximum depth of 7.5 m below ground surface (mbgs) on March 28, 2024. The boreholes were completed in the area proposed for manure storage (solid) and the retention area (catch basin). The borehole locations are shown on Figure 1.0 (attached).

One borehole was completed as a groundwater monitoring well to allow for in-situ hydraulic conductivity testing, which was completed on April 11, 2024. An uppermost groundwater resource (UGR) was conservatively determined to be below 7.5 mbgs. No further assessment was completed.





## 2.0 Assessment Results

The Site is generally sloping to the central portion of the pasture. A lease road borders the property to the west. A suspected wetland is located south of the proposed construction area that is fed from the surface run off from the field to the west of the proposed construction area. The suspected wetland is elevated above the proposed solid manure storage. The Site is currently in pasture. A portion of the property is grandfathered as solid manure storage. Assessment of this area was not completed. A natural drainage ditch is located between the proposed pen area and the proposed uninsulated barn.

Five investigative boreholes were drilled using a truck-mounted rotary auger and completed to a maximum depth of 7.5 mbgs on March 28, 2024. Potential liner material (clay loam) was found beneath sandy clay at depths between 2.0 and 3.8 mbgs to the depth of investigation. Bedrock was not encountered to the maximum depth of investigation.

One borehole (24BH01) was completed as a piezometer well to allow for in-situ hydraulic conductivity testing.

Boreholes were backfilled with the material removed by back spinning the solid stem auger and compacting to depth of the borehole.



The results of the soil analysis completed by a third-party laboratory are presented in Table 1 below. The soil sample locations are presented on Figure 1.0, and borehole logs are attached.

**Table 1: Soil Properties Results**

Parameter	Sand (%)	Silt (%)	Clay (%)	Soil Texture
24BH01-02	67	13	20	Sandy Clay Loam
24BH01-03	60	18	22	Sandy Clay Loam
24BH01-06	43	25	32	Clay Loam
24BH01-07	43	25	32	Clay Loam
24BH02-01	45	24	31	Sandy Clay Loam
24BH02-02	43	26	31	Clay Loam
24BH02-03	44	23	33	Clay Loam
24BH03-01	49	23	28	Sandy Clay Loam
24BH03-02	44	25	31	Clay Loam
24BH03-03	44	24	32	Clay Loam
24BH03-04	43	25	32	Clay Loam
24BH04-01	43	24	33	Clay Loam
24BH04-02	41	24	35	Clay Loam
24BH04-03	41	26	33	Clay Loam
24BH05-01	45	24	31	Sandy Clay Loam
24BH05-02	43	24	33	Clay Loam
24BH05-03	43	24	33	Clay Loam

The soils were identified as a sandy clay loam or clay loam. The suspected natural barrier (clay loam) had an average clay content of 32.5%, ranging from 31-35%.



The clay loam was found beneath the sandy clay loam to the depth of investigation at 7.5 meters below grade. The monitoring well installed at borehole 24BH01 (24MW01) was sufficiently hydrated prior to completing the in-situ hydraulic conductivity testing. The in-situ hydraulic conductivity test was completed on April 11, 2024. The monitoring well was placed to assess the material below the sandy clay, screened from 5.3 to 6.8 mbgs.

The initial depth to water was measured in the well. A volume of water was then added to the well and the change in depth measured over time to assess hydraulic conductivity of the clay strata. It is assumed (as per AGDEX 096-01) that all flow occurs under saturated conditions. The depth was measured every 30 seconds for 10 minutes and every 5 minutes for forty-five minutes. The results of the test were analyzed as a falling head test using AQTESOLV Bouwer-Rice method for unconfined wells. The results of the assessment were an in-situ hydraulic conductivity of  $4.1 \times 10^{-7}$  cm/sec.



### 3.0 Liner Assessments

#### 3.1 Natural Barrier Assessment (Solid Manure Storage)

Based on the information obtained it was determined that the native clay within the proposed area of construction for solid manure storage was found to have a minimum thickness of 2.2 meters. The proposed solid manure storage area is a rectangular shape approximately 247 meters x 164 meters, as shown on Figure 2.0.

Minimum Required Liner Depth for a natural barrier for solid manure storage:

$$\frac{2 \text{ m}}{1 \times 10^{-6} \text{ cm/sec}} = \frac{X \text{ m}}{4.1 \times 10^{-7} \text{ cm/sec}}$$

$$X = 0.82 \text{ m}$$

It is found that there is sufficient protection across the proposed solid manure storage area.

#### 3.2 Natural Barrier Assessment (Catch Basin)

Based on the information obtained it was determined that the native clay within the proposed retention area was found to have a minimum thickness of 2.2 meters. The catch basin design is discussed further in the following section.

Minimum Required Liner Thickness for Catch Basin:

$$\frac{5 \text{ m}}{1 \times 10^{-6} \text{ cm/sec}} = \frac{X \text{ m}}{4.1 \times 10^{-7} \text{ cm/sec}}$$

$$X = 2.0 \text{ m}$$

A minimum of 2.0 meters of native clay is required to provide a sufficient protective liner. It is found that there is sufficient protection across the assessed catch basin location.



#### **4.0 Conclusions**

The following conclusions are based on the discussed scope of the construction.

The soils beneath the proposed area of construction were determined to be appropriate for a naturally occurring protective layer for solid manure storage and as a catch basin.



## **5.0 Design and Construction Considerations**

### **5.1 Solid Manure Storage**

A berm is required on the east portion of the pen area to direct impacted runoff from entering the current drainage ditch. A 1.0 meter berm (as measured from the south outlet) is to be constructed on the west side of the ditch.

It may be considered to regrade the east portion of the pen, adjacent to the berm, to direct impacted runoff to the west retention area. This is not required as sufficient volume is present to retain impacted runoff, however it should be considered for animal comfort and to avoid erosion of the berm.

### **5.2 Catch Basin Sizing (Retention Area)**

#### **Surface Run-off Area**

The proposed area of contributing run-off, as shown on Figure 2.0, is conservatively 52,000 m<sup>2</sup>. The contributing area is larger than the proposed pen size as it was considered to not be reasonable or feasible to redirect the small portion of unimpacted runoff.

The area within the pens is acting as a natural catch basin that is referred to as a retention area. The required volume of the retention area is recommended to have a total storage capacity of 2,495 m<sup>3</sup>, based on Wetaskiwin precipitation data.

The storage capacity required is 2,495 m<sup>3</sup>, and the volume of the natural retention area as shown in Figure 2.0 is 2,950 m<sup>3</sup> (0.5 meter depth). A minimum 0.5 meter 'freeboard' is present around the pen area to the east (berm and natural hill), south (natural hill), west (lease road) and north (natural hill). If a roadway is to be constructed on the north portion of the pens, it is recommended to ensure that the runoff from the solid manure area is contained within the retention area.



## 6.0 Closure

Envirowest Engineering is pleased to submit the report to Joel Lozeau. The information and conclusions contained in this report are for their sole use. No other party is to rely upon the information contained within the report without the express written authorization of Envirowest Engineering.

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

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

Respectfully submitted,



2024-05-01

**Prepared by:**

Emily J. Low, P.Eng.  
Envirowest Engineering



May 1, 2024

**Reviewed by:**

Leah Predy, P.Ag.  
Envirowest Engineering

<b>PERMIT TO PRACTICE</b>
2206165 ALBERTA LTD
RM SIGNATURE: [Redacted]
RM APEGA ID #: 110373
DATE: May 1, 2024
<b>PERMIT NUMBER: P014810</b>
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

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



## 7.0 Qualifications of Assessors

Ms. Emily Low, B.Sc., P.Eng, is an Environmental Engineer with Envirowest Engineering and has approximately 15 years of environmental assessment, monitoring, and remediation experience in the agricultural, industrial, real estate and development, and oil and gas sectors. Ms. Low has a Bachelor of Science in Chemical Engineering from the University of Alberta and is a certified Professional Engineer in Alberta (Association of Professional Engineers and Geoscientists of Alberta).

Leah Predy, B.A., B.Sc., P.Ag., is a Professional Agrologist with Envirowest Engineering and has approximately 5 years of experience in the environmental field, both in field data collection and report preparation for environmental assessments, monitoring, and remediation, as well as agricultural projects. Prior to her employment with Envirowest Engineering, Leah had five years of experience managing rangelands and navigating legislation and regulations as a Rangeland Agrologist with the Government of Alberta. She is a Professional Agrologist in Alberta (Alberta Institute of Agrologists).





## 8.0 References

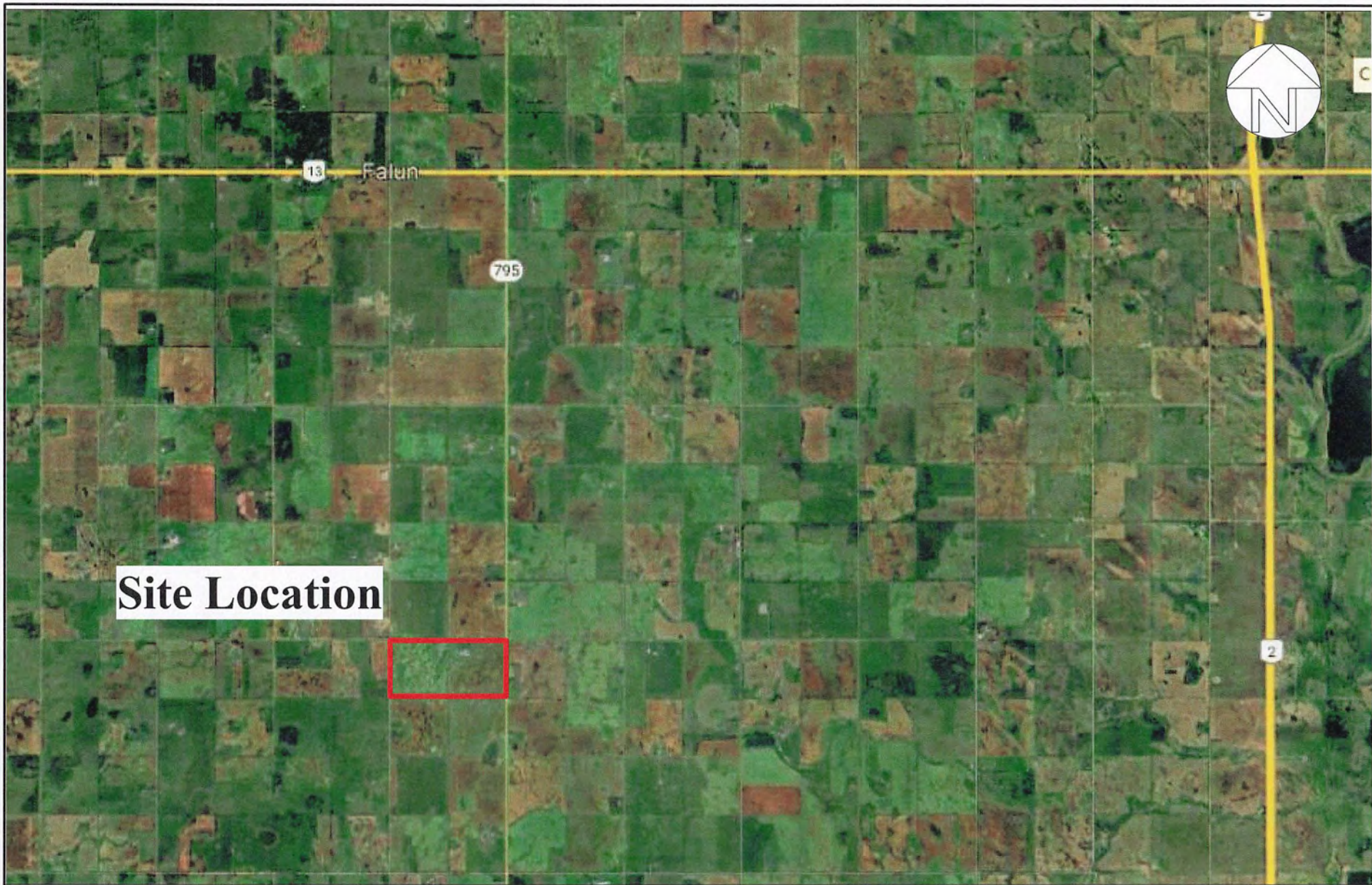
GOA (Government of Alberta). (November 2022). Agricultural Operation Practices Act and Regulations. Edmonton, AB: Author.

GOA (Government of Alberta). (December 2020). Agricultural Operation Practices Act: Standards and Administration Regulation. Edmonton, AB: Author.

## Appendix A

### Figures





**Site Location**



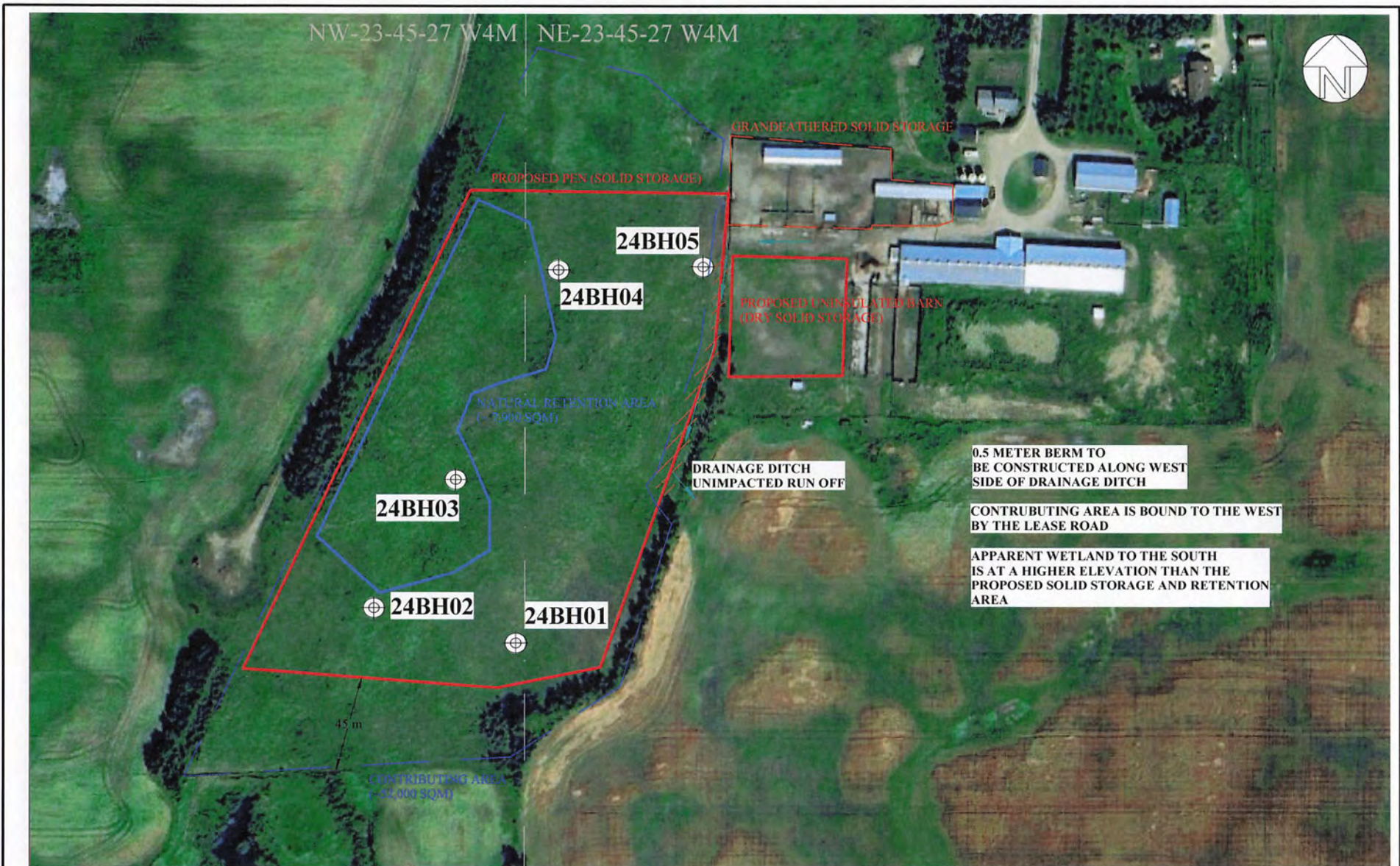
**Title:** Site Location  
 Site and Soil Assessment  
 N1/2-23-045-27 W4M  
 County of Wetaskiwin, Alberta

**Project No:**  
 2311-43051

**Date:** April 26, 2024

**Prepared by:**  
 E.Low

**Figure No.:**  
**1.0**



**Title:**  
 Site Plan and Borehole Locations  
 Site and Soil Assessment  
 N1/2-23-045-27 W4M  
 County of Wetaskiwin, Alberta

**Project No:**  
 2311-43051

**Scale:**  
 1:1500

**Date:**  
 April 26, 2024

**Prepared By:**  
 E. Low

**Figure:**  
**2.0**

**Appendix B**  
**Borehole Logs**





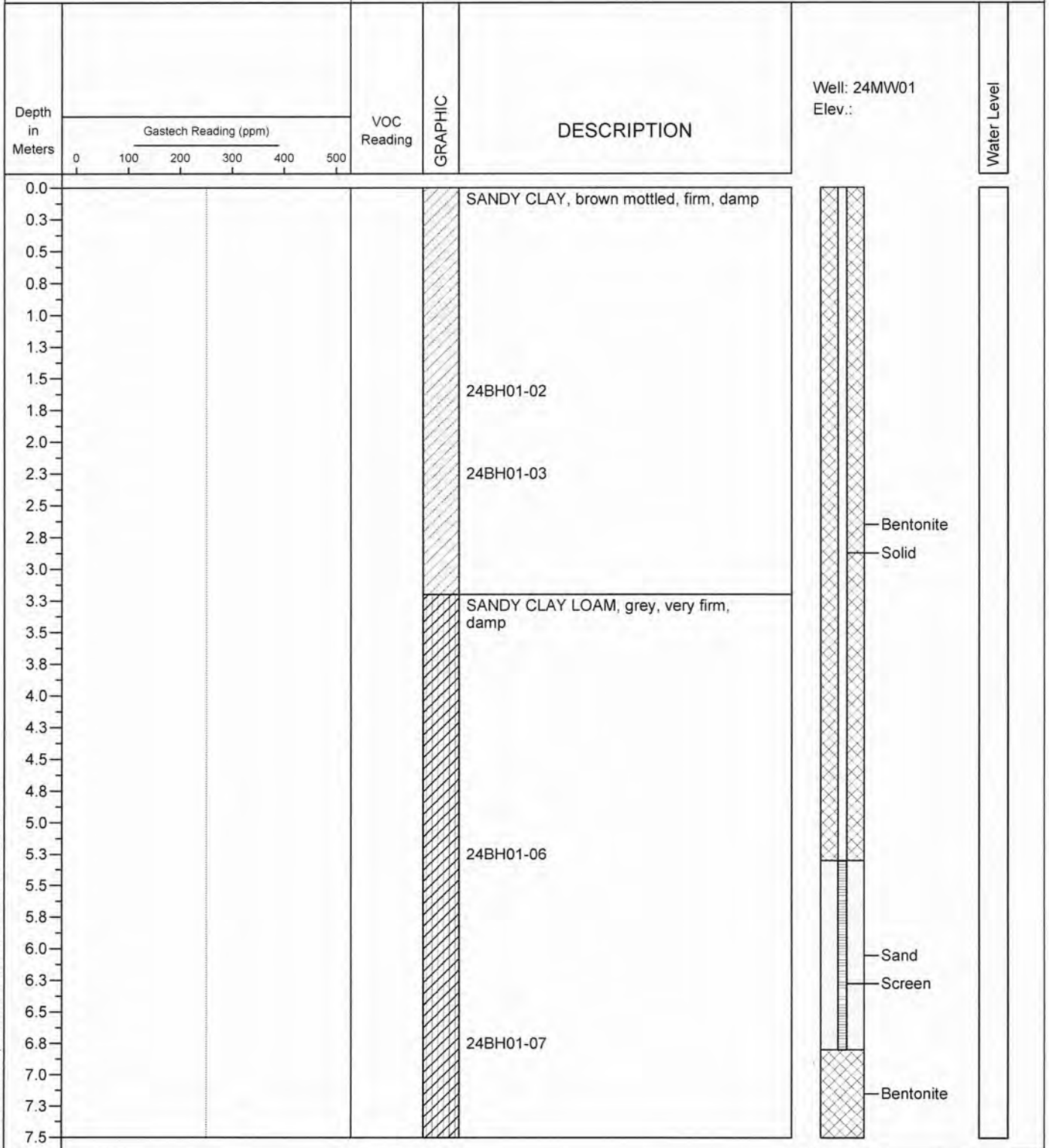
# LOG OF BORING 24BH01

(Page 1 of 1)

Site and Soil Assessment  
 N1/2-Sec.23-Twp.45-Rng.27-W4M  
 County of Wetaskiwin, Alberta

Driller: : Evergreen Drilling  
 Drilling Method: : Truck Mounted Auger  
 Drill Date : MArch 28, 2024  
 Logged By: : Emily Low P.Eng.

Project Number: 2311-43051



05-01-2024 Z:\Operations\Client Data\43051\_Joel Lozeau\24BH01\_bor



# LOG OF BORING 24BH02

(Page 1 of 1)

Site and Soil Assessment  
 N1/2-Sec.23-Twp.45-Rng.27-W4M  
 County of Wetaskiwin, Alberta

Driller: : Evergreen Drilling  
 Drilling Method: : Truck Mounted Auger  
 Drill Date : MArch 28, 2024  
 Logged By: : Emily Low P.Eng.

Project Number: 2311-43051

Depth in Meters	Gastech Reading (ppm)	VOC Reading	GRAPHIC	DESCRIPTION	Well Elev.:	Water Level
0.0				SANDY CLAY, brown mottled, firm, damp		
0.3						
0.5						
0.8						
1.0						
1.3						
1.5						
1.8						
2.0						
2.3						
2.5						
2.8						
3.0						
3.3						
3.5						
3.8				SANDY CLAY LOAM, grey, very firm, damp		
4.0						
4.3						
4.5						
4.8						
5.0						
5.3						
5.5						
5.8						
6.0						

05-01-2024 Z:\Operations\Client Data\43051 - Joel Lozeau\24BH02.bor



# LOG OF BORING 24BH02

(Page 1 of 1)

Site and Soil Assessment  
 N1/2-Sec.23-Twp.45-Rng.27-W4M  
 County of Wetaskiwin, Alberta

Driller: : Evergreen Drilling  
 Drilling Method: : Truck Mounted Auger  
 Drill Date : MArch 28, 2024  
 Logged By: : Emily Low P.Eng.

Project Number: 2311-43051

Depth in Meters	Gastech Reading (ppm)	VOC Reading	GRAPHIC	DESCRIPTION	Well Elev.:	Water Level
0.0				SANDY CLAY, brown mottled, firm, damp		
0.3						
0.5						
0.8						
1.0						
1.3						
1.5						
1.8						
2.0						
2.3						
2.5						
2.8						
3.0						
3.3						
3.5				SANDY CLAY LOAM, grey, very firm, damp		
3.8						
4.0						
4.3						
4.5						
4.8						
5.0						
5.3						
5.5						
5.8						
6.0						

05-01-2024 Z:\Operations\Client Data\43051 - Joel Lozeau\24BH03.bor





# LOG OF BORING 24BH03

(Page 1 of 1)

Site and Soil Assessment  
 N1/2-Sec.23-Twp.45-Rng.27-W4M  
 County of Wetaskiwin, Alberta

Driller: : Evergreen Drilling  
 Drilling Method: : Truck Mounted Auger  
 Drill Date : MArch 28, 2024  
 Logged By: : Emily Low P.Eng.

Project Number: 2311-43051

Depth in Meters	Gastech Reading (ppm)	VOC Reading	GRAPHIC	DESCRIPTION	Well: Elev.:	Water Level
0.0				SANDY CLAY, brown mottled, firm, damp		
0.3						
0.5				24BH03-01		
0.8						
1.0						
1.3						
1.5						
1.8						
2.0						
2.3				SANDY CLAY LOAM, grey, very firm, damp		
2.5						
2.8				24BH03-02		
3.0						
3.3						
3.5						
3.8				24BH03-03		
4.0						
4.3						
4.5						
4.8						
5.0						
5.3						
5.5				24BH03-04		
5.8						
6.0						

05-01-2024 Z:\Operations\Client Data\43051 Joel Lozeau\24BH04 bor



# LOG OF BORING 24BH05

(Page 1 of 1)

Site and Soil Assessment  
 N1/2-Sec.23-Twp.45-Rng.27-W4M  
 County of Wetaskiwin, Alberta

Driller: : Evergreen Drilling  
 Drilling Method: : Truck Mounted Auger  
 Drill Date : MArch 28, 2024  
 Logged By: : Emily Low P.Eng.

Project Number: 2311-43051

Depth in Meters	Gastech Reading (ppm)	VOC Reading	GRAPHIC	DESCRIPTION	Well: Elev.:	Water Level
0.0				SANDY CLAY, loose, orange		
0.3						
0.5						
0.8						
1.0						
1.3				brown, damp 24BH05-01		
1.5						
1.8						
2.0						
2.3						
2.5				SANDY CLAY LOAM, grey, firm, damp 24BH05-02		
2.8						
3.0						
3.3				24BH05-03		
3.5						
3.8				sand pockets		
4.0						
4.3						
4.5						
4.8						
5.0						
5.3						
5.5						
5.8						
6.0						

05-01-2024 Z:\Operations\Client Data\43051\_Joel Lozeau\24BH05 bor

**Appendix C**  
**Certificate of Analysis**



CLIENT NAME: ENVIROWEST  
 BOX 4248, 5118-50th STREET  
 PONOKA, AB T4J1R6  
 (403) 783-8229

ATTENTION TO: Emily Low  
 PROJECT: Lozeau  
 AGAT WORK ORDER: 24R135651

SOIL ANALYSIS REVIEWED BY: Parampreet Kaur, Report Writer  
 DATE REPORTED: Apr 07, 2024  
 PAGES (INCLUDING COVER): 8  
 VERSION\*: 1

Should you require any information regarding this analysis please contact your client services representative at (403) 735-2005

\*Notes

**Disclaimer:**

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.
- For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.

# Certificate of Analysis

AGAT WORK ORDER: 24R135651

PROJECT: Lozeau

2910 12TH STREET NE  
 CALGARY, ALBERTA  
 CANADA T2E 7P7  
 TEL (403)735-2005  
 FAX (403)735-2771  
 http://www.agatlabs.com

CLIENT NAME: ENVIROWEST

ATTENTION TO: Emily Low

SAMPLING SITE:

SAMPLED BY:

Particle Size - Texture											
DATE RECEIVED: 2024-04-02						DATE REPORTED: 2024-04-07					
		SAMPLE DESCRIPTION:		24BH01-02	24BH01-03	24BH01-06	24BH01-07	24BH02-01	24BH02-02	24BH02-03	24BH03-01
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:									
Parameter	Unit	G / S	RDL	5778615	5778616	5778617	5778618	5778619	5778620	5778621	5778622
Particle Size Distribution (Sand)	%		2	67	60	43	43	45	43	44	49
Particle Size Distribution (Silt)	%		2	13	18	25	25	24	26	23	23
Particle Size Distribution (Clay)	%		2	20	22	32	32	31	31	33	28
Soil Texture				Sandy Clay Loam	Sandy Clay Loam	Clay Loam	Clay Loam	Sandy Clay Loam	Clay Loam	Clay Loam	Sandy Clay Loam
		SAMPLE DESCRIPTION:		24BH03-02	24BH03-03	24BH03-04	24BH04-01	24BH04-02	24BH04-03	24BH05-01	24BH05-02
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:									
Parameter	Unit	G / S	RDL	5778623	5778624	5778625	5778626	5778627	5778628	5778629	5778630
Particle Size Distribution (Sand)	%		2	44	44	43	43	41	41	45	43
Particle Size Distribution (Silt)	%		2	25	24	25	24	24	26	24	24
Particle Size Distribution (Clay)	%		2	31	32	32	33	35	33	31	33
Soil Texture				Clay Loam	Clay Loam	Clay Loam	Clay Loam	Clay Loam	Clay Loam	Sandy Clay Loam	Clay Loam
		SAMPLE DESCRIPTION:		24BH05-03	24BH05-04						
		SAMPLE TYPE:		Soil	Soil						
		DATE SAMPLED:									
Parameter	Unit	G / S	RDL	5778631	5778632						
Particle Size Distribution (Sand)	%		2	43	44						
Particle Size Distribution (Silt)	%		2	24	24						
Particle Size Distribution (Clay)	%		2	33	32						
Soil Texture				Clay Loam	Clay Loam						

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5778615-5778632 Soil Texture is a calculated parameter. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.  
 % Silt is a calculated parameter. The calculated value is determined by subtracting the percent sand and clay values from 100 percent.

Analysis performed at AGAT Calgary (unless marked by \*)

Certified By: 

## Quality Assurance

CLIENT NAME: ENVIROWEST

AGAT WORK ORDER: 24R135651

PROJECT: Lozeau

ATTENTION TO: Emily Low

SAMPLING SITE:

SAMPLED BY:

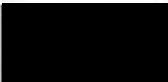
### Soil Analysis

RPT Date: Apr 07, 2024			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

**Particle Size - Texture**

Particle Size Distribution (Sand)	5778631	5778631	43	43	0.0%	< 2	113%	80%	120%
Particle Size Distribution (Silt)	5778631	5778631	24	24	0.0%	< 2	87%	80%	120%
Particle Size Distribution (Clay)	5778631	5778631	33	33	0.0%	< 2	94%	80%	120%

Comments: Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.

 Certified By: 

## Method Summary

CLIENT NAME: ENVIROWEST

AGAT WORK ORDER: 24R135651

PROJECT: Lozeau

ATTENTION TO: Emily Low

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
<b>Soil Analysis</b>			
Particle Size Distribution (Sand)	SOIL 0520; SOIL 0110; SOIL 0120	JONES 2001	HYDROMETER
Particle Size Distribution (Silt)	SOIL 0520; SOIL 0110; SOIL 0120	JONES 2001	HYDROMETER
Particle Size Distribution (Clay)	SOIL 0520; SOIL 0110; SOIL 0120	JONES 2001	HYDROMETER







# AGAT Laboratories

2910 12 Street NE  
 Calgary, Alberta T2E 7P7  
 P: 403-735-2005 • F: 403-735-2771  
 webearth.agatlabs.com

### Laboratory Use Only

Arrival Temperature: \_\_\_\_\_  
 Cooler Quantity: \_\_\_\_\_  
 Custody Seal Intact:  Yes  No  N/A  
 AGAT Job Number: \_\_\_\_\_

## Chain of Custody Record

Emergency Support Services Hotline **1-855-AGAT 245 (1-855-242-8245)**

### Report Information

Company: Environwest Engineering  
 Contact: Emily Law  
 Address: \_\_\_\_\_  
 Phone: 403-783-8229

### Report Information

1. Name: Emily Law  
 Email: elaw@environwestengineering.ca  
 2. Name: \_\_\_\_\_  
 Email: \_\_\_\_\_  
 3. Name: \_\_\_\_\_  
 Email: \_\_\_\_\_

### Turnaround Time Required (TAT)

Regular TAT  5 to 7 Business Days  
 <24 Hours (200%)  
 Rush TAT  Next Business Day (100%)  
 2 Business Days (50%)  
 3 Business Days (25%)

### Project Information

Client Project #: LORAW  
 Site Location: \_\_\_\_\_  
 Sample By: \_\_\_\_\_  
 AGAT Quote #: \_\_\_\_\_

If a quotation number is not provided, client will be billed at standard rates. See terms and conditions of quote for full details.

### Invoice To

Same as Report to

Company: \_\_\_\_\_  
 Contact: \_\_\_\_\_  
 Email: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Phone: \_\_\_\_\_  
 PO/CC #: \_\_\_\_\_

### Requirements (Selection may impact detection limits)

**CCME**  
 Agricultural  Industrial  Residential/Park  Commercial  FWAL

**AB Tier 1**  
 Agricultural  Industrial  Residential/Park  Commercial  Natural Area

**Alberta Surface Water**  
 Chronic  Acute  SK Notice of Site Cond.  Drinking Water  Other:

Is this part of the Alberta SRP program?  YES  NO (If yes, please fill below)

Application Number: \_\_\_\_\_  
 Grant Amount: \_\_\_\_\_  
 Well/Facility/Location ID: \_\_\_\_\_  
 UWI: \_\_\_\_\_

LABORATORY USE (LAB ID #)	SAMPLE IDENTIFICATION	DEPTH	DATE/TIME SAMPLED	SAMPLE MATRIX	COMMENTS	# OF CONTAINERS			Field Filtered (Y/N)	Preserved (Y/N)	Detailed Salinity: <input type="checkbox"/> AB <input type="checkbox"/> SK <input type="checkbox"/> BC <input type="checkbox"/> D50	<input type="checkbox"/> CCME/AB : BTEX/F1-F4 <input type="checkbox"/> CCME/AB : BTEX/F1-F2	<input type="checkbox"/> BC: BTEX/VPH/EPH <input type="checkbox"/> BC: LEPH/HEPH	SK: BTEX/TVH/C11-C22, C23-C60	Soil Metals: <input type="checkbox"/> HWS-B <input type="checkbox"/> SP-B <input type="checkbox"/> Hg <input type="checkbox"/> Cr <sup>6+</sup>	Water Metals: <input type="checkbox"/> Dissolved <input type="checkbox"/> Total <input type="checkbox"/> Hg <input type="checkbox"/> Cr <sup>6+</sup>	Routine Water Chemistry	Landfill: <input type="checkbox"/> AB Class 2 <input type="checkbox"/> BC <input type="checkbox"/> SK	Coliforms: <input type="checkbox"/> Total <input type="checkbox"/> Fecal <input type="checkbox"/> E.coli	Particle Size: <input type="checkbox"/> Sieve (75µm) <input checked="" type="checkbox"/> Texture	Hold For: 30 Days No Analysis (Additional Fee)	Long Term Storage - 6 Months	Long Term Storage - 1 Year	Hazardous (Y/N)		
						VIALS / JARS	BAGS	BOTTLES																		
1	24BH03-04			Soil																						
2	24BH04-01																									
3	24BH04-02																									
4	24BH04-03																									
5	24BH05-01																									
6	24BH05-02																									
7	24BH05-03																									
8	24BH05-04																									
9																										
10																										

Samples Relinquished By (Print Name): <u>Emily Law</u>	Date/Time: <u>April 24/13</u>	Samples Received By (Print Name): _____	Date/Time: _____	Samples Relinquished By (Print Name and Sign): _____	Date/Time: _____	Samples Received By (Print Name and Sign): _____	Date/Time: <u>April 24/13</u>	Pink Copy - Client	Page <u>2</u> of <u>2</u>
Samples Relinquished By (Print Name): _____	Date/Time: _____	Samples Received By (Print Name): _____	Date/Time: _____	Samples Relinquished By (Print Name and Sign): _____	Date/Time: _____	Samples Received By (Print Name and Sign): _____	Date/Time: <u>1:00pm</u>	White Copy - AGAT	Nº: AB <u>172625</u>

### RECEIVING BASICS - Shipping

Company/Consultant: Environment Eng.  
 Courier: Jazz Prepaid Collect  
 Waybill# \_\_\_\_\_  
 Branch: EDM GP FN FM  VAN LYD FSJ EST SASK Other: \_\_\_\_\_  
 If multiple sites were submitted at once:  Yes No  
 Custody Seal Intact: Yes No  NA  
 TAT: <24hr 24-48hr 48-72hr  Reg Other \_\_\_\_\_  
 Cooler Quantity: 1x Long

### TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes No  
 Inorganic Tests (Please Circle): Mibi , BOD , Nitrate/Nitrite , Turbidity , Color , Microtox , Ortho PO4 , Tedlar Bag , Residual Chlorine , Chlorophyll\* , Chloroamines\*  
 Earliest Expiry: \_\_\_\_\_  
 Hydrocarbons: Earliest Expiry \_\_\_\_\_

### SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES  NO Precaution Taken: \_\_\_\_\_  
 Legal Samples: Yes  NO  
 International Samples: Yes  NO  
 Tape Sealed: Yes  NO  
 Coolant Used: Icepack  Bagged Ice Free Ice Free Water  None

Temperature (Bottles/Jars only)  N/A  only Soil Bags Received

FROZEN (Please Circle if samples received Frozen)  N/A

1 (Bottle/Jar) \_\_\_ + \_\_\_ + \_\_\_ = \_\_\_ °C    2 (Bottle/Jar) \_\_\_ + \_\_\_ + \_\_\_ = \_\_\_ °C  
 3 (Bottle/Jar) \_\_\_ + \_\_\_ + \_\_\_ = \_\_\_ °C    4 (Bottle/Jar) \_\_\_ + \_\_\_ + \_\_\_ = \_\_\_ °C  
 5 (Bottle/Jar) \_\_\_ + \_\_\_ + \_\_\_ = \_\_\_ °C    6 (Bottle/Jar) \_\_\_ + \_\_\_ + \_\_\_ = \_\_\_ °C  
 7 (Bottle/Jar) \_\_\_ + \_\_\_ + \_\_\_ = \_\_\_ °C    8 (Bottle/Jar) \_\_\_ + \_\_\_ + \_\_\_ = \_\_\_ °C  
 9 (Bottle/Jar) \_\_\_ + \_\_\_ + \_\_\_ = \_\_\_ °C    10 (Bottle/Jar) \_\_\_ + \_\_\_ + \_\_\_ = \_\_\_ °C

(If more than 10 coolers are received use another sheet of paper and attach)

### LOGISTICS USE ONLY

Workorder No: \_\_\_\_\_  
 Samples Damaged: Yes No If YES why?  
 No Bubble Wrap Frozen Courier  
 Other: \_\_\_\_\_  
 Account Project Manager: \_\_\_\_\_ have they been notified of the above issues: Yes No  
 Whom spoken to: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
 CPM Initial \_\_\_\_\_  
 General Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

\* Subcontracted Analysis (See CPM)

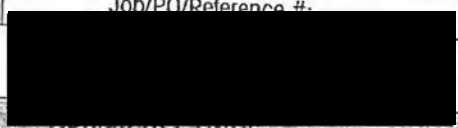


# JAZOO EXPRESS COURIER Ltd.

### CLIENT USE ONLY

contact name:	melissa	Contact Location:	AGAT RED DEER	Billed to:	AGAT
date:	April 2/24	Delivery From:	Agat, #12-7471 Edgar Industrial Bend		
		Delivery To:	AGAT, 2910 12TH ST. NE CALGARY		
total items:	3	Item Description:	Endiro West 3 coolers		
		envelope, sm/med/lg box, cooler, etc.			
		Job/PO/Reference #:			

Authorized Shipper Signature:



### DRIVER USE ONLY

Driver name:	EDWIN	P/U Time:		am	D/O Time:		am
ems #:	3		1:20	pm		3:25	pm
	Overweight		TDG				

Total # items dropped Off:	3	D/O Driver Name:	EDWIN
Authorized Receiver Signature:			

### HOTSHOT DETAILS

Km:		Or Total Charge (\$):	
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### OFFICE USE ONLY

Invoiced By:	
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To request a hot shot please contact dispatch at the city nearest you:

Calgary 403-660-5504  
 Edmonton 780-903-3628

Fort McMurray 587-645-6364  
 Grande Prairie 587-297-8406

THANK YOU FOR SUPPORTING LOCAL AND CHOOSING JAZOO EXPRESS COURIER LTD.

AQTESOLV for Windows

Data Set: Z:\Operations\Client Data\43051 Joel Lozeau\24MW01.aqt  
Date: 04/26/24  
Time: 14:44:58

PROJECT INFORMATION

Company: Envirowest Engineering  
Client: 42982  
Project: 2110-42982  
Test Date: November 25, 2022  
Test Well: 21BH03 (21MW01)

AQUIFER DATA

Saturated Thickness: 1.5 m  
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: New Well

X Location: 0. m  
Y Location: 0. m

Initial Displacement: 1.055 m  
Static Water Column Height: 0. m  
Casing Radius: 0.0254 m  
Well Radius: 0.0254 m  
Well Skin Radius: 0.0762 m  
Screen Length: 1.5 m  
Total Well Penetration Depth: 6.8 m

No. of Observations: 25

Observation Data			
Time (min)	Displacement (m)	Time (min)	Displacement (m)
0.	1.055	6.5	1.054
0.5	1.055	7.	1.053
1.	1.055	7.5	1.052
1.5	1.055	8.	1.051
2.	1.055	8.5	1.051
2.5	1.055	9.	1.051
3.	1.053	9.5	1.051
3.5	1.053	10.	1.051
4.	1.054	15.	1.051
4.5	1.054	20.	1.051
5.	1.054	25.	1.053
5.5	1.054	30.	1.053
6.	1.054		

SOLUTION

Slug Test  
Aquifer Model: Unconfined  
Solution Method: Bouwer-Rice  
ln(Re/rw): 4.051

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	4.144E-7	cm/sec
y0	1.092	m

T = K\*b = 6.216E-5 cm<sup>2</sup>/sec