PUBLIC HEARINGS AND MEETINGS
PLANNING AND DEVELOPMENT REPORT TO COUNCIL
LAND USE BLAW AMENDMENT
June 11, 2025
To be heard at: 1:00 PM

APPLICATION INFORMATION	**FILE NO. 25R035**
FOOTHILLS COUNTY	**SUBJECT LANDS:** Ptn. N 1/2 06 (49.58 ac), and Ptn. NW 05-19-29-W4, Plan 2510333, Block 1, Lot 1 (163.58 ac)
	LANDOWNERS: Rimrock Cattle Company Ltd.
	APPLICANT: Rimrock Renewables
	AGENT: Garnet Dawes, ISL Engineering and Land Services
	AREA OF SUBJECT LANDS: 77+/- acre portion of the subject lands which comprises of a total 213.16 acres
	CURRENT LAND USE: Agricultural District

PROPOSAL:
An application to allow for amendments to the Land Use Bylaw 60/2014 and a site-specific amendment to the Agricultural District to allow an Anaerobic Digester Facility as a Permitted Use and to permit flare stack structures up to 16m (52.49 ft.) in height to enable an Anaerobic Digester Facility on a 77+/- acre portion of Plan 2510333, Block 1, Lot 1, NW 05-19-29-W4 and N ½ 6-19-29-W4. A future subdivision of the 77+/- acres is contemplated.

DIVISION NO: 2	**COUNCILLOR:** Delilah Miller	**FILE MANAGER:** Heather Hemingway

EXECUTIVE SUMMARY

Summary of Proposal

This application is in two parts:

Part 1: Proposes amendments to Land Use Bylaw 60/2014 to introduce definitions for Anaerobic Digester Facility and related terms, clarify language regarding variances in Development Permit, and update setback requirements to reflect current provincial standards.

Part 2: Requests a site-specific amendment to the Agricultural District to allow an Anaerobic Digester Facility as a Permitted Use and to permit flare stack structures up to 16m (52.49 ft.) in height on the subject lands. Council is also requested to acknowledge the locations of berms located on the subject lands as accessory to the development.

Location

The subject lands are located approximately 5.5 kilometers west of the Town of High River on the south side of Coal Trail (514 Ave.) east of Meridian St.

Referral Considerations

This application was subject to a 30-day circulation to referral agencies prior to this hearing: Referral comments have been provided within the staff report for your reference.

Policy Evaluation

The application for amendment to the Land Use Bylaw 60/2014 and site specific land use amendment application has been reviewed in terms of the South Saskatchewan Regional Plan (SSRP), Foothills County's Growth Management Strategy, Foothills County's Municipal Development Plan 2010, and Land Use Bylaw 60/2014.

The proposed land use bylaw amendment and site specific amendment has been deemed to align with policies and guiding principles within these documents.

In addition, the proposed use has received Ministerial approval, subject to multiple conditions, which is attached in **Appendix D**.

BACKGROUND INFORMATION

Feedlot Approval:

In 1978, Western Feedlots Ltd. established a feedlot on the subject lands with a capacity of 15,000 head. In 1996, the operation was expanded to increase their capacity to 35,000 head. In 2017, Western Feedlots ceased operations, and the current landowners purchased the operation and received a grandfathered permit. To date, a portion of the subject lands has a working commercial feedlot with an NRCB permitted operating capacity of 35,000 beef finishers

AEPA Approval - 484778-00-00 & Ministerial Order 12/2025

In December 2023, the biodigester project was approved by Alberta Environment and Protected Areas (AEPA)
on the subject lands, for the construction, operation and reclamation of the Foothills County waste management facility for the collection and processing of waste or recyclables to produce fuel and the associated power plant.

The approval was appealed to the Environmental Appeals Board and an appeal hearing was concluded in March 2024. A decision was issued by the Minister of AEPA (Ministerial Order (12/2025) May 15, 2025, confirming the original approval subject to additional conditions. A copy of the Ministerial Order and original AEPA approval 484778-00-00 are attached as **Appendix D**. The full report of the appeal and the Board's recommendation to the Minister is available via the link emailed to Council members for information.

PURPOSE OF APPLICATION

The purpose of this application is to amend the Land Use Bylaw to allow for the construction and operation of a biodigester facility on a 77+/- acre portion of the subject lands, west of the existing Rimrock Cattle Company feedlot.

The County Land Use Bylaw 60/2014 currently does not contain provisions for development of an Anaerobic Digester Facility. Amendments to the Land Use Bylaw are required, including definitions for this use, related amendments, and a site specific amendment under the current Agricultural District land use, for Council's consideration of this use in Foothills County.

THE PROPOSAL IS IN TWO PARTS AS FOLLOWS:

PART 1 – AMENDMENT TO LAND USE BYLAW 60/2014

1. **The following new definitions are proposed to be added to the Land Use Bylaw under Section 2.5:**

   ANAEROBIC DIGESTER FACILITY is a facility designed to convert organic waste, such as animal manure, food and agricultural residues, or septic waste, into Renewable Natural Gas (RNA) and digestate through a controlled, oxygen-free (anaerobic) biological process.

   An anaerobic digester may also include a range of ancillary facilities that support feedstock processing, biogas production, and energy generation, such as receiving docks, storage tanks or bunkers, pre-treatment systems (e.g., screening, grinding, or shredding), primary and secondary digesters with mixing, heating, and pumping infrastructure, biogas storage and cleaning systems, cogeneration units, digestate separation and storage systems, composting areas, control and monitoring equipment, environmental protection measures (e.g., leachate management, odor control, and stormwater systems), as well as administration buildings, maintenance areas, and safety infrastructure like fencing and fire suppression systems.

   BIOGAS is a gas produced in an anaerobic digester, mainly composed of methane and carbon dioxide, resulting from the decomposition of organic materials. Biogas can be used for heat and electricity generation, as renewable natural gas for injection into pipelines or vehicle fuel, directly in industrial processes, or for household cooking and heating.

   DIGESTATE is the residual material remaining after the anaerobic digestion of organic feedstock. Digestate typically consists of both solid and liquid fractions and may be used as a soil amendment or fertilizer,

   FEEDSTOCK are materials used directly in manufacturing processes and transformed into an intermediate or finished material.

   RENEWABLE NATURAL GAS (RNG) is biogas that has been upgraded for use in place of fossil natural gas.

   NOTE: Having these definitions in the Land Use Bylaw would enable the Council to add the uses to applicable land use districts in the Land Use Bylaw, in the future if deemed appropriate

2. **The following amendments are proposed (in red) to existing definitions under Section 2.5 of the Land Use Bylaw:**

   AGRICULTURAL PROCESSING AND DISTRIBUTION means the use of land or a building for the upgrading of a product, for distribution or for sale that was originally produced in an agricultural operation but does not include an abattoir or Cannabis production or sales, or an Anaerobic Digester Facility.

   CLASS II COMPOST means an operation where only vegetative matter or manure is decomposed through a controlled bio-oxidation process, including a thermophilic phase, which results in a stable humus-like material but does not include an Anaerobic Digester Facility, on- site household composting or composing as part of agricultural general in accordance with Section10.8 or a manure storage facility.

UTILITY SERVICES, MAJOR means development for public or private utility infrastructure purposes which are likely to have a major impact on the environment or adjacent land uses by virtue of their emissions, effect, or appearance. Typical facilities would include sewage and/or water treatment plants, sewage lagoons, dams, power generating stations, cooling plants, incinerators, and, and high voltage electrical transmission towers but does not include an Anaerobic Digester Facility.

WASTE INCINERATION ENERGY RECOVERY means a waste management process that combusts waste to produce energy but does not include an Anaerobic Digester Facility.

NOTE: These definitions are amended to exclude this new use for clarity. Anaerobic Digester Facility would need to be added as a use to land use districts by bylaw.

3. **Section 5.3.2 within *Decision On Development Permit Applications*, is deleted and replaced to read as follows in red:**

~~5.3.2 Notwithstanding Section 5.3.1, if a Development Permit application for a permitted use that requires a variance to any other provision of the Bylaw, the use is considered a Discretionary use, and the application must be dealt with under all provisions for Discretionary uses under this Bylaw.~~

5.3.2 Notwithstanding Section 5.3.1, where a Development Permit application is made for a *permitted use* that does not comply with one or more other provisions of this Bylaw and therefore requires a *variance*, the application shall be considered a *Permitted Use with a variance*. In such cases, the Development Authority shall process the application in accordance with this Bylaw and may impose conditions pursuant to Section 5.4.3.

NOTE: This amendment is intended to provide clarity to the intent of the Development Permit conditions that may be imposed on a Permitted Uses that includes a request for a variance to other provisions under the Land Use Bylaw.

4. **Section 9.27.24 within *Special Setback Requirements,* is amended to read as follows with the changes in red:**

Setbacks and Provincial Legislation and Approvals ~~Setbacks to Municipal Utilities and Services~~

9.27.24 All development shall comply with the applicable Provincial legislation and approvals with respect to setbacks contained therein ~~with respect to setback to Municipal Utilities and Services~~ unless the setback is varied by the Approving Authority ~~with the written consent of the Deputy Minister of Environment~~ as set out in the *Matters Relating to Subdivision and Development Regulation* and *Guidelines for Setback Reviews*, each as may be replaced or amended from time to time, and notwithstanding any other provision in this Bylaw, a variance granted thereunder shall not be considered a variance under this Bylaw.

NOTE: This amendment is intended as an update to the existing outdated provisions regarding setbacks pertaining to Provincial approvals and legislation.

PROPOSAL PART 2: SITE SPECIFIC AMENDMENT DETAILS

Part 2 of the proposal is for a site-specific amendment under the Agricultural District to:

a. Permit an Anaerobic Digester Facility as a Permitted Use.
b. Allow flare stacks up to 16m (52.49 ft.) in height as per AEPA requirements.
   - A permitted use is a use that must be approved by the Approving Authority as a matter of course with conditions limited to those identified under Section 5.4.1 – 5.4.2, and no appeal lies with the area landowners.

This amendment applies only to the proposed 77+/- acre area of the subject land. A surveyed plan is to be registered that demarcates the area subject to the site specific amendment to the Land Use Bylaw.

Future Applications:

A Development Permit application approval is required prior to the development of an Anaerobic Digester Facility on the subject lands. An application for a development permit has been made concurrently but may only proceed further to three readings to a bylaw for the site specific amendment.

A future subdivision of the 77+/- acres development area is contemplated. No timeline has been provided for subdivision of these lands.

DETAILS OF THE DEVELOPMENT

Rimrock Renewables Ltd.is proposing to construct and operate a biodigester facility to be located west of the existing Rimrock Cattle Company feedlot.

The proposed facility will produce 450,000 to 610,000 GJ/year of renewable natural gas (RNG) through the upgrading of biogas produced by the anaerobic digestion of feedstock comprised of livestock manure from the adjacent feedlot (80,000 tonnes/year) and organic food resources from regional sources (60,000 tonnes/year).

The renewable natural gas produced by the facility will be transferred to an existing off-site ATCO pipeline. Digestate, a byproduct from the anaerobic digestion process will be separated into liquids and solids and used as either bedding material at the feedlot, or for application to lands under NRCB authorizations.

A copy of the complete application package with details of the proposed development is available via the link emailed to Council members for information. The Memorandum portion of the package, provided by ISL Engineering and Land Services Ltd. on behalf of the applicant, is also included in **Appendix B** of this report.

SUPPORTING FEASIBILITY STUDIES & ENGINEERING REPORTS

The following engineering feasibility studies and plans have been submitted in support of the application:

1. Stormwater Management Plan
2. Civil plan rough grading as built plans
3. Traffic Impact Assessment
4. Air Quality Assessment
5. Screening Risk Assessment Report
6. Land use Risk Assessment
7. Emergency Planning Zone Memo from H^2 Safety Services Inc.
8. Landscaping/Vegetation Plan

These reports have been included in a link emailed to Council members as part of the application package for information.

PROVINCIAL APPROVALS

The following is a list of approvals required from regulatory agencies:

Approvals Already Obtained:

1. Environmental Protection and Enhancement Act (EPEA) Approval No. 484778-00-00 and
2. Ministerial Order 12/2025 Respecting Environmental Appeal Board Appeal
3. Water Act Licence No. DAUT0010346
4. Storage and Application of Digestate on Agricultural Land Directive (April 30, 2023)
5. NRCB Digestate Memorandum of Understanding (June 26, 2023)
6. Historical Resources Act Approval No. 4515-21-0007-002

Approvals Pending or To Be Obtained:

1. Authorization under Agricultural Operation Practices Act (AOPA) for digestate application
2. Additional water licence transfers for remaining water needs

Provincial approvals already granted are included under **Appendix D** of the report and are included in the information provided via link emailed to Council members as part of the application package.

SETBACK DISTANCES TO WASTE FACILITIES

The Land Use Bylaw requires compliance with provincial setback regulations for developments near waste related facilities. This includes a 300m minimum distance from a waste storage site to the property line of any school, hospital, or residence.

As part of this application, an amendment to Section 9.27.24 has been proposed to update the Land Use Bylaw to be in alignment with provincial legislation, specifically the *'Matters Relating to Subdivision and Development Regulation*' and the "*Guidelines for Setback Reviews (Waste Facility) (2022)".*

A plan has been submitted and is attached as Appendix A6, showing a 300m buffer zone around the waste storage site. The setback distances required under the provincial regulations serve as protective buffers for nuisance impacts (e.g., odours, dust) and health risks (e.g., emissions, leachate).

Variances of the 300 metre setback may be considered by the Development Authority with submission of engineering reports, air quality assessments, landowner notifications, and mitigation plans in accordance with the provincial guidelines *(Guidelines for Setback Reviews (Waste Facility) 2022.* The variance to the setback would be considered as part of the development permit application.

The County may grant a **variance** to the required setback if the Development Authority is satisfied that the proposal will not create an undue risk in accordance with ***"The Matters Related to Subdivision and Development Regulation***" as follows:

Section 17 (6) The requirements contained in subsections (2) to (5) may be varied by a Subdivision Authority or a Development Authority if the applicant submits a report from a professional engineer that addresses the criteria for a variance stipulated in the *Guidelines for Setback Reviews* published by the Department of Environment and Parks in May 2022, as amended from time to time.

The Government of Alberta has published the ***"Guideline for Setback Reviews (Waste Facility) 2022*** for guidance for developers, Subdivision Authorities, and Development Authorities to evaluate applications where the setback distances are planned or being considered for a reduction. A setback variance may be applied for and decided upon by the Development Authority in accordance with the "Guideline for Setback Reviews (Waste Facility) 2022.

A copy of the Guideline for Setback Reviews (Waste Facility) 2022 is included as **Appendix C** for Council's information.

PROPOSED NUISANCE MITIGATION

The Approval granted by EPEA (484778-00-00) outlines the requirements and regulation of waste management (both feedstock and digestate), emissions and odour, groundwater monitoring, and industrial wastewater and runoff. Keeping records, monitoring and reporting is also regulated under these approvals.

Ministerial Order 12/2025 added conditions to include construction of an odour abatement system including, at a minimum:

- a wet chemical scrubber.
- two (2) carbon filters to treat the air effluent streams from the facility.
- a sampling facility to monitor the carbon media absorption capacity.
- a meteorological station to monitor wind speed, direction and ambient temperature at a site approved by the Director.
- a Fugitive Emission Monitoring Program to be completed and submitted to the Director prior to commencement of the operation.

The results of monitoring data are required to be made available to the public on the website and sent to identified parties.

The applicants have submitted an Air Quality Assessment Report, Screening Risk Assessment Report, Land use Risk Assessment, and an Emergency Planning Zone Review from H^2 Safety Services Inc., in support of the application. These reports have been included in a link emailed to Council members as part of the application package for information.

SITE CONSIDERATIONS

Site Location:

The subject lands are located approximately 5.5 km West of the Town of High River. A location map is included in **Appendix A** of the report.

Land Use

The subject lands are currently zoned Agricultural District. The majority of the land in the area consist of Agricultural District lands, with a number of Country Residential District parcels approved throughout. Other land uses in the area include:

- There is Natural Resource Extraction located approximately one mile to the east.
- Approximately two miles to the northeast is a multi-lot Country Residential subdivision approved as Tongue Creek Estates and Sage Valley Estates.
- Globalstar Canada have a Direct Control District #8 site for satellite aerodromes approximately two miles northeast.

A land use map for the subject lands and surrounding area can be found in **Appendix A** of the report.

Access & Transportation

The subject lands are bound on the south side by Coal Trail E. (a chipseal municipal road) and on the west by Meridian St. (a gravel municipal road).

Access to the development is proposed off Meridian St. on the west side of the parcel approximately 80 meters south of the Coal Trail E. intersection. Access to the balance of the lands has been identified on Exhibit G5 – Future Subdivision Access included in Appendix B2. This plan shows access points further to a future contemplated subdivision of the development site from the subject lands.

The applicant has indicated that they will upgrade and pave Meridian Street from the intersection of Coal Trail E to their site access. This will allow for all truck traffic for the site to be on paved roads to reach Provincial Highway 543.

A Traffic Impact Assessment (TIA) has been submitted in support of the application. A copy of the TIA has been included **Appendix B** for information.

The plans traffic projections note that peak hour traffic generated to the site is 19, both in the AM and again in the PM (totaling 38 vehicle trips per day) as follows:

- 5 personal vehicle trips (employees)
- 7 truck-mounted tank trucks making both inbound and outbound trips (14 trips total).

The TIA intersection improvements identify a Type IIIb westbound left turn lane at Highway 543 and Meridian St. is warranted for the 2042 horizon.

Public works has indicated that upgrading of Meridian St. to the proposed access is required and is to be developed to Foothills County's Industrial/Commercial road paved standards. In addition, 5m of road widening will be required by survey along the east side of Meridian St to allow for a 25m right of way.

The applicant is required to enter into a Development Agreement for upgrading and paving of Meridian St. as a condition of the Development Permit.

Landscaping and Screening

Under the Land Use Bylaw, landscaping and screening requirements may be applied to commercial and industrial uses in accordance with the County's Screening Standards. When necessary, these requirements are imposed as conditions of the Development Permit.

Section 9.14.2 of the Land Use Bylaw states:

> *"The Development Authority may require that landscaping and/or screening be provided in conjunction with any development and be addressed as part of the Development Permit application. The intent of landscaping and screening is to contribute to a reasonable standard of appearance for developments and to support a positive overall image for the area."*

To minimize the visual impact of the facility on surrounding properties and roadways, the applicants propose berms along the north and west boundaries of the site. These berms will be seeded with vegetation and planted with trees to form a shelterbelt as the trees mature.

The berms and associated landscaping are strategically located to screen stockpile areas (including manure and solid digestate staging), exterior work areas (process zones), and loading zones (organic food resource and manure handling), in accordance with the County's Screening Standards. This design aims to reduce visual impacts, noise, dust, and potential odours.

Figures 1.5 and 1.6 included in the application package in, along with Exhibit G6, illustrate the proposed landscaping and vegetation planning and are included in **Appendix B** of this report.

Public works have indicated that they have no concerns with the berms and grading completed to date. In accordance with Section 9.27.14 of the Land Use Bylaw, the berms along Meridian St. and Coal Trail will need to be engineered to meet the Alberta Infrastructure Highway Geometric Design Guide for minimum sight triangle. (D.4.2 Minimum Sight Triangle). A copy of the illustrated site triangle has been included in Public Works referral response attached as **Appendix E**.

Council has been asked to acknowledge the location of the berms as accessory to the use, a component of the screening plan, and required for the ultimate reclamation of the site.

The applicant will be required to enter into a Municipal Development Agreement for completion and maintenance of the Screening Plan and adherence to the grading plan as a condition of the Development Permit.

Water Supply

No municipal potable or grey water systems are proposed for the facility. Domestic water will be trucked in to the site for use in onsite washrooms and kitchen facilities.

The primary water source for the facility will be by way of an approved water license transfer (existing Rimrock Renewable water license for up to 160,971m3 for Industrial and Agricultural purposes), pumped from the Highwood River through existing water intake structure and pipe connections to a freshwater pond. This water license accounts for approximately 2/3 of the facilities water requirements based on 25% liquid digestate reuse. Additional water license transfer(s) will be applied for to make up the remaining water needs. The applicant will endeavor to reuse as much liquid digestate in the process as possible to reduce the overall water requirements for the facility.

A copy of the Water License approval is included in **Appendix D** and in the link emailed to Council members as part of the application package for information

Lot Grading / Stormwater Management

Rough grading of the site was completed in 2022. Final grading of the site will be completed as part of the facility construction. Some of the temporary stockpiles currently onsite will be utilized to complete final grading and backfilling. Topsoil and a portion of the subsoil piles will form part of the landscaping/screening for the site.

All stormwater from the site is directed to and contained within the liquid digestate pond on site. Stormwater captured within the pond is returned to the watershed via the bi-annual/seasonal application of liquid digestate to neighbouring lands. Groundwater monitoring will occur through the use of monitoring wells in accordance with the Groundwater Monitoring Program submitted by the applicant and approved by the Director in accordance with Section 4.5 of the AEPA Approval No. 484778-00-00.

Public Works has indicated that pond is sized to have adequate storage for greater than a 1:500 year event and acts as a secondary line of defiance in the event of leaks/failure. A complete Storm Water Management Report stamped by the engineer is required.

A stormwater management plan, site grades, and engineered drawings of the freshwater reservoir and digestate pond were submitted with the application and are included in a link emailed to Council members as part of the application package for information.

The applicant will be required to enter into a Municipal Development Agreement for Stormwater Management as a condition of the Development Permit.

Outdoor Lighting

Section 9.15 of the Land Use Bylaw requires all exterior lighting in the County to meet the requirements set forth in the *Dark Sky Bylaw*.

The applicants have indicated that facility lighting design will meet or exceed all requirements of the Dark Sky Bylaw and requirements under the Land Use Bylaw.

The applicant will be required to enter into a Municipal Development Agreement to ensure all lighting is in compliance with the *Dark Sky Bylaw* as a condition of the Development Permit.

Emergency Response Planning

The facility has been designed to meet applicable Canadian and industry safety standards.

Multiple studies have been completed to inform emergency response planning for the proposed facility. Copies of these studies including a Screening Risk Assessment, Land Use Risk Assessment, and Emergency Planning Zone Review, are available via the link emailed to Council.

Emergency flare stacks will operate only under upset conditions. Risk assessments confirm that no off-site evacuations or emergency actions are expected beyond the site boundaries

As per Ministerial Order 12/2025, a comprehensive Emergency Response Plan (ERP) must be developed before any feedstock is received. This ERP will be prepared in consultation with Foothills County, the Town of High River, the public and it must be approved by the Ministry. It will outline notification procedures, emergency exit routes, and protective measures for local residents.

Decommissioning and Reclamation

Decommissioning of the facility and site reclamation are regulated under the Environmental Protection and Enhancement Act (EPEA) Approval No. 484778-00-00. The EPEA Approval includes a $3.15 million financial security for decommissioning. Final reclamation will include landscaping restoration using onsite topsoil and berms, monitored under provincial oversight.

POLICY EVALUATION

The proposal aligns with relevant planning frameworks including:

South Saskatchewan Regional Plan (SSRP)

The SSRP provides a high-level policy framework for all lands in the South Saskatchewan River Basin within Alberta, including all sub basins. Objectives under the Agriculture section of the SSRP support the maintenance and diversification of the region's agricultural industry through: maintaining agricultural land base, supporting diverse and innovative irrigated agriculture, maximizing opportunities for value-added agricultural products, recognizing the contribution of local production in addition to existing domestic and international market opportunities, supporting the next generation of agricultural, food and rural entrepreneurs, and recognizing and rewarding continued stewardship and conservation of private agricultural land and diversification of the agricultural economy.
The redesignation generally aligns with the policy direction within the SSRP with consideration of policy sections related to: Economy (Agriculture, Energy), and Efficient Use of Land.

Summarized – supports diversification of agricultural operations, the creation of value-added agricultural products and local renewable energy production.

Foothills County Growth Management Strategy (GMS)

The subject property is located within the South Central District of the Foothills County's Growth Management Strategy. This District's predominate land uses are a mix of farming and ranching, with some natural resource extraction and growing country residential and recreational opportunities. Moderate growth is expected to continue within this district with the majority of this growth taking place on the east side of the district close to Highway 2 and the Towns of Okotoks and High River.

Land use redesignation will be carefully considered to avoid creating land use conflicts particularly with respect to long established agricultural operations.

The application has been evaluated in the context of the County's Growth Management Strategy and is generally consistent with the goals and objectives within that plan.

Summarized – Compatible with long standing agricultural use in the south central district.

Municipal Development Plan (MDP 2010)

Policies under the Agricultural Section of the MDP2010 support maintaining the integrity of the agricultural land base and note that agricultural uses and industries that support agriculture should be encouraged. Non-agricultural uses should only be permitted on land where the County judges the proposal to have minimal negative impacts on the agricultural resource, and potential agricultural use of the property and properties that may be affected.

The application has been evaluated in the context of the County's MDP 2010 and is generally consistent with the goals and objectives within that plan.

Summarized – Encourages agricultural innovation and non-agricultural uses that support rural viability without adversely impacting surrounding farmland.

Land Use Bylaw 60/2014 (LUB)

The purpose and intent of the Agricultural District under the land use bylaw is to promote a wide range of agricultural land uses that encourage growth, diversification and development of the agricultural industry while having regard for the agricultural value and rural character of the area consistent with the policies outlined in the Municipal Development Plan.

The proposed use is not currently contemplated under the Land Use Bylaw. The application is for an amendment under the Agricultural District land use to allow for new innovation to support existing intensive agriculture use and amendments to the Land Use Bylaw to support the use in Foothills County.

Summarized – Proposes a use consistent with the Agricultural District's intent to support diverse agricultural development. Amendments ensure consistency with the County's regulatory framework.

CIRCULATION REFERRALS

The application was circulated to all necessary internal departments and external agencies. The responses received are summarized in the table below.

CIRCULATION REFERRALS	
REFEREE	**COMMENTS**
INTERNAL	
Public Works:	A summary of Public work has commented as follows: • Meridian St. will require 5m road widening on east side and upgrading /surfacing to Foothills Count's Industrial/Commercial Road Paved Standards. • Berms along Meridian St. and Coal Trail will need to be engineered to meet the Alberta Infrastructure Highway Geometric Design Guide for minimum sight triangle. • Groundwater monitoring wells will be installed. • All Stormwater is contained by the digestate pond. Will require a Stormwater report stamped by the engineer. • As-builts will be required upon completion along with a letter of conformation from an engineer for all site grading, Stormwater Management Plan, and eternal upgrades. A copy of the full response from Public Works is included as **Appendix E** of the report.

CIRCULATION REFERRALS	
EXTERNAL	
Alberta Health Services	AHS – SHE has no concerns with the application at this time.
Fortis Alberta	Fortis Alberta has no issues with the land use application.
TELUS	Telus has no concerns.
PUBLIC	
Western Wheel	Public Hearing was advertised on May 28, 2025, and June 4, 2025.
Land Owners (1/2 Mile)	Notice of the Public Hearing was mailed to landowners within a ½ mile of the subject quarter section on May 13, 2025, earlier than typical notice requirements due to the potential of a Canada Post strike. • Three letters were received prior to the public hearing. A copy of these letters are included in **Appendix F** for information.

SUMMARY

PROPOSAL PART 1: AMENDMENT TO THE LAND USE BYLAW 60/2014

BYLAW XX/2025 Proposes updates to Land Use Bylaw 60/2014 to enable regulation of Anaerobic Digester Facilities. Key changes include:

- Adding definitions for Anaerobic Digester Facility, Biogas, Digestate, Feedstock, and Renewable Natural Gas.
- Clarifying procedures for Development Permit applications involving variances.
- Updating setback requirements to reflect current provincial legislation and approvals.

PROPOSAL PART 2: REQUEST FOR SITE SPECIFIC AMENDMENT

BYLAW XX/2025 Proposes a site specific amendment under the Agricultural District land use rules to allow an Anaerobic Digester Facility as a Permitted Use on the subject lands as well as to allow for the maximum height of 16m (52.49 ft.) for flare stacks on the subject lands under 12.1.7 6. C of the Agricultural Land Use District.

DECISIONS:

PROPOSAL PART 1 (REQUEST FOR LAND USE BYLAW AMENDMENT)

OPTIONS FOR COUNCIL'S CONSIDERATION:

OPTION #1: APPROVAL (First Reading to Bylaw XX/2025)

Should Council believe that the proposed Land Use Bylaw amendments have merit, and no significant planning considerations have been brought forward through the public hearing that cannot be resolved through the planning / approval process,

Council may choose to grant 1st reading to Bylaw XX/2025 approving amendments to the Land Use Bylaw 60/2014 included in the draft bylaw attached as **Appendix G**.

Note: Should Council choose to grant 1st reading to Bylaw XX/2025, they may wish to provide administration direction regarding any additional amendments that the feel should be included prior to 2nd and 3rd readings.

OPTION #2: POSTPONE DECISION.

Should Council decide that they require additional information or deem more discussion of the application at a municipal level is required prior to rendering a decision; Council may choose to postpone their decision on the approval of the proposed amendments to the Land Use Bylaw and provide further direction to administration and staff.

Note: *Council may wish to provide direction with respect to any amendments to the proposal that they deem necessary to address issues brought forward as part of the public hearing process and/or to address alignment with municipal plans or policies or existing provincial approvals, prior to the plan approval.*

If Council anticipates they will need to receive additional information prior to rendering a decision, they may need to adjourn rather than close the public hearing so that additional information may be received.

OPTION #3: REFUSAL.

Should Council believe that the proposed amendments to Land Use Bylaw 60/2014 do not have sufficient merit or that planning considerations have been brought forward through the public hearing process that Council feels cannot be addressed adequately through the planning / approval process, Council may choose to refuse the application.

PROPOSAL PART 2 REQUEST FOR SITE SPECIFIC AMENDMENT

OPTIONS FOR COUNCIL'S CONSIDERATION:

OPTION #1 – APPROVAL (First Reading to Bylaw XX/2025).
Should Council believe that the proposal for a site-specific amendment has merit, is consistent with the existing regional and municipal policy frameworks, not in conflict with existing Provincial approvals and no significant planning considerations have been brought forward through the public hearing that cannot be resolved through the planning / approval process:

Council may choose to grant 1st reading to Bylaw XX/2025 approving the application for a site specific amendment to allow an Anaerobic Digester Facility as a Permitted Use on the subject lands as well as to allow for the maximum height of 16m (52.49 ft.) for flare stacks on the subject lands under 12.1.7 6. C of the Agricultural Land Use District as included in the draft bylaw attached as **Appendix G**.

Note: Council may be supportive of the addition of the use "Anaerobic Digester Facility" as a Site Specific amendment to the Agricultural District but may not be supportive of it being a Permitted Use. In this case, Council would stipulate in the motion for approval that the use shall be added as a Discretionary Use rather than a Permitted Use.

Recommended Conditions for Option #1:

1. Submission of a completed Development Permit application including necessary fees.
2. Registration of a miscellaneous right of way plan at land titles to identity the area subject to the land use amendment.
3. 2nd and 3rd reading granted on bylaw XX/2025 for amendments to the Land Use Bylaw 60/2014
4. Execution of the Municipal Development Agreement for the payment of the Community Sustainability Fee which is to be paid at subdivision approval.

MOTION: In addition, Council acknowledges the existing berms as accessory to the use, as well as a component of the screening plan and necessary for the reclamation of the site.

OPTION #2: POSTPONE DECISION (Application for the Site Specific Amendment):

Should Council believe that they require additional information or deem more discussion of the application at a municipal or intermunicipal level is required prior to rendering a decision; Council may choose to postpone their decision on the application for a site specific amendment to allow an Anaerobic Digester Facility as a Permitted Use on the subject lands as well as to allow for the maximum height of 16m (52.49 ft.) for flare stacks on the subject lands under 12.1.7 6. C of the Agricultural Land Use District and provide further direction to administration and/or the applicant.

OPTION #3: REFUSAL on the application for the site specific amendment:
Should Council believe that the proposed application for site specific amendment to allow an Anaerobic Digester Facility as a Permitted Use on the subject lands as well as to allow for the maximum height of 16m (52.49 ft.) for flare stacks on the subject lands under 12.1.7 6. C of the Agricultural Land Use District does not have sufficient merit, is not consistent with the existing regional and municipal policy framework or that planning considerations have been brought forward through the public hearing process that Council feels cannot be addressed adequately through the planning / approval process, Council may choose to refuse the application.

APPENDICES

NOTE: A link has been emailed to Council members containing the following information:

- **Complete Application Package**
- **Environmental Appeal Board Summary Report and Recommendations.**

APPENDIX A: MAP SET:

1. Location Map
2. Area Land Use Map
3. Air Photo
4. Land Use Amendment Area
5. Facility Plot Plan
6. Waste Storage 300m Setback Area

APPENDIX B: APPLICATION PACKAGE

1. ISL Engineering and Land Services Application Memorandum
2. Exhibits G1 – G7
3. Traffic Impact Assessment

APPENDIX C: GUIDELINE FOR SETBACK REVIEWS (WASTE FACILITY) 2022

APPENDIX D: PROVINCIAL APPROVALS

1. Environmental Protection and Enhancement Act Approval 484778-00-00
2. Ministerial Order 12/2025
3. Water Act Licence No. DAUT0010346
4. Storage and Application of Digestate on Agricultural Land Directive April 30, 21023
5. National Resource Conservation Board Memorandum of Understanding – June 26, 2023
6. Historical Resources Act Approval No. 4515-21-0007-002

APPENDIX E: FOOTHILLS COUNTY PUBLIC WORKS REFERRAL RESPONSE

APPENDIX F: AREA LANDOWNER LETTERS

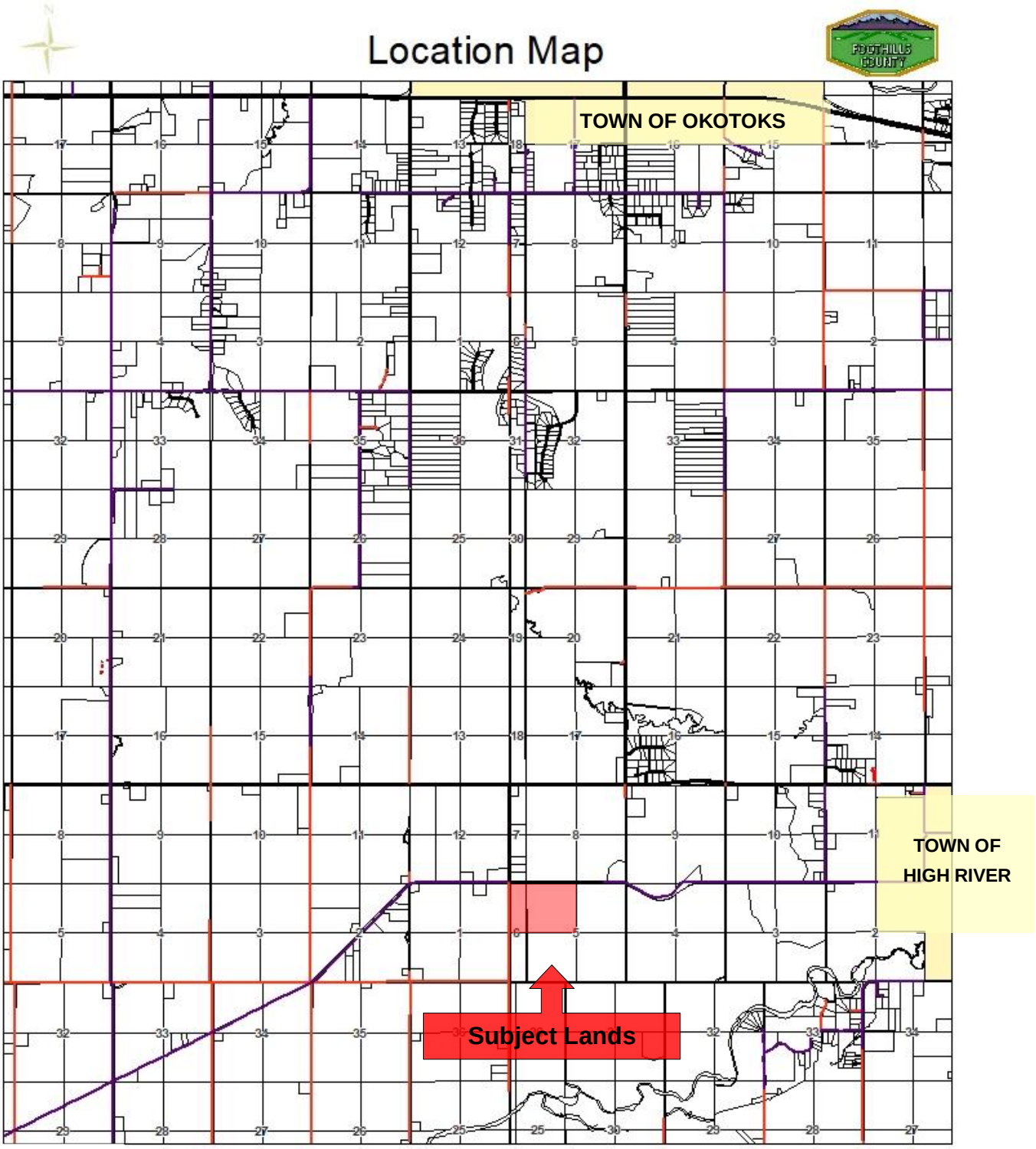
1. Letter from J. Venton
2. Letter from C. Derish
3. Letter from Dewright Holdings Ltd.

APPENDIX G: PROPOSED BYLAW

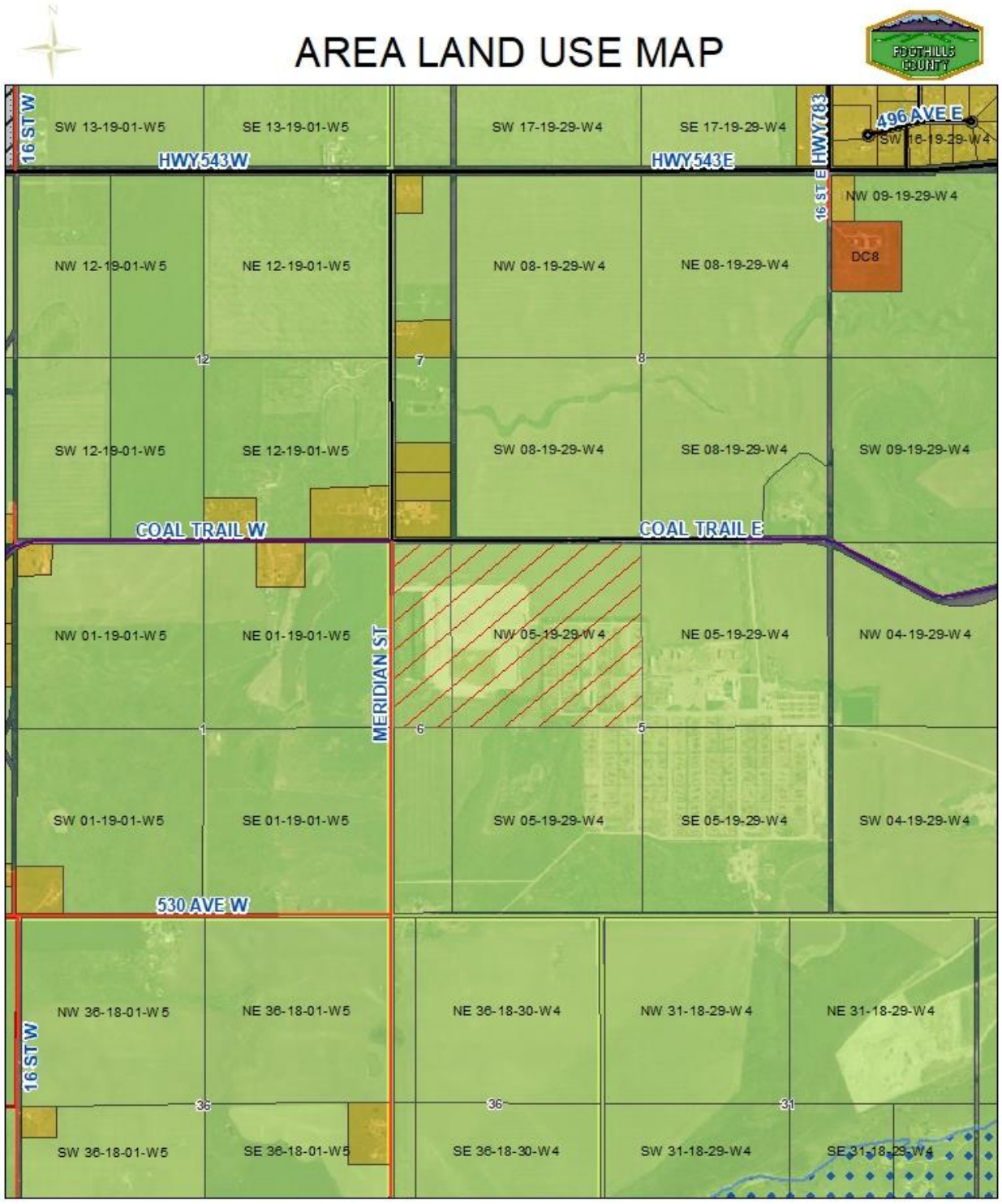
1. Draft Bylaw XX/2025 – Amendment to Land Use Bylaw 60/2014
2. Draft Bylaw XX/2025 – Proposed Site Specific Amendment

APPENDIX A: MAP SET

A1 - LOCATION MAP

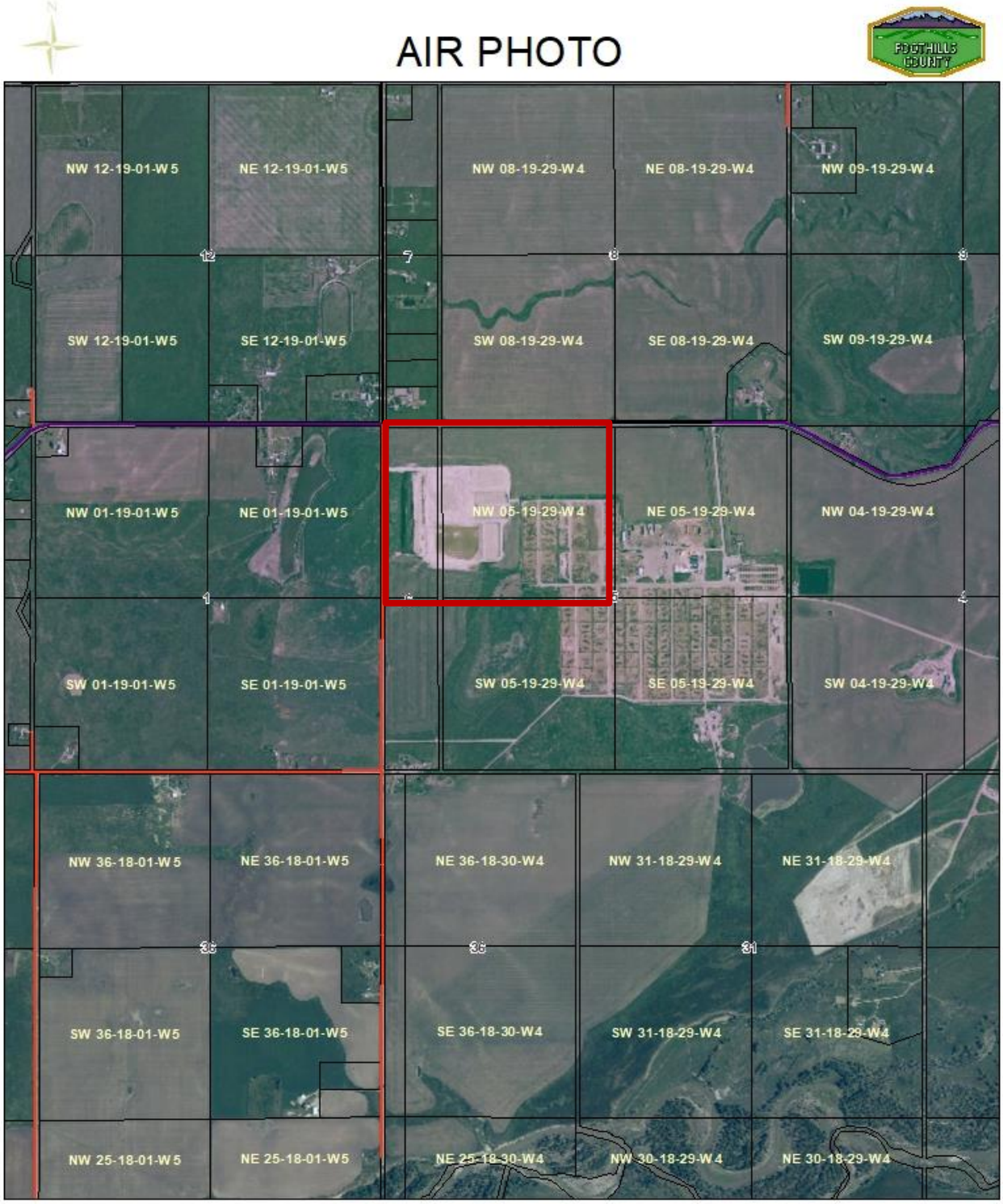


A2 - AREA LAND USE MAP



Area of Subject Lands

A3 - AREA AIR PHOTO

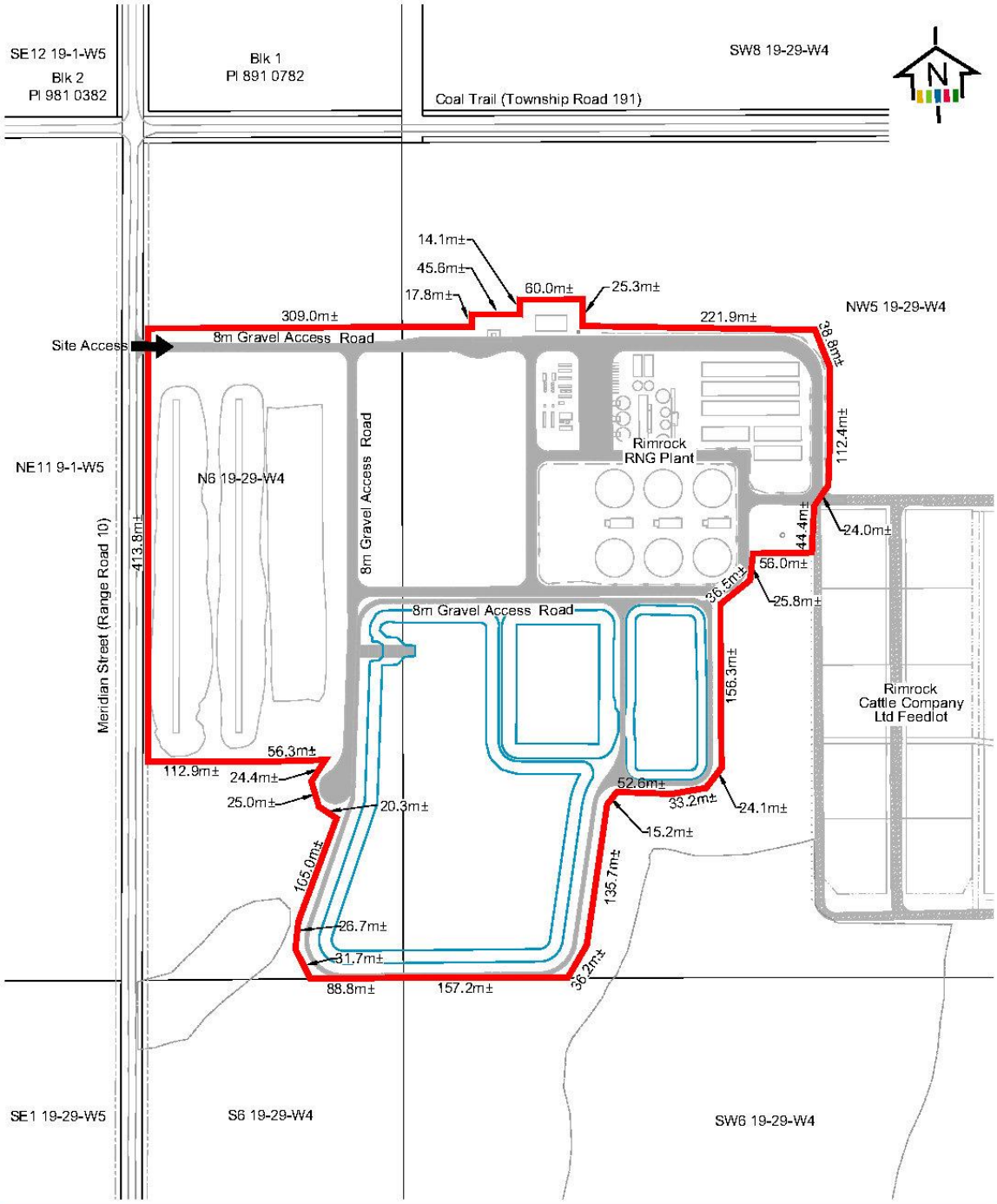


Legend
Parcels

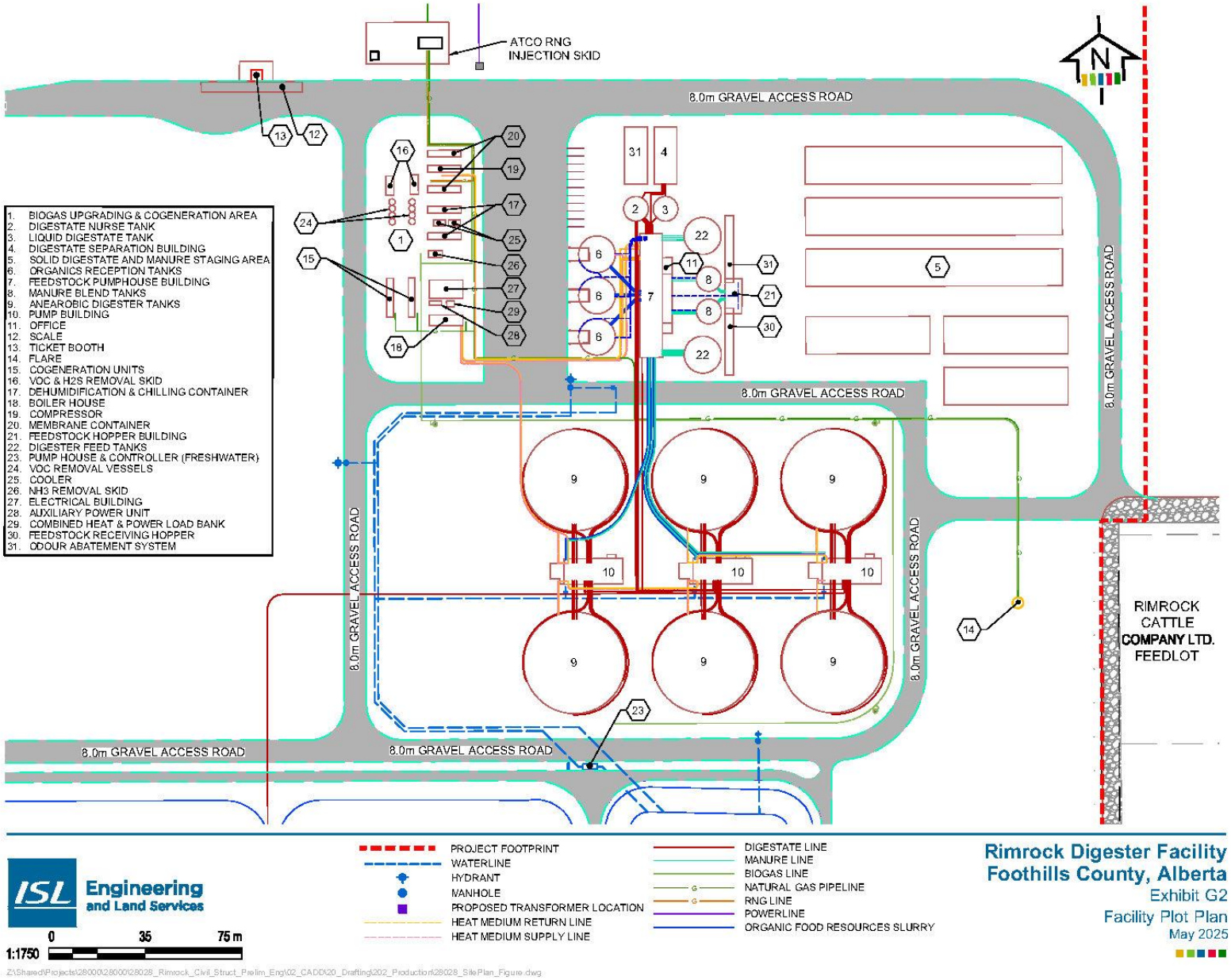
Document Path: C:\PRJ\PlanningData\MDF_Planning.mxd

Date Printed: 2025-02-12
1:24,000

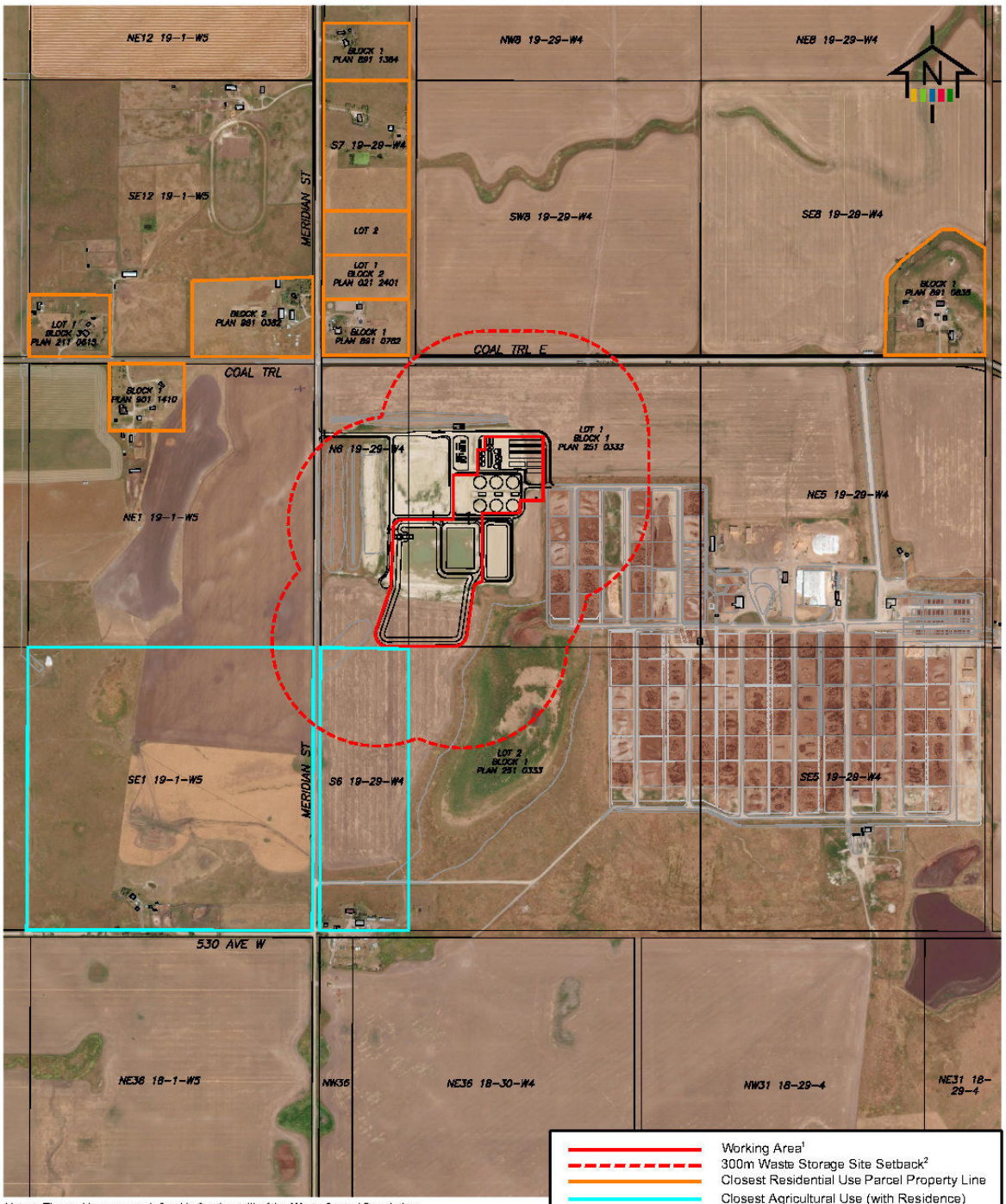
A4 - LAND USE AMENDMENT AREA



A5 - FACILITY PLOT PLAN



A6 - WASTE STORAGE SITE SETBACK AREA



Note 1: The working area as defined in Section 1(ii) of the *Waste Control Regulation*.
Note 2: Setback required under Land use bylaw 9.27.24 and Section 17(5)(d) of the *Matters Related to Subdivision and Development Regulation*.

ISL Engineering and Land Services

0 300 600 m
1:15000

Rimrock Digester Facility
Foothills County, Alberta
Exhibit G7
Rimrock 300m Offset Figure
May 2, 2025

Z:\Shared\Projects\28000\28000\28028_Rimrock_Civil_Struct_Prelim_Eng\02_CADD\20_Drafting\204_Figures\28028_Offset_Figure.dwg

Memorandum

4015 7 Street SE, Calgary AB T2G 2Y9, T: 403.254.0544 F: 403.254.9186

To:	**Foothills County**	Date:	**May 30, 2025**
Attention:	**Heather Hemingway, RPP, MCIP** **Director of Planning**		
Cc:	**Kendra Donnelly, Director,** **Rimrock Renewables Ltd.**		
Reference:	**Rimrock Renewables Anaerobic Digester Facility** **Land Use Bylaw Amendment and Development Permit Applications Package**		
From:	**Garnet Dawes P.Eng., Community Development Manager** **ISL Engineering and Land Services Ltd.**		

On behalf of Rimrock Renewables Ltd. (Rimrock Renewables), we are pleased to submit this Land Use Bylaw (LUB) Amendment and Development Permit (DP) Applications Package (the package) to Foothills County (the County) in support of the proposed Rimrock Digester Facility (the Facility).

The proposed site-specific LUB Amendment application seeks to add Anaerobic Digester Facility as a site-specific permitted use to the current agriculture use of the site which is zoned Agriculture (A) District, and other minor amendments. The DP application for the Facility, further described below, is also being provided as the County intends to run the two applications concurrently. Information provided in this package addresses both submission requirements.

The proposed Facility is located in the County, immediately adjacent to the Natural Resources Conservation Board (NRCB) regulated Rimrock Cattle Company feedlot (Feedlot), and approximately 5.5 kilometers (km) west of the Town of High River. See **Attachment G** (**Exhibit G1)** for a Facility location map. The Facility will produce 450,000 to 610,000 GJ/year of renewable natural gas (RNG) through the upgrading of biogas produced by the anaerobic digestion of feedstock comprised of: (a) livestock manure from the adjacent Feedlot (80,000 tonnes/year); and (b) organic food resources from regional sources (60,000 tonnes/year).

The RNG produced by the Facility will be transferred to an existing off-site ATCO pipeline. Digestate, a beneficial by-product of the anerobic digestion process will be separated into liquids and solids and used as either bedding material at the Feedlot or for application to lands under NRCB authorizations. Liquid and solid digestate is a less odorous, biologically stabilized, organic fertilizer alternative to raw manure which is currently being land spread in the region. Detailed information about the design and operation of the Facility is provided in this package.

The Facility will be regulated by several Provincial agencies and has undergone extensive regulatory review. The Facility has been approved under *Environmental Protection and Enhancement Act* Approval No. 484778-00-00 (the EPEA Approval). On May 15, 2025 Minister Rececca Shultz issued an *Order Respecting Environmental Appeals Board Appeal Nos. 23-119-121 and 124-125* (Ministerial Order), confirming the EPEA Approval, subject to several variations. These variations are in the form of seven (7) additional conditions and the replacement/update of two (2) previous conditions, which are intended to further strengthen AEPA's regulatory oversight of the Facility under EPEA. (see Section 5 of this package for additional details). The EPEA Approval issued by Alberta Environment and Protected Areas (AEPA) is the primary environmental approval governing the construction, operation and reclamation of the Facility. The EPEA Approval conditions mandate compliance with environmental requirements including but not limited to air emissions, pollution abatement, odours, groundwater protection, management of feedstocks and digestate, and reclamation.

The Facility is designed as a series of integrated processes that work together to ensure efficient facility operations while minimizing potential environmental impacts such as odorous emissions, noise and contamination. It has been carefully designed to meet and exceed Municipal, Provincial and Federal standards, with an emphasis on protecting the environment, minimizing impacts to the local community, and contributing positively to the County's agricultural and energy sectors. The EPEA Approval mandates compliance with regulatory requirements that include developing and implementing plans to manage potential odours and odour complaints, monitor and report on groundwater, prevent the attraction of pests and monitor and report on air emissions, and posting of financial security to ensure completion of reclamation.

This package addresses the specific requirements outlined in the *Anaerobic Digester Energy Production Land Use Bylaw Regulations & Applications* document dated April 7, 2025, from the County.

Supporting information included within this package includes but is not limited to:

- Land Use Bylaw Amendment and Development Permit Application Forms
- Landowner Authorization Letters
- Current Land Titles Certificates
- Provincial Regulatory Approvals
- Facility Operations Descriptions
- Site Plans, Facility Structure Descriptions, Engineering Reports and Technical Studies
- Mitigation Measures for Potential Impacts
- Lighting and Site Screening Information
- Public Safety and Emergency Response Information
- Decommissioning and Reclamation Plans
- Public consultation Information
- Rimrock Renewables Parties/Experts Supporting the landuse (Attachment O)

This package represents the culmination of extensive planning, regulatory engagement, engineering design, and communication efforts with the County aimed at developing a facility that will deliver meaningful environmental, operational, and economic benefits to the County and the surrounding region. Rimrock Renewables is committed to continuing open communication with County staff, Council, and the community throughout the review process and into the future operation of the Facility.

We appreciate your careful consideration of this package and welcome the opportunity to address any questions or requests for clarification that may arise during the review.

Regards,

Garnet Dawes, P.Eng.
ISL ENGINEERING AND LAND SERVICES LTD.
Applicant on behalf of Rimrock Renewables Ltd.

APPLICATION PACKAGE

The information and section numbering in this package aligns with the document provided to Rimrock Renewables by the County on April 7, 2025 entitled: *Foothills County Anaerobic Digester Energy Production Land Use Bylaw Regulations & Applications*" (the Application Requirements). See **Attachment A**.

To avoid duplication, where information requirements are provided in another section, this is indicated in the response rather than a repeat of the information. A list of acronyms and definitions used in this package is provided as Section 21 of this package.

1. Completed Application Forms. Authorization by the landowner must be provided for representation on behalf of the landowner

Application for Amendment to Land Use Bylaw

See **Attachment B** for:

- Completed Application for Amendment to Land Use Bylaw
- Letters of Authorization signed by the Landowner

Development Permit Application

See **Attachment B** for:

- Completed Application for Development Permit
- Letters of Authorization signed by the Landowner

2. Applicable fees prescribed in accordance with the County's fee schedule bylaws

Rimrock Renewables will pay all applicable fees in full as prescribed in accordance with the County's fee schedule for the two applications.

3. Abandoned Well Site Form

See **Attachment C** for the completed Abandoned Well Site form.

4. Current Land Title Certificates

See **Attachment D** for the Land Titles Certificates for the parcels in the two applications, and **Attachment D (Exhibit D1)** for the Map showing the location of the parcels, being:

- Title No. 251 051 002; Short Legal: 2510333;1;1
- Title No. 241 050 283 +11; Short Legal: 4;29;19;6;NW,NE

Rimrock Renewables is currently planning the future subdivision of the Facility site. A Plan of Survey showing the area required for development purposes has been submitted to the Alberta Land Titles for registration and is included in **Attachment D, Exhibit D4**. The boundary is approximately 76.7 acres and is situated within N6 19-29-W4 and NW5 19-29-W4 parcels. Further information regarding the Facility boundary and subdivision is provided in Section 7 of this package. This plan followed thorough consultations with Alberta Land Titles, during which time the requirements and documentation for the Facility were reviewed. While a subdivision application is not being made now, the submission of this plan with the package reflects Rimrock Renewables' commitment to transparency with stakeholders, long-term planning and supports a smoother regulatory and administrative process as Facility planning advances.

5. Relevant Provincial / Federal Approvals

The Facility will be regulated by several Provincial agencies and has undergone extensive regulatory review. There are no Federal approvals required for the Facility. Rimrock Renewables has obtained and/or will obtain, and is subject to, approvals from multiple regulatory agencies responsible for core aspects such as environmental protection, utilities regulation and agricultural operations. These approvals contain terms and conditions that mandate strict requirements to ensure the Facility meets operational, safety and environmental standards.

Key approvals for the Facility, including the EPEA Approval, along with relevant governing agencies, regulatory context, and status are described below in **Table 1.1**. Copies of relevant approvals are at **Attachment E**. The Facility will also be required to meet all applicable provincial and federal safety standards and codes and comply with all relevant Provincial and Federal legislation.

EPEA Approval

The EPEA Approval is the primary environmental approval governing the construction, operation and reclamation of the Facility. The EPEA application and approval process was extensive and involved detailed studies and review on behalf of Rimrock Renewables and AEPA. A summary of this process is provided below. Additional information on the EPEA Approval is provided below in **Table 1.1**.

Rimrock Renewables completed various environmental studies and field assessments in 2021 and 2022, including wildlife and wildlife habitat. This was in support of its AEPA application filed on June 10, 2022 (Original Application).

In July 2022, AEPA deemed the Original Application administratively complete and provided a Public Notice of Application to Rimrock Renewables with instructions to place it in the High River Times (both printed and online editions) and hand deliver it to residences within 2.0 km of the Facility's property line. This was completed in August 2022. Subsequently, AEPA notified Rimrock Renewables that the Director had accepted submissions from several Statement of Concern (SOC) filers. Rimrock consulted with, and responded to, all SOC filers via emails, phone calls and/or in person meetings, as reflected in detailed consultation records submitted to AEPA. See **Section 20** of this package).

In November 2022, as part of their technical review of the Original Application, AEPA sent Supplemental Information Request No. 1 (SIR #1) asking for additional information about the proposed Facility. Rimrock Renewables responded to SIR #1 in February 2023. In March 2023, AEPA sent Supplemental Information Request #2 (SIR #2) asking for additional information focused largely on odour mitigation for the Facility. Rimrock Renewables responded to SIR#2 in July 2023. The Original Application, SIR #1 response and SIR #2 response form the application for purposes of AEPA (AEPA Application).

It is important to note that feedback received from local landowners and residents of the County to both Rimrock Renewables and AEPA at the time influenced the assessment and selection of odour abatement technologies for the Facility. Their feedback was the primary driver for Rimrock Renewables to materially re-design and further optimize odour mitigation for the Facility in its SIR #2 response. These changes demonstrate Rimrock Renewables was receptive to stakeholder and public feedback and considered and incorporated such feedback into its design of the Facility.

In August 2023, AEPA provided a copy of a draft approval to Rimrock Renewables for review and comment. Rimrock Renewables provided comments in October and November 2023. AEPA required security in the amount of $3,153,353.50 to be posted prior to issuing any approval. That was done in December 2023. On December 11, 2023, the EPEA Approval was issued by the Designated Director for the construction, operation and reclamation of the *Foothills County waste management facility for the collection and processing of waste or recyclables to produce fuel, and the associated power plant*.

An Environmental Appeals Board (Board) hearing of appeals to the EPEA Approval concluded in March 2025. The Board issued their Report and Recommendations on April 29, 2025, which is available at this link: https://www.eab.gov.ab.ca/pub/Rimrock.pdf

On May 15, 2025 Minister Rececca Shultz issued an *Order Respecting Environmental Appeals Board Appeal Nos. 23-119-121 and 124-125* (Ministerial Order), confirming the EPEA Approval subject to several variations. These variations are in the form of seven (7) additional conditions and the replacement/update of two (2) previous conditions, which are intended to further strengthen AEPA's regulatory oversight of the Facility under EPEA. See Attachment E, file 2 for a copy of the Ministerial Order.

Table 1.1 Key Provincial Approvals

Approval / Permit	Responsible Agency	Context	Status
EPEA Approval No. 484778-00-00	AEPA	• This is the primary environmental approval governing the construction, operation and reclamation of the Facility. • Approval conditions mandate compliance with environmental requirements including but not limited to air emissions, pollution abatement, odours, groundwater protection, management of feedstocks and digestate, and financial security and reclamation.	• Approval No. 484778-00-00 was issued to Rimrock Renewables on December 11, 2023. See **Attachment E**, file 1. • On May 15, 2025 Minister Rececca Shultz issued an Order, confirming the EPEA Approval subject to several variations. See **Attachment E**, file 2 for a copy of the Ministerial Order.
Water Act Licence No. DAUT0010346	AEPA	• Rimrock Renewables obtained Licence No. DAUT0010346 (under Korova Feeders Ltd.) through an approved water licence transfer, under the Water Act. The transfer was reviewed by AEPA and was subject to 30-day Public Notice. The water license transfer was for an existing allocation from the Highwood River. • The licence contains limits and conditions, and a 10% holdback was applied by APEA so the net allocation is decreased from the previous license.	• Licence No. DAUT0010346 was issued to Korova Feeders Ltd. on September 26, 2022. See **Attachment E**, file 3. • The current licence accounts for approximately two-thirds of the Facility water requirements (see Section 11 of this package); Rimrock Renewables will apply for additional water licence transfer(s) to make-up the remaining water needs.
Micro-Generation Notice (AUC Rule 024: Rules Respecting Micro-Generation)	Alberta Utilities Commission (AUC)	• The two 1MW cogeneration units that will be used for Facility heat and power (see Section 8 of this package) meet technical requirements for micro-generation as stipulated under AUC Rule 024: Rules Respecting Micro-Generation. • In accordance with Rule 024, a Micro-Generation Notice was filed with the wire service provider (FortisAlberta Inc.) in February 2023, after required notifications and the 14-day public notification period required by AUC Rule 007 were completed.	• Coordination with FortisAlberta Inc. is in progress, will be completed pending final detailed Facility design.

Approval / Permit	Responsible Agency	Context	Status
Authorization for the Land Spreading of Digestate under the Agricultural Operation Practices Act (AOPA)	Natural Resources Conservation Board (NRCB)	• The NRCB regulates the storage and application of digestate on agricultural land under AOPA. Digestate produced by the Facility (see Section 8 of this package) can be treated as manure if it meets certain conditions. • To obtain an authorization for land spreading digestate the Facility is required to ensure that manure comprises at least 50% of the feedstock by wet weight annually; and the remaining feedstock consists of approved organic materials (see the following row and Section 8 of this package). • A Nutrient Management Plan (NWP) is required by the NRCB to demonstrate a land application strategy to meet nutrient requirements and provide protection to soil and groundwater. The Plan is updated periodically depending on land base and test results.	• Rimrock Renewables has been in consultation with the NRCB and will apply for authorization under AOPA for the land application of digestate resulting from the Facility prior to operational start-up.
Storage and Application of Digestate on Agricultural Land Directive	AEPA, NRCB and Alberta Agriculture and Irrigation (AGI)	• While not an approval specifically granted to the Facility, this Directive is specifically conditioned in the EPEA Approval. • The purpose of this Directive is to establish the parameters that allow digestate to be regulated as manure under the AOPA. • This Directive is specifically conditioned in the EPEA Approval and outlines the minimum manure content and the allowable feedstocks that can be used in combination with the manure. • Digestate produced in compliance with this directive can be stored in manure storage facilities regulated under AOPA and land applied as manure under AOPA and in accordance with any authorization conditions under the regulatory authority of the NRCB. • The Alberta Legislation has completed the second reading on April 17, 2025 of BILL 44 AGRICULTURAL OPERATION PRACTICES AMENDMENT ACT, 2025. It would amend AOPA to allow for, among other things, digestate to be treated the same as manure.	• This Directive is made in conjunction with the Memorandum of Understanding (MOU) among AGI, AEPA and the NRCB dated June 26, 2023, regarding the storage and application of digestate on agricultural land. • Current version of the Directive is April 20,2023. • See **Attachment E**, files 4a and 4b.
Historical Resources Act (HRA) Approval No: 4515-21-0007-002	Alberta Culture and the Status of Women (ACSW)	• The Approval requires that chance discovery of historical resources be reported to the contacts identified within Standard Requirements under the Historical Resources Act: Reporting the Discovery of Historic Resources.	• HRA Approval No: 4515-21-0007-002 was issued May 19, 2022. See **Attachment E**, file 5.

6. Information on the applicable utility operator proposed to receive the energy output

Rimrock Renewables and ATCO have entered into a producer services agreement whereby RNG produced from the Facility will be injected into ATCO's natural gas network for distribution and consumption in local markets. See **Attachment F**. ATCO's natural gas distribution system is regulated by the AUC, not the Alberta Energy Regulator (AER), as distribution networks operate at pressures below the AER threshold. The environmental attributes associated with the RNG are being purchased by FortisBC.

In accordance with AUC Rule 024, a Micro-Generation Notice was filed with the wire service provider, FortisAlberta. The Facility will consume all heat and power generated by the two onsite 1MW microgeneration cogeneration units. No excess power will be generated by the Facility for export to the grid. See **Section 5** of this package.

7. Accurate and Legible Site Plan

See **Attachment G** for the Facility Plot Plan showing existing and proposed structures and storage areas, and the site and plot plans include offsets, setbacks, project boundary, vegetation, and future subdivision access figures are referenced throughout this package:

- Exhibit G1 – Location Map
- Exhibit G2 – Facility Plot Plan
- Exhibit G3 – Site Offset Plan
- Exhibit G4 – Land Use Bylaw Amendment Area Plan
- Exhibit G5 – Future Subdivision Access Plan
- Exhibit G6 – Vegetation Plan
- Exhibit G7 – Rimrock 300m Offset Plan

The scope of the applications are described in the Plan of Survey and Land Use Bylaw Amendment Area Figure. See **Attachment G (Exhibit G4)** and **Section 4** of this package. The future subdivision parcel consolidation areas and confirmation of future access points to these parcels is demonstrated in the Future Subdivision Access Figure at **Attachment G (Exhibit G5).**

8. Statements to describe type of facility, daily operation, structure or system and the energy process involved

8 a. Description of the proposed development and how it operates:

The purpose of the Facility is to capture greenhouse gases, including odorous gases, from feedlot livestock manure and organic food resources and convert them into a usable RNG. Today, those greenhouse gases, along with the associated odorous emissions, are currently being released into the atmosphere.

The Facility will use the livestock manure from the adjacent NRCB-regulated Feedlot as the primary source of feedstock, along with organic food resources sourced from nearby communities. See below **Figure 1.1**. The feedstock will be mixed with water and sent to anaerobic digester tanks where micro-organisms will break down the organic material in the absence of oxygen, producing biogas.

The biogas will then be sent to an upgrader to be purified into RNG. The RNG will be injected into ATCO's natural gas distribution system. Digestate, a beneficial by-product of the anaerobic digestion process, will be separated into liquids and solids and used either as bedding material at the Feedlot or for application to lands as a less odorous, biologically stabilized, organic fertilizer alternative to raw manure, which is currently being land spread in the region.

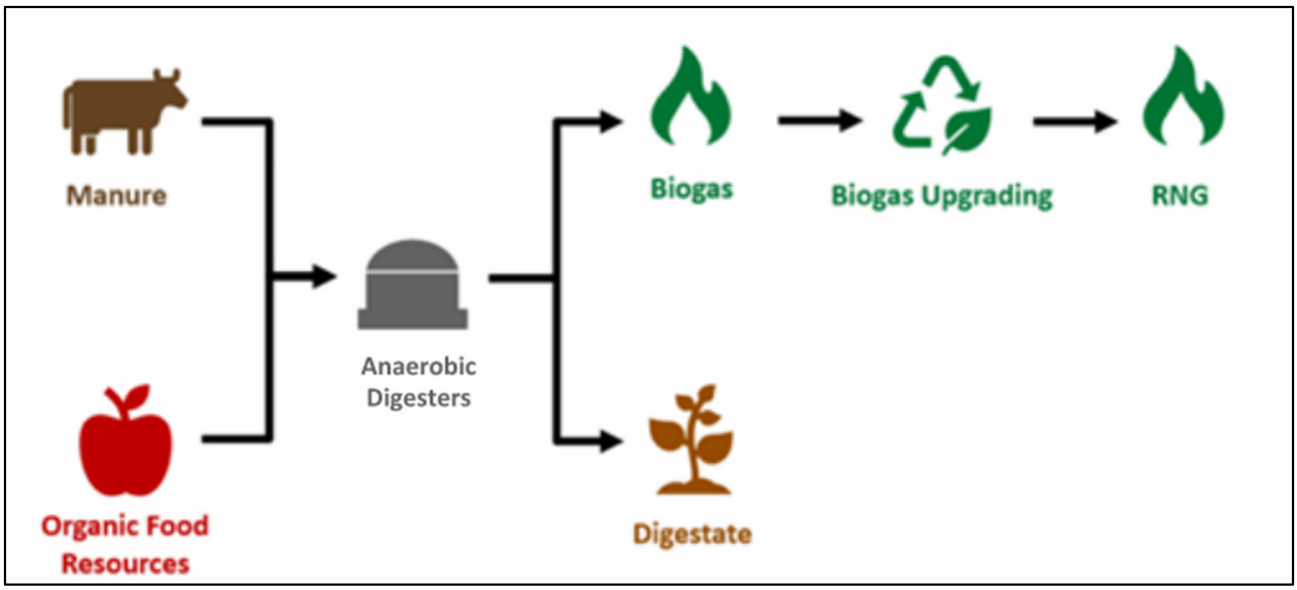


Figure 1.1 High-level Overview of Facility Process

A visual rendering of the Facility components (facing south) is provided below as Figure 1.2.

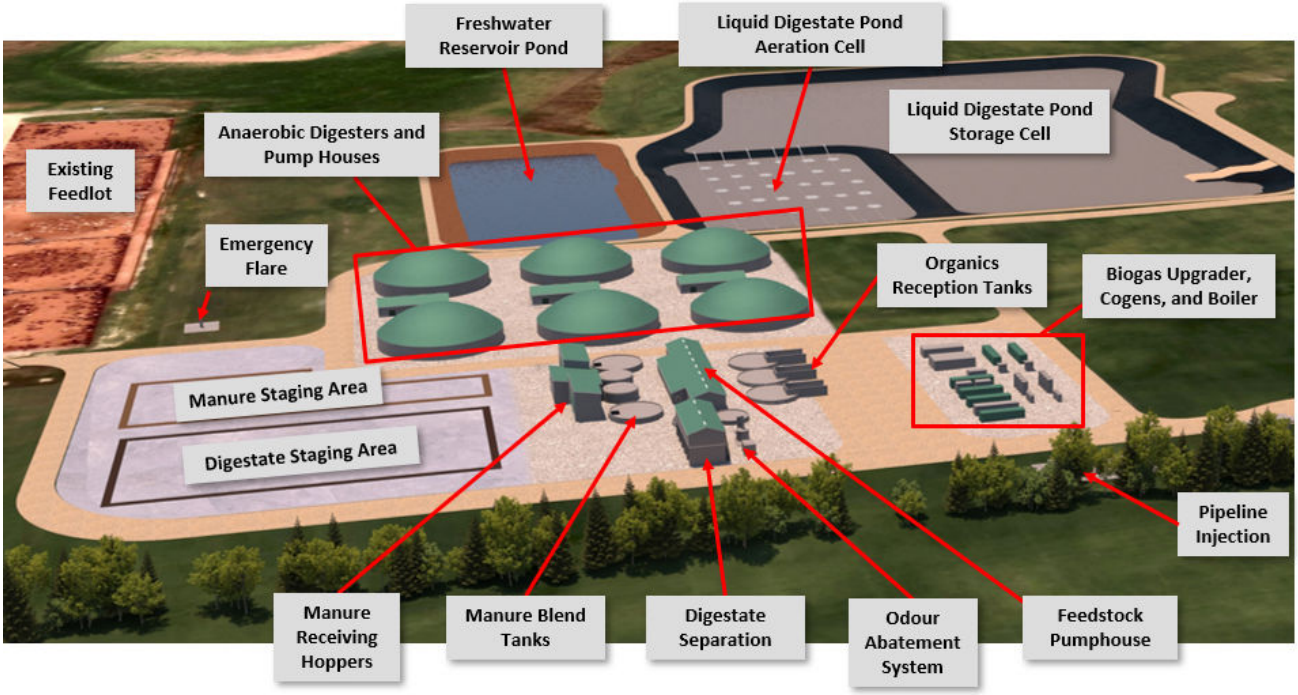


Figure 1.2 View of primary Facility components, looking south from north. Portion of the existing Feedlot shown immediately adjacent to the east.

A description of how the Facility will operate is provided in **Table 1.2**.

Table 1.2 Facility Operational Overview

Facility Component	Operational Description
Water (Freshwater Reservoir)	• Water for the Facility operations will be sourced from the Highwood River under approved water license transfers (see Section 11) and pumped from the river through an existing intake structure to the **freshwater pond** for storage and use in the **manure blend tanks**. • The freshwater pond has storage capacity for approximately 25-30 days of operation depending on the moisture content of the incoming feedstock.
Manure Feedstock Receiving and Blending	• Beef livestock manure feedstock, sourced from the adjacent **existing Feedlot**, will be transported to the Facility by truck on an internal gravel road. • Manure will be transferred from trucks into two enclosed 220 m^3 **manure receiving hoppers** and will be augured into fully enclosed **manure blend tanks** where it will be hydrated with water from the **freshwater reservoir**. • The hydrated manure with then be pumped to the six **anaerobic digester tanks**. • The combined storage of the blend and feed tanks as well as the manure receiving hoppers could provide up to 3 days of continuous operation when full. • Rimrock Renewables plans for manure trucks from the Feedlot to dump directly into the hoppers to avoid double handling. The **manure staging area** is intended to be used as contingency only and is limited in size by the EPEA Approval to 5,000 tonnes at any time.
Organic Food Resources Receiving	• Organic food resources will be pre-processed offsite (e.g., all packaging removed) and brought to the Facility in slurry form via enclosed trucks and pumped directly into fully enclosed **organic reception tanks**. The organics reception tanks provide 8-9 days of storage depending on the moisture content of the slurry. No organic resources will be stored outside of these fully enclosed tanks. • Only feedstock approved and described in the Storage and Application of Digestate on Agricultural Land Directive, Alberta Agriculture and Irrigation, 2023, as amended and listed in Rimrock Renewables' EPEA application will be received (see Section 5 of this package). It is important to note that Animal By-products in Table C of the Directive will not be accepted at the Facility since the thermal hydrolysis required to pre-treat these materials is not included in the Facility design. Further the Ministerial Order (see Section 5 of this package) requires the EPEA Approval to limit Rimrock Renewables to only process feedstock in Tables A and Table B of the Directive. • The organic slurry will be pumped from the enclosed tanks to the six **anaerobic digester tanks.**
Feedstock Pumphouse	• The **feedstock pumphouse** will house mechanical and electrical equipment such as pumps and heat exchangers as well as office space and control room. This building will also be fully enclosed, and odour abated.
Odour Abatement System	• All tanks involved in feedstock receiving and digestate separation (two manure blend tanks, two digester feed tanks, three organics reception tanks, one digestate nurse tank and one liquid digestate tank) will be enclosed, under negative pressure, and tied into an Odour Abatement System (OAS) via sealed ducting. • Air from the building around the **manure receiving hoppers, feedstock pumphouse** and **digestate separation building** will also be directed to the OAS. • The OAS will consist of 2-stages that will use wet chemical and dry scrubbers to remove hydrogen sulfide (H_2S), ammonia (NH_3), reduced sulphur compounds and volatile organic compounds (VOCs).

Facility Component	Operational Description
Anaerobic Digester Tanks & Pump Houses	• The manure slurry and organic slurry will be combined in the **six anaerobic digester** tanks where it will be converted to biogas and digestate through an anaerobic digestion process. • During anaerobic digestion, micro-organisms will break down the organic material within the diluted manure and organic food resources, in the absence of oxygen, producing biogas. • The anaerobic digester tanks are designed with dual membranes which provide a fully enclosed airtight system (see Figure 1.3). • To protect against the effects of extreme weather, an outer membrane will be installed over top of the inner membrane. This external outer membrane is a permanently inflated textile and will be continuously inflated using electrically operated blowers. The outer external membrane is a high-tensile strength, self cleaning, UV protected, fire-proofed, and corrosion resistant membrane. • The outer membrane, including the connection of the membrane to the concrete wall, is specifically designed to its location of use to withstand effects of wind and snow loads. • The digesters also are equipped with lightning rod protection to protect the digester and membrane gas holder from lightning strikes and will comply with NFPA 780 code. • The inner membrane is designed to capture and contain biogas. The inner membrane will rise and lower depending on the biogas production and will be monitored to prevent over pressure. • The pump houses are located between the digester tanks and will house mechanical equipment such as pumps, heat exchangers, and monitoring instruments. • The digester tanks will be monitored for flow rates, pressure, temperature, liquid level, pH, and alkalinity. Biogas composition within the digester tanks will also be monitored at the biogas upgrader using continuous gas analyzers to measure H_2S, NH_3, VOCs, and other compounds. • Each digester tank will be equipped with secondary containment, leak detection, and over pressure protection.
Digestate Separation	• Digestate is treated material resulting from the anaerobic digestion process, in which manure and organic food resources are broken down by bacteria in the absence of oxygen. • Digestate is a biologically stabilized material with a substantially less odour profile compared to raw manure due to the treatment process within the digester tanks. • Digestate will be pumped from the **anaerobic digester tanks** to the **digestate separation** building where it will be separated using screw presses into liquid and solid fractions. • The liquid digestate will then be pumped to the two celled **liquid digestate pond** via the liquid digestate tank**.** • Solid digestate will fall from the screw presses into the bays below where it will be loaded using a frontend loader and either delivered to the existing feedlot to be used as bedding, land spread under NRCB authorizations, or temporarily placed in the **solid digestate staging area**. • Although digestate separation is not currently required by current AEPA regulations, Rimrock Renewables has elected to include it as the primary odour mitigation for the liquid digestate pond. • The digestate separation building includes hood vents above the screw presses connected to the OAS to capture any potential odours from the separation process.
Liquid Digestate Pond	• The liquid digestate pond will have 2 cells, an **aeration cell** (cell 1) and a **storage cell** (cell 2). • Mechanical aeration in the **aeration cell** (cell 1) will provide secondary odour control by aerobic oxidation of any residual sulfur compounds remaining after digestate separation, thereby preventing the formation and release of H_2S from the liquid digestate pond. • The **storage cell** (cell 2) will be used for seasonal storage of the fully stabilized liquid digestate after aeration occurs. The liquid digestate in the storage cell will be pumped out twice a year and land applied under NRCB authorizations.

Facility Component	Operational Description
	• As a tertiary odour mitigation, the liquid digestate pond will be constructed to a shallow depth to prevent anaerobic activity from occurring within the pond. • The digestate pond has been sited such that the base elevation of both cells has been set above the groundwater table. The pond will be constructed with a High-Density Polyethylene (HDPE) liner to prevent seepage. To further protect groundwater and maintain the liner's functionality, a layer of sand is proposed beneath the liner. This sand layer will act as a buffer zone, allowing for the passage of air and moisture and serving to protect the liner from mechanical damage and will also facilitate the identification of any leaks and aid in the repair process, and will be linked to the groundwater monitoring system. Prior to placement of the HDPE liner and sand layer the subsurface of the pond will be compacted, providing an additional later of protection. The liner will be inspected annually.
Solid Digestate Staging Area	• After separation, a portion of the solid digestate will be transferred to the **solid digestate staging area** and from there transferred back to the Feedlot to be used for bedding in the cattle pens and/or land spread under authorizations from the NRCB. • The solid digestate staging area will be lined with roller-compacted concrete (RCC) and sloped towards the stormwater collection system such that any runoff is directed to the liquid digestate pond. • The volume of solid allowed to be staged onsite is limited by the EPEA Approval to 10,000 tonnes at any one time.
Biogas Upgrading and RNG Injection	• The biogas will be sent to a **biogas upgrader** using low pressure blowers where it will be conditioned to produce RNG. • The biogas upgrader utilizes similar odorous air capture technology as the OAS in order to purify biogas including wet chemical scrubber for ammonia (NH_3) and active carbon vessels for hydrogen sulphide (H_2S) and VOCs. These compounds will be captured and will not be released to the atmosphere as is currently happening today at the Feedlot and landfills where organic food resources are being disposed of. • Moderate gas compression is required to move biogas through the membrane separation system, where CO_2 is removed and methane is concentrated to produce RNG. • The compression also provides sufficient pressure for the RNG to be transferred via **pipeline injection** and meter station into ATCO's low-pressure natural gas distribution system.
Combined Heat and Power (Cogens)	• Natural gas will be used to power two microgeneration-sized cogeneration units (**cogens**) which will provide a portion of the heat and power required for operations. • During winter months supplemental heat and power will be required which will produced by the boiler and sourced from FortisAlberta, respectively.
Emergency Flare Stack	• An **Emergency Flare** stack will operate temporarily during initial commissioning of the Facility but thereafter only intermittently when required during unanticipated Facility upset conditions. • The flare stack will be designed to applicable codes and standards used within Alberta and will meet or exceed all code requirements. These standards contain design requirements to ensure the safety of the Facility and the surrounding area, including but not limited to various minimum allowable separation distances from buildings, structures, and the property lines; 30 m clearance around the flare of all debris and combustible material; minimum allowable flare height; maximum allowable radiant heat at ground level; and an installed wind guard. • In addition, the flare stack will be operated and maintained in accordance with the vendor's specification and the EPEA Approval requirements.

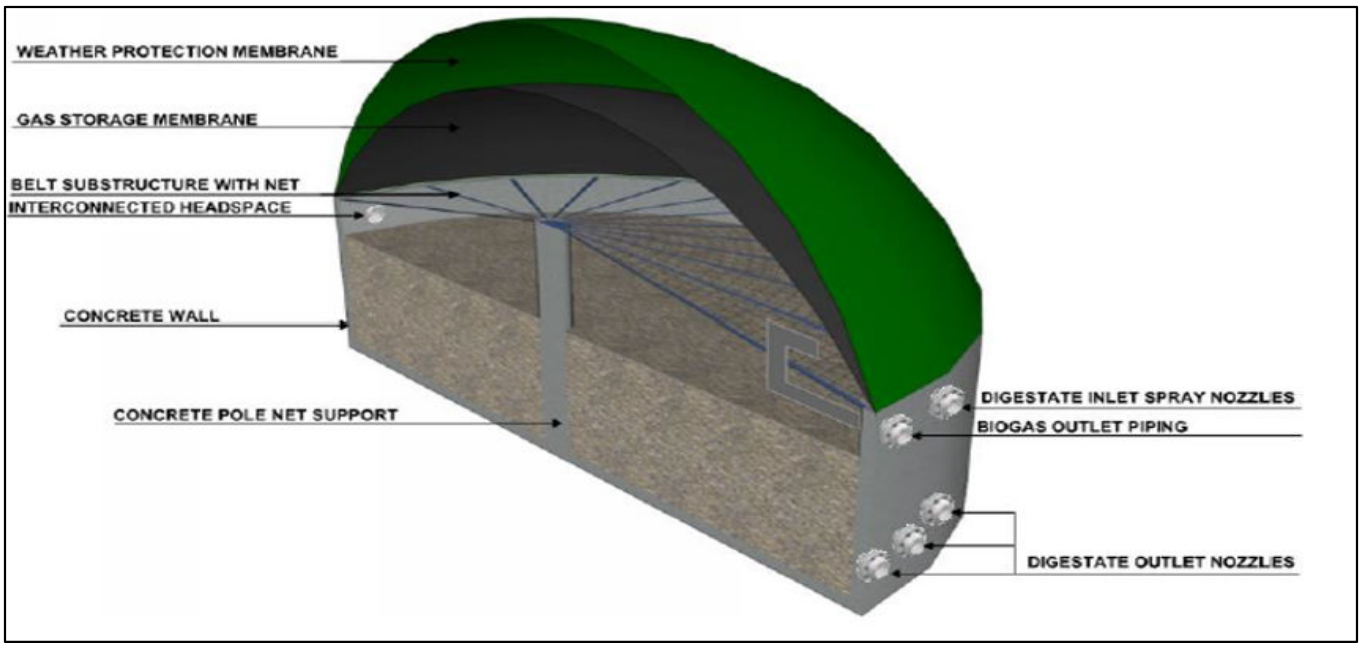


Figure 1.3 Anaerobic Digester Cross Section

8 b. Provisions for loading and parking:

Raw (un-hydrated) manure will be trucked in from the adjacent Feedlot via an existing internal gravel access road, with 15-20 truckloads per day 5-7 days per week. See below **Figure 1.4**. Manure will be delivered directly into recessed concrete manure receiving hoppers. The end-dump trucks will back up to the hoppers, at which point the overhead doors will open briefly to allow unloading. The overhead doors will remain closed at all other times, with the manure receiving hopper building maintained under negative pressure and fully odour abated.

Organic food resources will be delivered by enclosed trailers via the main Facility entrance at Meridian Road and pumped directly into enclosed organic food resource tanks through piping/hoses, 7 truckloads per day, 7 days per week. The organics will be processed offsite prior to being delivered as a slurry. The organics reception tanks and air from the building around the manure receiving hoppers will be directed to the Odour Abatement System (OAS). See above **Table 1.2**.

It is not anticipated that organics delivery vehicles or manure dump trucks will park onsite beyond the time it takes to unload feedstock. Parking for Facility staff and visitors will be provided via a small parking lot (approx. 10 stalls) north of the organics reception tanks. See below **Figure 1.4**.

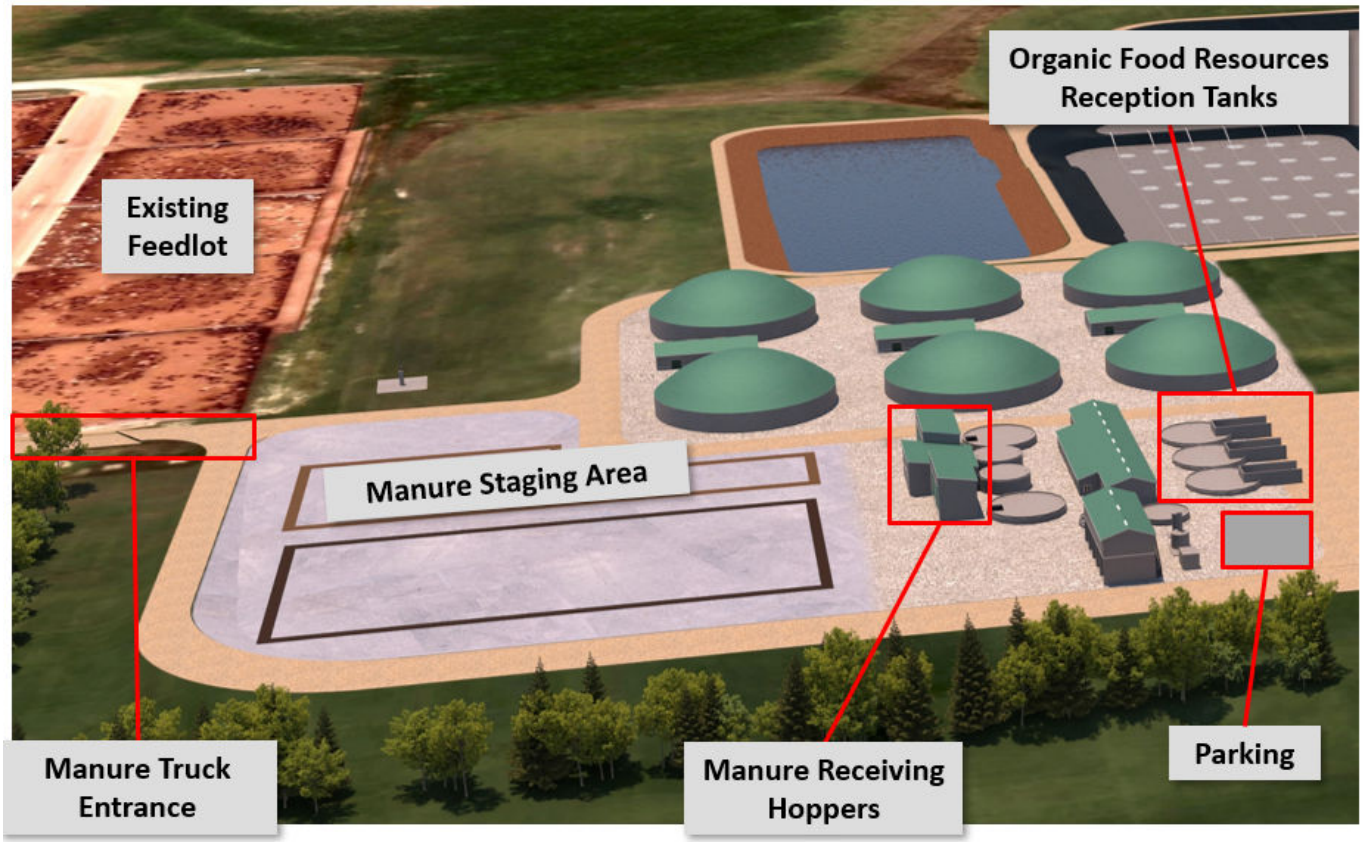


Figure 1.4 View of feedstock receiving components, looking south from north. Portion of the existing Feedlot and internal graveled access road for manure feedstock delivery shown immediately adjacent to the east. Organic deliveries will be via the main Facility entrance from Meridian Road (offscreen to the west).

8 c. Hours and days of operation:

Given anaerobic digestion is a biological process, the Facility will technically operate and be monitored remotely 24 hours a day. However, activities such as manure and organics feedstock delivery and digestate application will only occur during daytime operating hours 5-7 days per week. The Facility lighting design will comply with the County's Dark Sky Bylaw 2011-6 for use of light at night. See **Section 16** of this package.

8 d. Number of people to be employed on site:

It is anticipated that 5 operational staff will be employed onsite.

8 e. Buildings/structures or facilities used as part of the operation, including settling ponds, storage areas, and details of the purpose of the building/structure or facility for same:

Table 1.3 summarizes the primary buildings, structures, ponds and storage areas required for the Facility. Details of the purpose of these components is also provided in the preceding table and text. Refer also to the Facility Plot Plan provided in **Attachment G** (**Exhibit G2**).

Table 1.3 Primary Buildings, Structures, Ponds and Storage Areas

Plot Plan ID #	Building, Structure Pond, or Storage Area	Height Above Grade (m)	Details
See Exhibit G2	Freshwater Reservoir	n/a	• Holds freshwater to be used in the mixing process for organic food resources and manure (in enclosed tanks).
7	Manure Receiving Hoppers (2)	8.5	• Manure receiving hoppers to receive raw manure from the Feedlot, see also Table 1.1.
21	Manure Feedstock Hopper Building	6.9	• Building that contains the two manure receiving hoppers. Connected to the Odour Abatement System.
8	Manure Blend Tanks (2)	2.4	• Tanks where raw manure is combined with freshwater and blended to the proper hydration. Connected to the Odour Abatement System.
22	Manure Feed Tanks (2)	2.4	• Feed tanks accept manure slurry from manure blend tanks for feeding into the anaerobic digesters. Connected to the Odour Abatement System.
5	Manure and Solid Digestate Staging Area	n/a	• This area is described in further detail in Table 1.1.
6	Organics Reception Tanks (3)	0.0	• Fully enclosed tanks for receiving of organic food resources from enclosed trailers. Connected to the Odour Abatement System.
7, 11	Feedstock Pumphouse Building	6.4	• The feedstock pumphouse will house mechanical and electrical equipment such as pumps and heat exchangers as well as the office space and control room. This building will also be fully enclosed and connected to the Odour Abatement System.
9	Anaerobic Digester Tanks (6)	8.5[1]	• Each anaerobic digester tank will be fully enclosed and connected to the biogas upgrading system. Each tank has an active storage capacity of just under 7,700 m^3 and will be equipped with secondary containment as well as leak detection.
10	Pump Buildings (3)	7.4	• The pump houses are located between the six digester tanks and will house mechanical equipment such as pumps, heat exchangers, and monitoring instruments. The pumps and exchangers provide the circulation and heat necessary to maintain a temperature of approximately 38°C, creating optimal conditions for anaerobic digestion.
2	Digestate Nurse Tank	2.4	• Holding tanks for the digestate removed from the anaerobic digestor tanks. Connected to the Odour Abatement System.
3	Liquid Digestate Tank	2.4	• Holding tank for the liquid digestate after separation using screw presses. Connected to the Odour Abatement System.
4	Digestate Separation Building	9.9	• This building houses the screw presses that will separate liquid and solid digestate. Hood vents above screw presses connected to the Odour Abatement System.
32	Odour Abatement System	4.57	• The Odour Abatement System will capture building air and tank headspace from all structures located in the feedstock receiving and digestate separation area.
See Exhibit G2	Liquid Digestate Pond (2 cells)	n/a	• Pond used to treat liquid digestate via aeriation and to store both liquid digestate and stormwater prior to land spreading on lands annual in the spring and fall.

Plot Plan ID #	Building, Structure Pond, or Storage Area	Height Above Grade (m)	Details
			• The volume of the pond is 180,000 m^3 (at high water mark). The area of the pond will be approximately 8 ha (the top of berm high water level of both cells). It is important to note the liquid digestate pond will be emptied twice annually (spring and fall) and will only be at the high-water mark 2 months out of any given year. • Refer to Table 1.1 for additional details on the pond design and secondary containment.
28	Electrical Building	3.05	• Houses electrical components need to run the equipment.
18	Boiler House	3.7	• Houses the heat medium boiler unit.
17, 19, 20	Biogas Upgrading Modules (5) (membrane, compressor, dehumidification, chilling)	3.7	• Modules house components of the biogas treatment and upgrading system.
26	NH_3 removal skid (wet chemical scrubber)	3.5 (approx.)	• Separates and captures ammonia (NH_3) from biogas.
15	Cogeneration Units (2)	3.7	• Two 1MW microgeneration sized cogeneration units to produce heat and power for the Facility.
16, 24	VOC and hydrogen sulphide (H_2S) Removal Vessels	5.3 (approx.)	• This equipment is part of the biogas upgrading system and is used to remove hydrogen sulphide (H_2S) and volatile organic compounds (VOCs) from the biogas.
14	Emergency Flare Stack	12	• Used to depressurize the Facility in the event of an upset condition or during commissioning.

Notes:
n/a = not applicable
[1]Approximate height above grade to the top of the dome / membrane.

8 f. Details on the type and amount of waste products brought to the site to be utilized at the facility

The type and amount of product (feedstock) brought to the site and processed at the Facility by anaerobic digestion to produce RNG are described below in **Table 1.4**. The EPEA Approval restricts Rimrock Renewables from receiving any other third-party waste at the Facility. See **Attachment E**.

Table 1.4 Feedstocks to be Brought Onsite and Used at the Facility

Product (Feedstock)	Volume (tonnes/yr)	Details
Livestock manure	80,000	• Manure will be sourced from the adjacent Feedlot.
Oranic food resources	60,000	• Organic food resources will consist entirely of one or more of the feedstocks listed in the Types of Feedstock tables in the Storage and Application of Digestate on Agricultural Land Directive, Alberta Agriculture and Irrigation, 2023, as amended and listed in Rimrock Renewables' EPEA application will be received (see Section 5, Table 1.1 of this package. It is important to note that Animal By-products in Table C of the Directive will not be accepted at the Facility since the thermal hydrolysis required to pre-treat these materials is not included in the Facility design. Further the Ministerial Order (see Section 5 of this package) requires the EPEA Approval to limit Rimrock Renewables to only process feedstock in Tables A and Table B of the Directive.

The EPEA Approval also requires Rimrock Renewables to compile and submit to AEPA an annual feedstock summary including feedstock provider, location, description and quantities.

8 g. Description of storage areas for products/materials on site and any proposed fencing and screening proposed for same

Open air onsite staging and temporary storage areas for products/materials will be limited to the following:

- Freshwater pond which will be used for storage of freshwater for Facility processes;
- Manure staging area which will be used as required for contingency staging of manure feedstock;
- Solid digestate staging area which will be used for the temporary storage of solid digestate prior to transfer office as cattle bedding at the Feedlot and/or for land application under NRCB authorizations;
- Solid digestate staging bays which will be located on the bottom of the Digestate Separation Building. The bays will be used to capture the solid portion of the digestate after it has been separated, so that it can be transported to the solid digestate staging area. The bays will be orientated eastward and closed in on west, north, and south sides, the east side of the bays must remain open for access to front-end loaders that will relocate the solid digestate to the solid digestate staging area.
- Liquid digestate pond which will be used for temporary storage of liquid digestate. The pond will be emptied twice annually for land application under NRCB authorizations.

These are described in further detail in **Section 8 a** (**Table 1.2**) and **Section 8 e** (**Table 1.3**) of this package. A description of screening proposed for the Facility is at **Section 10** of this package.

8 h. Amount of product produced and method of distribution of end product(s) such as spreading of waste residual, distribution of biogas, transportation of materials off site, etc.

The amount of products produced by the Facility and method of distribution of end products, such as spreading of waste residual, distribution of biogas, transportation of materials off site, etc. as requested by the County, are described below in **Table 1.5**.

Table 1.5 Products Produced and Methods of Distribution

Product Produced	Amount	Distribution
RNG	450,000 to 610,000 GJ/year	• RNG will be injected into the existing ATCO natural gas network for distribution and consumption in local markets
Solid Digestate	45,000 tonnes/year	• The solid digestate will be transferred back to the Feedlot to be used as bedding in the cattle pens and/or land spread in the spring and fall under NRCB authorizations (see Section 5). Solid digestate spreading will use the same technique and equipment as is currently being used to spread raw manure.
Liquid Digestate	300,000 m^3/year	• The Facility will produce approximately 400,000 m^3 of liquid digestate. However, a 25% reuse of liquid digestate, has been conservatively estimated which will reduce the amount of freshwater required for hydration and result in 300,000 m^3 of liquid digestate too be land applied annually in the spring and fall under NRCB authorizations (see Section 5). • Rimrock Renewables will endeavor to re-use as much liquid digestate in the process as possible while maintaining stable biochemistry within the anaerobic digesters. • Land application will use a drag line technique as is common in the dairy or hog industries. Drag lining will involve pumping of liquid digestate from the pond through lay flat hosing to individual quarter sections and injected into unfrozen soil.

Rimrock Renewables has access to sufficient land parcels to support solid and liquid digestate application for the Facility. This includes quarter sections currently owned by the Rimrock Cattle Company, as well as a wide network of neighboring land parcels. Land application of digestate will be conducted annually in the spring and fall under NRCB authorizations. Rimrock Renewables will prepare a NMP for digestate land spreading as required by NRCB authorizations. The primary purpose of such plan is to ensure proper handling of digestate at rates that do not exceed crop requirements and to ensure no impacts to surface water and groundwater. The plan also contains testing and reporting requirements.

Rimrock Renewables also notes that digestate is a benign by-product of the anaerobic digestion process. It must be produced in accordance with the Digestate MOU and the Directive in order for it to be permitted to be land spread. See **Section 8 a** of this package. Digestate contains water (liquid digestate) and dissolved nutrients (solid and liquid digestate), not hazardous chemicals or contaminants, and does not present an immediate risk to the health of wildlife or livestock.

9. Engineering Feasibility Studies

Please note that several of the supporting attachments for this section contain some drawings prepared by ISL Engineering and Land Services Ltd. that reflect an older iteration of the Facility design layout, such as the Traffic Impact Assessment. However, updates to the Facility design since the creation of this package does not affect the relevant studies or conclusions contained within.

a. Water supply:

The Facility will not require connection to any municipal water infrastructure. Process water for the Facility will be obtained via Water License transfer. See Sections 5 and 11 of this package for additional details.

b. Stormwater management:

The Stormwater Management Report is provided at **Attachment H**. This Stormwater Management Report outlines how the runoff from the Facility will be fully contained and directed to the liquid digestate pond through the stormwater conveyance system. The report concludes that all stormwater from the site is contained by the liquid digestate pond and that there are no offsite runoff impacts.

c. Site grading:

Rough grading of the Facility site was completed in 2022. Final grading will be completed as part of Facility construction. The grading of the site has been carefully planned to utilize the cut from the liquid digestate pond to raise the broader site elevation. This strategic elevation is essential as it will allow for the conveyance of all onsite stormwater towards the liquid digestate pond, thus ensuring efficient management of site runoff and minimizing potential offsite impacts. Some of the temporary stockpiles that are currently onsite will be utilized to complete final grading and backfilling. Specifically, the subsoil and clay stockpiles will either be removed or modified during this activity. The topsoil and a portion of the subsoil piles will remain onsite in their current location per Provincial requirements and will form part of the landscaping / screening further described in **Section 10 b** of this package.

An Issued for construction (IFC) civil plan for the liquid digestate pond and freshwater reservoir, as well as the as-built contours for rough grading completed in 2023, are provided as **Attachment I**. Exhibits Include:

- Exhibit I1 – 2023 Grading As-built Plans
- Exhibit I2 – Liquid Digestate Pond and Freshwater Reservoir IFC Civil Plans

d. Material storage, treatment methods, and disposal

A summary of material storage, treatment methods and disposal for the Facility is provided in the Facility overview presented in **Section 8 a** of this package. Rimrock Renewables has completed extensive engineering and design

studies for the Facility, including but not limited to those provided to AEPA in support of the EPEA Application. The EPEA Approval contains detailed conditions regarding the construction and operation of the Facility, including that Rimrock Renewables construct the Facility as per the design described in the EPEA Application.

Regarding “disposal” of materials, digestate, a beneficial by-product of the anerobic digestion process, will be separated into liquids and solids and used as either bedding material at the Feedlot or for application to lands under NRCB authorizations. Digestate is a less odorous, biologically stabilized, organic fertilizer alternative to raw manure, which is currently being land spread in the region. As noted in Section 8 h of this package Rimrock Renewables has access to the full hectarage of land parcels required to support solid and liquid digestate application for the Facility. Land application of digestate will be conducted annually in the spring and fall under authorizations from the NRCB. Rimrock Renewables will prepare NMPs as required for any NRCB authorizations for digestate land spreading; these must be approved by the NRCB.

Any “waste” generated by Facility operations (e.g., general construction debris, operational waste such as filters) will be identified, characterized, classified and disposed of per relevant requirements (e.g., *Alberta User Guide for Waste Managers*).

10. Description of any proposed lot grading, landscaping, and fencing to be completed

a. Site grading

Site grading information is provided in Section 9 c of this package. An IFC civil plan and rough grading as-builts drawing showing site grading is provided as **Attachment I**.

b. Landscaping, screening and fencing

Screening will minimize the visual impact of the Facility on neighboring residences and road traffic. The Facility will be surrounded by the topsoil and subsoil berms on the north and west sides and will be kept on site for future reclamation. See **Figures 1.5 – 1.8** below. They were strategically placed at these locations to improve aesthetics, blend into the natural environment, and reduce visibility from neighboring residents. The berms will be seeded with vegetation and have trees planted along the top which will create a “shelterbelt” when the trees are mature. See **Figures 1.5 – 1.8** below.

A Landscape / Vegetation Plan is provided in **Attachment G (Exhibit G6)**. The berms and plantings will also provide barriers to minimize noise, dust, and odours. As per County Screening Standards, they have been positioned to screen the stockpile areas (manure and solid digestate staging areas), exterior work areas (process areas) and loading areas (organic food resources and manure loading). The overall landscaping plan for the Facility includes extensive grass coverage around the site, for aesthetic purposes (integrate into existing surroundings) and to supplement erosion and sediment control. Within the Facility itself, tanks will be partially underground, buildings will be cladded with colors that blend into the natural environment. Fencing of the Facility site is not proposed.

Figure 1.5 View looking north, from south of the proposed Facility. Portion of Rimrock Cattle Company Ltd. Feedlot shown immediately adjacent to the east. Screening can be seen along the north and west sides.

Figure 1.6 View looking south from Coal Trail, from north of the Facility. Range Road 10/Meridian Street running adjacent west of the facility, portion of existing feedlot on the east. Screening can be seen along the north and west sides.

Figure 1.7 View looking northeast from the liquid digestate pond. Screening can be seen along the north and west sides.

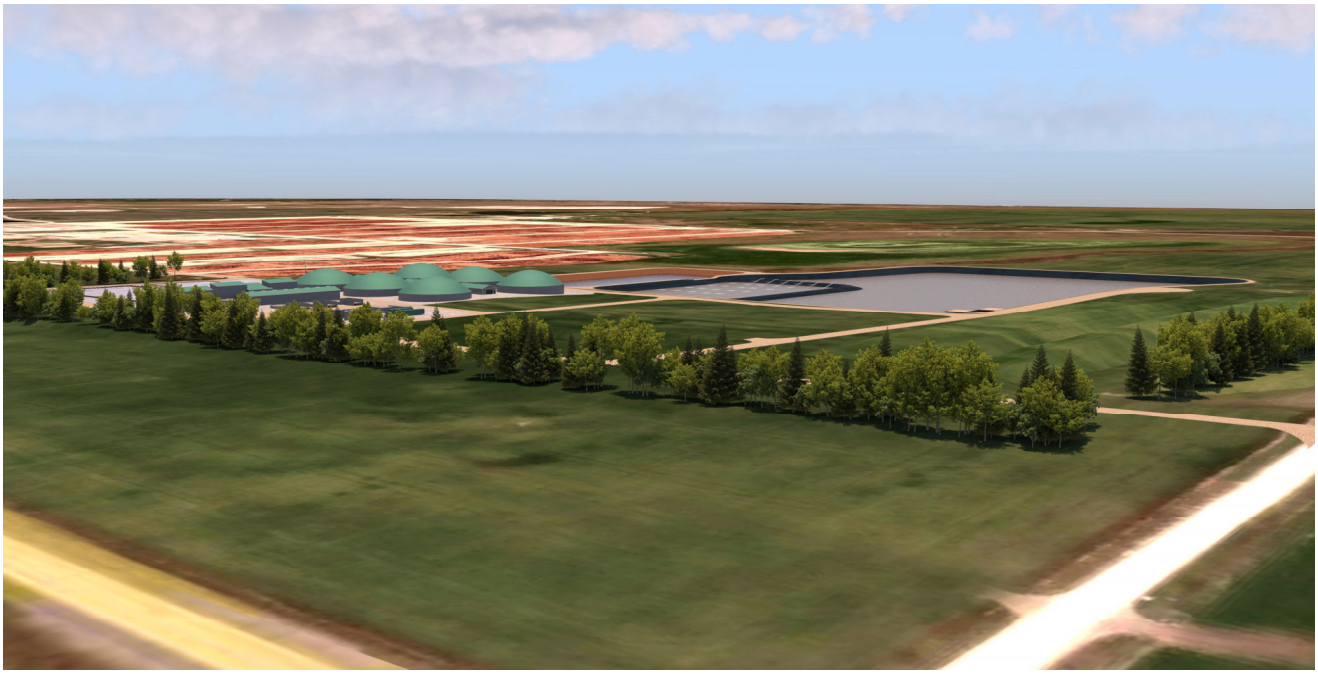


Figure 1.8 View looking southeast from the intersection of Coal Trail and Range Road 10/Meridian Street. Treed screening can be seen along the north and west sides.

11. Information on the amount of water required for this development and the proposed water source, and information on existing or proposed water licenses to be utilized.

No connections to existing County potable or grey water systems will be required for the Facility. Domestic water will be brought in by truck for use in onsite washrooms and kitchen.

The primary source of process water for the Facility will be the Highwood River under approved Water License transfers. Water will be pumped from the Highwood River through an existing water intake structure and pipe connections to the freshwater pond. A new river water intake is not required for the Facility.

Rimrock Renewables (under Korova) currently holds a Water Licence which approves the licensee to operate a works and to divert up to 160,971 m^3 of water per year from the source of water at the point of diversion at a maximum rate of 0.027 m^3 per second for the purposes of Industrial and Agricultural. See **Attachment E.** This Water License accounts for approximately two-thirds of the Facility water requirements based on 25% liquid digestate reuse. Rimrock Renewables will apply for additional water license transfer(s) to make-up the remaining water needs.

A 25% reuse of liquid digestate has been conservatively estimated which will reduce the amount of freshwater required for the Facility. See **Section 8 h** and **Table 1.5** of this package. Rimrock Renewables will endeavor to reuse as much liquid digestate in the process as possible while maintaining stable biochemistry within the anaerobic digesters. Opportunities to increase the amount of liquid digestate reuse will continue to be explored during detailed design and once operational, in order to reduce the overall water requirements of the Facility.

12. Access locations to and from the parcel(s) and identification of any impacts to local road systems.

The existing site access that has been constructed and approved by the County, and will be used, is noted on the Facility Plot Plan at **Attachment G (Exhibit G5)**. Future subdivision access for the remainder parcels after subdivision has been confirmed at **Attachment G (Exhibit G5)**.

Rimrock completed a Traffic Impact Assessment (TIA) to the County. See **Attachment J**. The TIA was scoped in conjunction with the County, and the County approved it in 2022. The key findings of the TIA include:

- The Facility will have minimal impact on the surrounding transportation network.
- No intersection upgrades are required immediately.
- The only future upgrade identified is the westbound left turn lane at Highway 543 / Range Road 10, and it is needed by 2042.

As part of the County's acceptance of the TIA, Rimrock Renewables committed to widening and paving Meridian Road to County Standards between Coal Trail and the Facility site access. This work is proposed to be completed following the construction of the Facility. See **Section 14** regarding transportation-related dust mitigation.

13. Traffic projections

The TIA has been accepted by the County as seen in **Attachment J** and **Section 12** of this package. Traffic generated by the Facility is anticipated to be modest and primarily comprised of employee vehicle and truck-mounted tank truck traffic. Based on operational assumptions provided by Rimrock Renewables, the following peak hour trip volumes were projected:

- AM Peak Hour (7:00-9:00 AM):
  - 5 inbound personal vehicle trips (employees)
  - 7 truck-mounted tank trucks making both inbound and outbound trips (14 trips total)
  - Total AM Peak Trips: 19
- PM Peak Hour (4:00-6:00 PM):

- 5 outbound personal vehicle trips (employees)
- 7 truck-mounted tank trucks making both inbound and outbound trips (14 trips total)
- Total PM Peak Trips: 19

Employee traffic is distributed predominantly from the east (90%), while all truck-mounted tank truck traffic is expected to access the site via Highway 543 to/from the east. Although truck traffic is initially based on facility startup operations, Rimrock Renewables expects a future reduction in volume, particularly for solid digestate hauling, as the Facility matures.

These projections were integrated into both 2022 and 2042 background traffic conditions and formed the basis for intersection capacity analysis and warrant assessments. Further, although the TIA is based on a previous iteration of the site layout, the above trip generation numbers remain accurate as between the initial and redesigned Facility.

14. Anticipated nuisances and proposed methods of controlling or mitigating

Potential nuisances from the Facility and proposed control and mitigation measures are described below.

Noise

Noise that may be generated from the Facility will be mitigated through design and engineering controls to reduce noise emissions from operating equipment such as pumps, fans, motors, and cogeneration units. The Facility has been designed to mitigate noise and will comply with the County Community Standards Bylaw No 45/2013 and AUC Rule 012: Noise Control.

A preliminary Noise Impact Assessment (NIA) was prepared for the Facility in 2022, based on the Facility design in the Original EPEA Application. The results demonstrated compliance with AUC Rule 012: Noise Control. AUC Rule 012 is a receiver-based regulation that limits the amount of off-site noise that can be generated by energy-related facilities. AUC Rule 012 also prescribes the level of acceptable noise experienced at a receptor by defining criteria for determination of a Permissible Sound Level (PSL) at the nearest or most impacted residences. As part of ongoing detailed design, Rimrock Renewables will update the NIA as per AUC Rule 012: Noise Control.

Inspections and maintenance will be completed during operations to ensure that any noise abatement equipment is in working order. Further, the delivery of manure feedstock will be via an existing private internal graveled access between the Feedlot and the Facility and will only occur during daytime operating hours. Organic food resources deliveries via truck will also be limited to daytime operating hours. The berms surrounding the north and west side will provide a noise buffer. The Facility will also implement a no-idling policy, where practical, for vehicles onsite.

Dust

Minimal nuisance dust is anticipated during Facility operations. Manure feedstock will be delivered by trucks via an existing private internal graveled access between the adjacent Feedlot and the Facility. In the event that use of this road specifically for the Facility has the potential to produce a nuisance level of dust to nearby residents, dust control options will be implemented as needed. The use of existing paved County roads for the delivery of organic food resources feedstock is not anticipated to create nuisance dust levels. Rimrock Renewables has also committed to paving Meridian Road from Coal Trail to the Facility site access.

The manure and digestate staging areas will be routinely inspected and are anticipated to have low dust content. After the digestate is separated most of the finer digestate particulate matter that could turn to dust will remain in the liquid digestate and go to the pond. See **Section 8** of this package. Any manure staged onsite will be limited in volume and be of the same constituency as the manure being stored in Feedlot pens approx. 250 m away. In the unlikely event blowing particulate dust from the staging area is observed at the Facility, then operational staff will take

measures to control dust by spraying small amounts of water. Further, Rimrock will avoid disturbing the solid digestate windrows during windy conditions.

The berms and trees surrounding the Facility (see **Attachment G, Exhibit G6** Vegetation Plan) will also reduce wind inside the facility and provide a barrier to dust moving outside the Facility. Additionally, the EPEA Approval includes conditions intended to address dust concerns. See **Attachment E**, sections 4.1.11-4.1.12.

Odour

As noted earlier, the purpose of the Facility is to capture greenhouse gases, including odorous gases, from feedlot livestock manure and organic food resources and convert them into a usable renewable energy resource called RNG. Today, those greenhouse gases, along with the associated odorous emissions, are currently being released into the atmosphere. Thus, the Facility will act as a large odour abatement system designed to capture emissions from manure at the adjacent Feedlot and convert these emissions through a closed system to RNG.

An Air Quality Assessment (AQA) completed by Rimrock Renewables in support of the Provincial EPEA approval process predicted the Facility will meet Provincial air quality requirements and that there will be a ***net reduction*** in regional air emissions and odours as a result of the operation of the Facility. See **Attachment L**. This reduction is due to greenhouse gases from manure at the adjacent Feedlot being captured and converted to RNG, the addition of odour abatement technology to the Facility design, and a significant reduction in the handling and amounts of raw manure that will be stored at the Feedlot.

Potential odours sources from the operation of the Facility itself will be mitigated through three primary odour abatement systems which are incorporated into the Facility design:

1. Digestate separation using screw presses that will separate the solid and liquid digestate fractions, thereby mitigating odours in both the solid and liquid digestate.

2. An Odour Abatement System (OAS), consisting of two stages that will use wet chemical and dry scrubbers to remove hydrogen sulphide (H_2S), ammonia (NH_3), reduced sulphur compounds and volatile organic compounds (VOCs). All tanks involved in feedstock receiving and digestate separation (two manure blend tanks, two digester feed tanks, three organics reception tanks, one digestate nurse tank and one liquid digestate tank) will be enclosed, under negative pressure, and tied into the OAS via sealed ducting. Air from the building around the manure receiving hoppers, the feedstock pumphouse and the digestate separation building will also be directed to the OAS. Further, in accordance with the Ministerial Order (see Section 5 of this package), the OAS will have one standby carbon filter and sampling facilities to monitor the carbon media absorption capacity.

3. Mechanical aeration in Cell 1 of the liquid digestate pond to remove H_2S from the liquid digestate through oxidation and stripping.

The EPEA Approval includes specific regulatory requirements regarding the operation and monitoring of these odour abatement systems for the Facility. See **Attachment E**, sections 3.2.5 and 4.1.

Additionally, the EPEA Approval requires Rimrock Renewables to implement, before commencing operations, and annually update, a Best Odour Management Practices Control Plan and an Odour Complaint Management and Response Program. See **Attachment E**, sections 4.1.24 and 4.1.27, respectively.

The Best Odour Management Practices Control Plan, includes but is not limited to the following:

- Procedures for the proper operation and maintenance of all air pollution abatement equipment and the associated monitoring devices to meet the design intent.
- Procedures for minimizing odour release into the atmosphere during the period of time when the Facility is starting up, shutting down or under any maintenance.
- Procedures for minimizing fugitive odour emissions, particularly intermittent sources involving agitation of material, vehicles waiting to unload or load, air displacement from loading the storage tanks, any maintenance that requires opening storage tanks, digesters and building doors.
- Corrective actions to be taken when operating parameters deviate from the established operating ranges.
- Measures to prevent anaerobic condition in the solid digestate storage pile and the liquid digestate pond.
- Management-related inspection, preventive maintenance, and recordkeeping requirements for the Facility.

The Odour Complaint Management and Response Program, includes but is not limited to the following:

- Upon receiving an odour complaint, or being informed of an odour complaint by the Director or another authority, Rimrock Renewables is required to:
  - investigate the situation; and
  - take all measures necessary to mitigate the odour, when the approval holder knows or ought to know the source of the odour being complained of results from the Facility (including but not limited the requirement to improve, repair or replace any equipment or thing in order to control or eliminate the odour; and contain, remove or treat the substance or thing causing the odour.
- Recordkeeping and retention requirements.

Rimrock Renewables is also required by the EPEA Approval to submit to AEPA a proposal for a Fugitive Emissions Monitoring Program. Per the Ministerial Order (see Section 5 of this package), the proposal for a Fugitive Emissions Monitoring Program is due a minimum of one [1] month prior to acceptance of feedstock at the Facility. The purpose of the Fugitive Emissions Monitoring Program is to develop and implement a monitoring program for the "area sources" of potential odours (i.e., liquid digestate pond and manure and solid digestate storage areas) as well the digestate separation building staging bays. See **Attachment I (Exhibit I1)** sections 4.1.33 - 4.1.39. This will allow Rimrock Renewable an opportunity to take empirical measurements to validate the assumptions (mass emission rates for instance) and results of the ambient air modeling completed as part of the Air Quality Assessment (AQA) prepared for the Facility. See **Attachment L**. This Fugitive Emissions Monitoring Program and reporting will provide an assurance mechanism to ensure that there are no fugitive releases from these sources that could contribute or cause odours offsite.

The Ministerial Order further requires Rimrock Renewables to construct a meteorological station for the Facility and provide the results of the monitoring data to a specified distribution and as per frequencies stipulated in the EPEA Approval.

The 300-meter setback under Section 17(5)(d) of the current *Matters Related to Subdivision and Development Regulation* (Matters Regulation) is shown on the Site Offset Plan, **Attachment G, Exhibit G7.** It is important to note that the type of Facility in this application does not have a direct analogy in the Matters Regulation and that the primary purpose of the setbacks is to reduce the likelihood that a new waste facility will impact neighbors by increasing nuisances like odours and emissions. As noted in the AQA (see above), the Facility will *reduce* the net emissions in the region.

While Rimrock Renewables submits that the setback should not apply given that the Facility will result in a net reduction of existing emissions and odour (the primary nuisances of concern for nearby residents), the necessary

information for a variance request pursuant to the Province's *Guideline for Setback Reviews [Waste Facility]* has been submitted with this application and includes:

1. Non-objection letters from two owners whose property line containing a residence is within the 300 m setback. See **Attachment K**. Note that although their property lines are within the setback, both residential sites are >800 m from the Facility working area.
    a. SE 1-19-1 West of 5 owned by Justin Flowers
    b. SW 6-19-29 West of 4, NW 5-19-29 West of 4 and NW 5-19-29 West of 4 owned by Rimrock Cattle Company

    (Note: Also provided in **Attachment K** is a non-objection letter for NE 1-19-1 West of 5 owned by Kirton (Clayton Cameron) and Rimrock Renewables is actively working to obtain a non-objection for SW 8-19-29 West of 4. These parcels however currently do not contain a residence.)

2. A copy of the AQA which notes the predicted net reduction in regional emissions and odours for the project (**Attachment L**). The AQA includes an odour assessment and wind direction and air emission/odour plume diagram.

3. Several studies indicating that in the event of an emergency, H_2S emissions will not be a risk to nearby residents. There is no risk for explosive gas impacts outside the Facility boundary and no need for evacuation, shelter-in-place or any other response from residents in the event of an emergency as all risks are contained within the Facility boundary (**Appendix M**). See also **Section 18** of this package.

As described above in this package, Rimrock Renewables will also comply with all Provincial regulations, and has developed design mitigations and management plans for odours, pests, dust, and noise. Furthermore, the robust regulatory requirements outlined in the EPEA Approval, which will be regulated and enforced by AEPA, address emissions, odours, pests, and groundwater monitoring, thereby significantly minimizing or eliminating the potential for nuisance to nearby residents.

Lot Drainage

The civil grading and stormwater design have been developed to ensure that all drainage and runoff from the Facility is fully contained and directed the liquid digestate pond through the stormwater conveyance system. See **Section 9** of this package and **Attachment H**. The Facility footprint has also been designed so that it will not affect offsite drainage.

Groundwater

The EPEA Approval conditions require Rimrock to develop and implement a Groundwater Monitoring Plan to be implemented once the Facility is commissioned. A proposed Groundwater Monitoring Plan has been submitted to AEPA for review. It is noted the current groundwater flow in the area is from the northwest to southeast (away from residences and towards the Feedlot), which significantly reduces the likelihood of impacts to nearby residents as they are north and west of the Facility site. It is further noted there are no previously identified sources of groundwater or soil contamination at the Facility site.

Vegetation Management

The Facility site is currently agricultural land. Vegetation assessments completed in 2021, prior to rough grading of the site, confirmed vegetation within the Facility footprint was comprised of remnant cereal (wheat) stubble. No Prohibited Noxious weeds listed under the Provincial *Weed Control Act* were identified during the vegetation assessment; however, Canada thistle (*Cirsium arvense*), a Noxious weed, was observed sporadically within the Facility footprint and with patchy distribution within the ditch of the nearby roads (Meridian Road, Coal Trail East).

The operating portions of the Facility site will be developed with a compacted and graveled surface. The presence of weeds and vegetation will be included in routine Facility inspections and vegetation and weeds will be managed within the Facility fence line as required. A Landscape / Vegetation Plan is also provided in **Attachment G (Exhibit G6).**

Vectors and Pests

Rimrock Renewables will implement measures to prevent the attraction of vectors (e.g. birds, insects and vermin) during the operation of the Facility, including a combination of facility design, operational procedures, housekeeping and, if required, pest control measures.

Facility design measures will include but may not be limited to:

- Organic food resources will be fully de-packaged offsite and transferred directly from trucks into enclosed organic food resource tanks through piping/hoses. There will be no open storage of organic food resources.
- Manure feedstock will be transferred into the manure receiving hoppers located in an enclosed building structure with overhead doors.
- All tanks involved in feedstock processing and digestate separation are fully enclosed.
- Manure and solid digestate staging areas will be entirely underlain with a Rolled Compacted Concrete (RCC) pad, with runoff fully contained and directed to Cell 1 of the liquid digestate pond through the stormwater conveyance system. This will prevent water buildup, prevent leaching, and allow for maintenance of the staging areas, including efficient material removal and loading.
- The liquid digestate pond is designed with submerged mechanical aeration in Cell 1. Aeration will increase the level of dissolved oxygen (mosquito larvae and other aquatic insects require stagnant, oxygen-deprived water to thrive), create water movement within the pond making it less suitable for insect egg-laying and larvae development, help regulate water temperature by mixing layers of water with different temperatures (insect larvae have specific temperature requirements for optimal growth), and promote breakdown of organic matter reducing the availability of nutrients that potentially support larvae development.
- The digestate pond is designed to fill from April to September and to only reach maximum depth 2 months of the year, meaning a reduction in surface area which will serve to reduce the attraction of birds or insects.
- Proper site drainage will be maintained to eliminate additional breeding grounds for insects.

Operational procedures will include but may not be limited to upfront and ongoing training and awareness of operational staff, setup and maintenance of a housekeeping inspection schedule, regular maintenance and inspection program to ensure the optimal Facility operation, implement proper waste management planning at the Facility. Pest control measures will be implemented, as required. The need for pest control measures will be determined on a case-by-case basis.

Rimrock Renewables is also required by the EPEA Approval (Approval Section 4.4.8) to implement, before commencing operations of the Facility, and annually update, a Program for Keeping Out Vectors as described in Rimrock Renewables' EPEA application. Procedures outlined in the Best Odour Management Practices Control Plan required under the EPEA Approval will also serve to prevent or reduce attraction of vectors to the Facility, through the proper containment and management of feedstock delivery and processing, as well as digestate staging and storage.

Lighting

The Facility lighting design will meet or exceed all the requirements specified by the Dark Sky Bylaw and the County Land Use Bylaw. See Section 16 of this package.

15. Descriptions of any noxious, toxic, radioactive, flammable, or explosive materials proposed; how it is being stored, storage location(s), and how much is being stored.

The Facility will have only small volumes of any hazardous materials onsite at any given time during operations. Rimrock Renewables will adhere to all regulations with respect to the management and storage of these materials and provisions for appropriate response procedures and equipment will be made in the Emergency Response Plan (see **Section 18** of this package). A description of these materials that will be used onsite is provided in **Table 1.6**.

Table 1.6 Materials Used Onsite

Materials	Description
Materials Used in Process	
Radioactive materials	None proposed
Ferric Chloride	Will be stored onsite and used as an additive to the manure slurry to control hydrogen sulphide (H_2S) levels within the digesters, if needed. It will likely be purchased in 1 m^3 plastic totes and approximately 6 totes could be stored onsite in an enclosed storage area prior to being moved into a day tank for injection into the manure slurry process. This material is corrosive.
Sulphuric acid	Will be used as part of the odour abatement system, specifically in the wet chemical scrubber to react with ammonia (NH_3) to create ammonium sulfate as a byproduct which is non-hazardous. It is expected that sulphuric acid will be purchased in 1m^3 totes and stored on-site in a fully enclosed 1.3 m^3 day tank equipped with secondary containment. It is corrosive and a strong oxidizer which can react with other compounds to create poisonous gases.
Byproducts[1]	
Hydrogen Sulphide (H_2S)	Hydrogen sulphide (H_2S) is a byproduct of the anaerobic digestion process as part of biogas production. Netting will be installed in anaerobic digester tanks to facilitate the growth of naturally occurring bacteria that consume hydrogen sulphide (H_2S). Ferric chloride will also be added to control any unexpected hydrogen sulphide (H_2S) spikes. Operational concentrations are expected not to be less than 200 ppm. See section 18 for more discussion of hydrogen sulphide (H_2S) modelling and public safety.
Ammonia (NH_3)	NH_3 is a byproduct of the anaerobic digestion process. It will be produced in anaerobic digester tanks as part of the biogas production. It is produced under low pressure conditions and removed from the biogas as part of the odor abatement system and biogas upgrading. Operational concentrations are expected to be less than 300 ppm.

Notes:
[1]H_2S and NH_3 are currently produced by the untreated manure and organics. The Facility will result in a net reduction of these substances.

Additionally, low-pressure biogas and upgraded RNG will be produced and upgraded onsite prior to injection to the grid. Both are considered flammable and potentially explosive but will be fully contained within enclosed, engineered systems designed in accordance with all applicable Canadian codes and standards for gas safety. Buildings will contain low-explosivity-limit (LEL) alarms which monitor gas in the building and will trigger an alarm that will be remotely monitored 24/7 and automatically trigger a station shutdown if required.

Hydrogen sulphide (H_2S) and ammonia (NH_3) will be present in the raw biogas stream produced by the Facility. The system will be designed as a fully enclosed gas tight system in accordance to Canadian industrial standards including but not limited to *CSA B149.6 - Code for Digester Gas, Landfill Gas, And Biogas Generation and Utilization.* Buildings will be equipped with hydrogen sulphide (H_2S) detection which trigger alarms that will be remotely monitored 24/7 and will automatically trigger a full station shutdown if required.

Comprehensive safety studies have been completed for the Facility. See **Section 18** of this package.

16. Details on outdoor lighting proposed for the site

The Facility lighting design will meet or exceed all the requirements specified by the Dark Sky Bylaw and the County Land Use Bylaw. All outdoor light fixtures are expected to be mounted on free-standing light poles with a maximum height of 9.0 m (29.5 ft) above building grade. (Land Use Bylaw 9.15.2) These will meet or exceed all the following requirements:

- Full Cut Off fixtures will be installed on all exterior lighting fixtures and be oriented to direct light below the horizon. (Dark Sky Bylaw 4.1)
- All illumination shall be extinguished when not required. (Dark Sky Bylaw 4.3)
- No illumination from a light source will be orientated such that the light emits beyond the property line. (Dark Sky Bylaw 8.7)
- Installed luminaire won't produce glare. (Dark Sky Bylaw 8.8)
- The only lamp type that will be used for external lighting at the Facility will be a Light Emitting Diode (LED).

17. Advertisements or business identification signage

Rimrock Renewables will use a sign at the Facility that meets the sizing and setbacks in the Land Use Bylaw: 4.2.1.42 Signs indicating the name of the Facility provided that they do not exceed 2.32m. (25 sq. ft.) in area, and that they are located on lands within that same Development, not within any Municipal or Provincial Road right of way, or as a means of advertisement on other lands.

Additionally, the sign will conform with General Sign Regulations and Prohibitions in the 'Private and Commercial Signs in the M.D. of Foothills Land Use Bylaws Regulations and Applications" guidance document dated April 7, 2015.

18. Public Safety and Emergency Response Planning

Rimrock Renewables has undertaken several studies to model the Facility in the highly unlikely event of a gas release or explosion. See **Attachment M**. Results of the studies indicate there will be no need for evacuation, shelter-in-place or any other response from residents in the event of an emergency as all risks are contained within the Facility boundary.

H2Safety calculated the emergency planning zone (EPZ) for the Facility. Using the maximum hydrogen sulphide (H_2S) concentrations, they calculated that the EPZ would remain within the Facility boundary. However, the regulations being used as best management practice require the EPZ to be calculated from the Facility boundary, resulting in an EPZ that extends 10 m out from the Facility boundary. As there no residences within 10 m of the Facility there is no need for shelter-in-place or evacuation in the unlikely event of an emergency. See **Attachment M (Exhibit M1)**.

ALARP Engineering conducted a Land Use Risk Assessment Study which modelled two types of failures of the Facility and found that both the release of hydrogen sulphide (H_2S) and explosion risk remained inside the Facility boundary, posing no danger to nearby residents. See **Attachment M (Exhibit M2)**.

Finally, Horizon Compliance modelled the unlikely event of all six digesters rupturing at the same time releasing all gas. To be conservative, they used hydrogen sulphide (H_2S) concentrations approximately 3-4 times higher than expected operationally (see **Section 16, Table 1.6** of this package). The modelling results were compared to the Occupational Health and Safety exposure limits and the limit considered Immediately Dangerous to Life or Health. The results predict that in the very unlikely event all six digesters failed simultaneously, the hydrogen sulphide (H_2S) concentrations outside the facility would be well below both of those safety and exposure limits. See **Attachment M (Exhibit M3)**.

Although the calculated EPZ contains no residences and there is minimal risk outside the Facility boundary, Rimrock Renewables will develop, implement, and continuously maintain an Emergency Response Plan (ERP) prior to the acceptance of any feedstock at the Facility, to prevent, manage, and mitigate conditions in the unlikely event of an onsite emergency.

As per the Ministerial Order (see Section 5 of this package), The ERP will be developed in consultation with Foothills County and the Town of High River and will include public input regarding emergency measures. The ERP will be continuously maintained during operations to ensure it is up-to-date. Development of the ERP will include consultation with adjacent landowners, residents, local fire and emergency services, the County and the Town of High River.

A final ERP cannot be developed until design has progressed allowing for purchasing of equipment and completion of a Hazard and Operability Study (HAZOP). A preliminary/typical table of contents for the final ERP will include the following sections:

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List of Tables

In addition to the ERP, the Facility will be designed with multiple safety systems to ensure safe operation and a safe and controlled shutdown in the event of a process upset, including but not limited to:

- Compliance with Canadian Codes and Standards: The Facility has been designed and will be constructed in full compliance with all applicable Canadian and Industry codes and standards, including those from Canadian Standards Association, the National Fire Protection Association, and relevant provincial regulations such as the Alberta Boilers Safety Association.
- Overpressure Protection: All pressure-containing systems are equipped with pressure relief valves and overpressure protection devices to prevent equipment failure and uncontrolled gas release as required by code.
- Process Monitoring and Detection: Continuous monitoring of key process parameters including pressure, temperature, gas composition and equipment status, allows operators to detect and respond to abnormal conditions in real-time.
- Fire and Gas Detection and Alarm Systems: Fire and Gas detectors will be installed in critical buildings to provide early warning of H_2S, lower explosivity limit (LEL), fire/smoke, and carbon monoxide. These systems will be integrated with alarms and automated shutdown protocols.
- Remote Monitoring and Control: The Facility will be equipped with a SCADA system that enables 24/7 remote monitoring and control by trained operators. This allows for immediate response to any deviations or alarms.

- Inspection and Preventive Maintenance Program: Rimrock Renewables will have a formal inspection, testing, and maintenance program which will be implemented to ensure ongoing integrity of critical equipment. This includes regular calibration of sensors, equipment function testing, system inspections and preventative maintenance in accordance with manufacturer recommendations and regulatory standards.

19. Plans outlining how the site will be decommissioned and reclaimed if the use is discontinued

As part of the EPEA Approval process, Rimrock Renewables was required to submit financial security to AEPA in the amount of $3,153,353.50 for the reclamation of the Facility. Additionally, the EPEA Approval includes conditions requiring Rimrock Renewables to annually review and revise the cost estimate for reclamation and submit the estimate to AEPA. Should AEPA deem additional security is required, Rimrock Renewables is required to provide this.

As part of the EPEA application, Rimrock Renewables submitted a conceptual reclamation plan. The plan included an assessment of baseline soils and biophysical characteristics of the site. During rough grading in 2022, the topsoil and subsoil were salvaged and will be stored onsite for future reclamation (as berms). As the site is agricultural, and no sensitive or contaminated soils were encountered, soil suitability for reclamation is expected to be good based on soil salvage potential and soil physico-chemical properties (texture, organic matter, and nutrient content). Appropriate soil conservation practices will be applied therefore equivalent land-use capability is expected to be achieved following reclamation of the site.

The EPEA Approval requires Rimrock Renewables to monitor environmental conditions (e.g., groundwater) annually and submit reports to AEPA for review and approval. The EPEA Approval also requires Rimrock Renewables to apply for an amendment at the time of decommissioning and submit a Decommissioning Plan and Land Reclamation Plan for approval by AEPA. The Decommissioning Plan must include a plan for dismantling the Facility, a comprehensive study of any contamination or affected lands, a plan to manage waste, and a strategy to remediate the site. It must also contain monitoring and testing plans. The Land Reclamation Plan must include removal of all infrastructure, restoration of drainage, soil replacement, erosion and sediment control, revegetation, and reclamation.

Once the site has been fully reclaimed, Rimrock Renewables will be required to obtain a reclamation certificate from AEPA.

20. Public consultation

Rimrock Renewables has conducted extensive consultation with area residents about the Facility in support of the EPEA, starting in July 2022. The extent of this consultation was well beyond the level of consultation that would be completed for a typical land use and/or development application - in terms of the area included, number of public stakeholders engaged, extent of the engagement, and the volume and nature of topics, concerns, and recommendations involved.

Rimrock Renewables has consulted with area residents within a 2,000 m (2 km) radius of the Facility footprint in association with the EPEA Approval process, as well as public and municipal bodies outside of this radius such as the Town of High River. See **Attachment N**. A summary of consultation with area residents is provided in **Table 1.7**, along with a summary of concerns and mitigations resulting from consultation that are directly relevant to the Land Use Bylaw Amendment and Development Permit applications in **Table 1.8**.

It is important to note that Rimrock Renewables' public consultation records make up approximately 900 pages of documentation considered by AEPA in support of the EPEA Approval. Rimrock Renewables' records of consultation reflect approximately 30 individual in-person meetings, 100 phone conversations and email exchanges, 2 public information sessions in 2023, and individual written responses to approximately 500 questions and concerns about the Facility. Rimrock Renewables is also committed to supporting the County consultation in support of these applications and to participating in County public meeting proceedings.

Table 1.7 Summary of Consultation Activities

Timeframe	Consultation Details
2022	
Summer/Fall 2022	• Rimrock Renewables hand-delivered a "Public Notice of Application" for the EPEA application to residences within 2.0 km of the Facility property line in July 2022, and posted it in the High River Times (both printed and online editions), as instructed by AEPA.
	• In July 2022, Rimrock Renewables also established a dedicated email address for stakeholder communications.
Winter 2022	• In December 2022 Rimrock Renewables launched a Facility website to provide information to the public about the proposed Facility. The website included information on the proposed Facility location, design and operations, environmental aspects, regulatory and permitting requirements, project timelines and contact information for Rimrock Renewables. The website was updated in March and August 2023 to share current information and project updates.
2023	
Winter 2023	• In January 2023 Rimrock Renewables sent a Project Update via registered mail to landowners, residents and occupants within 2.0 km of the Facility property line, as well as the County and the Town of High River. • The package also contained a copy of a public presentation to be delivered by Rimrock Renewables on January 12, 2023.

	• On January 12, 2023, Rimrock Renewables hosted a 90-minute virtual information session for residents within 2,000 m of the proposed Project, covering the following key topics:
	  ◦ Site history and feedlot operations.
	  ◦ Details about the proposed Facility and how it will operate.
	  ◦ Information to address common questions raised by stakeholders (e.g., odour, air quality, traffic, noise, water).
	  ◦ Overview of environmental studies and assessments.
	  ◦ Operational safety and community.
	  ◦ Project development timeline and current status.
	  ◦ Environmental regulatory obligations.
	  ◦ Public consultation and commitment to the community.
	• The session was formally logged into by 15 area residents. Rimrock Renewables notes that several residents likely had other individuals joining in the session with them in their homes. Therefore, Rimrock Renewables does not have access to final participation numbers, but based on questions received afterwards, the session was well attended. The session was also attended by representatives from Foothill County and the Town of High River.
	• Rimrock Renewables requested webinar participants to share any questions or feedback resulting from the session prior to an upcoming County Public meeting so they could be addressed in the subsequent public meeting (refer to March 2023 regarding Rimrock Renewables' responses).

Timeframe	Consultation Details
Winter 2023 cont'd.	• On January 25, 2023 Rimrock Renewables delivered a detailed presentation as part of the County Public Meeting about the proposed Facility. Rimrock Renewables presented detailed project information and responded to questions asked by the County Council. The meeting, which was advertised in the Western Wheel newspaper (Okotoks) January 4, 11 and 18, 2023, was hosted by the County, the NRCB and AEPA. It was open to anyone from the public that was interested in attending. • The County provided Rimrock Renewables the following high-level registration/attendance count for the Rimrock Renewables presentation: High River – 80; Foothills County – 14; Unknown – 15; Okotoks – 3; Media – 6; and Longview – 1. • There was also an opportunity for individuals to view the public meeting on a YouTube channel, for which there was no registration required.
Spring 2023	• In March 2023, Rimrock Renewables sent a Project Update and Information Package to participants in the January 12, 2023 information session.
	• Rimrock Renewables also performed a fulsome update of the Facility website in March 2023 to include design updates as submitted to AEPA in response to supplemental information requests. • A community page was also added to the Facility website that addressed in detail specific questions and concerns that have been raised from landowners and the community.
Summer 2023	• In July 2023, Rimrock Renewables sent a detailed information package to landowners, residents within 2 km of the Facility footprint, and other stakeholders. The package included an update on the recent changes to the Facility design. • Packages also included an invitation to discuss outstanding concerns and any additional questions about the Facility.
	• Rimrock Renewables also performed an additional fulsome update of the Facility website in August 2024 to include Facility design updates as submitted to AEPA.
2024/2025	
Ongoing Consultation	• Rimrock Renewables continues to actively monitor the stakeholder email address and remains open to continued consultation with area residents and other stakeholders about the Facility.

A summary of relevant concerns and mitigations resulting from consultation that are directly relevant to the Land Use Bylaw Amendment and Development Permit applications is provided below.

Table 1.8 Summary of Relevant Concerns and Mitigations

Topic	Concern(s)	Proposed Mitigations

Odours	Potential impact of Facility operations on existing regional odours	• Rimrock Renewables notes a majority of the concerns regarding odours were directly in relation to the existing Feedlot. As described in Sections 8 and 14 of this package, the entire Facility is essentially a large odour abatement system designed to capture emissions from manure at the adjacent Feedlot and convert them through a closed system to RNG.
		• Concerns from area residents about potential odours from the Facility itself were the primary driver for Rimrock Renewables to materially re-design and further optimize odour mitigation for the Facility (see Section 8 and 14 of this package for details on odour management and abatement).
		• Air quality assessments prepared for the Facility in support of the EPEA application demonstrate the Facility will comply with the Alberta Ambient Air Quality Objectives (AAAQO), including odorous compounds hydrogen sulphide and ammonia (H2S and NH3), and that there will be a net reduction in regional air emissions and odours as a result of the operation of the Facility. Further, the Environmental Appeals Board in its April 29, 2025 Report and Recommendations stated: *"Based on the evidence and submissions presented at the hearing, the Board found that although there were existing regional air quality and odour concerns, the Approval met the objectives of ensuring the Facility did not exceed the Alberta Ambient Air Quality Objectives and Alberta Air Quality Guidelines. The Board found there was evidence to suggest the Facility may provide some benefit to the regional air quality concerns of the Appellants and Intervenors, by providing a method of managing and processing the manure generated by the CFO and its associated greenhouse gases."*[1]
		• AEPA has included strict odour and emissions conditions in the EPEA Approval (**Attachment E**) for:
		  • Pollution Abatement Equipment (Approval Section 3.2.5) including updated conditions related to a meteorological station in the Ministerial Order (see Section 14 of this package),
		  • Air Operations, Limits, Monitoring and Reporting (Approval Section 4.1), and
		  • Odour Management (Approval Section 4.1).

Noise	Noise levels that will be generated by equipment and operations of the Facility, including traffic noise.	• Noise that may be generated from the Facility will be mitigated through design and engineering controls to reduce noise emissions from operating equipment such as pumps, fans, motors, and cogeneration units. • The Facility has been designed to mitigate noise and will comply with the County Community Standards Bylaw No 45/2013 and Alberta Utilities Commission (AUC) Rule 012: Noise Control. • Inspections and maintenance will be completed during operations to ensure that any noise abatement equipment is in working order. • The delivery of manure feedstock will be via an existing private internal graveled access between the Feedlot and the Facility and will only occur during daytime operating hours. Organic food resources deliveries via truck will also be limited to daytime operating hours. • The berms surrounding the north and west side will provide a noise buffer. The Facility will also implement a no-idling policy, where practical, for vehicles onsite. • See Section 14 of this package for additional details.

[1] Alberta Environmental Appeals Board Report and Recommendations (April 29, 2025). PDF p. 5.

Topic	Concern(s)	Proposed Mitigations
Lighting	Facility lighting and additional impacts to dark sky.	• Facility lighting will meet or exceed all the requirements specified by the Dark Sky Bylaw and the County Land Use Bylaw (see Section 16 of this package).
Viewshed	Facility screening and obstruction of views.	• The Facility will be screened on the north and west sides by vegetated topsoil berms and trees (see Section 9 of this package). • The tallest building onsite will be the Digestate Separation Building (9.9 m) (see Section 8 of this package).
Dust Control	Increased dust pollution and dust control.	• Minimal nuisance dust is anticipated during Facility operations. Manure feedstock will be delivered by trucks via an existing private internal graveled access between the adjacent Feedlot and the Facility. In the event that use of this internal road specifically for the Facility has the potential to produce a nuisance level of dust to nearby residents, dust control options will be implemented as needed. The use of existing paved County roads for the delivery of organic food resources feedstock is not anticipated to create nuisance dust levels. Rimrock Renewables has also committed to paving Meridian Road from Coal Train to the Facility access. • The manure and digestate staging areas will be routinely inspected and are anticipated to have low dust content. • The berms and tress surrounding the Facility will also reduce wind inside the facility and provide a barrier to dust moving outside the fence line. • See Section 14 of this package for additional details. • Additionally, the EPEA Approval (**Attachment E**) includes conditions intended to address dust concerns (4.1.11 to 4.1.12)
Traffic	Increased local traffic as a result of Facility operations and traffic safety.	• The results of the Traffic Impact Assessment (TIA, **Attachment J**) indicate there will be minimal traffic added in the peak hours and no impacts to the intersection operations at start up. • In the long term, there will be a net decrease in annual traffic from the Facility. The volume of solid digestate that will be land spread by truck, combined with the delivery of organic food resources using enclosed truck/trailer, is less than the amount of manure currently being land spread by the CFO. Liquid digestate is proposed to be applied via pump and drag line, not by truck. Therefore, operation of the Facility will result in a net reduction in traffic on County roads.
Zoning/Land Use	The site should be re-zoned from agricultural to industrial for this Facility	• This application is being submitted to facilitate appropriate and proper land use for the Facility.

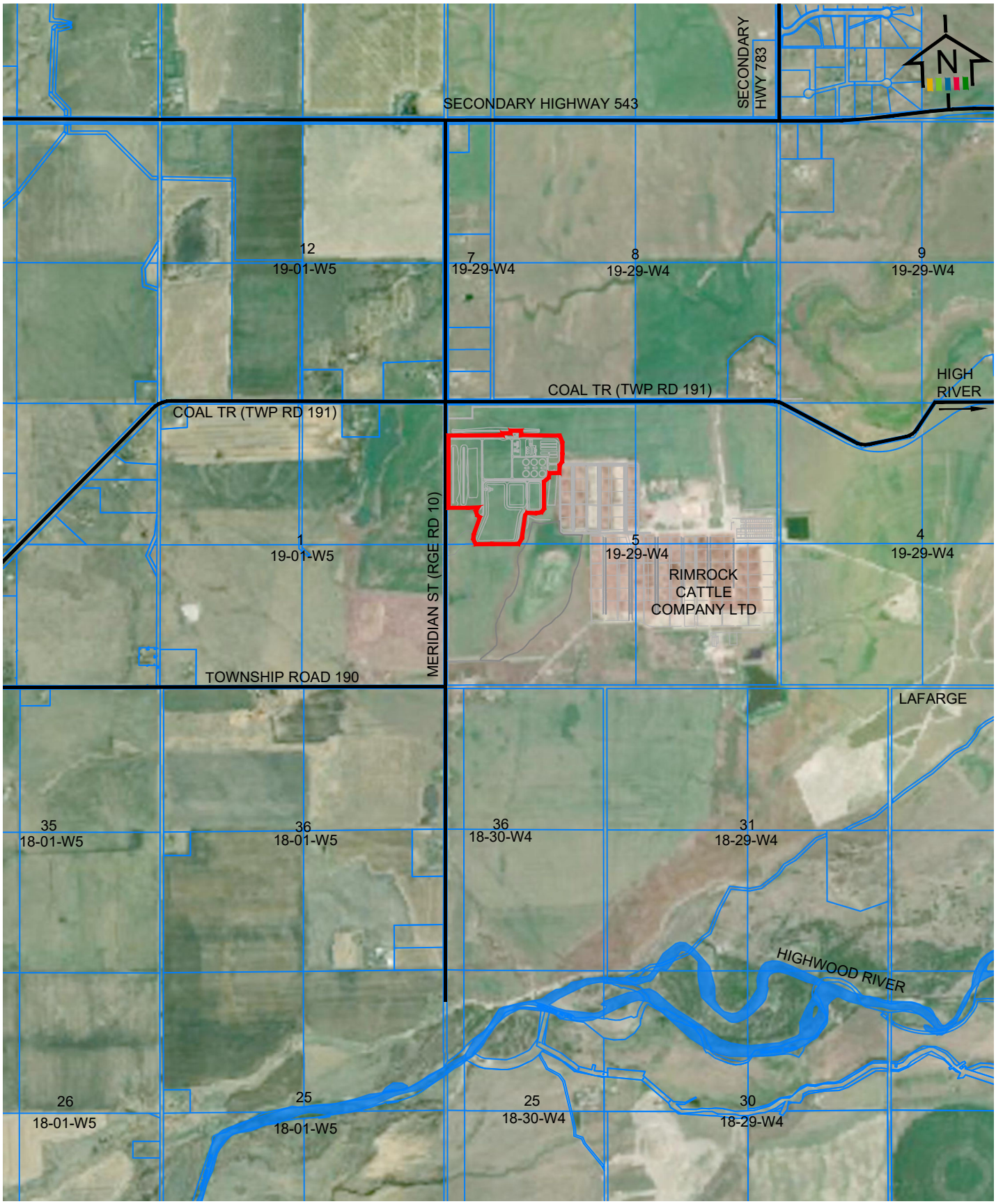
Topic	Concern(s)	Proposed Mitigations
Facility Location	The size of the Facility and that it should be moved to an existing industrial area	• The Facility must be located adjacent to the primary source of feedstock, which is manure from the existing Feedlot. Moving the on-farm Facility closer to an "industrial area" would result in additional traffic on County roads for manure feedstock and solid digestate transportation which would diminish the overall environmental benefit of the Facility and likely result in increase to regional odours compared to collocating the Facility adjacent to the Feedlot. It is also noted that there are numerous other residents located within 500 m of the Aldersyde industrial corridor. • Extensive measures have been incorporated into the Facility design to mitigate potential nuisances such as noise, odour, dust, and lighting (see Section 14 of this package) and the EPEA Approval contains strict conditions for the construction and operation of the Facility, including limits on emissions. • As described in Section 13 of this package and the TIA (**Attachment J**), in the long term, there will be a net decrease in annual traffic volumes as a result of the Facility. • Rimrock has committed to developing and implementing an ERP prior to commissioning the Facility (see additional details in Section 18 of this package).
Reclamation	Reclamation liability and costs	• Rimrock Renewables submitted a conceptual decommissioning and reclamation plan with the EPEA application. • As part of the EPEA Approval process Rimrock Renewables was required to submit financial security to AEPA in the amount of $3,153,353.50 for the reclamation of the Facility. • Additionally, the EPEA Approval (**Attachment E**, Approval Part 5) requires Rimrock Renewables to annually review and revise the cost estimate for reclamation and submit the estimate to AEPA. Should AEPA deem additional security is required, Rimrock Renewables is conditioned to provide it. • The EPEA Approval (Part 5) also requires that Rimrock Renewables shall apply for an amendment to this approval to reclaim the Facility by submitting a Decommissioning Plan and Land Reclamation Plan within six (6) months of the facility ceasing operation.

21. Acronyms and Definitions

Table 1.9 Acronyms and Definitions

Acronyms and Terms	Definitions
AAAQO	Alberta Ambient Air Quality Objectives
ACSW	Alberta Culture and the Status of Women
AEPA	Alberta Environment and Protected Areas
AER	Alberta Energy Regulator
AGI	Alberta Agriculture and Irrigation
AOPA	Agricultural Operation Practices Act
AQA	Air Quality Assessment
ATCO	ATCO Natural Gas
AUC	Alberta Utilities Commission

B2. EXHIBITS G1 - G7



Rimrock Digester Facility Boundary
Highway / Roads

ISL Engineering and Land Services

0 600 1200 m
1:30,000

Rimrock Digester Facility
Foothills County, Alberta
Exhibit G1
Facility Location Map
May 2025

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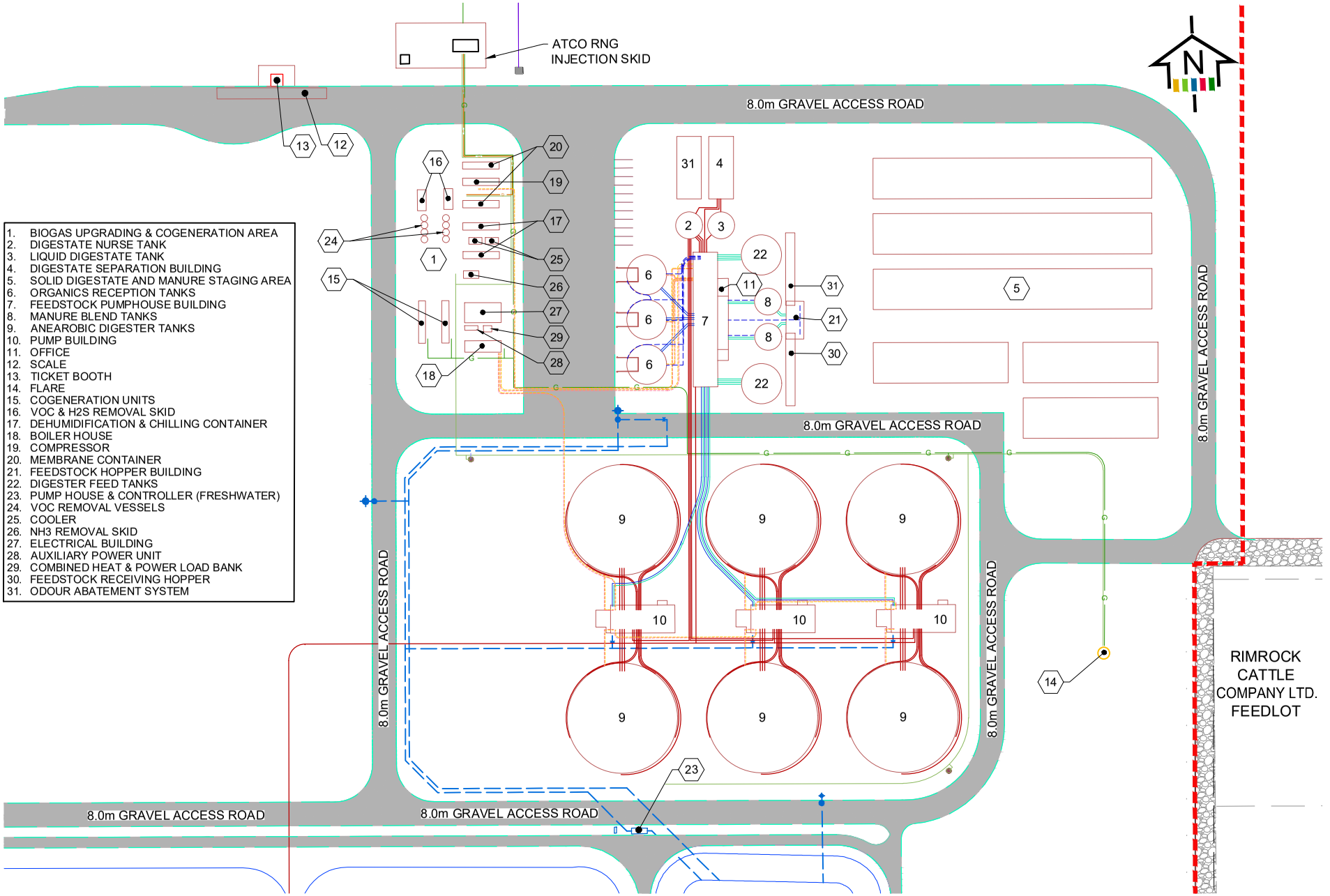

ISL Engineering and Land Services

0 35 75 m

1:1750

PROJECT FOOTPRINT
WATERLINE
HYDRANT
MANHOLE
PROPOSED TRANSFORMER LOCATION
HEAT MEDIUM RETURN LINE
HEAT MEDIUM SUPPLY LINE

DIGESTATE LINE
MANURE LINE
BIOGAS LINE
NATURAL GAS PIPELINE
RNG LINE
POWERLINE
ORGANIC FOOD RESOURCES SLURRY

Rimrock Digester Facility
Foothills County, Alberta
Exhibit G2
Facility Plot Plan
May 2025

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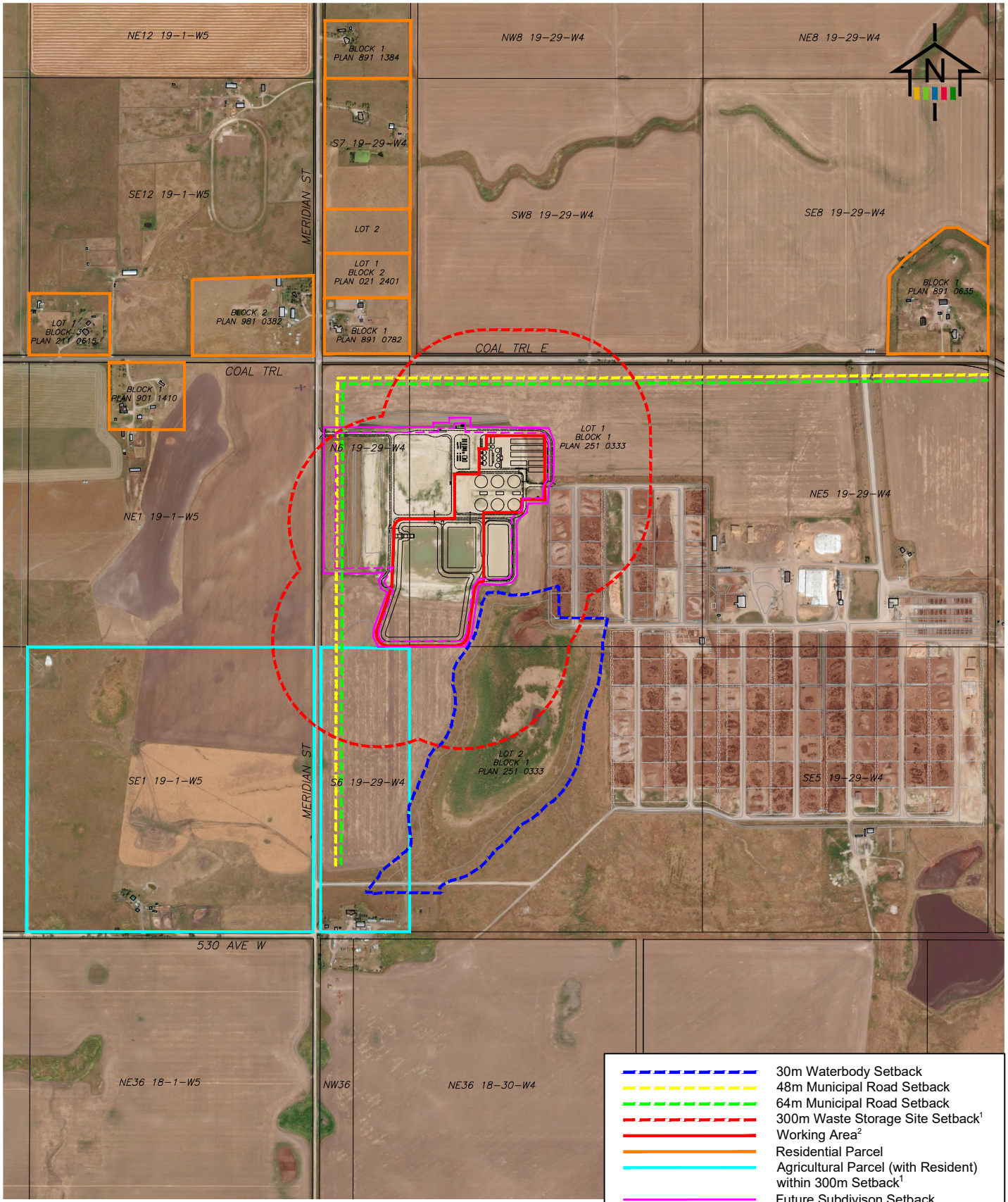

Note 1: Setback required under Land use bylaw 9.27.24 and Section 17(5)(d) of the *Matters Related to Subdivision and Development Regulation*.
Note 2: The working area as defined in Section 1(ii) of the *Waste Control Regulation*.

ISL Engineering and Land Services

0 300 600 m
1:15000

Rimrock Digester Facility
Foothills County, Alberta
Exhibit G3
Site Offset Figure
May 2, 2025

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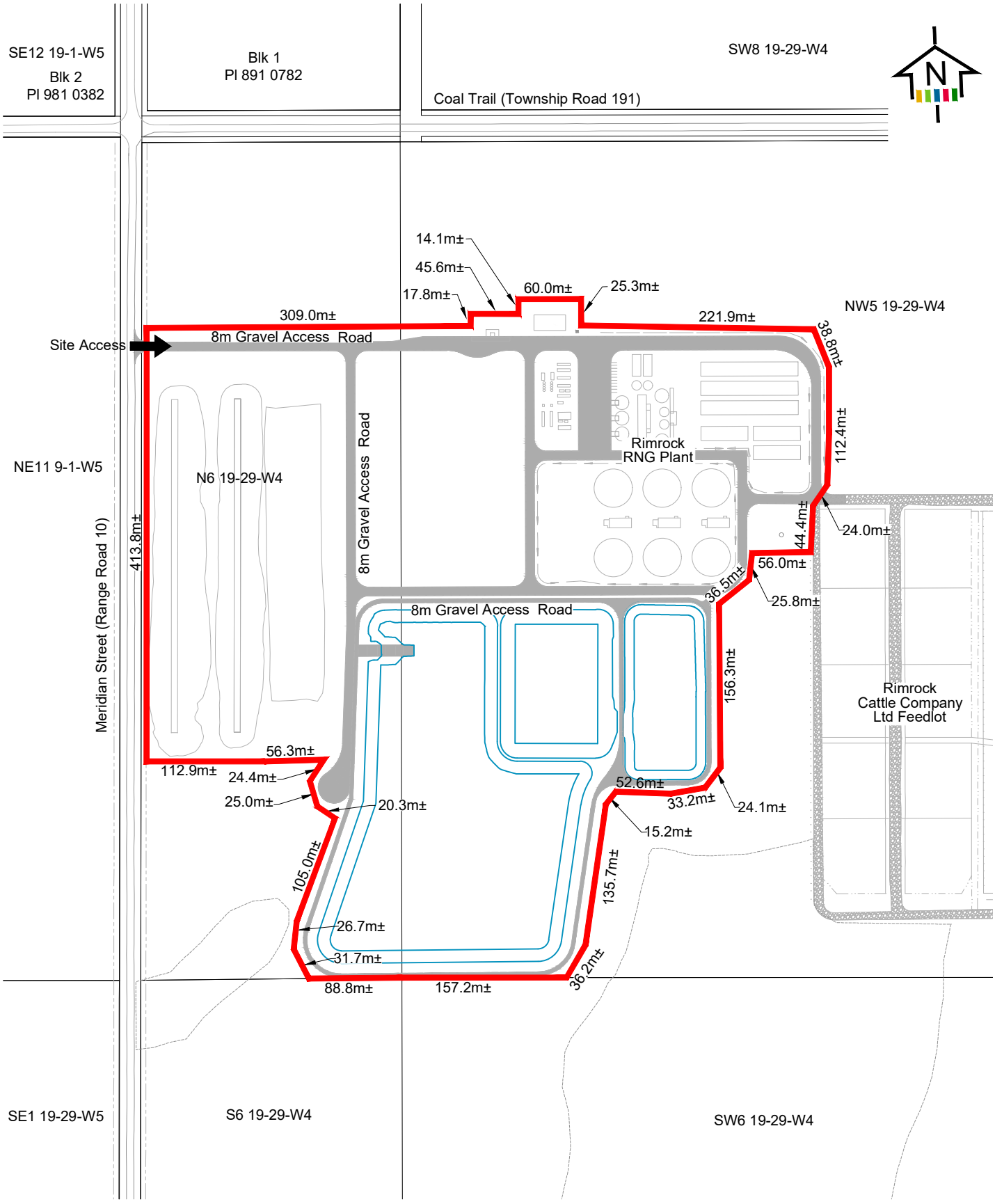

Rimrock Digester Facility Boundary

ISL Engineering and Land Services

0 100 200 m
1:5,000

Rimrock Digester Facility
Foothills County, Alberta
Exhibit G4
Landuse Amendment Area
May 2025

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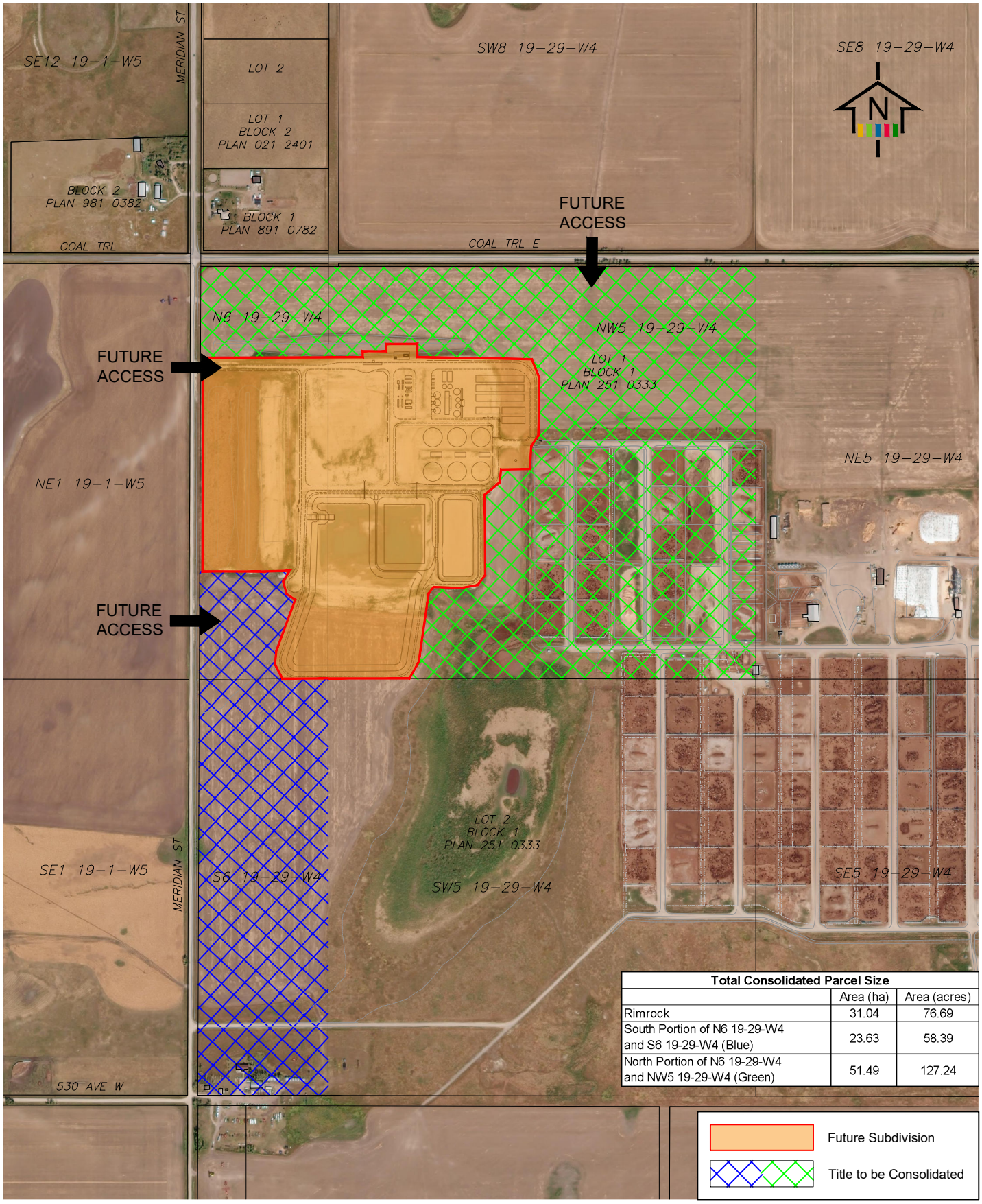

Total Consolidated Parcel Size		
	Area (ha)	Area (acres)
Rimrock	31.04	76.69
South Portion of N6 19-29-W4 and S6 19-29-W4 (Blue)	23.63	58.39
North Portion of N6 19-29-W4 and NW5 19-29-W4 (Green)	51.49	127.24

ISL Engineering and Land Services

0 200 400 m

1:10000

Rimrock Digester Facility
Foothills County, Alberta

Exhibit G5

Future Subdivision Access Figure

May 2025

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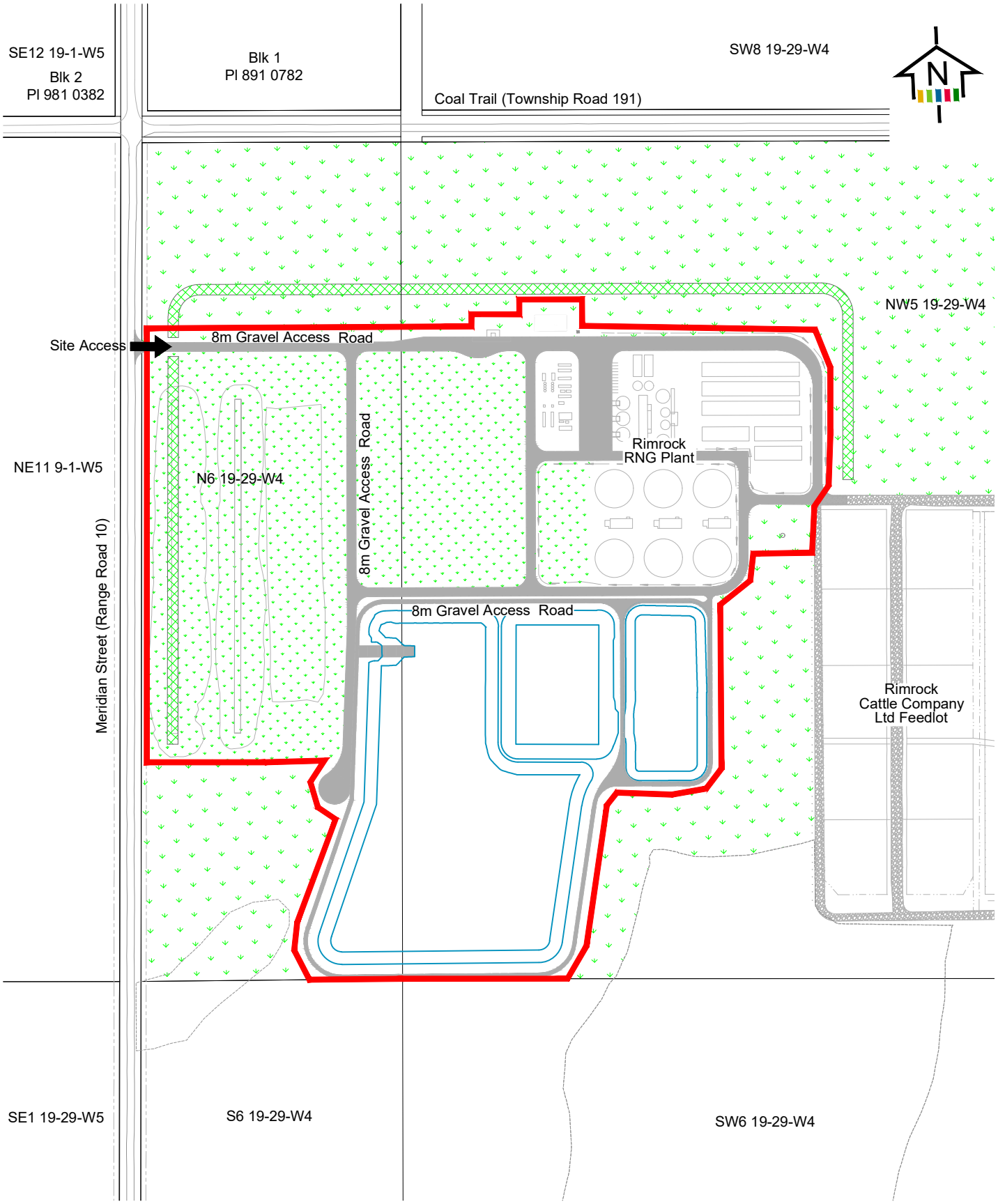

ISL Engineering and Land Services

0 100 200 m

1:5,000

Rimrock Digester Facility Boundary

Cereal Crop

Landscape Area

Trees Area

Rimrock Digester Facility
Foothills County, Alberta

Exhibit G6

Vegetation Plan

May 2025

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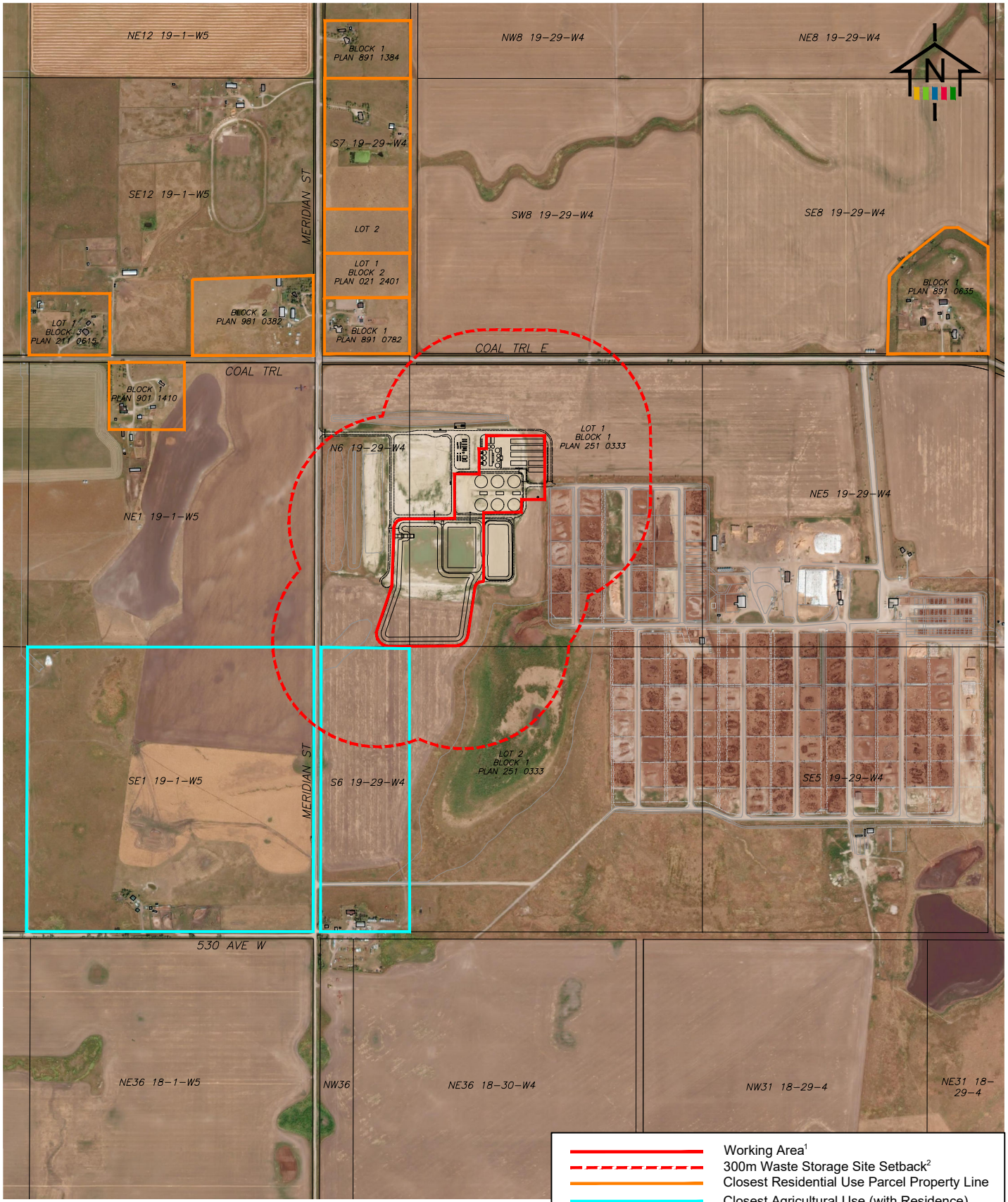

Note 1: The working area as defined in Section 1(ii) of the *Waste Control Regulation*.
Note 2: Setback required under Land use bylaw 9.27.24 and Section 17(5)(d) of the *Matters Related to Subdivision and Development Regulation*.

ISL Engineering and Land Services

0 300 600 m
1:15000

Rimrock Digester Facility
Foothills County, Alberta
Exhibit G7
Rimrock 300m Offset Figure
May 2, 2025

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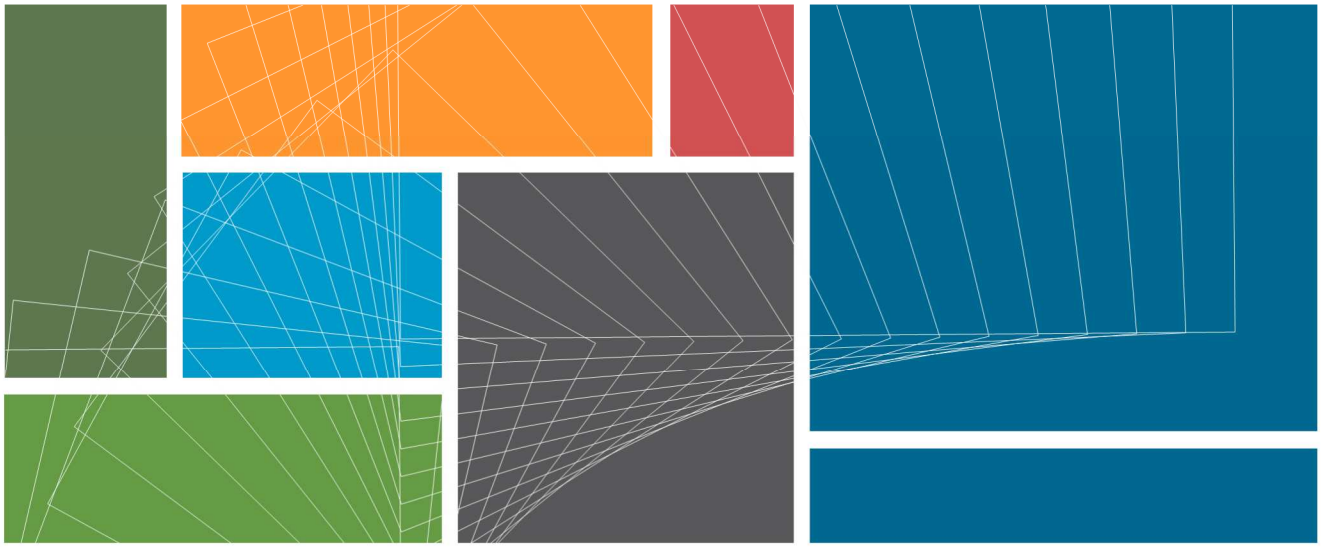


Tidewater Mainstream and Infrastructure Ltd.

Final Report

Rimrock Biodigester Facility - Traffic Impact Assessment

September 2022

ISL Engineering and Land Services Ltd. Is an award-winning full-service consulting firm dedicated to working with all levels of government and the private sector to deliver planning and design solutions for transportation, water, and land projects.

Proudly certified as a leader in quality management under Engineers and Geoscientists BC's OQM Program from 2014 to 2021.

Corporate Authorization

This document entitled “Rimrock Biodigester Facility - TIA” has been prepared by ISL Engineering and Land Services Ltd. (ISL) for the use of Tidewater Mainstream and Infrastructure Ltd. The information and data provided herein represent ISL’s professional judgment at the time of preparation. ISL denies any liability whatsoever to any other parties who may obtain this report and use it, or any of its contents, without prior written consent from ISL.

Alexander Ho, P.Eng., PTOE
Transportation Engineer

Table of Contents

APPENDICES

TABLES

EXHIBITS

following page

1.0 Introduction and Scope

1.1 Introduction

ISL Engineering and Land Services Ltd. (ISL) was retained by Tidewater Mainstream and Infrastructure Ltd. (Tidewater) to undertake a transportation impact assessment (TIA) for the proposed Rimrock Biodigester facility. The proposed facility is located at the southeast corner of the intersection of Coal Trail (Township Road 191) / Range Road 10 in Foothills County, west of the Town of High River, Alberta. The proposed access to the development is off Range Road 10. The site location is shown below in Figure 1.1 and the site plan is attached in Appendix A.

The purpose of the study is to determine the traffic impact of the proposed development and if any intersection and/or roadway upgrades are required on the adjacent roadway network.

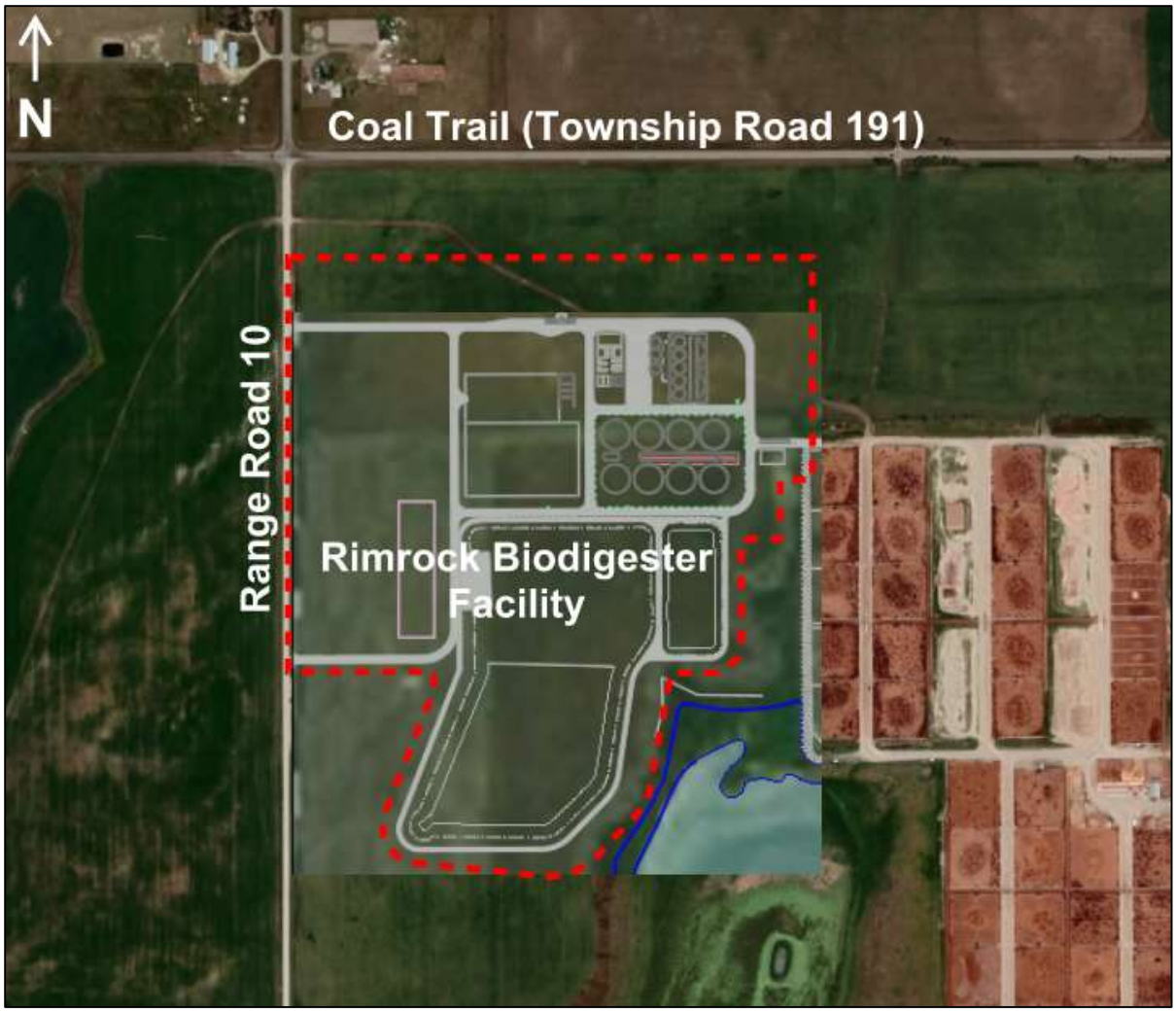


Figure 1.1: Site Location

1.2 Scope

The following scope of work was confirmed with Foothills County and was completed by ISL:

- Complete a weekday 12-hour (7 AM to 7 PM) camera count at Highway 543 / Range Road 10.
- Complete manual weekday AM (7-9 AM) and PM (4-6 PM) peak hour traffic counts at Coal Trail / Range Road 10 and Coal Trail / Rimrock Feeders access.
- Convert the highway count to the 100th Highest Hour AM and PM peak hour traffic by referencing counts from a nearby Alberta Transportation automated count station.
- Analyze traffic in Synchro at Highway 543 / Range Road 10, Coal Trail / Range Road 10, Coal Trail / Rimrock Feeders access, and Range Road 10 / Rimrock Biodigester access in the following horizons:
  - 2022 Background
  - 2022 Background + Development
  - 2042 Background
  - 2042 Background + Development
- The 2042 Background traffic is calculated by applying a yearly growth to the background traffic. From the 10 yr traffic volume history at Highway 543 / Highway 783 (2 km east of Highway 543 / Range Road 10), the growth on Highway 543 is 1.2% per year. To be conservative, 2.0% per year will be used. On the lower volume Range Road 10 and Coal Trail, a lower rate of 1.0% per year is proposed.
- The AM and PM peak hour generated trips of the proposed biodigester facility was provided by Tidewater based on expected operations.
- Trip distribution:
  - 2022 and 2042: Based on existing traffic patterns
- Conduct signal, left turn, right turn, and illumination warrant analyses at Highway 543 / Range Road 10.
- Document findings and recommendations in a report.

2.0 Background

2.1 Traffic Counts

ISL conducted traffic counts on Wednesday, July 20, 2022 at the following intersections:

- Highway 543 / Range Road 10 (12-hour camera count from 7 AM to 7 PM)
- Coal Trail / Range Road 10 (AM and PM peak hour counts from 7-9 AM and 4-6 PM)
- Coal Trail / Rimrock Feeders access (AM and PM peak hour counts from 7-9 AM and 4-6 PM)

The turning traffic volumes can be found in Appendix B.

2.2 100th Highest Hour Volumes

To calculate the 100th Highest Hour traffic at Highway 543, ISL referenced Alberta Transportation's Highway Geometric Design Guide, Chapter A, Section 4.4 (September 2020). Using this methodology, the collected Highway 543 and Range Road 10 count data was converted to the average annual daily traffic (AADT), AM 100th Highest Hour, and PM 100th Highest Hour estimates.

Data at Highway 543 and Range Road 10 was collected using a countCAM traffic count camera for 12-hours (7:00 AM to 7:00 PM). The AM and PM peak periods were found to be from 7:30 to 8:30 AM and from 4:30 to 5:30 PM, respectively, and are summarized below in Table 2.1.

Table 2.1: Highway 543 / Range Road 10 Traffic Volumes

Traffic Movement	Recorded Data from 12-Hour Count		
	12-Hour Volume	AM Peak Hour Volume	PM Peak Hour Volume
EBL	0	0	0
EBT	660	64	64
EBR	9	0	1
WBL	206	8	25
WBT	732	62	96
WBR	2	0	0
NBL	9	0	1
NBT	0	0	0
NBR	192	23	19
SBL	2	0	0
SBT	0	0	0
SBR	0	0	0
Totals	**1,812**	**157**	**206**

Following the AT Design Guide, the following steps were undertaken to calculate the AADT:

- 2021 AADT (2,362 veh) and Wednesday July 21, 2021 12-hour volumes were gathered from Automated Traffic Recorder (ATR) Number 50230850 located on Highway 23, 2.8 km east of the intersection of Highway 2 and Highway 23, east of the Town of High River. The ATR was chosen for its proximity and having similar vehicle volumes to Highway 543.
- Using the ATR 12-hour count total and the 2021 AADT, an AADT factor of 1.15 was calculated.
- Multiplying the AADT factor with the 12-hour count at Highway 543 / Range Road 10 results in an AADT estimate for each movement as shown in Table 2.2 below.

Table 2.2: Highway 543 / Range Road 10 Estimates

Traffic Movement	AADT Estimate
EBL	0
EBT	759
EBR	10
WBL	237
WBT	842
WBR	2
NBL	10
NBT	0
NBR	221
SBL	2
SBT	0
SBR	0
Total	**2,084**

Next, the 100th Highest Hour Traffic volumes were calculated:

- 2021 AADT (2,362 veh) and 2021 100th Highest Hour (257 veh) volumes were gathered from ATR Number 50230850.
- A K factor of 0.109 was calculated by dividing the 100th Highest Hour with the AADT of the ATR.
- The 100th highest hour total traffic at the Highway 543 / Range Road 10 intersection was calculated by multiplying the K factor with the total AADT Estimate (2,084 veh) in the above Table 2.2. The 100th highest hour total traffic at Highway 543 / Range Road 10 intersection is 227.
- The AM and PM 100th Highest Hour Count Factors were calculated by dividing the AM (157 veh) and PM (206 veh) peak totals from Table 2.1 by the 227 from the previous step. The AM and PM 100th Highest Hour Count Factors were found to be 1.444 and 1.101, respectively.
- The AM and PM 100th Highest Hour traffic for the Highway 22 Through Volumes (see Table 2.3 below) were calculated by multiplying the above 100th Highest Hour Count Factors to the AM and PM peak hour volumes from the count.

Table 2.3: 100th Highest Hour Volumes

Traffic Movement	100th Highest Hour	
	AM Peak	PM Peak
EBL	0	0
EBT	92	70
EBR	0	1
WBL	12	28
WBT	90	106
WBR	0	0
NBL	0	1
NBT	0	0
NBR	33	21
SBL	0	0
SBT	0	0
SBR	0	0
Total	**227**	**227**

2.3 2022 Background Traffic Volumes

The 100th Highest Hour volumes on Highway 543 / Range Road 10 and the volumes from the traffic counts at Coal Trail / Range Road 10 and Coal Trail / Rimrock Feeders access were used for the 2022 horizon background traffic volumes. The resulting 2022 Background traffic is shown in Exhibit 2.1.

2.4 Growth Rates

Growth data was taken from the AT count data at Highway 543 / Highway 783. From the 10-year traffic volume history at Highway 543 / Highway 783 (2 km east of Highway 543 / Range Road 10), the growth on Highway 543 is 1.2% per year. To be conservative, a linear growth rate of 2.0% was applied to Highway 543. On the lower volume Range Road 10 and Coal Trail, a lower rate of 1.0% was applied.

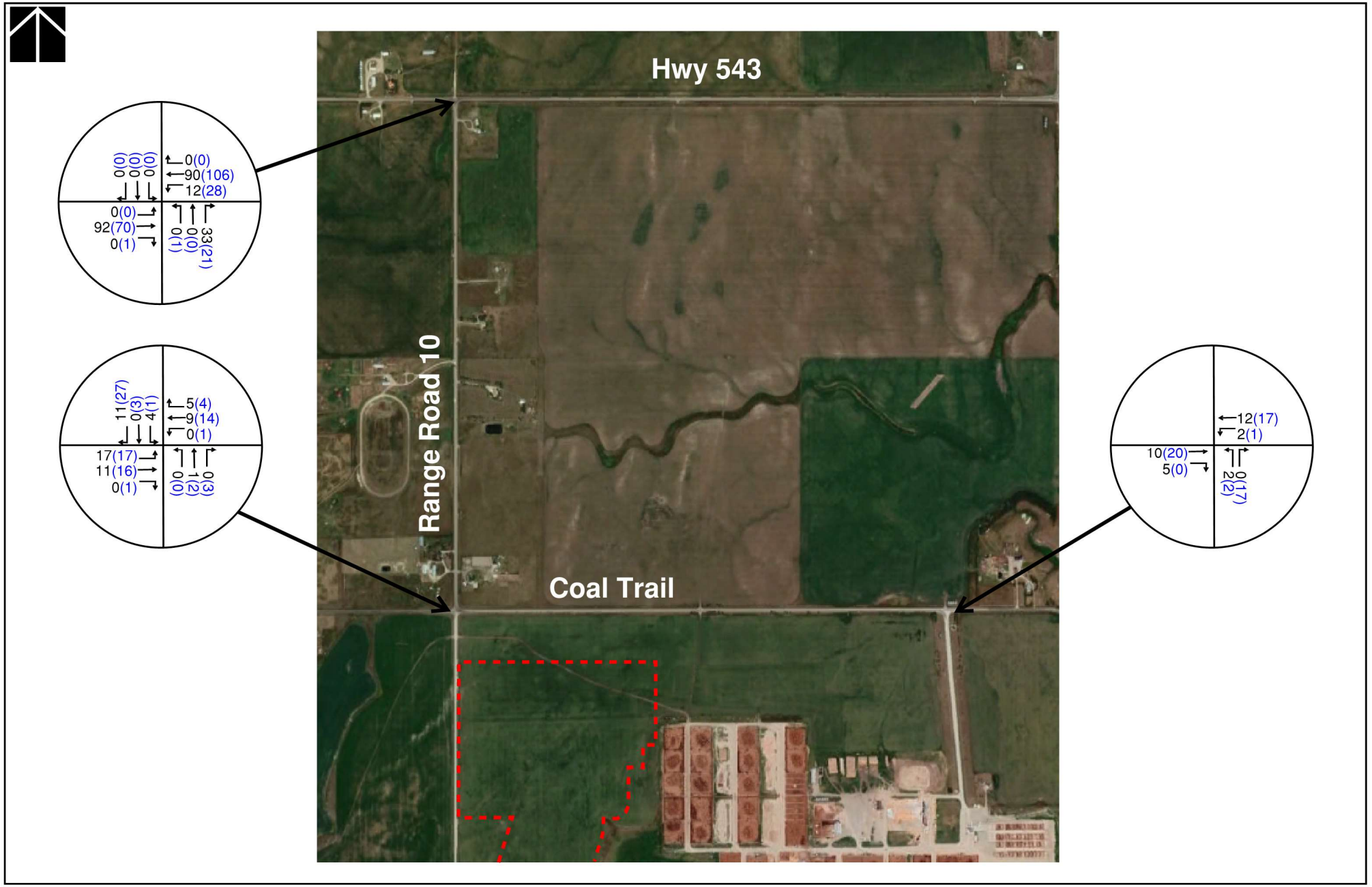
2.5 2042 Background Traffic Volumes

To estimate the 2042 horizon background traffic volumes, a 2.0% annual growth rate was applied to the 100th Highest Hour volumes on Highway 543. On Range Road 10 and Coal Trail, a 1.0% annual growth rate was applied. The 2042 Background traffic volumes are shown In Exhibit 2.2.

2.6 Intersection

The geometry of the three existing analyzed intersections is as follows:

- Highway 543 / Range Road 10:
  - Type IIb intersection with stop signs on the north-south approaches
  - North approach is gravel
  - 2 lane undivided highway / roadway with no turn bays at the intersection
  - Speed limits: 100 km/h on Highway 543, 80 km/h on Range Road 10
- Coal Trail / Range Road 10:
  - Type IIc intersection with stop signs on the north-south approaches
  - South approach is gravel
  - 2 lane undivided roadway with no turn bays at the intersection
  - Speed limits: 80 km/h on Coal Trail and Range Road 10
- Coal Trail / Rimrock Feeders access:
  - Type IIa intersection with a stop sign on the south approach
  - South approach is gravel, north approach is a field access
  - 2 lane undivided roadway with no turn bays at the intersection
  - Speed limit: 80 km/h on Coal Trail



- - - Site Area
AM Volumes (PM Volumes)

RIMROCK BIODIGESTER FACILITY TIA

2022 BACKGROUND TRAFFIC VOLUMES

EXHIBIT 2.1
Sep 2022

- - - Site Area
AM Volumes (PM Volumes)

RIMROCK BIODIGESTER FACILITY TIA

2042 BACKGROUND TRAFFIC VOLUMES

EXHIBIT 2.2
Sep 2022

3.0 Trip Generation and Distribution

3.1 Trip Generation

The following trip generation was provided by Tidewater based on their operational plans:

- 5 employees on weekdays
- Approximately 7 industrial heavy vehicles per AM and PM peak hour, consisting of organics delivery, consumables, maintenance, manure hauling, and solid digestate land spreading. The 7 heavy vehicles per peak hour is based on the anticipated truck volumes from Tidewater and the following peak hour assumptions:
  - Organics Delivery: 7 trucks per day. Assumed 2 trucks in each peak hour.
  - Consumables: 10 trucks per month. Assumed 1 truck in each daily peak hour.
  - Maintenance: 7 trucks per month. Assumed 1 truck in each daily peak hour.
  - Solid Digestate: 2,700 trucks per year which translates to 225 per month and 12 trucks per day (assuming 20 working days). Assumed 3 trucks in each peak hour.
  - Liquid Digestate: 2 trucks per year. Assumed 0 per day and 0 in each peak.
  - Total: 7 trucks in the AM and PM peak hours.

Tidewater advised the facility will normally have five employees at the biodigester facility, operating on normal business hours. In this TIA, it was assumed the shift start and end would occur during the AM and PM Peak hours, respectively, and each employee would drive their own personal vehicle to work. The trip generation rates and generated trips for each peak are summarized in Table 3.1.

To be conservative, it was assumed the 7 heavy trucks in each peak will make the inbound and outbound trip within the same peak hour. The generated trips for the industrial traffic are also summarized in Table 3.1.

It is noted that the traffic provided and analyzed are for volumes at the peak and startup of the facility's operation. As noted by Tidewater, the heavy industrial truck traffic will be reduced as the facility transitions from start-up to maturity, resulting in a reduction from 2,700 Solid Digestate trucks per year to an estimated 1,500 trucks per year.

Table 3.1: Trip Generation – AM and PM Peak

Use	Quantity	AM Peak						PM Peak					
		Rate	Trips	In%	Inbound	Out%	Outbound	Rate	Trips	In%	Inbound	Out%	Outbound
Employees	5	1	5	100%	5	0%	0	1	5	0%	0	100%	5
Industrial Traffic	7	2	14	50%	7	50%	7	2	14	50%	7	50%	7
Total Trips	-	-	**19**	-	**12**	-	**7**	-	**19**	-	**7**	-	**12**

3.2 Trip Distribution

The employee trips were distributed onto Coal Trail east and Coal Trail west based on the existing staff travel patterns as collected from the traffic count at the existing access. The resulting trip distributions, based on the existing counts, are shown in Table 3.2.

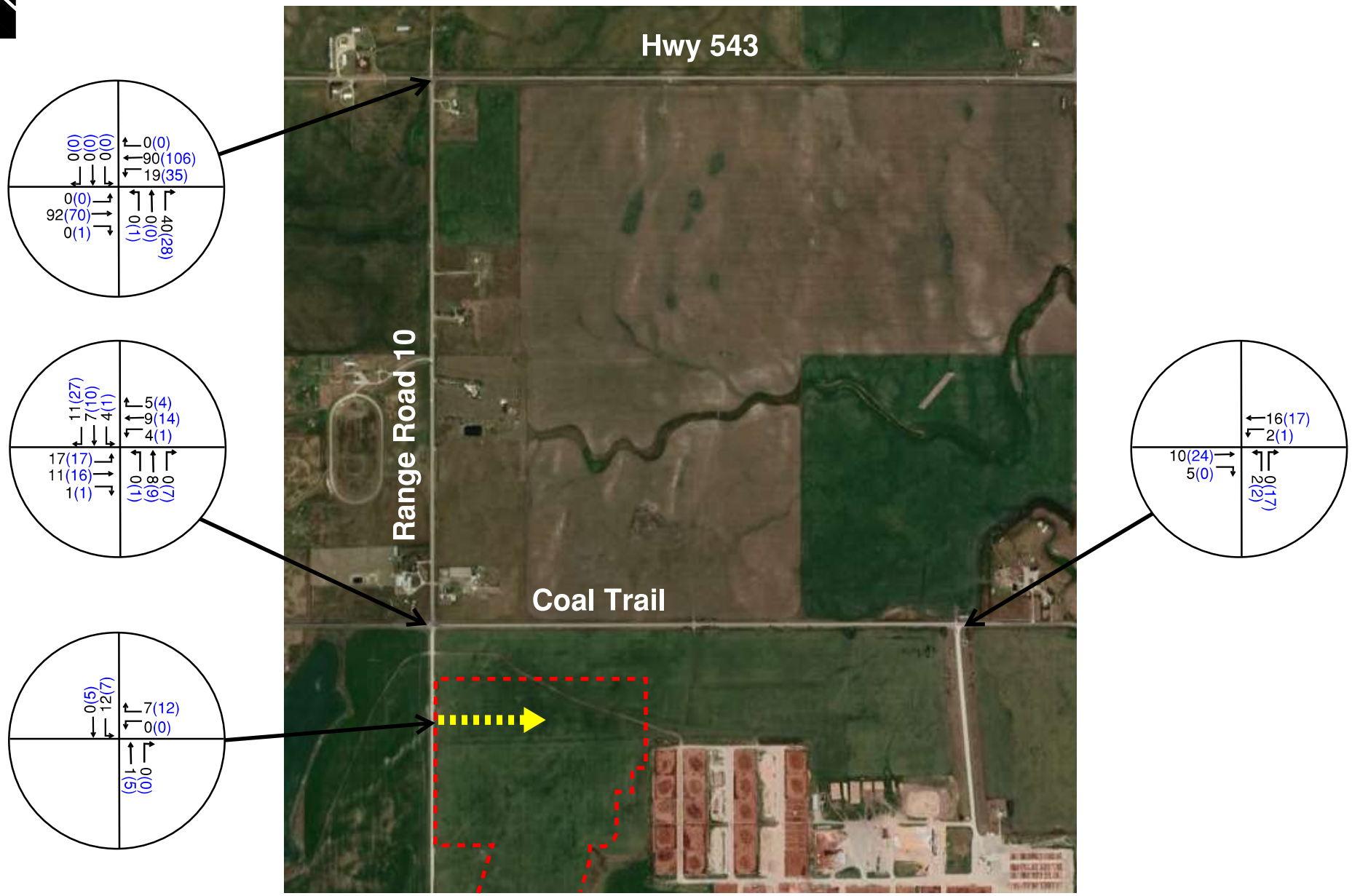
Table 3.2: Employee Trip Distribution

Peak	Inbound / Outbound		
	To/From West	To/From East	Total
AM Peak	10%	90%	100%
PM Peak	10%	90%	100%

As confirmed with Tidewater, the industrial traffic will all travel to/from Highway 543 east as shown in Figure 3.1 below.

Figure 3.1: Industrial Vehicles Path

The generated trips from the Rimrock Biodigester facility were added to the 2022 and 2042 Background volumes to determine the 2022 and 2042 Background + Development traffic (refer to Exhibits 3.1 and 3.2).

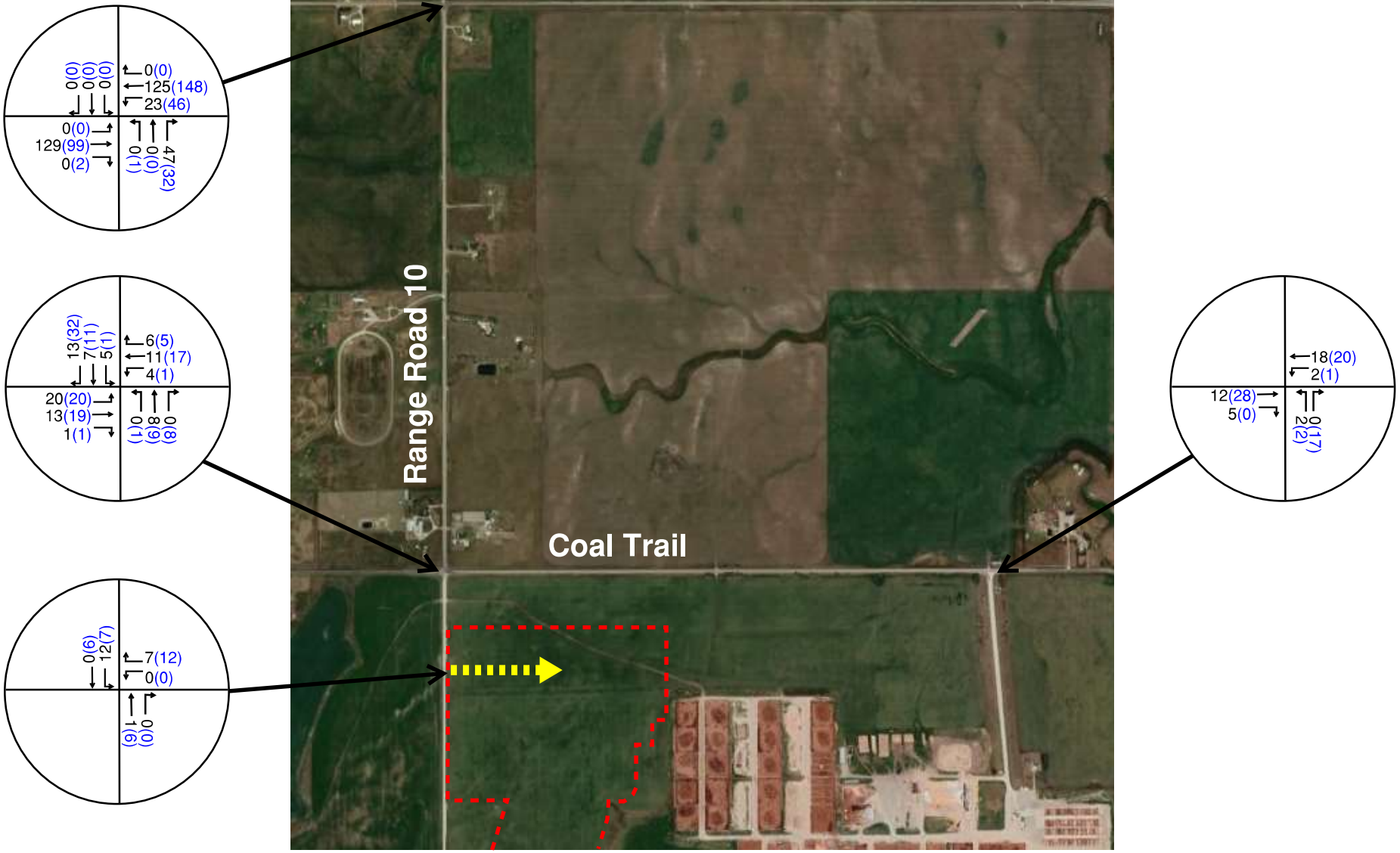


- - - Site Area
AM Volumes (PM Volumes)
Future Access

RIMROCK BIODIGESTER FACILITY TIA

2022 BACKGROUND + DEVELOPMENT TRAFFIC VOLUMES

EXHIBIT 3.1
Sep 2022



- - - Site Area
AM Volumes (PM Volumes)
Future Access

RIMROCK BIODIGESTER FACILITY TIA

2042 BACKGROUND + DEVELOPMENT TRAFFIC VOLUMES

EXHIBIT 3.2
Sep 2022

4.0 Traffic Analysis

4.1 Synchro

The Synchro 10 software traffic analysis package was used to analyze the operational characteristics of the unsignalized intersections. A Level of Operating Service (LOS) A represents the highest level of service or generally "free flowing conditions" while a LOS F generally represents the lowest level of service with "breakdown" or "gridlock" condition in vehicular flow. There are varying degrees of delay and congestion introduced at the intersection LOS B, C, D, and E. LOS D is representative of "normal" peak hour congestion, while LOS E is representative of an intersection nearing its capacity. LOS criteria for intersections are based on average delay per vehicle and are summarized in Table 3.1 below.

LOS C or better is considered the accepted standard for peak hour operations, based on the guideline for a Level 2 Highway in a Rural Area Outside Metropolitan Area classification per AT's Highway Geometric Design Guide.

Table 4.1: Level of Service Criteria

LOS		A	B	C	D	E	F
Delay, sec/vehicle	Signalized	< 10	10 – 20	20 – 35	35 – 55	55 – 80	> 80
	Unsignalized	< 10	10 – 15	15 – 25	25 – 35	35 – 50	> 50

Synchro also calculates each movement's volume to capacity (v/c) ratio. A v/c ratio of 1.0 represents an intersection or movement at full capacity with no ability to facilitate extra vehicles. Typically, v/c ratio of 0.90 or less for all intersection movements is the accepted standard for peak hour operations, with v/c of 1.0 accepted where limited to certain movements.

Synchro analysis also calculates the 95th percentile vehicle queue length for each intersection movement, which provides the criteria for left and right turn storage requirements. This queue length is exceeded 5% of the time, which is accepted practice for normal peak hour operation.

Synchro analysis was used to evaluate the following intersections:

- Highway 543 / Range Road 10
- Coal Trail / Range Road 10
- Coal Trail / Rimrock Feeders access
- Range Road 10 / Rimrock Biodigester access

As of writing, there are two accesses proposed for the development to allow ease of turning around for the industrial traffic. To be conservative for the traffic analysis, it was assumed that there is only the one access.

4.2 2022 Background

The 2022 Background was analyzed in Synchro using existing lane configurations (shown in Exhibit 4.1). The results are attached in Appendix C and summarized in Table 4.2. From the analysis, all study intersections operate well within the acceptable performance criteria.

Table 4.2: 2022 Background Results

Intersection		AM Peak			PM Peak		
Name	Movement	v/c Ratio	LOS	Queue Length 95th (m)	v/c Ratio	LOS	Queue Length 95th (m)
Highway 543 / Range Road 10 (N-S Stop)	EBL/T/R	0.00	A	0	0.00	A	0
	WBL/T/R	0.01	A	0	0.02	A	0
	NBL/T/R	0.04	A	1	0.02	A	1
	SBL/T/R	0.00	A	0	0.00	A	0
Coal Trail / Range Road 10 (N-S Stop)	EBL/T/R	0.01	A	0	0.01	A	0
	WBL/T/R	0.00	A	0	0.00	A	0
	NBL/T/R	0.00	A	0	0.01	A	0
	SBL/T/R	0.02	A	0	0.03	A	1
Coal Trail / Rimrock Feeders Access (N Stop)	EBT/R	0.01	A	0	0.01	A	0
	WBL/T	0.00	A	0	0.00	A	0
	NBL/R	0.00	A	0	0.02	A	0

4.3 2022 Background + Development

The 2022 Background + Development was analyzed in Synchro using existing lane configurations with a stop-controlled access at the proposed development (shown in Exhibit 4.2). The results are attached in Appendix C and summarized in Table 4.3. From the analysis, all study intersections operate well within acceptable performance criteria.

Table 4.3: 2022 Background + Development Results

Intersection		AM Peak			PM Peak		
Name	Movement	v/c Ratio	LOS	Queue Length 95th (m)	v/c Ratio	LOS	Queue Length 95th (m)
Highway 543 / Range Road 10 (N-S Stop)	EBL/T/R	0.00	A	0	0.00	A	0
	WBL/T/R	0.01	A	0	0.02	A	1
	NBL/T/R	0.04	A	1	0.03	A	1
	SBL/T/R	0.00	A	0	0.00	A	0
Coal Trail / Range Road 10 (N-S Stop)	EBL/T/R	0.01	A	0	0.01	A	0
	WBL/T/R	0.00	A	0	0.00	A	0
	NBL/T/R	0.01	A	0	0.02	A	0
	SBL/T/R	0.02	A	1	0.04	A	1
Coal Trail / Rimrock Feeders Access (N Stop)	EBT/R	0.01	A	0	0.01	A	0
	WBL/T	0.00	A	0	0.00	A	0
	NBL/R	0.00	A	0	0.02	A	0
Range Road 10 / Rimrock Biodigester Access (W Stop)	WBL/R	0.01	A	0	0.01	A	0
	NBT/R	0.00	A	0	0.00	A	0
	SBL/T	0.01	A	0	0.00	A	0

4.4 2042 Background

The 2042 Background was analyzed in Synchro using existing lane configurations (shown in Exhibit 4.1). The results are attached in Appendix C and summarized in Table 4.4. From the analysis, all study intersections operate well within the acceptable performance criteria.

Table 4.4: 2042 Background

Intersection		AM Peak			PM Peak		
Name	Movement	v/c Ratio	LOS	Queue Length 95th (m)	v/c Ratio	LOS	Queue Length 95th (m)
Highway 543 / Range Road 10 (N-S Stop)	EBL/T/R	0.00	A	0	0.00	A	0
	WBL/T/R	0.01	A	0	0.03	A	1
	NBL/T/R	0.05	A	1	0.03	A	1
	SBL/T/R	0.00	A	0	0.00	A	0
Coal Trail / Range Road 10 (N-S Stop)	EBL/T/R	0.01	A	0	0.01	A	0
	WBL/T/R	0.00	A	0	0.00	A	0
	NBL/T/R	0.00	A	0	0.01	A	0
	SBL/T/R	0.02	A	0	0.04	A	1
Coal Trail / Rimrock Feeders Access (N Stop)	EBT/R	0.01	A	0	0.01	A	0
	WBL/T	0.00	A	0	0.00	A	0
	NBL/R	0.00	A	0	0.02	A	0

4.5 2042 Background + Development

The 2042 Background + Development was analyzed in Synchro using existing lane configurations with a stop-controlled access at the proposed development (shown in Exhibit 4.2). The results are attached in Appendix C and summarized in Table 4.5. From the analysis, all study intersections operate well within the acceptable performance criteria.

Table 4.5: 2042 Background + Development Results

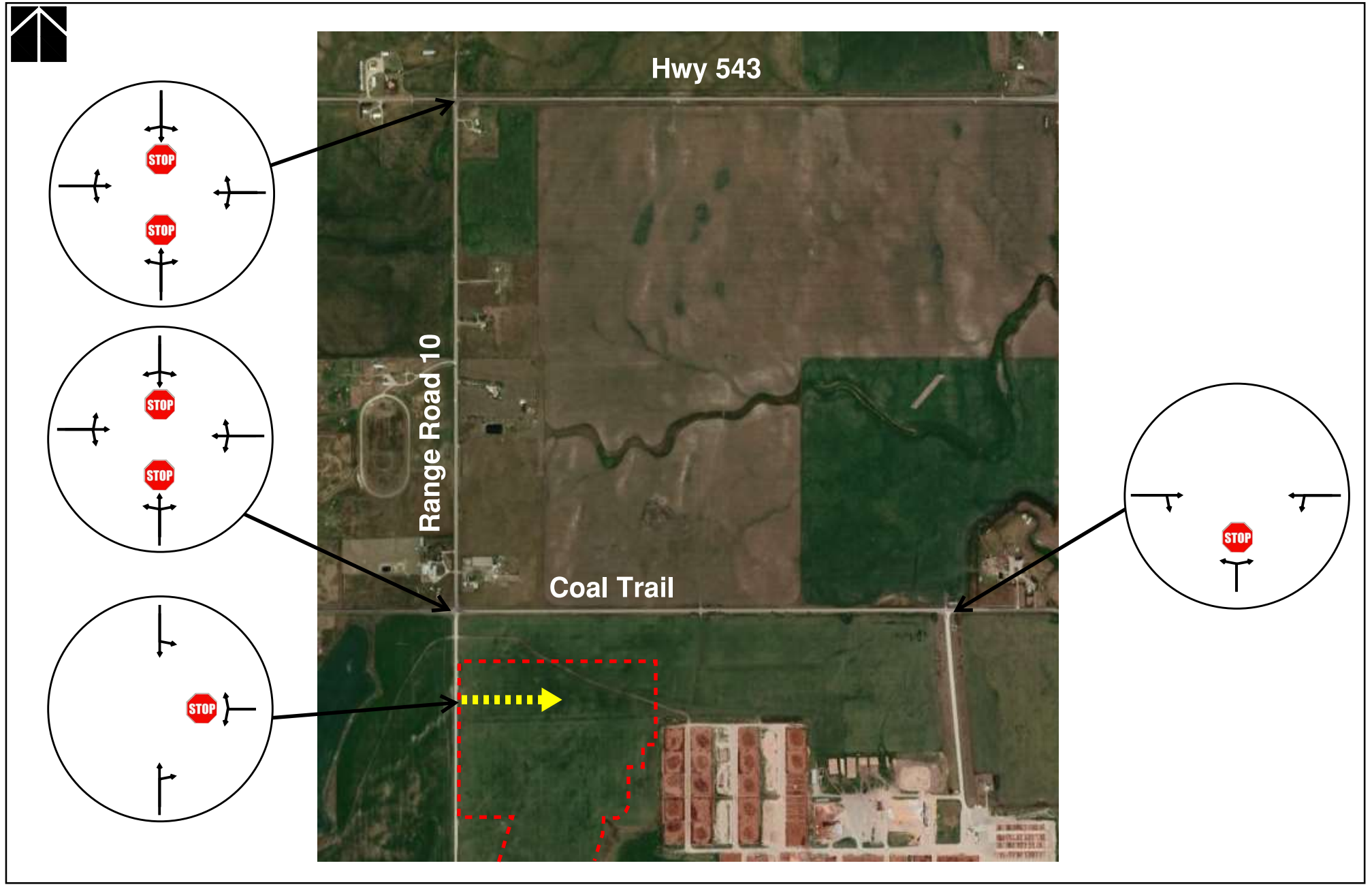
Intersection		AM Peak			PM Peak		
Name	Movement	v/c Ratio	LOS	Queue Length 95th (m)	v/c Ratio	LOS	Queue Length 95th (m)
Highway 543 / Range Road 10 (N-S Stop)	EBL/T/R	0.00	A	0	0.00	A	0
	WBL/T/R	0.02	A	0	0.03	A	1
	NBL/T/R	0.05	A	1	0.04	A	1
	SBL/T/R	0.00	A	0	0.00	A	0
Coal Trail / Range Road 10 (N-S Stop)	EBL/T/R	0.01	A	0	0.01	A	0
	WBL/T/R	0.00	A	0	0.00	A	0
	NBL/T/R	0.01	A	0	0.02	A	1
	SBL/T/R	0.03	A	0	0.05	A	1
Coal Trail / Rimrock Feeders Access (N Stop)	EBT/R	0.01	A	0	0.02	A	0
	WBL/T	0.00	A	0	0.00	A	0
	NBL/R	0.00	A	0	0.02	A	0
Range Road 10 / Rimrock Biodigester Access (W Stop)	WBL/R	0.01	A	0	0.01	A	0
	NBT/R	0.00	A	0	0.00	A	0
	SBL/T	0.01	A	0	0.00	A	0

- - - Site Area

RIMROCK BIODIGESTER FACILITY TIA

EXISTING LANE CONFIGURATIONS

EXHIBIT 4.1
Sep 2022



ISL

TIDEWATER
Midstream and Infrastructure Ltd.

- - - Site Area
Future Access

RIMROCK BIODIGESTER FACILITY TIA

POST DEVELOPMENT LANE CONFIGURATIONS

EXHIBIT 4.2
Sep 2022

5.0 Intersection Improvements

5.1 Signal Warrant

The Transportation Association of Canada's (TAC) "Traffic Signal and Pedestrian Signal Head Warrant Analysis" was completed for both Background + Development scenarios (see Appendix D). In the warrant, the 6-hour peak traffic is required. A conversion factor of 2.61 (local City of Calgary rate) was used to calculate the 6-hour peak from the 100th highest hour volumes as follows: 6-hour peak = (AM Peak + PM Peak) x 2.61

A summary of signal warrant analysis can be found in Table 5.1 below.

Table 5.1: TAC Signal Warrant Results

Intersection	Scenario	Warrant Score	Warranted (Yes/No)
Highway 543 / Range Road 10	2022 Background + Development	01	No
	2042 Background + Development	03	No

Based on the results from the signal warrant, signalization is not warranted at the intersection on Highway 543 in any scenario.

5.2 Illumination Warrant

Currently, Highway 543 / Range Road 10 is not illuminated. Analysis using the Transportation Association of Canada's (TAC) *Illumination of Isolated Rural Intersections* was undertaken to check if full illumination is required for all scenarios. In the warrant, the collision history data for the past 3 years are referenced. From the collision data from AT's Transportation Infrastructure Management System (TIMS) website, there were no reported collisions due to inadequate lighting at Highway 543 / Range Road 10 in the last 5 years.

Based on the illumination warrant, illumination is not required in any scenario. The results of the TAC illumination warrants can be found in Appendix D and a summary of the results can be found in Table 5.2 below.

Table 5.2: TAC Illumination Warrant Results

Illumination Warrant	Total	Warrant	Type
2022 Background	91	No	None
2022 Background + Development	91	No	None
2042 Background	101	No	None
2042 Background + Development	101	No	None

5.3 Left Turn Warrant

The Alberta Transportation Highway Geometric Design Guide Chapter D "At-Grade Intersections" was used for the left-turn warrant analysis at Highway 543 / Range Road 10. The warrant considers several factors, including traffic volumes and design speed. Figure D-7.6 series were used for the intersections analyzed. The results of the left turn warrants are shown in Appendix D and summarized in Table 5.3.

Table 5.3: Left Turn Warrant Results

Left Turn Warrant	Direction	Warrant	Type
2022 Background	Eastbound	No	None
	Westbound	No	None
2022 Background + Development	Eastbound	No	None
	Westbound	No	None
2042 Background	Eastbound	No	None
	Westbound	Yes	IIIb
2042 Background + Development	Eastbound	No	None
	Westbound	Yes	IIIb

The intersection is currently a Type IIb intersection and a Type IIIb westbound intersection upgrade is warranted in the 2042 Background scenario. The upgrade done for the 2042 Background will be sufficient for the 2042 Background + Development scenario and no further upgrades will be required. A Type IIIb intersection is shown in Figure 5.1 below.

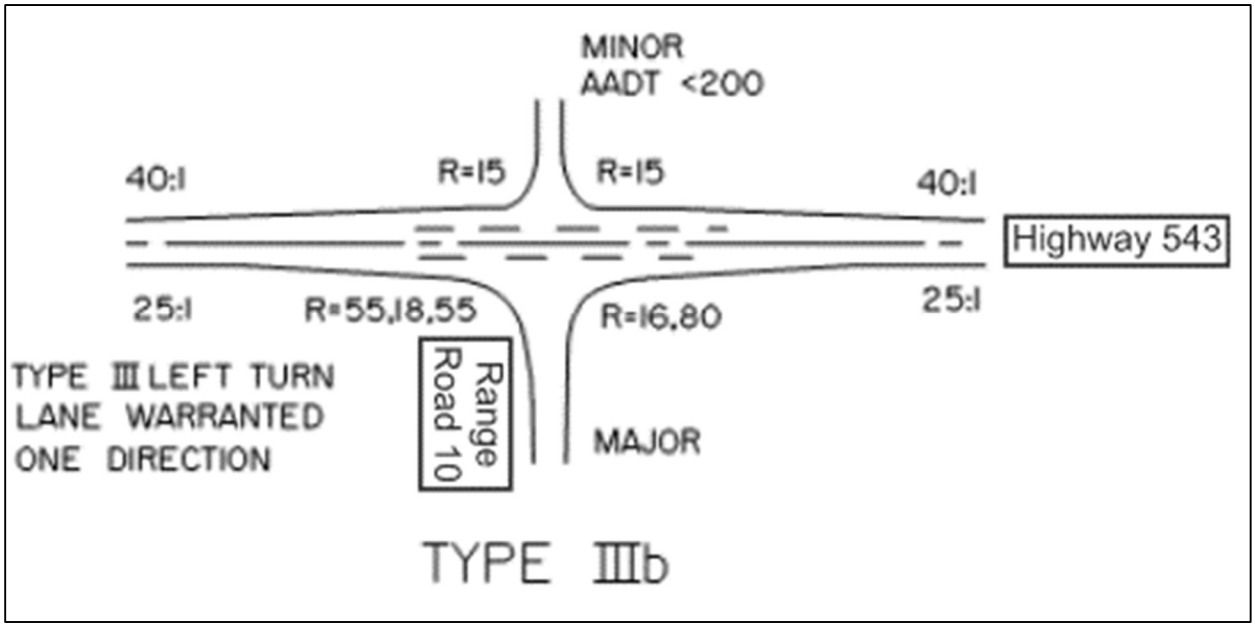


Figure 5.1: Alberta Transportation Type IIIb Intersection – Highway 543 / Range Road 10

5.4 Right Turn Warrant

A right turn warrant analysis as per Section D.7.7 of the “Highway Geometric Design Guide” was undertaken at Highway 543 / Range Road 10. The following conditions must all be met to warrant an exclusive right turn lane at a two-lane highway intersection:

1. Main (or through) road AADT ≥ 1800
2. Intersecting road AADT ≥ 900, and
3. Right turn daily traffic volumes ≥ 360 for the movement in question

Based on the projected traffic volumes, eastbound and westbound right turns are not warranted in any scenario.

6.0 Conclusions

The Rimrock Biodigester Facility Traffic Impact Assessment has been prepared for Tidewater Mainstream and Infrastructure to understand the traffic impacts of the proposed Rimrock Biodigester facility development located in the SE quadrant of the intersection of Coal Trail / Range Road 10 in Foothills County, AB. The following is a summary of the TIA completed for the proposed development:

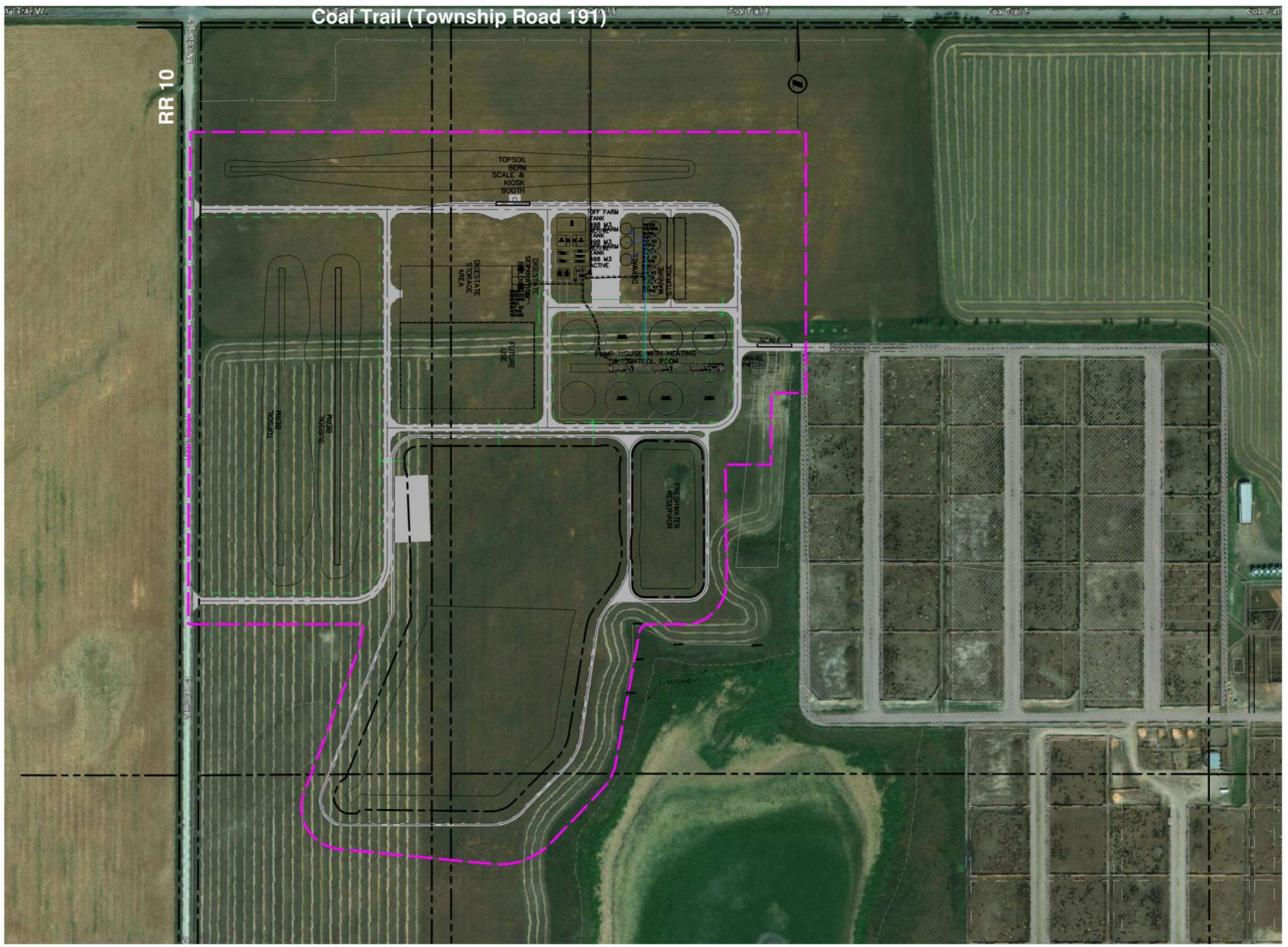
- The proposed biodigester facility will generate 19 trips during the AM peak hour and 19 trips during the PM peak hour, based on expected operations which include employee and industrial traffic.
- The generated trips from the development were added to the 2022 and 2042 Background traffic and were analyzed using Synchro software. Based on the analyses, the Highway 543 / Range Road 10, Coal Trail / Range Road 10, Coal Trail / Rimrock Feeders access, and Range Road 10 / Rimrock Biodigester access intersections will operate well within accepted performance metrics in all scenarios.
- Signal warrant, illumination, left, and right turn warrant analyses were also conducted. The results are as follows:
  - At both the 2022 and 2042 horizons, a traffic signal is not warranted for Highway 543 / Range Road 10.
  - At both the 2022 and 2042 horizons, illumination is not warranted for Highway 543 / Range Road 10.
  - At Highway 543 / Range Road 10 a Type IIIb westbound left turn is warranted for the 2042 Background horizon. Implementing this improvement will be sufficient for the 2042 Background + Development scenario and no further upgrades will be required.
  - At both the 2022 and 2042 horizons, eastbound and westbound right turns are not warranted.

7.0 Closure

ISL Engineering and Land Services Ltd. has prepared this report entitled “Rimrock Biodigester Facility - Transportation Impact Assessment” for Tidewater Mainstream and Infrastructure Ltd. to support the proposed development at the southeast corner of Coal Trail / Range Road 10 in Foothills County. The material contained herein reflects ISL’s best judgment in light of the information available at the time of the study and the level of detail normally expected at the preliminary planning stage.

Any use which a third party makes of this report or reliance on this report or decision made based on this report are the sole responsibility of such third parties. ISL accepts no responsibility for damages, if any suffered by a third party as a result of decisions made, or actions taken, based on this report.

APPENDIX A
Site Plan



NOTES

1. ALL PIPE SIZES ARE IN MILLIMETRES AND ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. ALL COORDINATES AND DISTANCES ARE BASED ON UTM COORDINATE SYSTEM (NAD 83).

LEGEND

ALBERTA ONE CALL

NAD 83 COORDINATES

NO.	DESCRIPTION	DATE (YYYY-MM-DD)	BY	APPD
B	ISSUED FOR BID	2022-06-20	PV	GD
A	ISSUED FOR 90% REVIEW	2022-06-10	PV	GD

PERMIT

SEAL

	BY	DATE (YYYY-MM-DD)
DESIGNED	PV	2022-06-10
DRAWN	JAS	2022-06-10
CHECKED	GD	2022-06-10

SCALE 1:2000 0 40 80 m

ISL

PROJECT

RIMROCK BIODIGESTER
EARLY CIVIL WORKS
FOOTHILLS COUNTY, ALBERTA

SEC: 5 & 6 - TWP: 19 - RGE: 29 - W 4th M

SHEET TITLE

SITE BOUNDARY

FILE NO.	ENG DWG NO.
28028_SiteLayout.dwg	28028
SHEET ID.	SHEET NO.
C300.1	

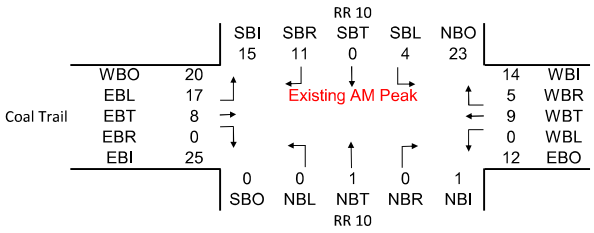
	BY	DATE (YYYY-MM-DD)	PROFILE NO.
DRAWN			

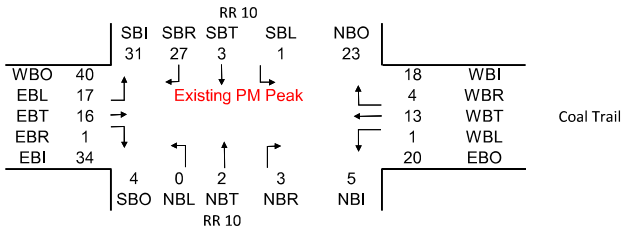
ISC: SHEET SIZE ANSI D 25 mm 0

FILE G:\PROJECTS\28000\28000\28028_RIMROCK_CIVIL_STRUCT_PRELIM_ENGRG_CAD\02_DRAFTING\201_XREF_GLOBAL\28028_SITELAYOUT.DWG | DATE: July 6, 2022 13:46:43

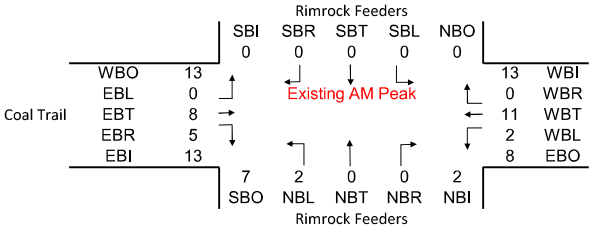
APPENDIX B
Traffic Counts

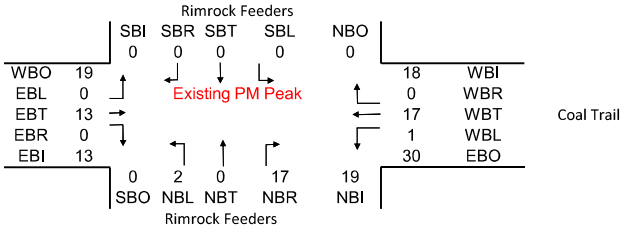
Coal Trail / Range Road 10 - July 20, 2022



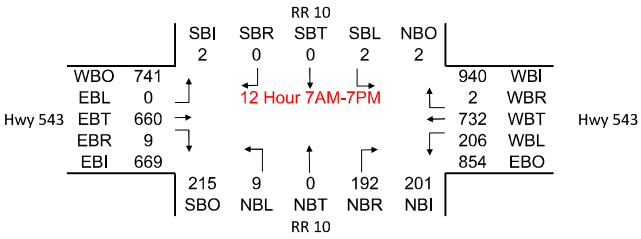


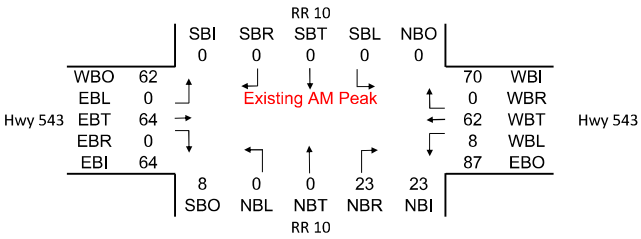
Coal Trail / Rimrock Feeders Access - July 20, 2022

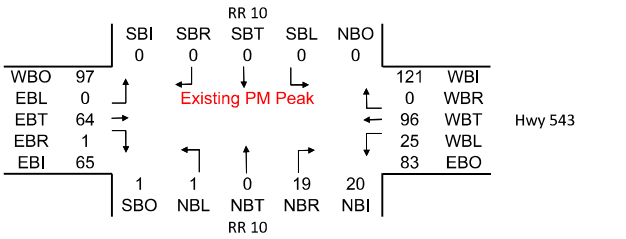




Highway 543 / Range Road 10 - July 20, 2022







APPENDIX C
Synchro Results

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	92	0	12	90	0	0	0	33	0	0	0
Future Volume (vph)	0	92	0	12	90	0	0	0	33	0	0	0
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt								0.865				
Flt Protected					0.994							
Satd. Flow (prot)	0	1834	0	0	1823	0	0	1586	0	0	1834	0
Flt Permitted					0.994							
Satd. Flow (perm)	0	1834	0	0	1823	0	0	1586	0	0	1834	0
Link Speed (k/h)		100			100			80			80	
Link Distance (m)		981.8			934.5			1619.7			68.2	
Travel Time (s)		35.3			33.6			72.9			3.1	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	98	0	13	96	0	0	0	35	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	98	0	0	109	0	0	35	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	22.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	92	0	12	90	0	0	0	33	0	0	0
Future Volume (Veh/h)	0	92	0	12	90	0	0	0	33	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	98	0	13	96	0	0	0	35	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	96			98			220	220	98	255	220	96
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	96			98			220	220	98	255	220	96
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	96	100	100	100
cM capacity (veh/h)	1498			1495			731	672	958	668	672	960

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	98	109	35	0
Volume Left	0	13	0	0
Volume Right	0	0	35	0
cSH	1498	1495	958	1700
Volume to Capacity	0.00	0.01	0.04	0.00
Queue Length 95th (m)	0.0	0.2	0.9	0.0
Control Delay (s)	0.0	0.9	8.9	0.0
Lane LOS		A	A	A
Approach Delay (s)	0.0	0.9	8.9	0.0
Approach LOS			A	A

Intersection Summary				
Average Delay		1.7		
Intersection Capacity Utilization		22.2%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	11	0	0	9	5	0	1	0	4	0	11
Future Volume (vph)	17	11	0	0	9	5	0	1	0	4	0	11
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.955						0.899	
Flt Protected		0.971									0.988	
Satd. Flow (prot)	0	1781	0	0	1751	0	0	1834	0	0	1629	0
Flt Permitted		0.971									0.988	
Satd. Flow (perm)	0	1781	0	0	1751	0	0	1834	0	0	1629	0
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		593.3			1543.8			284.3			1619.7	
Travel Time (s)		26.7			69.5			12.8			72.9	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	18	12	0	0	10	5	0	1	0	4	0	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	30	0	0	15	0	0	1	0	0	16	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 19.6%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	11	0	0	9	5	0	1	0	4	0	11
Future Volume (Veh/h)	17	11	0	0	9	5	0	1	0	4	0	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	18	12	0	0	10	5	0	1	0	4	0	12
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	15			12			72	63	12	61	60	12
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	15			12			72	63	12	61	60	12
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	100	100	99
cM capacity (veh/h)	1603			1607			900	818	1069	925	821	1068

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	30	15	1	16
Volume Left	18	0	0	4
Volume Right	0	5	0	12
cSH	1603	1607	818	1028
Volume to Capacity	0.01	0.00	0.00	0.02
Queue Length 95th (m)	0.3	0.0	0.0	0.4
Control Delay (s)	4.4	0.0	9.4	8.6
Lane LOS	A		A	A
Approach Delay (s)	4.4	0.0	9.4	8.6
Approach LOS			A	A

Intersection Summary				
Average Delay		4.5		
Intersection Capacity Utilization		19.6%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	10	5	2	12	2	0
Future Volume (vph)	10	5	2	12	2	0
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.958					
Flt Protected				0.993	0.950	
Satd. Flow (prot)	1757	0	0	1821	1742	0
Flt Permitted				0.993	0.950	
Satd. Flow (perm)	1757	0	0	1821	1742	0
Link Speed (k/h)	80			80	50	
Link Distance (m)	1543.8			306.8	403.0	
Travel Time (s)	69.5			13.8	29.0	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	5	2	13	2	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	0	15	2	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	10	5	2	12	2	0
Future Volume (Veh/h)	10	5	2	12	2	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	11	5	2	13	2	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			16		30	14
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			16		30	14
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1602		982	1067

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	16	15	2
Volume Left	0	2	2
Volume Right	5	0	0
cSH	1700	1602	982
Volume to Capacity	0.01	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	1.0	8.7
Lane LOS		A	A
Approach Delay (s)	0.0	1.0	8.7
Approach LOS			A

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	70	1	28	106	0	1	0	21	0	0	0
Future Volume (vph)	0	70	1	28	106	0	1	0	21	0	0	0
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998						0.871				
Flt Protected					0.990			0.998				
Satd. Flow (prot)	0	1830	0	0	1816	0	0	1594	0	0	1834	0
Flt Permitted					0.990			0.998				
Satd. Flow (perm)	0	1830	0	0	1816	0	0	1594	0	0	1834	0
Link Speed (k/h)		100			100			80			80	
Link Distance (m)		981.8			934.5			1619.7			68.2	
Travel Time (s)		35.3			33.6			72.9			3.1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	74	1	29	112	0	1	0	22	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	75	0	0	141	0	0	23	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	24.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	70	1	28	106	0	1	0	21	0	0	0
Future Volume (Veh/h)	0	70	1	28	106	0	1	0	21	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	74	1	29	112	0	1	0	22	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	112			75			244	244	74	266	245	112
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	112			75			244	244	74	266	245	112
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			100	100	98	100	100	100
cM capacity (veh/h)	1478			1524			699	645	987	661	645	941

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	75	141	23	0
Volume Left	0	29	1	0
Volume Right	1	0	22	0
cSH	1478	1524	970	1700
Volume to Capacity	0.00	0.02	0.02	0.00
Queue Length 95th (m)	0.0	0.4	0.6	0.0
Control Delay (s)	0.0	1.6	8.8	0.0
Lane LOS		A	A	A
Approach Delay (s)	0.0	1.6	8.8	0.0
Approach LOS			A	A

Intersection Summary				
Average Delay		1.8		
Intersection Capacity Utilization		24.0%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	16	1	1	14	4	0	2	3	1	3	27
Future Volume (vph)	17	16	1	1	14	4	0	2	3	1	3	27
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.973			0.919			0.882	
Flt Protected		0.976			0.998						0.998	
Satd. Flow (prot)	0	1783	0	0	1781	0	0	1685	0	0	1614	0
Flt Permitted		0.976			0.998						0.998	
Satd. Flow (perm)	0	1783	0	0	1781	0	0	1685	0	0	1614	0
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		593.3			1543.8			284.3			1619.7	
Travel Time (s)		26.7			69.5			12.8			72.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	18	17	1	1	15	4	0	2	3	1	3	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	36	0	0	20	0	0	5	0	0	32	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 18.6%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	16	1	1	14	4	0	2	3	1	3	27
Future Volume (Veh/h)	17	16	1	1	14	4	0	2	3	1	3	27
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	18	17	1	1	15	4	0	2	3	1	3	28
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	19			18			102	74	18	76	73	17
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	19			18			102	74	18	76	73	17
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	100	100	97
cM capacity (veh/h)	1597			1599			845	806	1061	900	808	1062

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	36	20	5	32
Volume Left	18	1	0	1
Volume Right	1	4	3	28
cSH	1597	1599	942	1026
Volume to Capacity	0.01	0.00	0.01	0.03
Queue Length 95th (m)	0.3	0.0	0.1	0.7
Control Delay (s)	3.7	0.4	8.8	8.6
Lane LOS	A	A	A	A
Approach Delay (s)	3.7	0.4	8.8	8.6
Approach LOS			A	A

Intersection Summary				
Average Delay		4.9		
Intersection Capacity Utilization		18.6%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	20	0	1	17	2	17
Future Volume (vph)	20	0	1	17	2	17
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.878	
Flt Protected				0.997	0.995	
Satd. Flow (prot)	1834	0	0	1828	1602	0
Flt Permitted				0.997	0.995	
Satd. Flow (perm)	1834	0	0	1828	1602	0
Link Speed (k/h)	80			80	50	
Link Distance (m)	1543.8			306.8	403.0	
Travel Time (s)	69.5			13.8	29.0	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	0	1	18	2	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	21	0	0	19	20	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	20	0	1	17	2	17
Future Volume (Veh/h)	20	0	1	17	2	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	0	1	18	2	18
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			21		41	21
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			21		41	21
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	98
cM capacity (veh/h)			1595		970	1056

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	21	19	20
Volume Left	0	1	2
Volume Right	0	0	18
cSH	1700	1595	1047
Volume to Capacity	0.01	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.4
Control Delay (s)	0.0	0.4	8.5
Lane LOS		A	A
Approach Delay (s)	0.0	0.4	8.5
Approach LOS			A

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	92	0	19	90	0	0	0	40	0	0	0
Future Volume (vph)	0	92	0	19	90	0	0	0	40	0	0	0
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt								0.865				
Flt Protected					0.991							
Satd. Flow (prot)	0	1834	0	0	1817	0	0	1586	0	0	1834	0
Flt Permitted					0.991							
Satd. Flow (perm)	0	1834	0	0	1817	0	0	1586	0	0	1834	0
Link Speed (k/h)		100			100			80			80	
Link Distance (m)		981.8			934.5			1619.7			68.2	
Travel Time (s)		35.3			33.6			72.9			3.1	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	98	0	20	96	0	0	0	43	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	98	0	0	116	0	0	43	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 22.6%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	92	0	19	90	0	0	0	40	0	0	0
Future Volume (Veh/h)	0	92	0	19	90	0	0	0	40	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	98	0	20	96	0	0	0	43	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	96			98			234	234	98	277	234	96
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	96			98			234	234	98	277	234	96
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	96	100	100	100
cM capacity (veh/h)	1498			1495			713	657	958	638	657	960

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	98	116	43	0
Volume Left	0	20	0	0
Volume Right	0	0	43	0
cSH	1498	1495	958	1700
Volume to Capacity	0.00	0.01	0.04	0.00
Queue Length 95th (m)	0.0	0.3	1.1	0.0
Control Delay (s)	0.0	1.4	8.9	0.0
Lane LOS		A	A	A
Approach Delay (s)	0.0	1.4	8.9	0.0
Approach LOS			A	A

Intersection Summary				
Average Delay		2.1		
Intersection Capacity Utilization		22.6%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	11	1	4	9	5	0	8	0	4	7	11
Future Volume (vph)	17	11	1	4	9	5	0	8	0	4	7	11
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.964						0.930	
Flt Protected		0.972			0.990						0.991	
Satd. Flow (prot)	0	1775	0	0	1750	0	0	1834	0	0	1690	0
Flt Permitted		0.972			0.990						0.991	
Satd. Flow (perm)	0	1775	0	0	1750	0	0	1834	0	0	1690	0
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		593.3			1543.8			284.3			1619.7	
Travel Time (s)		26.7			69.5			12.8			72.9	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	18	12	1	4	10	5	0	9	0	4	7	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	31	0	0	19	0	0	9	0	0	23	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	15.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	11	1	4	9	5	0	8	0	4	7	11
Future Volume (Veh/h)	17	11	1	4	9	5	0	8	0	4	7	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	18	12	1	4	10	5	0	9	0	4	7	12
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	15			13			84	72	12	74	70	12
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	15			13			84	72	12	74	70	12
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	99	100	100	99	99
cM capacity (veh/h)	1603			1606			877	808	1068	900	810	1068

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	31	19	9	23
Volume Left	18	4	0	4
Volume Right	1	5	0	12
cSH	1603	1606	808	945
Volume to Capacity	0.01	0.00	0.01	0.02
Queue Length 95th (m)	0.3	0.1	0.3	0.6
Control Delay (s)	4.3	1.5	9.5	8.9
Lane LOS	A	A	A	A
Approach Delay (s)	4.3	1.5	9.5	8.9
Approach LOS			A	A

Intersection Summary					
Average Delay		5.5			
Intersection Capacity Utilization	15.2%	ICU Level of Service		A	
Analysis Period (min)	15				

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	10	5	2	16	2	0
Future Volume (vph)	10	5	2	16	2	0
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.958					
Flt Protected				0.995	0.950	
Satd. Flow (prot)	1757	0	0	1825	1742	0
Flt Permitted				0.995	0.950	
Satd. Flow (perm)	1757	0	0	1825	1742	0
Link Speed (k/h)	80			80	50	
Link Distance (m)	1543.8			306.8	403.0	
Travel Time (s)	69.5			13.8	29.0	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	5	2	17	2	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	0	19	2	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	10	5	2	16	2	0
Future Volume (Veh/h)	10	5	2	16	2	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	11	5	2	17	2	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			16		34	14
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			16		34	14
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1602		977	1067

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	16	19	2
Volume Left	0	2	2
Volume Right	5	0	0
cSH	1700	1602	977
Volume to Capacity	0.01	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.8	8.7
Lane LOS		A	A
Approach Delay (s)	0.0	0.8	8.7
Approach LOS			A

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	7	1	0	12	0
Future Volume (vph)	0	7	1	0	12	0
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected						0.950
Satd. Flow (prot)	1586	0	1834	0	0	1742
Flt Permitted						0.950
Satd. Flow (perm)	1586	0	1834	0	0	1742
Link Speed (k/h)	80		80			80
Link Distance (m)	230.2		91.0			284.3
Travel Time (s)	10.4		4.1			12.8
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	7	1	0	13	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	7	0	1	0	0	13
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02
Turning Speed (k/h)	100	100		100	100	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	17.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	7	1	0	12	0
Future Volume (Veh/h)	0	7	1	0	12	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	7	1	0	13	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	27	1			1	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	27	1			1	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			99	
cM capacity (veh/h)	980	1084			1622	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	7	1	13
Volume Left	0	0	13
Volume Right	7	0	0
cSH	1084	1700	1622
Volume to Capacity	0.01	0.00	0.01
Queue Length 95th (m)	0.1	0.0	0.2
Control Delay (s)	8.3	0.0	7.2
Lane LOS	A		A
Approach Delay (s)	8.3	0.0	7.2
Approach LOS	A		

Intersection Summary				
Average Delay		7.3		
Intersection Capacity Utilization		17.3%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	70	1	35	106	0	1	0	28	0	0	0
Future Volume (vph)	0	70	1	35	106	0	1	0	28	0	0	0
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998						0.869				
Flt Protected					0.988			0.998				
Satd. Flow (prot)	0	1830	0	0	1812	0	0	1590	0	0	1834	0
Flt Permitted					0.988			0.998				
Satd. Flow (perm)	0	1830	0	0	1812	0	0	1590	0	0	1834	0
Link Speed (k/h)		100			100			80			80	
Link Distance (m)		981.8			934.5			1619.7			68.2	
Travel Time (s)		35.3			33.6			72.9			3.1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	74	1	37	112	0	1	0	29	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	75	0	0	149	0	0	30	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 24.4%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	70	1	35	106	0	1	0	28	0	0	0
Future Volume (Veh/h)	0	70	1	35	106	0	1	0	28	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	74	1	37	112	0	1	0	29	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	112			75			260	260	74	290	261	112
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	112			75			260	260	74	290	261	112
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			100	100	97	100	100	100
cM capacity (veh/h)	1478			1524			680	629	987	631	628	941

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	75	149	30	0
Volume Left	0	37	1	0
Volume Right	1	0	29	0
cSH	1478	1524	972	1700
Volume to Capacity	0.00	0.02	0.03	0.00
Queue Length 95th (m)	0.0	0.6	0.7	0.0
Control Delay (s)	0.0	2.0	8.8	0.0
Lane LOS		A	A	A
Approach Delay (s)	0.0	2.0	8.8	0.0
Approach LOS			A	A

Intersection Summary				
Average Delay		2.2		
Intersection Capacity Utilization		24.4%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	16	1	1	14	4	1	9	7	1	10	27
Future Volume (vph)	17	16	1	1	14	4	1	9	7	1	10	27
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.973			0.944			0.905	
Flt Protected		0.976			0.998			0.997			0.999	
Satd. Flow (prot)	0	1783	0	0	1781	0	0	1726	0	0	1658	0
Flt Permitted		0.976			0.998			0.997			0.999	
Satd. Flow (perm)	0	1783	0	0	1781	0	0	1726	0	0	1658	0
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		593.3			1543.8			284.3			1619.7	
Travel Time (s)		26.7			69.5			12.8			72.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	18	17	1	1	15	4	1	9	7	1	11	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	36	0	0	20	0	0	17	0	0	40	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 18.6%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	16	1	1	14	4	1	9	7	1	10	27
Future Volume (Veh/h)	17	16	1	1	14	4	1	9	7	1	10	27
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	18	17	1	1	15	4	1	9	7	1	11	28
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	19			18			106	74	18	84	73	17
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	19			18			106	74	18	84	73	17
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	99	99	100	99	97
cM capacity (veh/h)	1597			1599			834	806	1061	881	808	1062

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	36	20	17	40
Volume Left	18	1	1	1
Volume Right	1	4	7	28
cSH	1597	1599	897	973
Volume to Capacity	0.01	0.00	0.02	0.04
Queue Length 95th (m)	0.3	0.0	0.4	1.0
Control Delay (s)	3.7	0.4	9.1	8.9
Lane LOS	A	A	A	A
Approach Delay (s)	3.7	0.4	9.1	8.9
Approach LOS			A	A

Intersection Summary					
Average Delay			5.7		
Intersection Capacity Utilization		18.6%	ICU Level of Service		A
Analysis Period (min)		15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	24	0	1	17	2	17
Future Volume (vph)	24	0	1	17	2	17
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.878	
Flt Protected				0.997	0.995	
Satd. Flow (prot)	1834	0	0	1828	1602	0
Flt Permitted				0.997	0.995	
Satd. Flow (perm)	1834	0	0	1828	1602	0
Link Speed (k/h)	80			80	50	
Link Distance (m)	1543.8			306.8	403.0	
Travel Time (s)	69.5			13.8	29.0	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	25	0	1	18	2	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	25	0	0	19	20	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	24	0	1	17	2	17
Future Volume (Veh/h)	24	0	1	17	2	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	25	0	1	18	2	18
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			25		45	25
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			25		45	25
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	98
cM capacity (veh/h)			1589		965	1051

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	25	19	20
Volume Left	0	1	2
Volume Right	0	0	18
cSH	1700	1589	1042
Volume to Capacity	0.01	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.4
Control Delay (s)	0.0	0.4	8.5
Lane LOS		A	A
Approach Delay (s)	0.0	0.4	8.5
Approach LOS			A

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	12	5	0	7	5
Future Volume (vph)	0	12	5	0	7	5
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected						0.972
Satd. Flow (prot)	1586	0	1834	0	0	1783
Flt Permitted						0.972
Satd. Flow (perm)	1586	0	1834	0	0	1783
Link Speed (k/h)	80		80			80
Link Distance (m)	230.2		91.0			284.3
Travel Time (s)	10.4		4.1			12.8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	13	5	0	7	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	13	0	5	0	0	12
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02
Turning Speed (k/h)	35	25		25	35	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	16.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	12	5	0	7	5
Future Volume (Veh/h)	0	12	5	0	7	5
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	13	5	0	7	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	24	5			5	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	24	5			5	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	988	1078			1616	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	13	5	12
Volume Left	0	0	7
Volume Right	13	0	0
cSH	1078	1700	1616
Volume to Capacity	0.01	0.00	0.00
Queue Length 95th (m)	0.3	0.0	0.1
Control Delay (s)	8.4	0.0	4.2
Lane LOS	A		A
Approach Delay (s)	8.4	0.0	4.2
Approach LOS	A		

Intersection Summary				
Average Delay		5.3		
Intersection Capacity Utilization		16.7%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	129	0	16	125	0	0	0	40	0	0	0
Future Volume (vph)	0	129	0	16	125	0	0	0	40	0	0	0
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt								0.865				
Flt Protected					0.994							
Satd. Flow (prot)	0	1834	0	0	1823	0	0	1586	0	0	1834	0
Flt Permitted					0.994							
Satd. Flow (perm)	0	1834	0	0	1823	0	0	1586	0	0	1834	0
Link Speed (k/h)		100			100			80			80	
Link Distance (m)		981.8			934.5			1619.7			68.2	
Travel Time (s)		35.3			33.6			72.9			3.1	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	137	0	17	133	0	0	0	43	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	137	0	0	150	0	0	43	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	28.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	129	0	16	125	0	0	0	40	0	0	0
Future Volume (Veh/h)	0	129	0	16	125	0	0	0	40	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	137	0	17	133	0	0	0	43	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	133			137			304	304	137	347	304	133
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	133			137			304	304	137	347	304	133
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	95	100	100	100
cM capacity (veh/h)	1452			1447			643	602	911	574	602	916

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	137	150	43	0
Volume Left	0	17	0	0
Volume Right	0	0	43	0
cSH	1452	1447	911	1700
Volume to Capacity	0.00	0.01	0.05	0.00
Queue Length 95th (m)	0.0	0.3	1.1	0.0
Control Delay (s)	0.0	0.9	9.1	0.0
Lane LOS		A	A	A
Approach Delay (s)	0.0	0.9	9.1	0.0
Approach LOS			A	A

Intersection Summary				
Average Delay		1.6		
Intersection Capacity Utilization	28.0%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	13	0	0	11	6	0	1	0	5	0	13
Future Volume (vph)	20	13	0	0	11	6	0	1	0	5	0	13
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.955						0.901	
Flt Protected		0.971									0.987	
Satd. Flow (prot)	0	1781	0	0	1751	0	0	1834	0	0	1631	0
Flt Permitted		0.971									0.987	
Satd. Flow (perm)	0	1781	0	0	1751	0	0	1834	0	0	1631	0
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		593.3			1543.8			284.3			1619.7	
Travel Time (s)		26.7			69.5			12.8			72.9	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	21	14	0	0	12	6	0	1	0	5	0	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	35	0	0	18	0	0	1	0	0	19	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	21.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	13	0	0	11	6	0	1	0	5	0	13
Future Volume (Veh/h)	20	13	0	0	11	6	0	1	0	5	0	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	21	14	0	0	12	6	0	1	0	5	0	14
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	18			14			85	74	14	72	71	15
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	18			14			85	74	14	72	71	15
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	99	100	99
cM capacity (veh/h)	1599			1604			881	806	1066	910	809	1065

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	35	18	1	19
Volume Left	21	0	0	5
Volume Right	0	6	0	14
cSH	1599	1604	806	1019
Volume to Capacity	0.01	0.00	0.00	0.02
Queue Length 95th (m)	0.3	0.0	0.0	0.4
Control Delay (s)	4.4	0.0	9.5	8.6
Lane LOS	A		A	A
Approach Delay (s)	4.4	0.0	9.5	8.6
Approach LOS			A	A

Intersection Summary				
Average Delay		4.5		
Intersection Capacity Utilization	21.0%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	12	5	2	14	2	0
Future Volume (vph)	12	5	2	14	2	0
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.962					
Flt Protected				0.994	0.950	
Satd. Flow (prot)	1764	0	0	1823	1742	0
Flt Permitted				0.994	0.950	
Satd. Flow (perm)	1764	0	0	1823	1742	0
Link Speed (k/h)	80			80	50	
Link Distance (m)	1543.8			306.8	403.0	
Travel Time (s)	69.5			13.8	29.0	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	13	5	2	15	2	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	0	0	17	2	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	12	5	2	14	2	0
Future Volume (Veh/h)	12	5	2	14	2	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	13	5	2	15	2	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			18		34	16
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			18		34	16
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1599		977	1064

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	18	17	2
Volume Left	0	2	2
Volume Right	5	0	0
cSH	1700	1599	977
Volume to Capacity	0.01	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.9	8.7
Lane LOS		A	A
Approach Delay (s)	0.0	0.9	8.7
Approach LOS			A

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	99	2	39	148	0	1	0	25	0	0	0
Future Volume (vph)	0	99	2	39	148	0	1	0	25	0	0	0
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.997						0.870				
Flt Protected					0.990			0.998				
Satd. Flow (prot)	0	1828	0	0	1816	0	0	1592	0	0	1834	0
Flt Permitted					0.990			0.998				
Satd. Flow (perm)	0	1828	0	0	1816	0	0	1592	0	0	1834	0
Link Speed (k/h)		100			100			80			80	
Link Distance (m)		981.8			934.5			1619.7			68.2	
Travel Time (s)		35.3			33.6			72.9			3.1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	104	2	41	156	0	1	0	26	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	106	0	0	197	0	0	27	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 26.9%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	99	2	39	148	0	1	0	25	0	0	0
Future Volume (Veh/h)	0	99	2	39	148	0	1	0	25	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	104	2	41	156	0	1	0	26	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	156			106			343	343	105	369	344	156
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	156			106			343	343	105	369	344	156
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			100	100	97	100	100	100
cM capacity (veh/h)	1424			1485			598	563	949	559	563	890

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	106	197	27	0
Volume Left	0	41	1	0
Volume Right	2	0	26	0
cSH	1424	1485	929	1700
Volume to Capacity	0.00	0.03	0.03	0.00
Queue Length 95th (m)	0.0	0.6	0.7	0.0
Control Delay (s)	0.0	1.7	9.0	0.0
Lane LOS		A	A	A
Approach Delay (s)	0.0	1.7	9.0	0.0
Approach LOS			A	A

Intersection Summary				
Average Delay		1.8		
Intersection Capacity Utilization		26.9%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	19	1	1	17	5	0	2	4	1	4	32
Future Volume (vph)	20	19	1	1	17	5	0	2	4	1	4	32
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.997			0.972			0.910			0.882	
Flt Protected		0.976			0.998						0.999	
Satd. Flow (prot)	0	1784	0	0	1779	0	0	1669	0	0	1616	0
Flt Permitted		0.976			0.998						0.999	
Satd. Flow (perm)	0	1784	0	0	1779	0	0	1669	0	0	1616	0
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		593.3			1543.8			284.3			1619.7	
Travel Time (s)		26.7			69.5			12.8			72.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	20	1	1	18	5	0	2	4	1	4	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	42	0	0	24	0	0	6	0	0	39	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 18.9%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	19	1	1	17	5	0	2	4	1	4	32
Future Volume (Veh/h)	20	19	1	1	17	5	0	2	4	1	4	32
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	20	1	1	18	5	0	2	4	1	4	34
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	23			21			121	88	20	90	86	20
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	23			21			121	88	20	90	86	20
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	100	99	97
cM capacity (veh/h)	1592			1595			815	792	1057	880	794	1057

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	42	24	6	39
Volume Left	21	1	0	1
Volume Right	1	5	4	34
cSH	1592	1595	951	1017
Volume to Capacity	0.01	0.00	0.01	0.04
Queue Length 95th (m)	0.3	0.0	0.1	0.9
Control Delay (s)	3.7	0.3	8.8	8.7
Lane LOS	A	A	A	A
Approach Delay (s)	3.7	0.3	8.8	8.7
Approach LOS			A	A

Intersection Summary				
Average Delay		5.0		
Intersection Capacity Utilization		18.9%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	24	0	1	20	2	17
Future Volume (vph)	24	0	1	20	2	17
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.878	
Flt Protected				0.998	0.995	
Satd. Flow (prot)	1834	0	0	1830	1602	0
Flt Permitted				0.998	0.995	
Satd. Flow (perm)	1834	0	0	1830	1602	0
Link Speed (k/h)	80			80	50	
Link Distance (m)	1543.8			306.8	403.0	
Travel Time (s)	69.5			13.8	29.0	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	25	0	1	21	2	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	25	0	0	22	20	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	24	0	1	20	2	17
Future Volume (Veh/h)	24	0	1	20	2	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	25	0	1	21	2	18
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			25		48	25
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			25		48	25
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	98
cM capacity (veh/h)			1589		961	1051

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	25	22	20
Volume Left	0	1	2
Volume Right	0	0	18
cSH	1700	1589	1041
Volume to Capacity	0.01	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.4
Control Delay (s)	0.0	0.3	8.5
Lane LOS		A	A
Approach Delay (s)	0.0	0.3	8.5
Approach LOS			A

Intersection Summary				
Average Delay		2.7		
Intersection Capacity Utilization	13.3%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	129	0	23	125	0	0	0	47	0	0	0
Future Volume (vph)	0	129	0	23	125	0	0	0	47	0	0	0
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt								0.865				
Flt Protected					0.992							
Satd. Flow (prot)	0	1834	0	0	1819	0	0	1586	0	0	1834	0
Flt Permitted					0.992							
Satd. Flow (perm)	0	1834	0	0	1819	0	0	1586	0	0	1834	0
Link Speed (k/h)		100			100			80			80	
Link Distance (m)		981.8			934.5			1619.7			68.2	
Travel Time (s)		35.3			33.6			72.9			3.1	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	137	0	24	133	0	0	0	50	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	137	0	0	157	0	0	50	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.4%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	129	0	23	125	0	0	0	47	0	0	0
Future Volume (Veh/h)	0	129	0	23	125	0	0	0	47	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	137	0	24	133	0	0	0	50	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	133			137			318	318	137	368	318	133
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	133			137			318	318	137	368	318	133
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			100	100	95	100	100	100
cM capacity (veh/h)	1452			1447			627	588	911	549	588	916

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	137	157	50	0
Volume Left	0	24	0	0
Volume Right	0	0	50	0
cSH	1452	1447	911	1700
Volume to Capacity	0.00	0.02	0.05	0.00
Queue Length 95th (m)	0.0	0.4	1.3	0.0
Control Delay (s)	0.0	1.3	9.2	0.0
Lane LOS		A	A	A
Approach Delay (s)	0.0	1.3	9.2	0.0
Approach LOS			A	A

Intersection Summary				
Average Delay		1.9		
Intersection Capacity Utilization		28.4%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	13	1	4	11	6	0	8	0	5	7	13
Future Volume (vph)	20	13	1	4	11	6	0	8	0	5	7	13
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.963						0.927	
Flt Protected		0.972			0.991						0.990	
Satd. Flow (prot)	0	1775	0	0	1750	0	0	1834	0	0	1683	0
Flt Permitted		0.972			0.991						0.990	
Satd. Flow (perm)	0	1775	0	0	1750	0	0	1834	0	0	1683	0
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		593.3			1543.8			284.3			1619.7	
Travel Time (s)		26.7			69.5			12.8			72.9	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	21	14	1	4	12	6	0	9	0	5	7	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	36	0	0	22	0	0	9	0	0	26	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	17.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	13	1	4	11	6	0	8	0	5	7	13
Future Volume (Veh/h)	20	13	1	4	11	6	0	8	0	5	7	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	21	14	1	4	12	6	0	9	0	5	7	14
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	18			15			97	82	14	84	80	15
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	18			15			97	82	14	84	80	15
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	99	100	99	99	99
cM capacity (veh/h)	1599			1603			858	795	1065	884	798	1065

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	36	22	9	26
Volume Left	21	4	0	5
Volume Right	1	6	0	14
cSH	1599	1603	795	943
Volume to Capacity	0.01	0.00	0.01	0.03
Queue Length 95th (m)	0.3	0.1	0.3	0.6
Control Delay (s)	4.3	1.3	9.6	8.9
Lane LOS	A	A	A	A
Approach Delay (s)	4.3	1.3	9.6	8.9
Approach LOS			A	A

Intersection Summary				
Average Delay		5.4		
Intersection Capacity Utilization	17.4%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	12	5	2	18	2	0
Future Volume (vph)	12	5	2	18	2	0
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.962					
Flt Protected				0.995	0.950	
Satd. Flow (prot)	1764	0	0	1825	1742	0
Flt Permitted				0.995	0.950	
Satd. Flow (perm)	1764	0	0	1825	1742	0
Link Speed (k/h)	80			80	50	
Link Distance (m)	1543.8			306.8	403.0	
Travel Time (s)	69.5			13.8	29.0	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	13	5	2	19	2	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	0	0	21	2	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	12	5	2	18	2	0
Future Volume (Veh/h)	12	5	2	18	2	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	13	5	2	19	2	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			18		38	16
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			18		38	16
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1599		972	1064

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	18	21	2
Volume Left	0	2	2
Volume Right	5	0	0
cSH	1700	1599	972
Volume to Capacity	0.01	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.7	8.7
Lane LOS		A	A
Approach Delay (s)	0.0	0.7	8.7
Approach LOS			A

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	7	1	0	12	0
Future Volume (vph)	0	7	1	0	12	0
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected						0.950
Satd. Flow (prot)	1586	0	1834	0	0	1742
Flt Permitted						0.950
Satd. Flow (perm)	1586	0	1834	0	0	1742
Link Speed (k/h)	80		80			80
Link Distance (m)	230.2		91.0			284.3
Travel Time (s)	10.4		4.1			12.8
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	7	1	0	13	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	7	0	1	0	0	13
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02
Turning Speed (k/h)	100	100		100	100	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	17.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	7	1	0	12	0
Future Volume (Veh/h)	0	7	1	0	12	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	7	1	0	13	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	27	1			1	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	27	1			1	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			99	
cM capacity (veh/h)	980	1084			1622	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	7	1	13
Volume Left	0	0	13
Volume Right	7	0	0
cSH	1084	1700	1622
Volume to Capacity	0.01	0.00	0.01
Queue Length 95th (m)	0.1	0.0	0.2
Control Delay (s)	8.3	0.0	7.2
Lane LOS	A		A
Approach Delay (s)	8.3	0.0	7.2
Approach LOS	A		

Intersection Summary			
Average Delay	7.3		
Intersection Capacity Utilization	17.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	99	2	46	148	0	1	0	32	0	0	0
Future Volume (vph)	0	99	2	46	148	0	1	0	32	0	0	0
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.997						0.869				
Flt Protected					0.988			0.999				
Satd. Flow (prot)	0	1828	0	0	1812	0	0	1592	0	0	1834	0
Flt Permitted					0.988			0.999				
Satd. Flow (perm)	0	1828	0	0	1812	0	0	1592	0	0	1834	0
Link Speed (k/h)		100			100			80			80	
Link Distance (m)		981.8			934.5			1619.7			68.2	
Travel Time (s)		35.3			33.6			72.9			3.1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	104	2	48	156	0	1	0	34	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	106	0	0	204	0	0	35	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	27.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	99	2	46	148	0	1	0	32	0	0	0
Future Volume (Veh/h)	0	99	2	46	148	0	1	0	32	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	104	2	48	156	0	1	0	34	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	156			106			357	357	105	391	358	156
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	156			106			357	357	105	391	358	156
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			100	100	96	100	100	100
cM capacity (veh/h)	1424			1485			584	551	949	534	550	890

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	106	204	35	0
Volume Left	0	48	1	0
Volume Right	2	0	34	0
cSH	1424	1485	933	1700
Volume to Capacity	0.00	0.03	0.04	0.00
Queue Length 95th (m)	0.0	0.8	0.9	0.0
Control Delay (s)	0.0	2.0	9.0	0.0
Lane LOS		A	A	A
Approach Delay (s)	0.0	2.0	9.0	0.0
Approach LOS			A	A

Intersection Summary				
Average Delay		2.1		
Intersection Capacity Utilization		27.3%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	19	1	1	17	5	1	9	8	1	11	32
Future Volume (vph)	20	19	1	1	17	5	1	9	8	1	11	32
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.997			0.972			0.940			0.902	
Flt Protected		0.976			0.998			0.997			0.999	
Satd. Flow (prot)	0	1784	0	0	1779	0	0	1719	0	0	1653	0
Flt Permitted		0.976			0.998			0.997			0.999	
Satd. Flow (perm)	0	1784	0	0	1779	0	0	1719	0	0	1653	0
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		593.3			1543.8			284.3			1619.7	
Travel Time (s)		26.7			69.5			12.8			72.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	20	1	1	18	5	1	9	8	1	12	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	42	0	0	24	0	0	18	0	0	47	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 18.9%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	19	1	1	17	5	1	9	8	1	11	32
Future Volume (Veh/h)	20	19	1	1	17	5	1	9	8	1	11	32
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	20	1	1	18	5	1	9	8	1	12	34
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	23			21			125	88	20	98	86	20
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	23			21			125	88	20	98	86	20
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	99	99	100	98	97
cM capacity (veh/h)	1592			1595			804	792	1057	861	794	1057

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	42	24	18	47
Volume Left	21	1	1	1
Volume Right	1	5	8	34
cSH	1592	1595	892	970
Volume to Capacity	0.01	0.00	0.02	0.05
Queue Length 95th (m)	0.3	0.0	0.5	1.2
Control Delay (s)	3.7	0.3	9.1	8.9
Lane LOS	A	A	A	A
Approach Delay (s)	3.7	0.3	9.1	8.9
Approach LOS			A	A

Intersection Summary				
Average Delay		5.7		
Intersection Capacity Utilization	18.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	28	0	1	20	2	17
Future Volume (vph)	28	0	1	20	2	17
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.878	
Flt Protected				0.998	0.995	
Satd. Flow (prot)	1834	0	0	1830	1602	0
Flt Permitted				0.998	0.995	
Satd. Flow (perm)	1834	0	0	1830	1602	0
Link Speed (k/h)	80			80	50	
Link Distance (m)	1543.8			306.8	403.0	
Travel Time (s)	69.5			13.8	29.0	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	29	0	1	21	2	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	29	0	0	22	20	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	28	0	1	20	2	17
Future Volume (Veh/h)	28	0	1	20	2	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	29	0	1	21	2	18
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			29		52	29
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			29		52	29
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	98
cM capacity (veh/h)			1584		956	1046

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	29	22	20
Volume Left	0	1	2
Volume Right	0	0	18
cSH	1700	1584	1036
Volume to Capacity	0.02	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.4
Control Delay (s)	0.0	0.3	8.5
Lane LOS		A	A
Approach Delay (s)	0.0	0.3	8.5
Approach LOS			A

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	12	6	0	7	6
Future Volume (vph)	0	12	6	0	7	6
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected						0.974
Satd. Flow (prot)	1586	0	1834	0	0	1786
Flt Permitted						0.974
Satd. Flow (perm)	1586	0	1834	0	0	1786
Link Speed (k/h)	80		80			80
Link Distance (m)	230.2		91.0			284.3
Travel Time (s)	10.4		4.1			12.8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	13	6	0	7	6
Shared Lane Traffic (%)						
Lane Group Flow (vph)	13	0	6	0	0	13
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02
Turning Speed (k/h)	35	25		25	35	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	16.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	12	6	0	7	6
Future Volume (Veh/h)	0	12	6	0	7	6
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	13	6	0	7	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	26	6			6	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	26	6			6	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	985	1077			1615	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	13	6	13
Volume Left	0	0	7
Volume Right	13	0	0
cSH	1077	1700	1615
Volume to Capacity	0.01	0.00	0.00
Queue Length 95th (m)	0.3	0.0	0.1
Control Delay (s)	8.4	0.0	3.9
Lane LOS	A		A
Approach Delay (s)	8.4	0.0	3.9
Approach LOS	A		

Intersection Summary				
Average Delay		5.0		
Intersection Capacity Utilization		16.7%	ICU Level of Service	A
Analysis Period (min)		15		

APPENDIX D
Warrant Results

Alberta Transportation - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	Hwy 543	Direction (EW or NS)	EW	Road Authority:	Alberta Transportation
Side Street (name)	RR 10	Direction (EW or NS)	NS	City:	Foothills County
Quadrant / Int #		Comments	2022 Back+Dev AM + PM Peak times 2.61	Analysis Date:	2022 Aug 04, Thu
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET			Count Date:	2022 Jul 20, Wed
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Hwy 543	WB				1				8,500	1			
Hwy 543	EB				1				8,500	1			
RR 10	NB				1					1			
RR 10	SB				1					1			

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

Are the RR 10 NB right turns significantly impeded by through movements? (y/n)	n
Are the RR 10 SB right turns significantly impeded by through movements? (y/n)	n
Are the Hwy 543 WB right turns significantly impeded by through movements? (y/n)	n
Are the Hwy 543 EB right turns significantly impeded by through movements? (y/n)	n

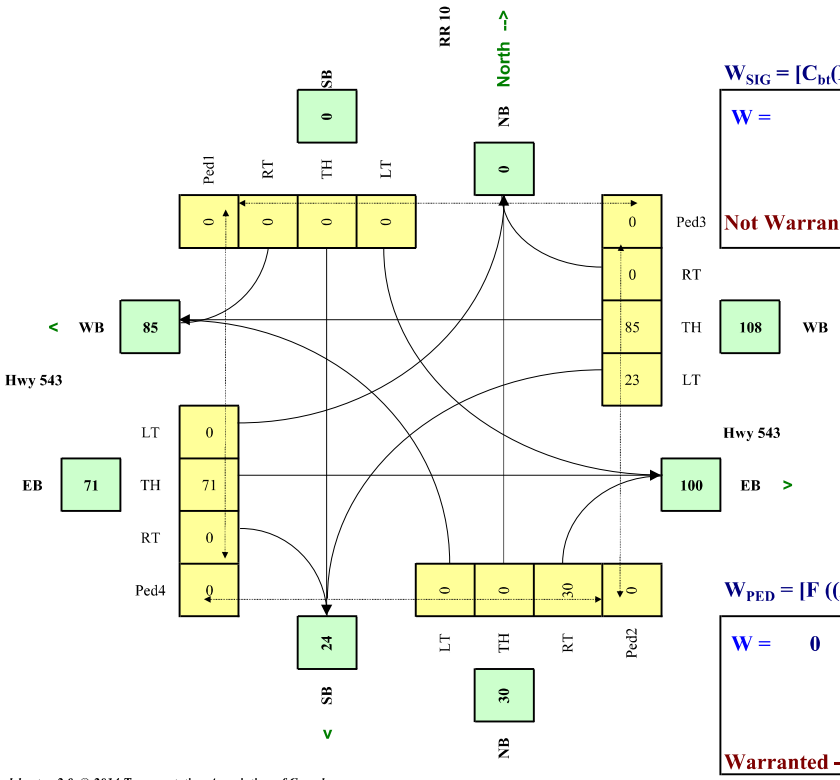
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	23,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Hwy 543	EW	100	9.0%	n	0.0
RR 10	NS		9.0%	n	0.0

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
6 Hour Average																
	3	0	178	0	0	0	139	509	0	0	425	3				
Total (6-hour peak)	3	0	178	0	0	0	139	509	0	0	425	3	0	0	0	0
Average (6-hour peak)	0	0	30	0	0	0	23	85	0	0	71	0	0	0	0	0
Actual Pedestrian Crossing Distance (m)																

Average 6-hour Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F (X_{v\text{-}p}) L) / K_2] \times C_i$

W =	1	1	0
		Veh	*Ped*

Not Warranted - Vs<75

RESET SHEET

$W_{PED} = [F ((Xped_m)d_m/K_2) + (Xped_s)d_s/K_3)]$

W = 0

Warranted - Complex Intersection

Alberta Transportation - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	Hwy 543	Direction (EW or NS)	EW	Road Authority:	Alberta Transportation
Side Street (name)	RR 10	Direction (EW or NS)	NS	City:	Foothills County
Quadrant / Int #		Comments	2042 Back+Dev AM + PM Peak times 2.61	Analysis Date:	2022 Aug 04, Thu
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET			Count Date:	2022 Jul 20, Wed
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Hwy 543	WB				1				8,500	1			
Hwy 543	EB				1				8,500	1			
RR 10	NB				1					1			
RR 10	SB				1					1			

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

Are the RR 10 NB right turns significantly impeded by through movements? (y/n)	n
Are the RR 10 SB right turns significantly impeded by through movements? (y/n)	n
Are the Hwy 543 WB right turns significantly impeded by through movements? (y/n)	n
Are the Hwy 543 EB right turns significantly impeded by through movements? (y/n)	n

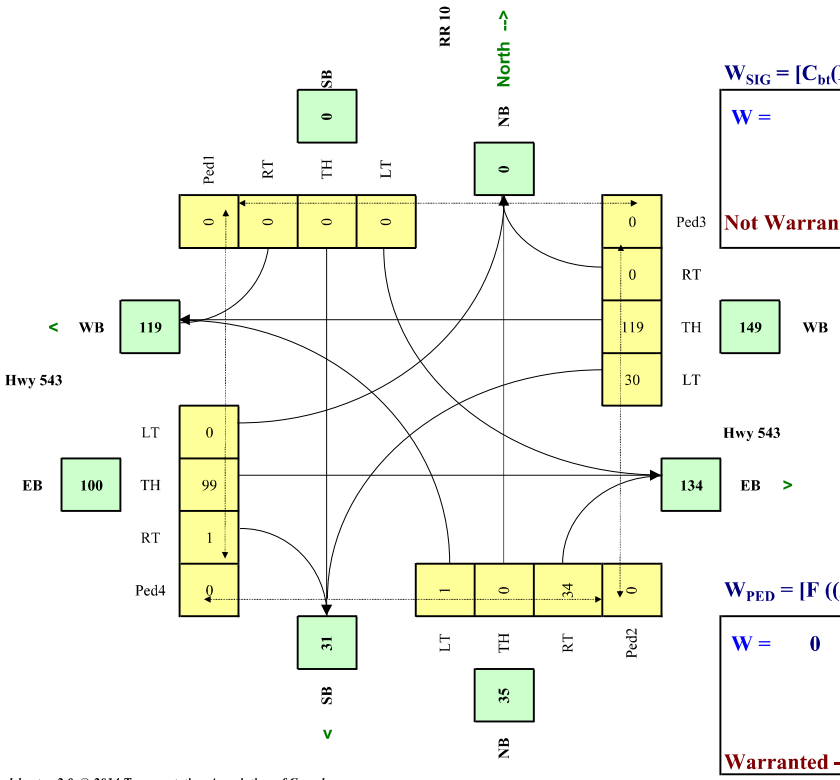
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	23,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Hwy 543	EW	100	9.0%	n	0.0
RR 10	NS		9.0%	n	0.0

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
6 Hour Average																
	3	0	206	0	0	0	179	713	0	0	595	4				
Total (6-hour peak)	3	0	206	0	0	0	179	713	0	0	595	4	0	0	0	0
Average (6-hour peak)	1	0	34	0	0	0	30	119	0	0	99	1	0	0	0	0
Actual Pedestrian Crossing Distance (m)																

Average 6-hour Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F (X_{v\text{-}p}) L) / K_2] \times C_i$

W =	3	3	0
		Veh	*Ped*

Not Warranted - Vs<75

RESET SHEET

$W_{PED} = [F ((Xped_m)d_m/K_2) + (Xped_s)d_s/K_3)]$

W = 0

Warranted - Complex Intersection

Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

This spreadsheet is to be used in conjunction with *Illumination of Isolated Rural Intersections*, Transportation Association of Canada, February 2001.

Please enter information in the cells with yellow background

INTERSECTION CHARACTERISTICS

Highway 543	Main Road
Range Road 10	Minor Road
Foothills County	City/Town

Date August 4, 2022
Other 2022 Background

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	0		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	N				OK	
Highest operating speed on raised, channelized approach (km/h)			5		OK	
Channelization Factor					OK	0
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	100				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =	B	0				
Posted Speed Category =		0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	0.0	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	4	2	3	Number of legs = 3 or more	OK	6
					Geometric Factors Subtotal	**6**

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	N			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	2250	2	10	Either Use the two AADT inputs **OR** the Descriptive Signalization Warrant (Unused values should be set to Zero) Refer to Table 1(B) for description and rating values for signalization warrant.	OK	20
AADT on Minor Road (2-way)	500	1	20		OK	20
Signalization Warrant	Descriptive	0	30		OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	100	4	5	Refer to Table 1(B), note #3	OK	20
Operating Speed on Minor Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
					Operational Factors Subtotal	**80**

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	1	1	5	Maximum of 4 quadrants	OK	5
					Environmental Factor Subtotal	**5**

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4)	OK	0
OR				**OR** the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)	0	0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of **all** night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
					Collision History Subtotal	**0**

Check Intersection Signalization:
Intersection is not Signalized

LIGHTING IS NOT WARRANTED

SUMMARY	
Geometric Factors Subtotal	6
Operational Factor Subtotal	80
Environmental Factor Subtotal	5
Collision History Subtotal	0
TOTAL POINTS	**91**

Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

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Please enter information in the cells with yellow background

INTERSECTION CHARACTERISTICS

Highway 543	Main Road
Range Road 10	Minor Road
Foothills County	City/Town

Date August 4, 2022
Other 2022 Background + Dev

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	0		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	N				OK	
Highest operating speed on raised, channelized approach (km/h)			5		OK	
Channelization Factor					OK	0
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	100				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =	B	0				
Posted Speed Category =		0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	0.0	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	4	2	3	Number of legs = 3 or more	OK	6
					Geometric Factors Subtotal	**6**

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	N			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	2400	2	10	Either Use the two AADT inputs **OR** the Descriptive Signalization Warrant (Unused values should be set to Zero) Refer to Table 1(B) for description and rating values for signalization warrant.	OK	20
AADT on Minor Road (2-way)	650	1	20		OK	20
Signalization Warrant	Descriptive	0	30		OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	100	4	5	Refer to Table 1(B), note #3	OK	20
Operating Speed on Minor Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
					Operational Factors Subtotal	**80**

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	1	1	5	Maximum of 4 quadrants	OK	5
					Environmental Factor Subtotal	**5**

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4)	OK	0
OR				**OR** the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)	0	0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of **all** night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
					Collision History Subtotal	**0**

Check Intersection Signalization:
Intersection is not Signalized

LIGHTING IS NOT WARRANTED

SUMMARY	
Geometric Factors Subtotal	6
Operational Factor Subtotal	80
Environmental Factor Subtotal	5
Collision History Subtotal	0
TOTAL POINTS	**91**

Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

This spreadsheet is to be used in conjunction with *Illumination of Isolated Rural Intersections*, Transportation Association of Canada, February 2001.

Please enter information in the cells with yellow background

INTERSECTION CHARACTERISTICS

Highway 543	Main Road
Range Road 10	Minor Road
Foothills County	City/Town

Date August 4, 2022
Other 2042 Background

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	0		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	N				OK	
Highest operating speed on raised, channelized approach (km/h)			5		OK	
Channelization Factor					OK	0
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	100				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =	B	0				
Posted Speed Category =		0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	0.0	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	4	2	3	Number of legs = 3 or more	OK	6
					Geometric Factors Subtotal	**6**

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	N			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	3100	3	10	Either Use the two AADT inputs **OR** the Descriptive Signalization	OK	30
AADT on Minor Road (2-way)	660	1	20	Warrant (Unused values should be set to Zero) Refer to Table	OK	20
Signalization Warrant	Descriptive	0	30	1(B) for description and rating values for signalization warrant.	OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	100	4	5	Refer to Table 1(B), note #3	OK	20
Operating Speed on Minor Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
					Operational Factors Subtotal	**90**

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	1	1	5	Maximum of 4 quadrants	OK	5
					Environmental Factor Subtotal	**5**

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4)	OK	0
OR				**OR** the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)	0	0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of **all** night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
					Collision History Subtotal	**0**

Check Intersection Signalization:
Intersection is not Signalized

LIGHTING IS NOT WARRANTED

SUMMARY	
Geometric Factors Subtotal	6
Operational Factor Subtotal	90
Environmental Factor Subtotal	5
Collision History Subtotal	0
TOTAL POINTS	**101**

Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

This spreadsheet is to be used in conjunction with *Illumination of Isolated Rural Intersections*, Transportation Association of Canada, February 2001.

Please enter information in the cells with yellow background

INTERSECTION CHARACTERISTICS

Highway 543	Main Road
Range Road 10	Minor Road
Foothills County	City/Town

Date August 4, 2022
Other 2042 Background + Dev

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	0		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	N				OK	
Highest operating speed on raised, channelized approach (km/h)			5		OK	
Channelization Factor					OK	0
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	100				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =	B	0				
Posted Speed Category =		0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	0.0	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	4	2	3	Number of legs = 3 or more	OK	6
					Geometric Factors Subtotal	**6**

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	N			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	3200	3	10	Either Use the two AADT inputs **OR** the Descriptive Signalization Warrant (Unused values should be set to Zero) Refer to Table 1(B) for description and rating values for signalization warrant.	OK	30
AADT on Minor Road (2-way)	800	1	20		OK	20
Signalization Warrant	Descriptive	0	30		OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	100	4	5	Refer to Table 1(B), note #3	OK	20
Operating Speed on Minor Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
					Operational Factors Subtotal	**90**

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	1	1	5	Maximum of 4 quadrants	OK	5
					Environmental Factor Subtotal	**5**

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4)	OK	0
OR				**OR** the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)	0	0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of **all** night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
					Collision History Subtotal	**0**

Check Intersection Signalization:
Intersection is not Signalized

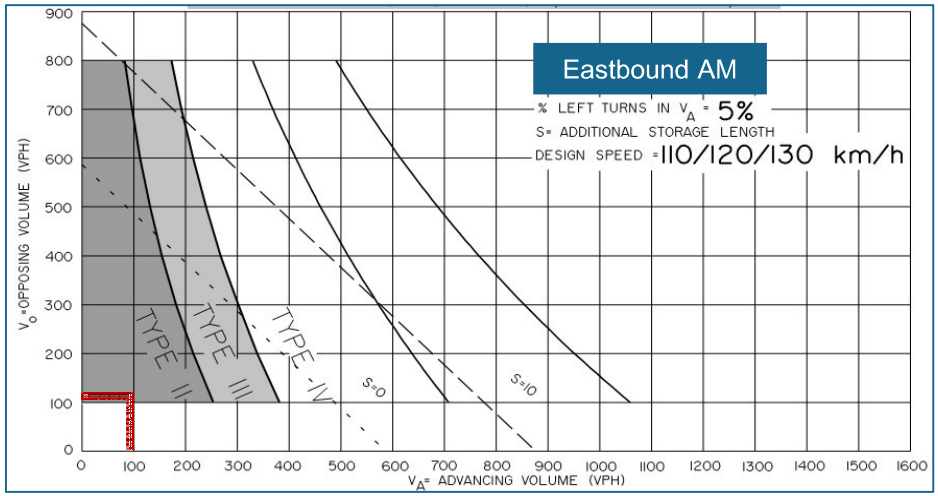
LIGHTING IS NOT WARRANTED

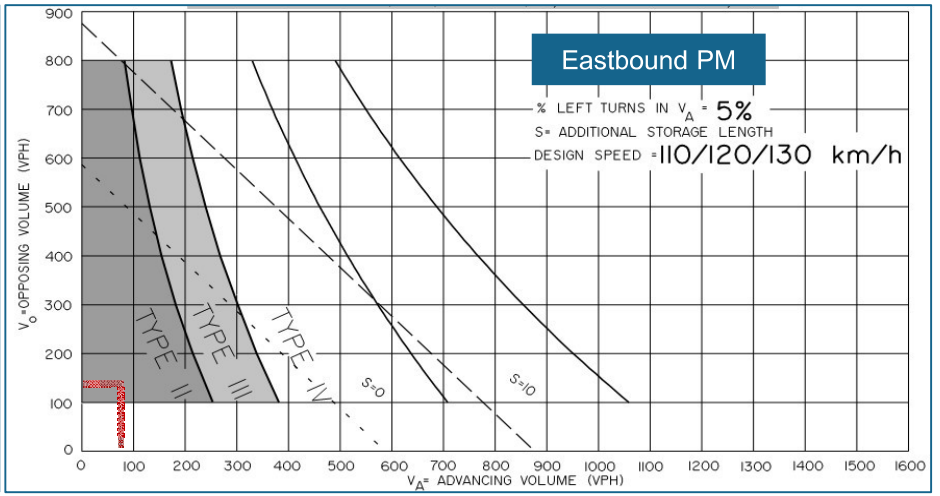
SUMMARY	
Geometric Factors Subtotal	6
Operational Factor Subtotal	90
Environmental Factor Subtotal	5
Collision History Subtotal	0
TOTAL POINTS	**101**

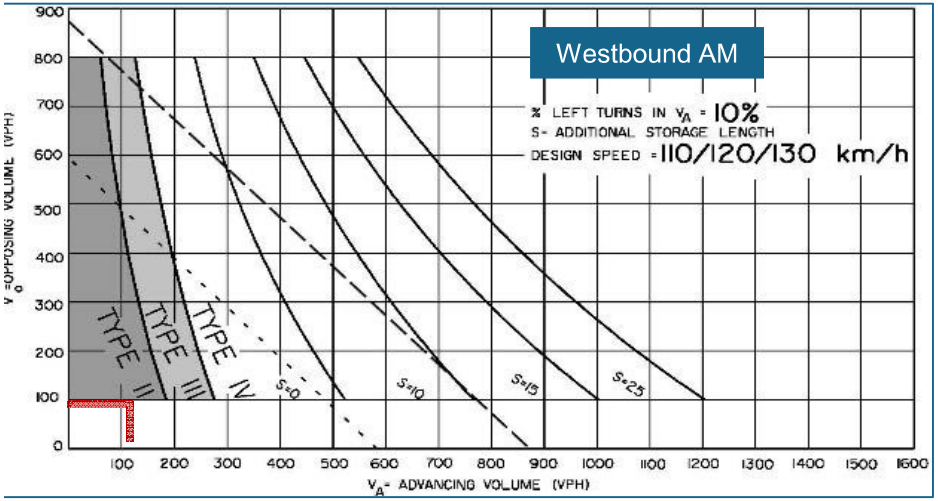
Alberta Transportation Turn Lane Warrants

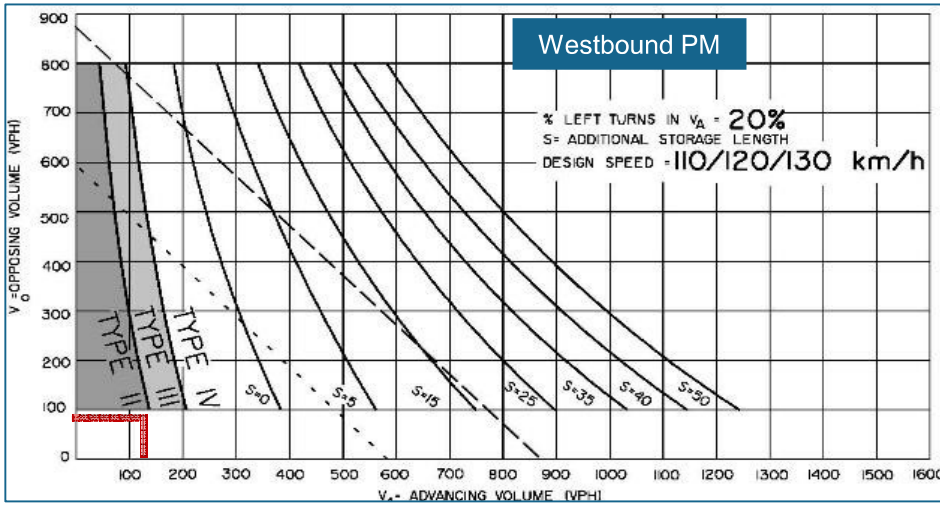
Intersection: *Highway 543 at RR 10*

Scenario: *2022 Background*





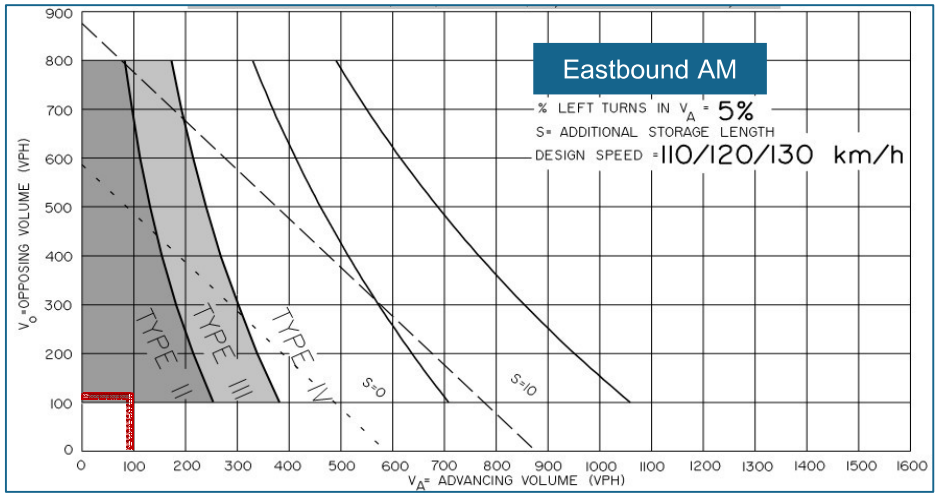


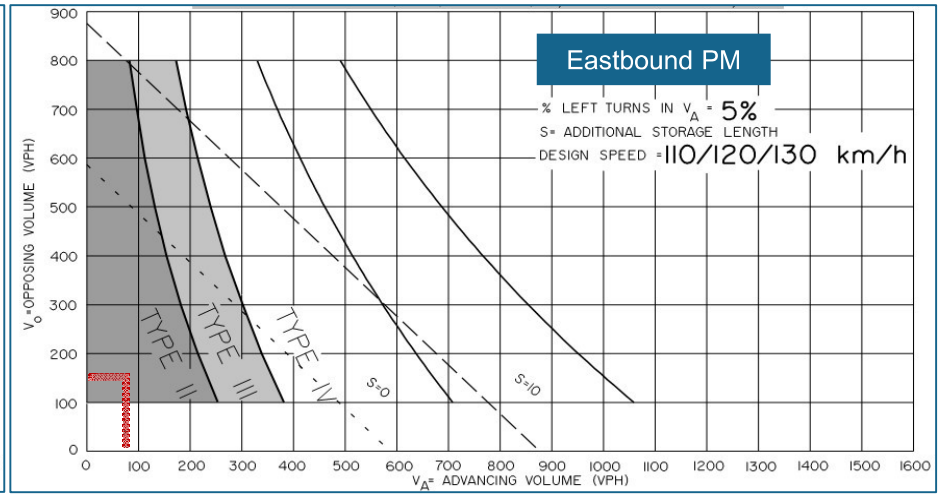


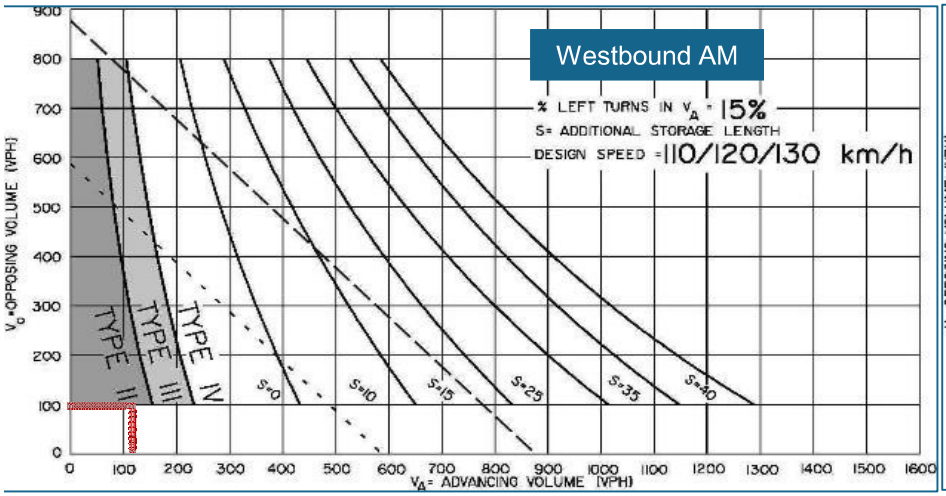
Alberta Transportation Turn Lane Warrants

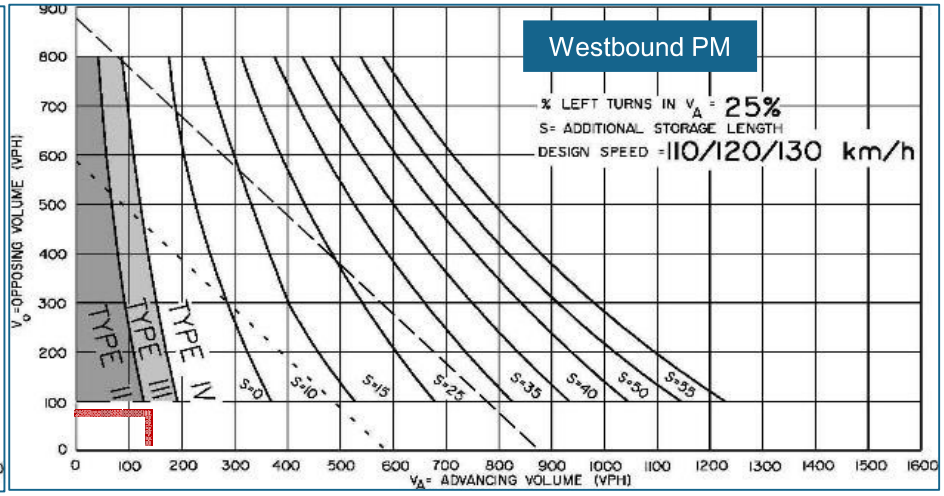
Intersection: *Highway 543 at RR 10*

Scenario: *2022 Background + Dev*





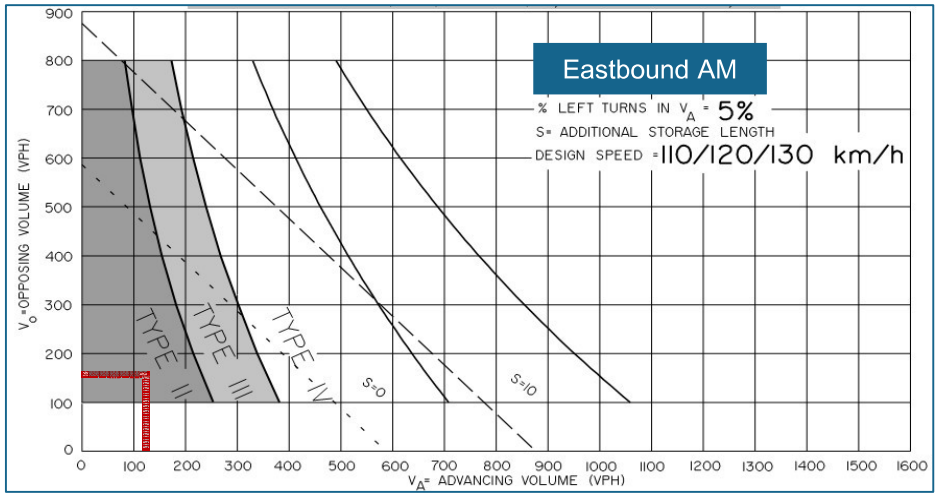


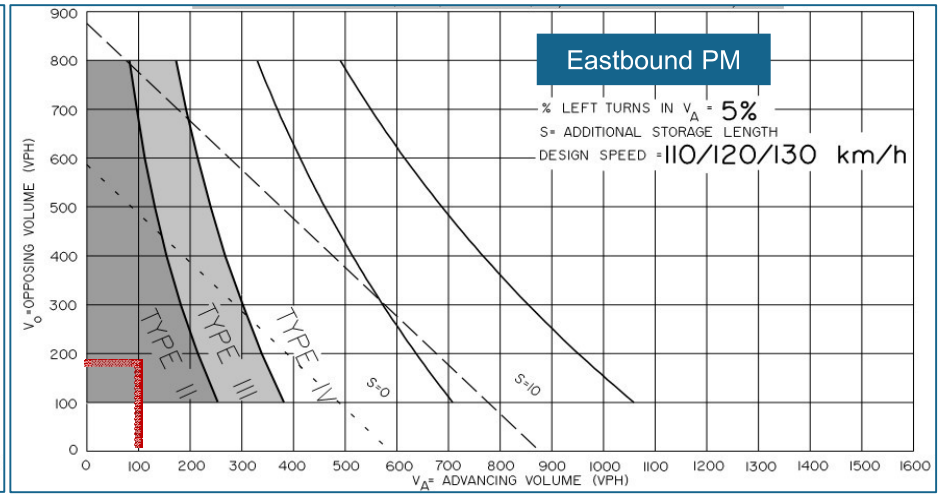


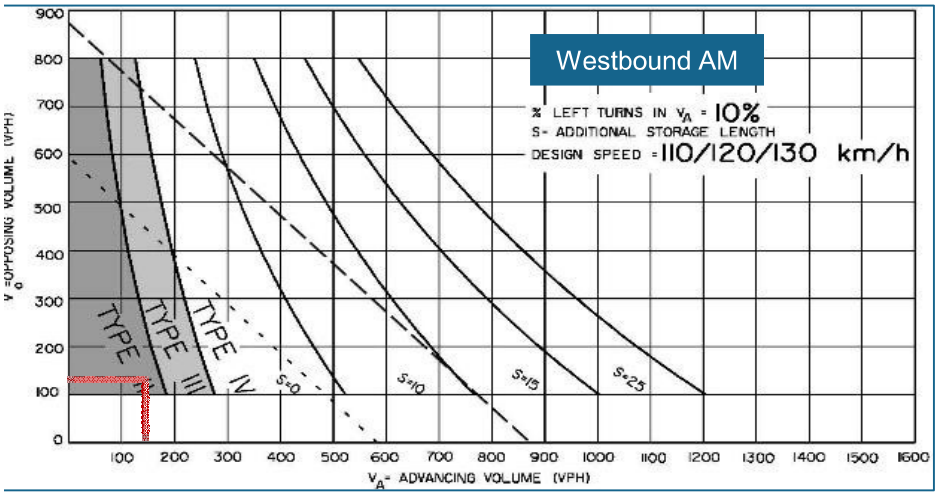
Alberta Transportation Turn Lane Warrants

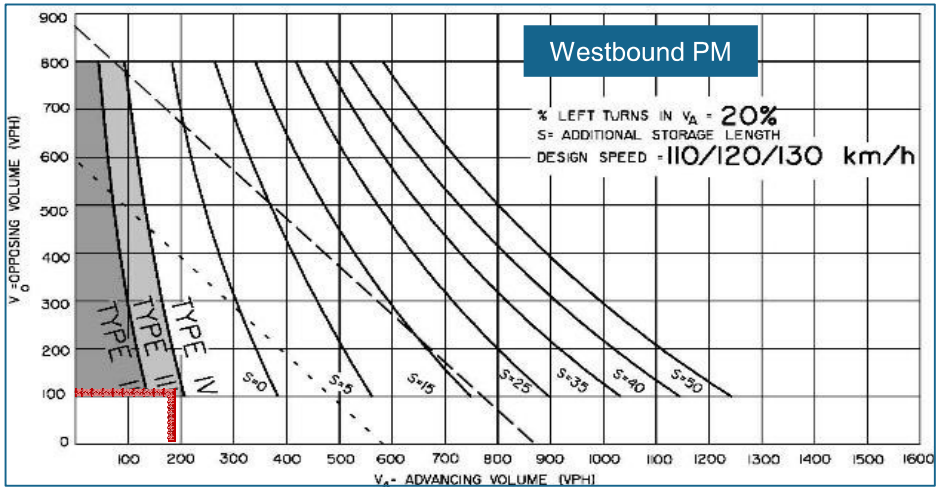
Intersection: *Highway 543 at RR 10*

Scenario: *2042 Background*





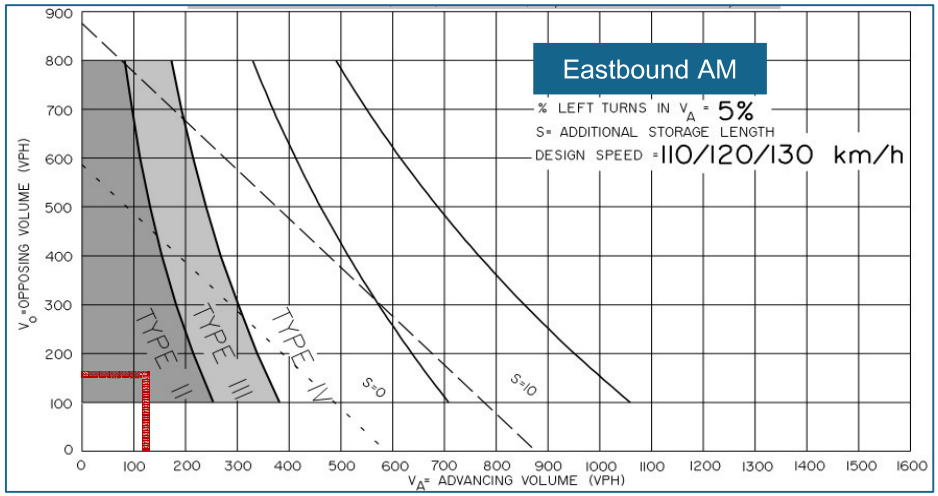


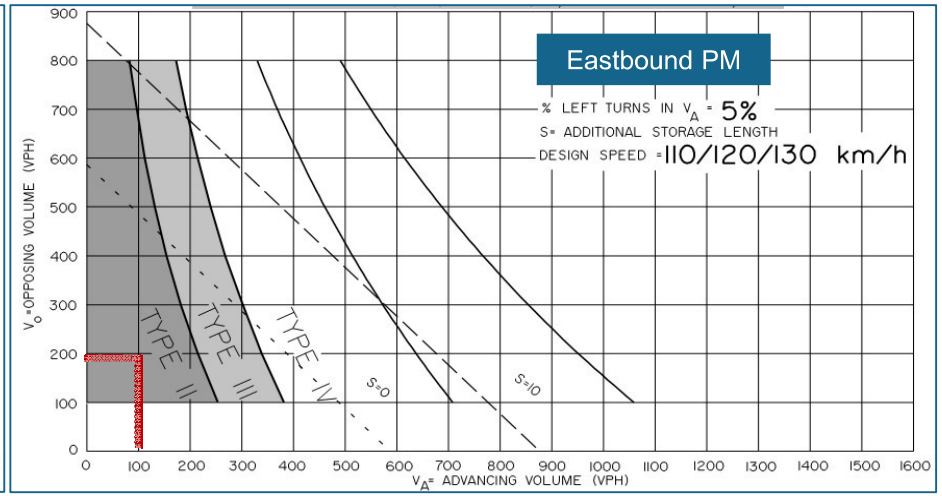


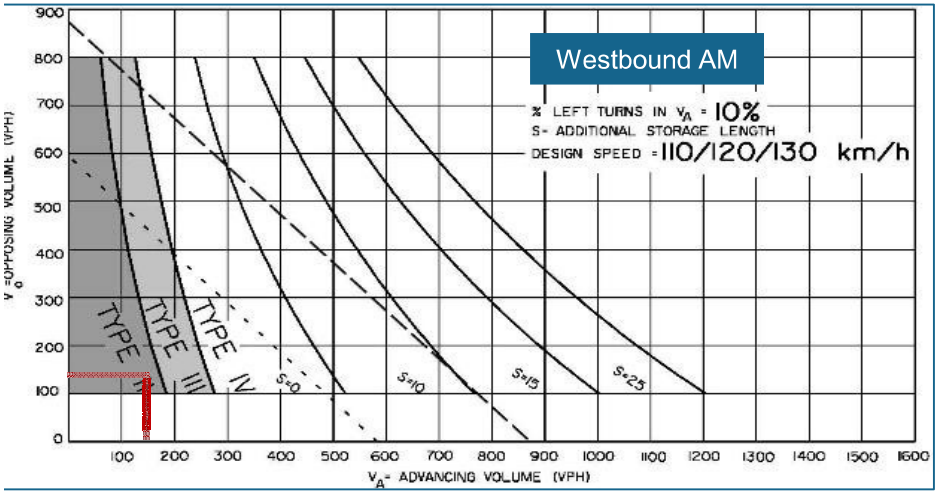
Alberta Transportation Turn Lane Warrants

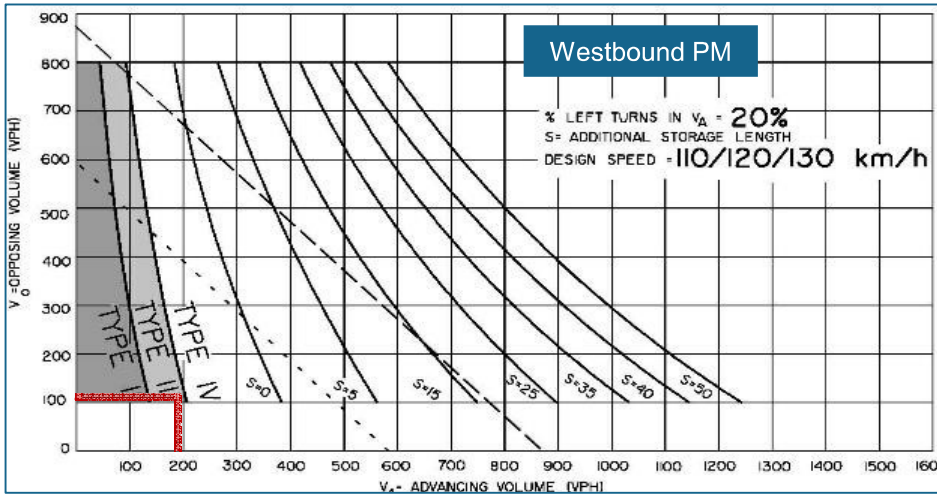
Intersection: *Highway 543 at RR 10*

Scenario: *2042 Background + Dev*









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Guideline for Setback Reviews
[Waste Facility]

Alberta Environment and Parks provides the following guidance for developers, subdivision authorities and development authorities to evaluate a development permit or subdivision application where the setback distances are planned or being considered for a reduction.

This guidance may be updated from time to time. Refer back to the latest publication for updates.

Introduction

Section 17 of the Subdivision and Development Regulation (SDR) under the *Municipal Government Act* defines the setback distance to a wastewater treatment facility, an operating landfill, a non-operating landfill, a waste storage site and a hazardous waste management facility.

Setbacks apply to developments specified in the SDR as residences, schools, or hospitals. The setback distances as listed in the Subdivision and Development Regulation are as follows:

- 300 metres to a wastewater treatment plant
- 300 metres to a non-operating landfill
- 300 metres to a storage site (non-hazardous waste transfer stations)
- 450 metres to an operating landfill
- 450 meters to a hazardous waste management facility

Setback distances to the specific developments act as a buffer from a wide range of factors, such as nuisance (odours, vectors and smoke) and contaminant migration (emissions, leachate and landfill gas). The distances can be reduced only if the factors mentioned are not present or the pathways are removed (i.e. mitigative measures).

The subdivision authority or development authority should notify AEP, if the setback distance is reduced for an operating waste facility.

Retroactive Approval for Existing Developments

When reviewing a development permit or subdivision application that includes a request to vary the setback distance for an existing development, the subdivision authority or development authority should consider information submitted by the applicant that is current (for example, produced within the last two years) in determining if the development is appropriate for a reduced setback distance.

If a reduced setback distance is not appropriate for an existing development, then the subdivision authority or development authority may refuse the request or may consider if additional terms and conditions to the development permit, such as additional mitigative controls, design changes, or additional investigations, may be required to mitigate any negative impact resulting from the reduction.

How to Vary the Setback Distance

This guideline applies to both specified developments encroaching on waste management facilities, and waste management facilities encroaching on specified developments.

For all types of waste facilities, the application for a reduced setback should include the following information:

- the types of waste stored, treated or disposed
- details about the facility operation including an aerial photograph or plan showing the facility as well as the setback measurements
- a visual inspection report for the facility
- a list of complaints related to the operation of the facility from the last two years
- an engineering report (specific to the waste facility) that includes a statement on if the reduced setback distance is feasible, and if any mitigative measures are required
- a certifying statement (see Appendix 1)
- if any mitigative measures are required, the design details, monitoring, and maintenance requirements for the mitigative measures

Monitoring data used to support the reduced setback should be current (produced in the last two years) or include a statement as to why the data is still representative.

Facilities with more than one activity

When applying to vary the setback distance for a facility with multiple waste activities at one location, details for each activity should be included in the application. For example, for a hazardous waste landfill, the application should include information outlined in both Section 2 on hazardous waste management facilities and Section 3 on landfills.

Figure 1 is a visual representation of the information required when there are two separate waste facility types within the proposed setback variance.

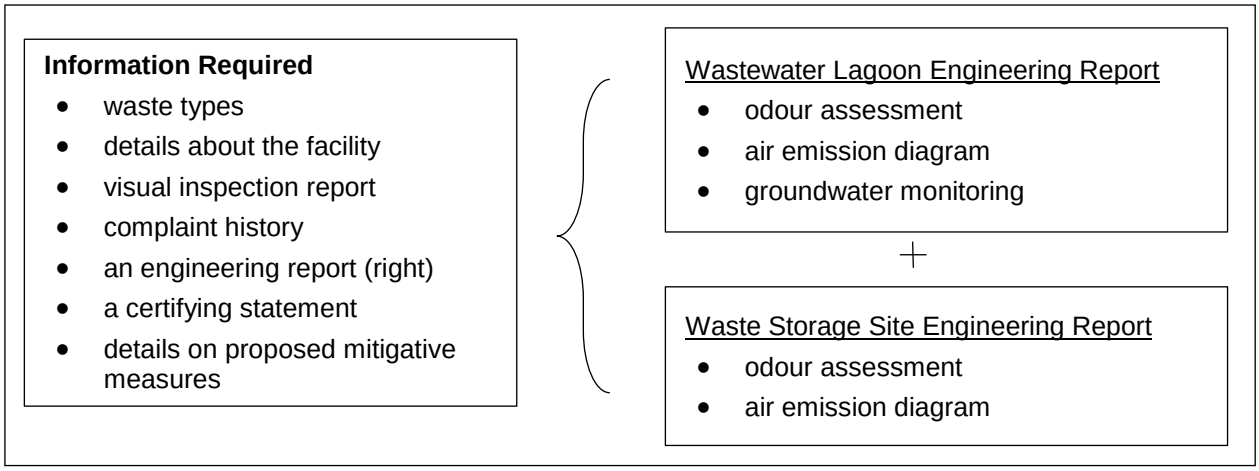

Figure 1: Visual representation of information requirements for a storage site and a wastewater lagoon

1. Wastewater Treatment Plant

A wastewater treatment plant is defined in the Wastewater and Storm Drainage Regulation (AR 119/1993), which states that a "wastewater treatment plant" is a structure, thing or process used for physical, chemical, biological or radiological treatment of wastewater, and includes a structure, thing or process used for:

(i) wastewater storage,
(ii) treated wastewater use and disposal, and
(iii) sludge treatment, storage and disposal.

While wastewater is typically generated from domestic activities, by definition it includes both industrial wastewater and domestic wastewater. A wastewater lagoon is a wastewater treatment plant.

The engineering report, completed by a qualified professional, should include the following information:

- an odour assessment
- wind direction and air emission/odour plume diagram
- groundwater monitoring results, well logs, and an interpretation of the groundwater monitoring results, including but not limited to:
    - regional and site specific geology and hydrogeology
    - a map showing all water wells and residences within a 1 kilometre radius of the site and other topographical features, such as water bodies within 1.5 kilometres of the site, including if any of the water wells are used for human consumption

2. Hazardous Waste Management Facilities

A hazardous waste management facility is defined in the Waste Control Regulation (AR 192/1996), which states that a "hazardous waste management facility" means a facility for the collection, storage, treatment or disposal of hazardous waste, but does not include an on-site facility.

The engineering report, completed by a qualified professional, should include the following information:

- a review of the historical reports/issues associated with the operation of the facility (such as annual reports)
- groundwater monitoring results, well logs, and their interpretation, including but not limited to:
    - regional and site specific geology and hydrogeology
    - a map showing all water wells and residences within a 1 kilometre radius of the site and other topographical features, such as water bodies within 1.5 kilometres of the site, including if any of the water wells are used for human consumption
- an evaluation of the potential for, and magnitude of. adverse impacts on the environment and public health and safety within the setback distance for:
    - wind direction and air emission/odour plume diagram
    - air emissions (such as volatile organic compounds (VOC) and dust)
    - fugitive emissions
    - existing site contamination
    - VOCs in soil or groundwater
- pollution control measures implemented by the facility
- identify risks from site operations that may impact the proposed development

3. Landfills

A landfill is defined in the Waste Control Regulation (AR 192/1996), which states that a "landfill" is a waste management facility where waste is disposed of by placing it on or in land, but does not include a land treatment facility, a surface impoundment, a salt cavern or a disposal well.

The engineering report, completed by a qualified professional, should include the following information:

- delineation of waste placed (using test plots, historical aerial photographs)
- type of waste disposed (age, amount, depth of waste)
- duration of operation (actual or estimated if not available)
- landfill topography
- final topography showing site drainage
- if applicable, the landfill liner and final cover details (thickness and composition)
- the visual inspection report should include additional details of any visual notable landfill issues (such as: slope subsidence, vegetation stress, lack of vegetation, exposed refuse, or leachate breakout)
- a review of the available reports associated with the operation of the facility (such as annual reports)
- groundwater monitoring and sampling results, well logs, and an interpretation of the groundwater monitoring and sampling results, including but not limited to:
    - regional and site specific geology and hydrogeology
    - a map showing all water wells and residences within a 1 kilometre radius of the site and other topographical features, such as water bodies within 1.5 kilometres of the site, including if any of the water wells are used for human consumption
    - a map showing the extent of groundwater contamination
- subsurface landfill gas monitoring results

4. Storage Sites

A storage site is called a transfer station. A storage site is defined in the Waste Control Regulation (AR 192/1996). It is a waste management facility where waste is collected and held for removal to another waste management facility. The activities on these sites are limited to some physical treatment that includes: shredding, grinding, compacting and sorting.

The engineering report, completed by a qualified professional, should include the following information:

- an odour assessment
- wind direction and air emission/odour plume diagram

Other Waste Receivers

Non-hazardous waste facilities, such as composting facilities, which are actively receiving and storing third party waste as part of their operation may be considered storage sites with respect to maintaining a setback to select developments. Areas where final product or non-hazardous recyclables are stored are not considered working areas and no assessment is needed for these areas.

Setback Evaluation

The information provided in the application for a reduced setback should indicate:

- if the waste facility has nuisances
- details of any contamination contaminant migration (i.e. groundwater, landfill gas)

Delineation of contamination in both soil and groundwater is required in accordance with the Alberta Tier 1 Soil and Groundwater Remediation Guidelines and Alberta Tier 2 Soil and Groundwater Remediation Guidelines criteria, if present.

If these factors are present, the engineering report should included details for any mitigative measures that are in place (or will be in place) to ensure there are no pathways to the proposed development.

Mitigative Measures

If the setback reduction is approved and mitigative measures are used, the subdivision authority and development authority should ensure there is a process to ensure mitigation measures are monitored and maintained. If mitigative measures fail, this can present additional risks to the development and occupants. On-going monitoring and reporting of the mitigation measures may be required to ensure the mitigation controls remain effective.

Nuisance Assessment

If odours or vectors are present, then the reviewer should consider that a reduced setback might increase the complaints related to the existing conditions.

Out of Scope

This guidance does not include any information on the following:

- landfill setback distances for a water well under section 15 of the Nuisance and General Sanitation Regulation (AR 243/2003)
- requests that are intended to address multiple developments, previous variances, pre-existing developments, or blanket variances

Tracking

Development authorities should track when a setback variance has been issued with respect to the development permit or subdivision development application. The setback variance information should be retained and made available in the event of a property transfer to a new landowner.

Explosive Gas

If methane gas is produced by the waste facility (i.e. municipal solid waste landfill) and there is no natural barrier (such as a ravine), then the proposed development should not include underground infrastructure such as a basement. Gas migration does not correspond to groundwater flow and may be subject to preferential pathways such as sand or gravel lenses. Natural barriers do not include high groundwater or surface water ponds.

The evaluation of the methane monitoring results should be compared to existing guidance such as the Guidance Document on Management of Methane Gas Adjacent to Landfills, prepared for Alberta Environmental Protection by CG&S CH2M Gore & Storrie Limited. Seasonal monitoring should be considered to assess seasonal variations. The evaluation can include the following:

- Identify the presence of landfill gas, through a surface survey.

- Landfill gas monitoring probes should be installed in locations where a surface survey identify the presence of landfill gas.
    - Install wells into the waste to identify the locations of the landfill site to target for further landfill gas collection or other mitigation measures.
- If the landfill produces methane, landfill gas probes shall be place outside the waste footprint to measure for subsurface gas migration.
    - Install probes to a depth of one to two metres. See Appendix 2 for additional guidance on methane sampling.

Methane concentration of the landfill gas is assumed to be 50 per cent by volume. Additional information on gas monitoring is provided in Appendix 2. Landfill applications should reference Table 5.5 of the Standards for Landfills in Alberta for gas concentration considerations. A copy of the table is provided in Appendix 2.

The following table, Table 1, has been prepared for methane monitoring in soil, outside the waste footprint. For more specific monitoring at off-site buildings, refer to the Guidance Document on Management of Methane Gas Adjacent to Landfills.

It is recommended, when possible, that subsurface migration measurements are taken between 10 to 60 metres from the waste footprint and where preferential subsurface migration pathways are identified.

Table 1: Adapted from Guidance Document on Management of Methane Gas Adjacent to Landfills

Methane Concentrations (PPM)*	Gas Pressure, Additional Measurement	Development Considerations
0 – 100 ppm	Establish background levels	If concentration is not from background conditions underground infrastructure should not be developed
100 - 500 ppm	Indicator of potential LFG generation	If concentration is not from background conditions underground infrastructure should not be developed
500 - 5000 ppm	Indicator of potential LFG migration	Recommend no underground infrastructure; consider building monitoring to detect LFG
> 5,000 ppm	Measure and monitor soil gas pressure (see Appendix 2)	Recommend no underground infrastructure consider building monitoring to detect LFG and increased subsurface LFG monitoring
>50,000 ppm	Measure and monitor soil gas pressure, LFG pressures should be below 0.25 kPa near any off-site buildings	Recommend no underground infrastructure; monitor at neighbouring building footing with continuous LEL monitoring of adjacent buildings recommended; additional LFG collection controls at landfill should be considered to prevent migration

ppm – part per million
LFG – Landfill Gas
kPa – kilopascals
* 500 ppm = 1 per cent Lower Explosive Limit (LEL) (for methane) [20 per cent LEL = 1 per cent Landfill Gas.]

Groundwater Contamination

If the waste facility has produced contamination in groundwater, the engineering report should include an evaluation of the associated risk to the specified development. Any contamination that exceeds the Table 2 of the Alberta Tier 1 Soil and Groundwater Remediation Guidelines for residential use at the facility property boundary should be remediated or mitigated before a setback variance is granted. Additional information on groundwater monitoring is provided in Appendix 3.

Landfill Specific Considerations

Operating/Non-Operating

Landfills may be in various states of closure or post-closure, which is also called reclamation. Once the landfill no longer accepts and disposes of waste, the landfill is non-operating. If the landfill facility continues to receive and dispose of waste, it is operating. When there is an area of the landfill that has been closed, but the landfill remains operating, the landfill as a whole is considered operating.

Remediation/Reclamation

For landfills that have been mined and the waste has been removed, the surrounding areas should be monitored for any remaining effects from the waste. The setback distance remains in effect until such time that a remediation certificate has been issued.

Reclamation certificates are not available. Only a remediation certificate may be available for waste management facilities if all the waste and effects associated with the disposal of the waste is first removed and analysis of the soil and groundwater confirms this.

Working Area/ Disposal Area

The working area includes areas where waste may be, or have been, burned[1], processed or stored, whereas a disposal area is where waste has been placed onto or into the land as its final resting place, but also includes the working areas until the site is no longer operating. The building site and property line are measured slightly differently depending on the type of development application. For historical landfills, if the waste footprint has not been delineated, the property line should be used to measure the setback distance for the disposal area, until the disposal area is delineated.

Appendix 4 contains a checklist for landfills.

[1] *Open burning of municipal solid waste is prohibited; however, the burning of clean wood waste may in some cases still occur at the facility. Areas where burning occurs at a waste facility are considered the working areas of the facility.*

Appendix 1: Certification Statement

This page can be printed and included with the application

"STATEMENT PAGE"

APPLICATION FOR A

SETBACK VARIANCE

Project Name _____

Location _____

Municipality _____

I acknowledge that I have reviewed the Guideline for Setback Reviews and certify that the project complies with all of the requirements and guidelines specified for the development, and the risks have been evaluated and disclosed within the application.

SIGNED AND STAMPED by a qualified professional.

NAME _____

COMPANY _____

For projects that do not comply with all of the guidelines please submit a detailed explanation of the deficiency and why it is, in your professional opinion, necessary.

Appendix 2: Landfill Gas Detection and Landfill Gas Subsurface Migration

Additional details on methane measurements can be found in Section 3 of the Guidance Document on Management of Methane Gas Adjacent to Landfills, prepared for Alberta Environmental Protection. prepared by CG&S CH2M Gore & Storrie Limited, 1999 as amended.

Landfills should reference Table 2 below, an excerpt from the Standards for Landfills in Alberta, for the measurement of gas concentrations.

Table 2: Table 5.5 from the Standards for Landfills in Alberta

Sampling Location	Explosive Gas Limits
• In the subsurface at the property boundary	50 % LEL
• In an on-site building or enclosed structure • In the area immediately outside the foundation of the building or structure	20 % LEL
• In an off-site building or enclosed structure • In the area immediately outside the foundation of the building or structure	1 % LEL

For subsurface gas detection, gas probes are installed into the subsurface using an auger or drill rig. The probe installation requires the inclusion of a sample port and valve. A protective outer casing is required similar to groundwater monitoring wells.

Only qualified and trained personnel should install and sample landfill gas probes.

When measuring subsurface gas migration, there are five steps (in this order):

- Measure probe pressure
- Checking the entire sample train for leaks
- Purge the probe piping
- Read and record gas composition
- Reseal the probe once monitoring is complete

To measure the pressure use the following methods:

- U-tube or digital manometer
- Differential Pressure Gauge
- Electronic Pressure Gauge

After the pressure readings are collected, a sample of the methane or a representative sample can be taken and analyzed, using one of the following methods.

- Handheld detectors (with a sampling ports)
    - Flame ionization detector
    - Thermal conductivity detector
    - Catalytic combustion sensor
- Canister sample for laboratory analysis (follow the laboratory instructions).

Field data collection should include:

- methane, carbon dioxide, oxygen concentration and hydrogen sulphide, (if a handheld detector is used)
- barometric pressure
- ambient temperature
- the probe gas pressure

Hydrogen sulphide (H_2S) can be present in landfill gas. It may be important to include as a monitoring parameter. If H_2S is present, personal protective equipment should include an H_2S monitor for all field sampling personnel.

Additional Useful References

Procedure D-4-1 “Assessing Methane Hazards from Landfill Sites”. Ministry of Ontario, (Updated March 22, 2019)

Appendix 3: Groundwater Monitoring Wells

Water well drilling activity is regulated in Alberta under the *Water Act*, the Water (Ministerial) Regulation (AR 205/1998). Drillers installing wells for the purpose of collecting groundwater data must obtain a Class C approval and are required to follow the applicable provisions of the Water Wells and Ground Source Heat Exchange Systems Directive.

Groundwater monitoring wells for the purpose of assessing the presence or absence of contamination should be located at least 10 metres but not more than 60 metres, from the waste footprint. Site-specific hydrogeology should be used to select the length and vertical position of the monitoring well screen.

All sampling and testing must be conducted by qualified professionals. Field measurement should include:

- The water level measurement and water elevation
- Thickness of any LNAPPL (e.g. layers), if present
- pH
- Electrical Conductivity
- Temperature

The laboratory analysis should include, but not be limited to:

- pH
- Total Dissolved Solids (TDS)
- Alkalinity
- Ammonia
- Total Kjeldahl Nitrogen
- Nitrate – N
- Nitrite – N
- Electrical Conductivity
- Hardness (as $CaCO_3$)
- Chlorides
- Calcium
- Magnesium
- Sodium
- Potassium
- Sulphate
- Dissolved Organic Carbon (DOC)
- Iron
- Manganese

Depending on the type of wastes managed at the waste facility, additional parameters should be included. This can include hydrocarbons such as BTEX and other VOCs, and/or Total Metals.

Landfill applications should reference Table 5.2 of the Standards for Landfills in Alberta for the parameters in groundwater monitoring analysis.

Appendix 4: Checklist for Landfills

Considerations for Consent		Condition	
		Yes	No
Consent should **not** be considered when all three of the following conditions exist:			
a.	gas levels above background are present within the waste disposal area of the landfill		
b.	the land area where development is to occur has no natural physical barrier to gas movement		
c.	the development has underground infrastructure or basements		
Where groundwater has been contaminated, consent should only be considered where:			
a.	potable water to the proposed development is being supplied from a municipal system		
b.	vegetation, or other receptors, or property will not be affected by the contaminated groundwater		
Information Requirements		**Provided**	
		Yes	**No**
An engineering report, completed by a qualified professional that includes, as a minimum:			
a.	landfill cell delineation including approximate waste depths		
b.	duration of operation		
c.	amount, types of waste, and degree of waste stabilization in the landfill		
d.	landfill topography for site drainage		
e.	landfill final cover details such as thickness and composition		
f.	a visual inspection report that details vegetation stress and degree of cover, landfill settlement, exposed refuse, leachate breakout, and any other visually notable landfill issues		
g.	a review of the available reports/issues associated with the operation of the facility (such as annual reports)		
h.	regional and site specific geology and hydrogeology		
i.	a map showing all water wells and residences within a 1km radius of the site and other topographical features, such as water bodies, within 5km of the site		
j.	the applicable sections of the area structure plan documenting the zoning and expected use of the landfill and surrounding area		
k.	well logs and groundwater monitoring and sampling results		
l.	landfill gas monitoring results		
m.	an opinion on whether encroachment is feasible (under what mitigative measures, to what distance)		
n.	if mitigative measures are proposed, the design details, monitoring and maintenance program for the mitigative measures		

Alberta Environment and Protected Areas

APPROVAL

PROVINCE OF ALBERTA

ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT
R.S.A. 2000, c.E-12, as amended.

APPROVAL NO.: 484778-00-00

APPLICATION NO.: 001-484778

EFFECTIVE DATE: December 11, 2023

EXPIRY DATE: December 10, 2033

APPROVAL HOLDER: Rimrock Renewables Ltd.

ACTIVITY: **Construction, operation and reclamation of the**

Foothills County waste management facility for the collection and processing of waste or recyclables to produce fuel and the associated power plant

is subject to the attached terms and conditions.

Designated Director under the Act: Craig Knaus, B.Sc.

Date Signed: December 11, 2023

TERMS AND CONDITIONS ATTACHED TO APPROVAL

PART 1: DEFINITIONS

SECTION 1.1: DEFINITIONS

1.1.1 All definitions from the Act and the regulations apply except where expressly defined in this approval.

1.1.2 In all PARTS of this approval:

(a) "Act" means the *Environmental Protection and Enhancement Act*, R.S.A. 2000, c.E-12, as amended;

(b) "air effluent stream" means any substance in a gaseous medium released by or from a facility;

(c) "anaerobic digester tank" means a reaction vessel that converts soluble organic compounds into biogas, as described in the application;

(d) "AOPA" means the *Agricultural Operation Practices Act*, R.S.A. 2000, c.A-7, as amended;

(e) "APEGA" means the Association of Professional Engineers and Geoscientists of Alberta;

(f) "application" means the written submissions from the approval holder to the Director in respect of application number 001-484778 and any subsequent applications where amendments are issued for this approval;

(g) "arable land" means the land that has the same meaning as that used in section 24(1) of the *Agricultural Operation Practices Act Standards and Administration Regulation,* Alta. Reg. 267/2001, as amended;

(h) "biogas" means gaseous fuel produced from the anaerobic digestion of feedstock;

(i) "biogas upgrading system" means the system used to purify biogas into renewable natural gas that can be injected into a natural gas distribution system and includes chemical scrubber, activated carbon filter and membrane containers;

(j) "cogeneration unit" means a 1095 KW natural gas fired reciprocating engine generator set, as described in the application;

TERMS AND CONDITIONS ATTACHED TO APPROVAL

(k) "combined total thermal energy" means thermal energy is recovered from the reciprocating engine exhaust, cooling water and lubricating oil, and subsequently used at the facility;

(l) "composite sample" means a sample prepared from not less than 15 sub-samples that are representative of the entire volume of solid digestate being tested;

(m) "container" means any portable device in which a substance is kept, including but not limited to drums, barrels and pails which have a capacity greater than 18 litres;

(n) "confined feeding operation" means confined feeding operation as defined in AOPA;

(o) "day", when referring to sampling, means any sampling period of 24 consecutive hours;

(p) "decommissioning" means the dismantling and decontamination of a facility undertaken subsequent to the termination or abandonment of any activity or any part of any activity regulated under the Act;

(q) "decontamination" means the treatment or removal of substances from the facility and affected lands;

(r) "Detailed Design Drawings and Specifications" means the detailed design drawings and specifications, signed and stamped by a professional registered with APEGA, that are issued for construction or tendering;

(s) "digestate" means liquid or solid material formed during the production of biogas in an anaerobic digester tank at the facility and includes solid digestate and liquid digestate;

(t) "Directive" means the Storage and Application of Digestate on Agricultural Land Directive, Alberta Agriculture and Irrigation, 2023, as amended;

(u) "Director" means an employee of the Government of Alberta designated as a Director under the Act;

(v) "dismantling" means the removal of buildings, structures, process and pollution abatement equipment, vessels, storage facilities, material handling facilities, railways, roadways, pipelines and any other installations that are being or have been used or held for or in connection with the facility;

TERMS AND CONDITIONS ATTACHED TO APPROVAL

(w) "domestic wastewater" means wastewater that is the composite of liquid and water-carried wastes associated with the use of water for drinking, cooking, cleaning, washing, hygiene, sanitation or other domestic purposes, together with any infiltration and inflow wastewater, that is released into a wastewater collection system;

(x) "emergency flare" means the flare used for combustion of the biogas that can not be released into the biogas upgrading system or a natural gas distribution system;

(y) "excavation zone" means the volume containing a tank and backfill material bounded by the ground surface, walls, and floor of the pit and trenches into which the tank is placed at the time of installation;

(z) "facility" means all buildings, structures, process and pollution abatement equipment, vessels, storage facilities, material handling facilities, roadways, railways, pipelines and other installations, and includes the land, located on the Northwest Quarter of Section 5, Township 19, Range 29, West of the 4th Meridian and the Northeast Quarter of Section 6, Township 19, Range 29, West of the 4th Meridian, that is being or has been used or held for or in connection with the Foothills County waste management facility and the associated power plant;

(aa) "facility developed area" means the areas of the facility used for the storage, treatment, processing, transport, or handling of raw material, intermediate product, by-product, finished product, process chemicals, or waste material;

(bb) "feedstock" means manure and any substance listed in the Directive that are used to produce biogas in the anaerobic digester tanks at the facility;

(cc) "fugitive emissions" means emissions of substances to the atmosphere other than ozone depleting substances, originating from a facility source other than a flue, vent, or stack but does not include sources which may occur due to breaks or ruptures in process equipment;

(dd) "ISO/IEC 17025" means the international standard, developed and published by International Organization for Standardization (ISO), specifying management and technical requirements for laboratories;

(ee) "incompatible waste" means waste materials which could cause dangerous reactions from direct contact with one another;

(ff) "industrial runoff" means precipitation that falls on or traverses the facility developed area;

TERMS AND CONDITIONS ATTACHED TO APPROVAL

(gg) "industrial runoff control system" means the parts of the facility that collect, store or treat industrial runoff from the facility;

(hh) "industrial wastewater" means the composite of liquid wastes and water-carried wastes, any portion of which results from any industrial process carried on at the facility;

(ii) "industrial wastewater control system" means the parts of the facility that collect, store or treat industrial wastewater;

(jj) "liner" means a continuous layer constructed of natural or man-made materials, which restricts the downward or lateral migration of the contents of the structure or facility;

(kk) "liquid digestate pond" means a pond used to store liquid digestate and industrial runoff at the facility;

(ll) "local environmental authority" means the Department of Environment and Protected Areas, in the Province of Alberta, or the agency that has the equivalent responsibilities for any jurisdiction outside the Province;

(mm) "manual stack survey" means a survey conducted in accordance with the *Alberta Stack Sampling Code*, Alberta Environment, 1995, as amended;

(nn) "manure" means manure as defined in AOPA;

(oo) "manure storage facility" means a manure storage facility as defined in AOPA;

(pp) "membrane container" means the equipment used for removal of carbon dioxide contained in the biogas, as described in the application;

(qq) "month" means calendar month;

(rr) "MWh_{net}" means MegaWatt-hour that includes both the combined total thermal energy and the net generation of electricity, excluding any electricity used by the cogeneration units;

(ss) "NRCB" means the Natural Resources Conservation Board in the Province of Alberta;

(tt) "odour abatement system" means air pollution abatement equipment used to treat the air effluent streams and includes chemical scrubber and carbon filter that are operated in series for removal of ammonia, total reduced sulphur and volatile organic compounds contained in the air effluent streams, as described in the application;

TERMS AND CONDITIONS ATTACHED TO APPROVAL

(uu) "process and building air system" means the system used to collect building air and the air effluent streams from the processes and subsequently direct them to the odour abatement system for treatment, as described in the application;

(vv) "QA/QC" means quality assurance and quality control;

(ww) "record drawing/document" means a document prepared by a professional member of APEGA to record design changes for which they accept professional responsibility and which represents the final design of the project that was either approved or authorized according to the terms and conditions of this approval;

(xx) "regulations" means the regulations enacted pursuant to the Act, as amended;

(yy) "release detection" means determining whether a release has occurred from a tank into the environment or a leak has occurred into the interstitial space between the tank and secondary containment around it;

(zz) "representative grab" means a sample consisting of equal volume portions of water collected from at least four sites between 0.20-0.30 metres below the water surface within a pond;

(aaa) "routine parameters" means Ca, Mg, Na, K, Cl, SO_4, NO_3 + NO_2 – Nitrogen, hardness, alkalinity (HCO_3, CO_3), pH, conductance (electrical conductivity), total dissolved solids (calculated), SAR (calculated), and cation/anion balance;

(bbb) "run-on" means precipitation that may drain as surface flow onto the facility developed area;

(ccc) "soil" means mineral or organic earthen materials that can, have, or are being altered by weathering, biological processes, or human activity;

(ddd) "storm event" means a 1 in 100 year precipitation event occurring over 24 hours in High River, Alberta;

(eee) "tank" means a stationary device, designed to contain an accumulation of a substance, which is constructed primarily of non-earthen materials that provide structural support including wood, concrete, steel and plastic;

(fff) "topsoil" means the uppermost layer of soil and consists of:

(i) the A-horizons and all organic horizons as defined in *The Canadian System of Soil Classification* (Third Edition), Agriculture and Agri-Food Canada, Publication 1646, 1998, as amended, and

(ii) the soil ordinarily moved during tillage;

TERMS AND CONDITIONS ATTACHED TO APPROVAL

(ggg) "total reduced sulphur" means a gaseous mixture consisting of hydrogen sulphide, methyl mercaptan, dimethyl sulphide, dimethyl disulphide, carbon disulphide and carbonyl sulphide;

(hhh) "upper subsoil" means the layer of soil directly below the topsoil layer that consists of the B-horizons as defined in *The Canadian System of Soil Classification,* (Third Edition), Agriculture and Agri-Food Canada, Publication 1646, 1998, as amended;

(iii) "volume estimate" means a technical evaluation based on the sources contributing to the release including but not limited to pump capabilities, water meters and batch release volumes;

(jjj) "waste storage areas" means the areas designated for storage of waste, as described in the application;

(kkk) "water table" means the upper level of groundwater, below which the pore spaces in the soil or rock are saturated with water;

(lll) "week" means any consecutive 7-day period; and

(mmm) "year" means calendar year, unless otherwise specified.

PART 2: GENERAL

SECTION 2.1: REPORTING

2.1.1 The approval holder shall immediately report to the Director by telephone any contravention of the terms and conditions of this approval at 1-780-422-4505.

2.1.2 The approval holder shall submit a written report to the Director within seven (7) days of the reporting pursuant to 2.1.1.

2.1.3 The approval holder shall immediately notify the Director in writing if any of the following events occurs:

(a) the approval holder is served with a petition into bankruptcy;

(b) the approval holder files an assignment in bankruptcy or Notice of Intent to make a proposal;

(c) a receiver or receiver-manager is appointed;

(d) an application for protection from creditors is filed for the benefit of the approval holder under any creditor protection legislation; or

TERMS AND CONDITIONS ATTACHED TO APPROVAL

(e) any of the assets which are the subject matter of this approval are seized for any reason.

2.1.4 If the approval holder monitors for any substances or parameters which are the subject of operational limits as set out in this approval more frequently than is required and uses procedures authorized in this approval, then the approval holder shall provide the results of such monitoring as an addendum to the reports required by this approval.

2.1.5 The approval holder shall submit all annual reports required by this approval to be compiled or submitted to the Director on or before March 31 of the year following the year in which the information was collected, unless otherwise specified in this approval.

SECTION 2.2: RECORD KEEPING

2.2.1 The approval holder shall:

(a) record; and

(b) retain

all the following information in respect of any sampling conducted or analyses performed in accordance with this approval for a minimum of ten (10) years, unless otherwise authorized in writing by the Director:

(i) the place, date and time of sampling,

(ii) the dates the analyses were performed,

(iii) the analytical techniques, methods or procedures used in the analyses,

(iv) the names of the persons who collected and analysed each sample, and

(v) the results of the analyses.

SECTION 2.3: ANALYTICAL REQUIREMENTS

2.3.1 With respect to any sample required to be taken pursuant to this approval, the approval holder shall ensure that:

(a) collection;

(b) preservation;

(c) storage;

TERMS AND CONDITIONS ATTACHED TO APPROVAL

(d) handling; and

(e) analysis

shall be conducted in accordance with the following, unless otherwise authorized in writing by the Director:

(i) for air:

(A) the *Alberta Stack Sampling Code*, Alberta Environment, 1995, as amended,

(B) the *Methods Manual for Chemical Analysis of Atmospheric Pollutants*, Alberta Environment, 1993, as amended, and

(C) the *Air Monitoring Directive,* Alberta Environment and Parks, 2016, as amended;

(ii) for industrial wastewater, industrial runoff, groundwater and domestic wastewater:

(A) the *Standard Methods for the Examination of Water and Wastewater*, published jointly by the American Public Health Association, American Water Works Association, and the Water Environment Federation, 2023, as amended;

(iii) for soil:

(A) the *Soil Monitoring Directive,* Alberta Environment, 2009, as amended, and

(B) the *Soil Quality Criteria Relative to Disturbance and Reclamation*, Alberta Agriculture, 1987, as amended;

(iv) for waste and digestate:

(A) the *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, USEPA, SW-846, 1986, as amended,

(B) the *Methods Manual for Chemical Analysis of Water and Wastes*, Alberta Environmental Centre, Vegreville, Alberta, 1996, AECV96-M1, as amended,

TERMS AND CONDITIONS ATTACHED TO APPROVAL

(C) *ASTM D5623, Standard Test Method for Sulfur Compounds in Light Petroleum Liquids by Gas Chromatography and Sulfur Selective Detection*, ASTM International, West Conshohocken, PA, 2019, as amended, or

(D) the *Standard Methods for the Examination of Water and Wastewater*, American Public Health Association, American Water Works Association, and the Water Environment Federation, 2023, as amended.

2.3.2 The approval holder shall analyse all samples that are required to be obtained by this approval in a laboratory accredited pursuant to ISO/IEC 17025, as amended, for the specific parameter(s) to be analysed, unless otherwise authorized in writing by the Director.

2.3.3 The term sample used in 2.3.2 does not include samples directed to continuous monitoring equipment, unless specifically required in writing by the Director.

2.3.4 The approval holder shall comply with the terms and conditions of any written authorization issued by the Director under 2.3.2.

SECTION 2.4: OTHER

2.4.1 The terms and conditions of this approval are severable. If any term or condition of this approval or the application of any term or condition is held invalid, the application of such term or condition to other circumstances and the remainder of this approval shall not be affected thereby.

2.4.2 All tanks shall conform to the *Guidelines for Secondary Containment for Above Ground Storage Tanks,* Alberta Environmental Protection, 1997, as amended, unless otherwise authorized in writing by the Director.

2.4.3 All above ground storage tanks containing liquid hydrocarbons or organic compounds shall conform to the *Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks*, Canadian Council of Ministers of the Environment, PN 1180, 1995, as amended.

PART 3: CONSTRUCTION

SECTION 3.1: GENERAL

3.1.1 If construction of the Foothills County waste management facility as described in application number 001-484778 has not commenced by December 31, 2024, the approval holder shall apply for an amendment to this approval, unless otherwise authorized in writing by the Director.

TERMS AND CONDITIONS ATTACHED TO APPROVAL

3.1.2 The approval holder shall notify the Director in writing at least 14 days before commencing operations of the facility, unless otherwise authorized in writing by the Director.

3.1.3 The approval holder shall construct the Foothills County waste management facility as described in the application and shall include, at a minimum, all of the following:

(a) the two (2) feedstock receiving hoppers;

(b) the two (2) manure blend tanks;

(c) the two (2) digester feed tanks;

(d) the three (3) organics reception tanks;

(e) the digestate nurse tank;

(f) the liquid digestate tank;

(g) the six (6) anaerobic digester tanks;

(h) the feedstock receiving hopper building;

(i) the feedstock pumphouse building;

(j) the digestate separation building;

(k) the biogas upgrading system;

(l) the two (2) cogeneration units; and

(m) the process heater.

3.1.4 The approval holder shall construct, at a minimum, all of the following for each of tanks referred to in 3.1.3(b) to (g):

(a) automatic shutoff devices for overfill protection;

(b) a secondary containment for leak detection; and

(c) a ground water monitoring well within the excavation zone for release detection.

TERMS AND CONDITIONS ATTACHED TO APPROVAL

3.1.5 The approval holder shall construct the secondary containment required by 3.1.4 according to the application and shall include, at a minimum, all of the following:

(a) a geomembrane barrier to surround the below-ground portions of an underground tank; and

(b) a leak detection and removal system.

SECTION 3.2: AIR

3.2.1 The approval holder shall construct the following stacks according to the corresponding height requirements referred to in the TABLE 3.2-A.

TABLE 3.2-A: STACK HEIGHTS

STACK	MINIMUM HEIGHT ABOVE GRADE (metres)
The odour abatement system exhaust stack	6.0
The emergency flare stack	12.0
Each of the two (2) cogeneration unit exhaust stacks as identified in the application by the designations Cogen 1 and Cogen 2	10.0
The process heater exhaust stack as identified in the application by the designation H-701	6.1

3.2.2 The approval holder shall equip the following stacks with sampling facilities:

(a) the odour abatement system exhaust stack;

(b) each of the two (2) cogeneration unit exhaust stacks as identified in the application by the designations Cogen 1 and Cogen 2; and

(c) the process heater exhaust stack as identified in the application by the designation H-701.

3.2.3 The approval holder shall:

(a) install;

(b) operate; and

TERMS AND CONDITIONS ATTACHED TO APPROVAL

(c) maintain

the sampling facilities required by 3.2.2 in accordance with, at a minimum, all of the following:

(i) the *Alberta Stack Sampling Code,* Alberta Environment, 1995, as amended, and

(ii) the *Air Monitoring Directive,* Alberta Environment and Parks, 2016, as amended.

3.2.4 The approval holder shall install, at a minimum, all of the following on the emergency flare stack:

(a) wind guard;

(b) pilot light; and

(c) electric igniter

unless an equivalent system is authorized in writing by the Director.

POLLUTION ABATEMENT EQUIPMENT

3.2.5 The approval holder shall construct, at a minimum, all of the following pollution abatement equipment:

(a) the odour abatement system;

(b) the nitrogen oxides abatement equipment;

(c) the aeration system in the liquid digestate pond; and

(d) the emergency flare.

3.2.6 The approval holder shall construct the process and building air system as described in the application to direct the air effluent streams from all of the following sources to the odour abatement system:

(a) the feedstock receiving hopper building including the two (2) feedstock receiving hoppers;

(b) the tanks referred to in 3.1.3(b) to (f); and

(c) the digestate screw presses.

TERMS AND CONDITIONS ATTACHED TO APPROVAL

SECTION 3.3: LIQUID DIGESTATE, INDUSTRIAL RUNOFF AND INDUSTRAIL WASTEWATER

3.3.1 The approval holder shall construct:

(a) the industrial runoff control system; and

(b) the industrial wastewater control system

as described in the application.

3.3.2 At least three (3) months prior to the commencement of construction of the liquid digestate pond, the approval holder shall submit to the Director the following documents for the liquid digestate pond construction, signed and stamped by a professional registered with APEGA:

(a) Detailed Design Drawings and Specifications prepared in accordance with the application;

(b) a Construction Quality Assurance Plan; and

(c) a Construction Quality Control Plan.

3.3.3 If any Detailed Design Drawings and Specifications are found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

3.3.4 The approval holder shall implement the Detailed Design Drawings and Specifications as authorized in writing by the Director.

3.3.5 The Detailed Design Drawings and Specifications required by 3.3.2 shall include, at a minimum, all of the following:

(a) a geomembrane liner that shall have:

(i) a thickness of not less than 50 mil, and

(ii) a hydraulic conductivity of not more than $1x10^{-9}$ metres per second;

(b) separation between the seasonally high water table and the bottom of the liner;

(c) a liner uplift analysis that considers effects of an underdrain or a dewatering system in the event that separation referred to in (b) is less than one (1) metre;

(d) a system capable of preventing accumulation of gases under the entire liner;

(e) a prepared clay sub-grade suitable to protect the integrity of liner system; and

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(f) any other information as required in writing by the Director.

3.3.6 The approval holder shall submit to the Director a summary report of the Construction Quality Assurance and Construction Quality Control results, signed and stamped by a professional registered with APEGA, at least one (1) month prior to commencement of the liquid digestate pond operation.

3.3.7 The summary report required by 3.3.6 shall contain, at a minimum, all of the following:

(a) confirmation that the liquid digestate pond has been constructed according to:

(i) the Construction Quality Assurance Plan,

(ii) the Construction Quality Control Plan, and

(iii) the Detailed Design Drawings and Specifications;

(b) a description of any deviations that resulted in a minor adjustment to the Detailed Design Drawings and Specifications to suit field conditions encountered;

(c) confirmation by the professional registered with APEGA that deviations will result in an equivalent design performance of the liquid digestate pond;

(d) record drawing/document; and

(e) any other information as required in writing by the Director.

SECTION 3.4: SOLID DIGESTATE AND MANURE

3.4.1 The approval holder shall construct:

(a) the solid digestate staging area; and

(b) the manure staging area

as described in the application and shall include, at a minimum, all of the following:

(i) a liner that shall:

(A) be constructed of clay material or alternative material,

(B) have a thickness of at least 0.3 metres measured perpendicular to the liner surface, and

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(C) have a hydraulic conductivity of not more than 1 $x10^{-9}$ metres per second;

(ii) an industrial runoff control system with the capability of collecting and controlling the volume of industrial runoff expected from a storm event, and

(iii) a run-on control system with the capability of preventing the volume of run-on expected from a storm event.

SECTION 3.5: DOMESTIC WASTEWATER

3.5.1 The approval holder shall construct the domestic wastewater system according to the application and shall include, at a minimum, all of the following:

(a) a domestic wastewater holding tank; and

(b) a domestic wastewater collection and removal system.

SECTION 3.6: LAND CONSERVATION

3.6.1 The approval holder shall:

(a) salvage; and

(b) conserve

all topsoil for land reclamation.

3.6.2 The approval holder shall:

(a) salvage; and

(b) conserve

all upper subsoil for land reclamation.

3.6.3 The approval holder shall:

(a) conserve; and

(b) stockpile

all topsoil separately from the upper subsoil.

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3.6.4 The approval holder shall locate all:

(a) topsoil stockpiles; and

(b) upper subsoil stockpiles

at the facility.

3.6.5 The approval holder shall stockpile all topsoil as follows:

(a) on stable foundations; and

(b) on undisturbed topsoil.

3.6.6 The approval holder shall stockpile all upper subsoil as follows:

(a) on stable foundations; and

(b) on areas where the topsoil has been removed.

3.6.7 The approval holder shall take all steps necessary to prevent erosion, including but not limited to, all of the following:

(a) revegetating the stockpiles; and

(b) any other steps authorized in writing by the Director.

3.6.8 The approval holder shall immediately suspend conservation of:

(a) topsoil; and

(b) upper subsoil

when wet or frozen conditions will result in mixing, loss or degradation of topsoil or upper subsoil.

3.6.9 The approval holder shall recommence conservation of:

(a) topsoil; and

(b) upper subsoil

only when wet or frozen field conditions in 3.6.8 no longer exist.

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PART 4: OPERATIONS, LIMITS, MONITORING AND REPORTING

SECTION 4.1: AIR

OPERATIONS

4.1.1 The approval holder shall not release any air effluent streams to the atmosphere except as authorized by this approval.

4.1.2 The approval holder shall only release air effluent streams to the atmosphere from the following sources:

(a) the odour abatement system exhaust stack;

(b) the two (2) membrane container vents;

(c) each of the two (2) cogeneration unit exhaust stacks as identified in the application by the designations Cogen 1 and Cogen 2;

(d) the emergency flare stack;

(e) the process heater exhaust stack as identified in the application by the designation H-701;

(f) any emergency pressure relief valves;

(g) the space ventilation exhaust stacks as described in the application;

(h) the space heater exhaust vents as described in the application; and

(i) any other source authorized in writing by the Director.

4.1.3 The approval holder shall direct air effluent streams from all of the following sources to the odour abatement system:

(a) the feedstock receiving hopper building including the two (2) feedstock receiving hoppers;

(b) the three (3) organics reception tanks;

(c) the two (2) manure blending tanks;

(d) the two (2) digester feed tanks;

(e) the digestate nurse tank;

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(f) the liquid digestate tank;

(g) all hood vents and air ducts above the digestate screw presses; and

(h) any other source authorized in writing by the Director.

4.1.4 In addition to the limits specified in 4.1.13, the approval holder shall not operate the process equipment unless and until the pollution abatement equipment associated with the process equipment is operating.

4.1.5 The approval holder shall only release biogas from each of the six (6) anaerobic digester tanks to:

(a) the biogas upgrading system;

(b) the emergency flare;

(c) the emergency pressure relief valves; and

(d) the two (2) cogeneration units

as described in the application.

4.1.6 The approval holder shall prevent excessive biogas from being built up in each of the six (6) anaerobic digester tanks.

4.1.7 The approval holder shall maintain the following stacks according to the minimum height requirements specified in TABLE 4.1-A.

TABLE 4.1-A: STACK HEIGHTS

STACK	MINIMUM HEIGHT ABOVE GRADE (metres)
The odour abatement system exhaust stack	6.0
The emergency flare stack	12.0
Each of the two (2) cogeneration unit exhaust stacks as identified in the application by the designations Cogen 1 and Cogen 2	10.0
The process heater exhaust stack as identified in the application by the designation H-701	6.1

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4.1.8 The approval holder shall continuously operate the emergency flare stack with the following minimum systems:

(a) wind guard;

(b) pilot light; and

(c) electric igniter

unless an equivalent system is authorized in writing by the Director.

4.1.9 The approval holder shall ensure the combustion of all combustible gases released to the emergency flare stack.

4.1.10 The approval holder shall operate:

(a) the odour abatement system;

(b) the nitrogen oxides abatement equipment;

(c) the aeration system in the liquid digestate pond; and

(d) the emergency flare

in accordance with their respective manufacturers' operation and maintenance manuals.

4.1.11 The approval holder shall control fugitive emissions and any source not specified in 4.1.2 in accordance with 4.1.12 of this approval, unless otherwise authorized in writing by the Director.

4.1.12 With respect to fugitive emissions and any source not specified in 4.1.2, the approval holder shall not release a substance or cause to be released a substance that causes or may cause any of the following:

(a) impairment, degradation or alteration of the quality of natural resources;

(b) material discomfort, harm or adverse effect to the well being or health of a person; or

(c) harm to property or to vegetative or animal life.

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AIR LIMITS

4.1.13 Releases of the following substances to the atmosphere shall not exceed the limits specified in TABLE 4.1-B.

TABLE 4.1-B: LIMITS

FACILITY UNIT	EMISSION SOURCE	SUBSTANCE	LIMIT
Power plant	Each of the two (2) cogeneration unit exhaust stacks as identified in the application by the designations Cogen 1 and Cogen 2	Nitrogen oxides	0.20 kg/MWh_{net} on an annual average and 0.45 kg/hour
Feedstock and digestate processing units	The odour abatement system exhaust stack	Hydrogen sulphide	0.0008 kg/hour
		Ammonia	0.040 kg/hour
Process heater	The process heater exhaust stack as identified in the application by the designation H-701	Nitrogen oxides	16.0 g/GJ

MONITORING AND REPORTING

4.1.14 The approval holder shall monitor the air emission sources as specified in TABLE 4.1-C.

4.1.15 The approval holder shall report to the Director the results of the air emission source monitoring as required in TABLE 4.1-C.

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TABLE 4.1-C: SOURCE MONITORING AND REPORTING

Emission Source	Monitoring			Reporting Frequency
	Parameter	Frequency	Method	
Each of the two (2) cogeneration unit exhaust stacks as identified in the application by the designations Cogen 1 and Cogen 2	Nitrogen oxides	Annually	Manual stack survey	End of the month following the month in which the manual stack survey was done
	Stack effluent flowrate			
	Temperature			
The process heater exhaust stack as identified in the application by the designation H-701	Nitrogen oxides	Once every five (5) years		
	Stack effluent flowrate			
	Temperature			
The odour abatement system exhaust stack	Total reduced sulphur	Twice per year, at least six (6) months apart		
	Ammonia			
	Volatile organic compounds			
	Stack effluent flowrate			
	Temperature			

4.1.16 The information required by:

(a) 4.1.14;

(b) 4.1.15; and

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(c) 4.1.22

shall, at a minimum, comply with:

(i) the *Alberta Stack Sampling Code*, Alberta Environment, 1995, as amended, and

(ii) the *Air Monitoring Directive*, Alberta Environment and Parks, 2016, as amended.

4.1.17 The approval holder shall notify the Director in writing a minimum of two (2) weeks prior to any manual stack survey that is required to be conducted by this approval.

4.1.18 The approval holder shall daily:

(a) monitor; and

(b) record

dissolved oxygen concentrations in each of two (2) cells of the liquid digestate pond.

4.1.19 The approval holder shall:

(a) continuously monitor pH of the scrubbing solution of the odour abatement system; and

(b) record the time, date and pH when pH is outside of the designed operating range provided by the manufacturer.

4.1.20 The approval holder shall retain the records required by 4.1.18 and 4.1.19 for a minimum of five (5) years.

4.1.21 The approval holder shall make the records required by 4.1.18 and 4.1.19 available immediately upon request by the Director.

4.1.22 The approval holder shall submit to the Director an Annual Air Emissions Summary and Evaluation Report.

4.1.23 The approval holder shall include in the Annual Air Emissions Summary and Evaluation Report, at a minimum, all of the following:

(a) information as specified in the following sections of the *Air Monitoring Directive Chapter 9: Reporting*, Alberta Environment and Parks, 2016, as amended:

(i) section 6.2,

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(ii) sections 6.4.3 and 6.4.4,

(iii) sections 6.4.7 to 6.4.10, and

(iv) section 6.6;

(b) a month-by-month summary of information required by:

(i) 4.1.18,

(ii) 4.1.19, and

(iii) 4.1.31; and

(c) any other information as required in writing by the Director.

ODOUR MANAGEMENT

4.1.24 The approval holder shall:

(a) implement, before commencing operations of the facility; and

(b) annually update

the Best Odour Management Practices Control Plan as described in the application.

4.1.25 The approval holder shall submit to the Director an up-to-date Best Odour Management Practices Control Plan, when requested in writing by the Director.

4.1.26 If the Best Odour Management Practices Control Plan is found deficient by the Director, the approval holder shall correct all deficiencies identified by the Director by the date specified in writing by the Director.

4.1.27 The approval holder shall:

(a) implement, before commencing operations of the facility; and

(b) annually update

the Odour Complaint Management and Response Program as described in the application.

4.1.28 The approval holder shall submit to the Director an up-to-date Odour Complaint Management and Response Program, when requested in writing by the Director.

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4.1.29 If the Odour Complaint Management and Response Plan is found deficient by the Director, the approval holder shall correct all deficiencies identified by the Director by the date specified in writing by the Director.

4.1.30 Upon:

(a) receiving an odour complaint; or

(b) being informed of an odour complaint by the Director or another authority,

the approval holder shall immediately:

(i) investigate the situation, and

(ii) take all measures necessary to mitigate the odour, when the approval holder knows or ought to know the source of the odour being complained of results from the facility, including but not limited to:

(A) improve, repair or replace any equipment or thing in order to control or eliminate the odour; and

(B) contain, remove or treat the substance or thing causing the odour.

4.1.31 The approval holder shall:

(a) record; and

(b) retain

all of the following information regarding odour complaints referred to in 4.1.30 for a minimum of five (5) years:

(i) the organization that received the complaint,

(ii) the contact information of the complainant, if provided to the approval holder,

(iii) the date and time of the complaint,

(iv) the approximate location where the odour was detected,

(v) the date and time that the complainant detected the odour,

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(vi) the hourly average wind speed and wind direction at or near the facility over a period of 24 hours prior to the complaint,

(vii) the hourly average ambient outdoor temperature at or near the facility over a period of 24 hours prior to the complaint,

(viii) the investigation outcomes pursuant to 4.1.30,

(ix) for where the source of odour being complained of results from the facility:

(A) a detailed description of the measures taken pursuant to 4.1.30,

(B) a detailed description of how the source of the odour may have given rise to the complaints,

(C) a follow-up review of actions taken to determine the effectiveness of eliminating the source of the odour from that occurrence, and

(D) measures that will be taken in the future to prevent the same situation that caused that odour from re-occurring; and

(x) any other information as required in writing by the Director.

4.1.32 The approval holder shall make the records required by 4.1.31 available immediately upon request by the Director.

4.1.33 The approval holder shall submit a proposal for Fugitive Emissions Monitoring Program to the Director within the first 12 months of the operation.

4.1.34 The approval holder shall develop the proposal for Fugitive Emissions Monitoring Program, at a minimum, comparable with the following:

(a) the *Measurement of Gaseous Emission Rates from Land Surfaces Using an Emission Isolation Flux Chamber – User's Guide*, EPA 600/8-86/008, 1986; and

(b) the *Quantification of Area Fugitive Emissions at Oil Sands Mines*, Version 2.2, Government of Alberta, 2023, as amended.

4.1.35 In the proposal for Fugitive Emissions Monitoring Program, the approval holder shall include, at a minimum, all of the following:

(a) a detailed description of the fugitive emission sources at the facility, including but not limited to:

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(i) the liquid digestate pond,

(ii) the digestate separation building staging bays,

(iii) the solid digestate staging area, and

(iv) the manure staging area;

(b) an identification of factors that may affect the actual emission rates of:

(i) total reduced sulphur,

(ii) ammonia, and

(iii) volatile organic compounds

from the fugitive emission sources referred to in (a);

(c) a sampling strategy to determine:

(i) the sampling numbers,

(ii) the sampling locations, and

(iii) the sampling duration and frequency

so that the spatial and temporal variability of the air emissions from the fugitive emission sources at the facility is adequately addressed;

(d) the methods to be used for quantification of the mass emission rates of:

(i) total reduced sulphur,

(ii) ammonia, and

(iii) volatile organic compounds

from the fugitive emission sources referred to in (a), including but not limited to:

(A) the procedures for the sampling and analysis of air emissions,

(B) the design and specifications of the sampling apparatus,

(C) the quality control plans for the sampling and analysis of air emissions, and

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(D) the surface area measurement and calculation methods; and

(e) any other information as required in writing by the Director.

4.1.36 If the proposal for Fugitive Emissions Monitoring Program is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

4.1.37 The approval holder shall implement the Fugitive Emissions Monitoring Program as authorized in writing by the Director.

4.1.38 The approval holder shall submit to the Director any written Fugitive Emissions Monitoring Program Report obtained from the fugitive emissions monitoring referred to in 4.1.37 by the end of the month following the month in which the fugitive emissions monitoring was done, unless otherwise authorized in writing by the Director.

4.1.39 If any Fugitive Emissions Monitoring Program Report is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

SECTION 4.2: INDUSTRIAL WASTEWATER AND INDUSTRIAL RUNOFF

OPERATIONS

4.2.1 The approval holder shall not release any substances from the facility to the surrounding watershed except as authorized by this approval.

4.2.2 The approval holder shall manage:

(a) industrial wastewater; and

(b) industrial runoff

as described in the application, unless otherwise authorized in writing by the Director.

4.2.3 The approval holder shall only release industrial wastewater as follows:

(a) to the facility to be used within the process;

(b) to facilities holding a current Act authorization;

(c) to an Alberta Energy Regulator approved facility; or

(d) as otherwise authorized in writing by the Director.

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4.2.4 The approval holder shall only release industrial runoff as follows:

(a) to the facility to be used within the process;

(b) to facilities holding a current Act authorization;

(c) to the liquid digestate pond; or

(d) as otherwise authorized in writing by the Director.

SECTION 4.3: WASTE MANAGEMENT

OPERATIONS

4.3.1 The wastes referred to in SECTION 4.3 of this approval do not refer to:

(a) feedstock; and

(b) the digestate released in accordance with 4.4.7 (a) and (b).

4.3.2 The approval holder shall release waste generated at the facility only:

(a) to facilities holding a current Act authorization;

(b) to an Alberta Energy Regulator approved facility;

(c) to facilities approved by a local environmental authority outside of Alberta; or

(d) as otherwise authorized in writing by the Director.

4.3.3 The approval holder shall not:

(a) receive; or

(b) store

any third party waste at the facility.

4.3.4 The approval holder shall:

(a) treat; and

(b) store

waste generated at the facility in accordance with this approval.

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4.3.5 The approval holder shall store hazardous waste or hazardous recyclables stored in containers or tanks in accordance with the *Hazardous Waste Storage Guidelines*, 1988, Alberta Environment, as amended.

4.3.6 The approval holder shall not:

(a) transfer;

(b) treat; or

(c) store

waste or recyclables in an amount or in a manner that will cause or may cause an adverse effect on human health or the environment.

4.3.7 The approval holder shall not:

(a) treat; or

(b) store

waste or recyclables at the facility in an amount or in a manner that causes or may cause:

(i) fire,

(ii) explosion,

(iii) violent reaction,

(iv) emission of toxic dust, mist, fumes or gases, or

(v) emission of flammable fumes or gases.

4.3.8 The approval holder shall store waste generated at the facility only in the waste storage areas.

4.3.9 The approval holder shall:

(a) provide and maintain an adequate aisle space between containers in the waste storage areas to allow:

(i) inspection, and

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(ii) unobstructed movement of personnel, fire protection equipment, spill control equipment and decontamination equipment to any area of the waste storage areas; and

(b) arrange inspection aisles in the waste storage areas such that the identification label on each container is readable.

4.3.10 The approval holder shall prevent direct contact of incompatible waste with one another.

MONITORING AND REPORTING

4.3.11 Prior to the consignment or storage of any waste generated at the facility, the approval holder shall:

(a) identify;

(b) characterize; and

(c) classify

the waste but not including industrial runoff and air effluent streams in accordance with:

(i) the *Industrial Waste Identification and Management Options*, Alberta Environment, 1996, as amended, and

(ii) the *Alberta User Guide for Waste Managers*, Alberta Environment, 1996, as amended.

4.3.12 The approval holder shall measure or, when not practical to measure, estimate the quantity of waste generated at the facility each year.

4.3.13 The approval holder shall compile all the information required by 4.3.11 and 4.3.12 in an Annual Waste Management Summary Report as indicated in TABLE 4.3-A.

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TABLE 4.3-A: ANNUAL WASTE MANAGEMENT SUMMARY REPORT

Waste Name	Uniform Waste Code				Quantity (kg or L)		Stored	Recycled		Disposed	
	WC	PIN	Class	Mgmt	Hazardous	Non-hazardous	On-site	On-site	Off-site	On-site	Off-site
				TOTAL							

4.3.14 The approval holder shall submit the Annual Waste Management Summary Report to the Director.

SECTION 4.4: FEEDSTOCK AND DIGESTATE MANAGEMENT

OPERATIONS

4.4.1 The approval holder shall only process feedstock as described in the Directive.

4.4.2 In the event the percentage of manure by wet weight of the feedstock falls below 50%, the approval holder shall apply for an amendment to this approval on or before March 31 of the year following the year in which the percentage of manure by wet weight used as feedstock fell below 50%.

4.4.3 The approval holder shall manage digestate as described in the application.

4.4.4 At any one time the approval holder shall not store more than:

(a) ten thousand (10,000) tonnes of solid digestate in the solid digestate staging area; and

(b) five thousand (5,000) tonnes of manure in the manure staging area.

4.4.5 The approval holder shall only release the following to the liquid digestate pond:

(a) liquid digestate;

(b) industrial runoff; and

(c) any accidental release of manure or digestate.

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4.4.6 The approval holder shall operate the liquid digestate pond at or below a maximum level of 0.6 metres below the top of the pond liner, unless otherwise authorized in writing by the Director.

4.4.7 The approval holder shall only release digestate as follows:

(a) by application to arable land in accordance with the Directive;

(b) to the following that is the subject of the appropriate Approval, Registration or Authorization under AOPA:

(i) a confined feeding operation, or

(ii) a manure storage facility;

(c) to facilities holding a current Act authorization;

(d) to the facility to be used within the process; or

(e) as otherwise authorized in writing by the Director.

4.4.8 The approval holder shall:

(a) implement, before commencing operations of the facility; and

(b) annually update

the Program for Keeping Out Vectors as described in the application.

4.4.9 The approval holder shall submit to the Director an up-to-date Program for Keeping Out Vectors, when requested in writing by the Director.

4.4.10 If the Program for Keeping Out Vectors is found deficient by the Director, the approval holder shall correct all deficiencies identified by the Director by the date specified in writing by the Director.

MONITORING AND REPORTING

4.4.11 The approval holder shall monitor digestate as required in TABLE 4.4-A, unless otherwise authorized in writing by the Director.

4.4.12 The approval holder shall report to the Director the results of the digestate monitoring as required in TABLE 4.4-A, unless otherwise authorized in writing by the Director.

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TABLE 4.4-A: DIGESTATE MONITORING AND REPORTING

MONITORING				REPORTING FREQUENCY
Parameters	**Frequency**	**Sampling Method**	**Sampling Location**	
Total Kjeldahl Nitrogen (without reduction of nitrate)	Twice per year, at least six (6) months apart	(a) one (1) composite sample for solid digestate; and (b) one (1) representative grab for liquid digestate.	(a) solid digestate staging area; and (b) liquid digestate pond.	Annually
Ammonium-nitrogen (KCl extract)				
Nitrate-nitrogen (KCl extract)				
Total phosphorus (strong acid digest)				
Routine parameters				
Total metals (strong acid digest)				
Solid content				
Reduced sulphur compounds				
Any other parameters as required in writing by the Director				

4.4.13 The approval holder shall record all the information as indicated in:

(a) TABLE 4.4-B; and

(b) TABLE 4.4-C.

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TABLE 4.4-B: ANNUAL DIGESTATE RELEASE SUMMARY

Owner of the Facility or Land	Facility Type Referred to in 4.4.7	AOPA or EPEA Authorization Referred to in 4.4.7*	Legal Land Description of the Land Referred to in 4.4.7	Type of Digestate (Liquid or Solid Digestate)	Digestate Quantity (kg)

* If grandfathered under AOPA without a municipal permit, just state: "grandfathered"

TABLE 4.4-C: ANNUAL FEEDSTOCK SUMMARY

Feedstock Provider	Legal Land Description	Feedstock Description	Feedstock Quantity (kg)

4.4.14 The approval holder shall submit an annual Feedstock and Digestate Management Report on or before March 31 of the year following the year in which the information was collected to:

(a) the Director; and

(b) the NRCB

unless otherwise authorized in writing by the Director.

4.4.15 The annual Feedstock and Digestate Management Report shall include, at a minimum, all of the following:

(a) the information required in:

(i) 4.4.11,

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(ii) 4.4.12, and

(iii) 4.4.13; and

(b) any other information as required in writing by the Director.

SECTION 4.5: GROUNDWATER

4.5.1 The approval holder shall develop a proposal for a Groundwater Monitoring Program for the facility which shall include, at a minimum, all of the following:

(a) a hydrogeologic description and interpretation of the facility;

(b) a map and description of surface water drainage patterns for the facility;

(c) a lithologic description and maps, including cross-sections, of the surficial and the upper bedrock geologic materials at the facility;

(d) a site map showing the location and type of current and historical potential sources of groundwater contamination;

(e) cross-sections showing depth to water table, patterns of groundwater movement and hydraulic gradients at the facility;

(f) the hydraulic conductivity of all surficial and bedrock materials at the facility;

(g) a map showing the location of existing and additional proposed groundwater monitoring wells at the facility;

(h) a lithologic description of all boreholes drilled at the facility;

(i) construction and completion details of existing groundwater monitoring wells;

(j) a rationale for proposed groundwater monitoring well locations and proposed completion depths of those wells;

(k) a description of groundwater monitoring well development protocols;

(l) a list of parameters to be monitored and the monitoring frequency for each groundwater monitoring well or group of groundwater monitoring wells at the facility;

(m) a description of the groundwater sampling and analytical QA/QC procedures;

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(n) details of a groundwater response plan specifying actions to be taken should contaminants be identified through the Groundwater Monitoring Program; and

(o) any other information relevant to groundwater quality at the facility.

4.5.2 The approval holder shall submit the proposal for the Groundwater Monitoring Program to the Director on or before December 31, 2024.

4.5.3 If the Groundwater Monitoring Program proposal is found deficient by the Director, the approval holder shall correct all deficiencies as identified in writing by the Director within the timeline specified in writing by the Director.

4.5.4 The approval holder shall implement the Groundwater Monitoring Program as authorized in writing by the Director.

4.5.5 The approval holder shall:

(a) protect from damage; and

(b) keep locked except when being sampled

all groundwater monitoring wells, unless otherwise authorized in writing by the Director.

4.5.6 If a representative groundwater sample cannot be collected because the groundwater monitoring well is damaged or is no longer capable of producing a representative groundwater sample, the approval holder shall:

(a) clean, repair or replace the groundwater monitoring well; and

(b) collect and analyse a representative groundwater sample prior to the next scheduled sampling event

unless otherwise authorized in writing by the Director.

4.5.7 In addition to the sampling information recorded in 2.2.1, the approval holder shall record the following sampling information for all groundwater samples collected:

(a) a description of purging and sampling procedures;

(b) the static elevations above sea level, and depth below ground surface of fluid phases in the groundwater monitoring well prior to purging;

(c) the temperature of each sample at the time of sampling;

(d) the pH of each sample at the time of sampling; and

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(e) the specific conductance of each sample at the time of sampling.

4.5.8 The approval holder shall carry out remediation of the groundwater in accordance with the following:

(a) the *Alberta Tier 1 Soil and Groundwater Remediation Guidelines*, Alberta Environment and Parks, August 2022, as amended; and

(b) the *Alberta Tier 2 Soil and Groundwater Remediation Guidelines*, Alberta Environment and Parks, August 2022, as amended.

4.5.9 The approval holder shall compile a Groundwater Monitoring Report which shall include, at a minimum, all of the following information:

(a) a completed *Record of Site Condition* Form, Government of Alberta, 2014, as amended;

(b) a legal land description of the facility and a map illustrating the facility boundaries;

(c) a topographic map of the facility;

(d) a description of the industrial activity and processes;

(e) a map showing the location of all surface and groundwater users, and a listing describing surface water and water well use details, within at least a three (3) kilometre radius of the facility;

(f) a general hydrogeological characterization of the region within a three (3) kilometre radius of the facility;

(g) a detailed hydrogeological characterization of the facility, including an interpretation of groundwater flow patterns;

(h) cross-sections showing depth to water table, patterns of groundwater movement and hydraulic gradients at the facility;

(i) borehole logs and completion details for groundwater monitoring wells;

(j) a map showing locations of all known buried channels within at least three (3) kilometres of the facility;

(k) a map of surface drainage within the facility and surrounding area to include nearby water bodies;

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(l) a map of groundwater monitoring well locations and a table summarizing the existing groundwater monitoring program for the facility;

(m) a summary of any changes to the groundwater monitoring program made since the last groundwater monitoring report;

(n) analytical data recorded as required in 4.5.4 and 4.5.6(b);

(o) a summary of fluid elevations recorded as required in 4.5.7(b) and an interpretation of changes in fluid elevations;

(p) an interpretation of QA/QC program results;

(q) an interpretation of all the data in this report, including the following:

  (i) diagrams indicating the location and extent of any contamination,

  (ii) a description of probable sources of contamination, and

  (iii) a site map showing the location and type of current and historical potential sources of groundwater contamination;

(r) a summary and interpretation of the data collected since the groundwater monitoring program began including:

  (i) control charts which indicate trends in concentrations of parameters, and

  (ii) the migration of contaminants;

(s) a description of the following:

  (i) contaminated groundwater remediation techniques employed,

  (ii) source elimination measures employed,

  (iii) risk assessment studies undertaken, and

  (iv) risk management studies undertaken;

(t) a proposed sampling schedule for the following years;

(u) a description of any contaminant remediation, risk assessment or risk management action conducted at the facility; and

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(v) recommendations for changes to the groundwater monitoring program to make it more effective.

4.5.10 The approval holder shall submit the Groundwater Monitoring Report to the Director on or before March 31 of every year, unless otherwise authorized in writing by the Director.

4.5.11 If the Groundwater Monitoring Report is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

SECTION 4.6: SOIL MANAGEMENT

Not used at this time.

SECTION 4.7: DOMESTIC WASTEWATER

4.7.1 The approval holder shall only release domestic wastewater to facilities holding a current Act authorization, unless otherwise authorized in writing by the Director.

PART 5: FINANCIAL SECURITY REQUIREMENTS

5.1.1 The approval holder shall annually review and revise the cost estimate for reclamation of the facility including decommissioning and land reclamation.

5.1.2 The annual revised cost estimate for the facility shall be submitted to the Director by March 31 of each year.

5.1.3 The approval holder shall review and revise the cost estimate for reclamation of the facility when one or more of the following occurs:

(a) the cost estimate of future conservation and reclamation of the facility changes;

(b) the extent of the operation of the facility is increased or reduced;

(c) the facility or any portion of it is conserved and reclaimed;

(d) the conservation and reclamation plan required by this approval is changed; or

(e) the activities conducted at the facility for which security is required are increased or decreased.

5.1.4 The approval holder shall submit the revised cost estimate arising from 5.1.3 to the Director within 30 days of the occurrence of any of the circumstances described in 5.1.3.

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5.1.5 The approval holder shall provide additional financial security as required in writing by the Director.

5.1.6 The approval holder shall renew the financial security for the facility at least 30 days prior to the date it expires.

5.1.7 The approval holder shall maintain the financial security for the facility until returned in accordance with the Act or the regulations.

PART 6: DECOMMISSIONING AND LAND RECLAMATION

SECTION 6.1: GENERAL

6.1.1 The approval holder shall apply for an amendment to this approval to reclaim the facility by submitting a:

(a) Decommissioning Plan; and

(b) Land Reclamation Plan

to the Director.

6.1.2 The approval holder shall submit the:

(a) Decommissioning Plan; and

(b) Land Reclamation Plan

referred to in 6.1.1 within six (6) months of the facility ceasing operation, except for repairs and maintenance, unless otherwise authorized in writing by the Director.

SECTION 6.2: DECOMMISSIONING

6.2.1 The Decommissioning Plan referred to in 6.1.1 shall include, at a minimum, all of the following:

(a) a plan for dismantling the facility;

(b) a comprehensive study to determine the nature, degree and extent of contamination at the facility and affected lands;

(c) a plan to manage all wastes at the facility;

(d) evaluation of remediation technologies proposed to be used at the facility and affected lands;

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(e) a plan for decontamination of the facility and affected lands in accordance with the following:

(i) for soil or groundwater, the *Alberta Tier 1 Soil and Groundwater Remediation Guidelines*, Alberta Environment and Parks, August 2022, as amended,

(ii) for soil or groundwater, the *Alberta Tier 2 Soil and Groundwater Remediation Guidelines*, Alberta Environment and Parks, August 2022, as amended,

(iii) for drinking water, the *Canadian Environmental Quality Guidelines*, Canadian Council of Ministers of the Environment, PN 1299, 1999, as amended, and

(iv) for surface water, the *Environmental Quality Guidelines for Alberta Surface Waters*, Alberta Environment and Parks, 2018, as amended;

(f) confirmatory testing to indicate compliance with the remediation objectives;

(g) a plan for maintaining and operating contaminant monitoring systems;

(h) a schedule for activities (a) through (g) above; and

(i) any other information as required in writing by the Director.

6.2.2 If the Decommissioning Plan is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

SECTION 6.3: LAND RECLAMATION

6.3.1 The Land Reclamation Plan referred to in 6.1.1 shall include, at a minimum, all of the following:

(a) the final use of the reclaimed area and how equivalent land capability will be achieved;

(b) removal of infrastructure;

(c) restoration of drainage;

(d) soil replacement;

(e) erosion control;

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(f) revegetation and conditioning of the facility including:

(i) species list, seed source and quality, seeding rates and methods,

(ii) fertilization rates and methods, and

(iii) wildlife habitat plans where applicable;

(g) reclamation schedule; and

(h) any other information as required in writing by the Director.

6.3.2 If the Land Reclamation Plan is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

December 11, 2023

DATE

DESIGNATED DIRECTOR UNDER THE ACT
CRAIG KNAUS, B.Sc.

ALBERTA

Office of the Minister

Ministerial Order
12/2025

Environmental Protection and Enhancement Act
R.S.A. 2000, c. E-12

Order Respecting Environmental Appeals Board
Appeal Nos. 23-119-121 & 124-125

I, Rebecca Schulz, Minister of Environment and Protected Areas, pursuant to section 100 of the *Environmental Protection and Enhancement Act,* make the order in the attached Appendix, being an Order Respecting Environmental Appeals Board Appeal Nos. 23-119-121, & 124-125.

Dated at the City of Edmonton, in the Province of Alberta, this 15th day of May, 2025.

Rebecca Schulz
Minister

APPENDIX

Order Respecting Environmental Appeals Board Appeal Nos. 23-119-121 & 124-125

With respect to the decision of the Director, Regulatory Assurance Division South, Alberta Environment and Protected Areas, EPEA Approval No. 484778-00-00 (the "Approval") under the *Environmental Protection and Enhancement Act* to Rimrock Renewables Ltd., I, Rebecca Schulz, Minister of Environment and Protected Areas, order that the Approval is confirmed subject to the following:

1. The Approval is varied as follows:

   (a) The following is added after section 3.2.6:

   3.2.7 The approval holder shall construct the odour abatement system required in 3.2.5 to include, at a minimum, all the following:
   a. a wet chemical scrubber as described in the application;
   b. two (2) carbon filters, each with an adequate capacity to treat the air effluent streams from the facility and allow for one standby carbon filter at any time; and
   c. sampling facilities to monitor the carbon media absorption capacity.

   3.2.8 The approval holder shall construct a meteorological station for the site at a location on the site approved by the Director in accordance with condition 3.2.9 and in accordance with the Air Monitoring Directive, Alberta Environment and Parks, 2016, as amended, to continuously monitor and record at minimum, all of the following:
   a. wind speed;
   b. wind direction; and
   c. ambient temperature.

   3.2.9 Prior to constructing the meteorological station for the site, the approval holder will determine the most effective location for placement of the meteorological station and will acquire the Director's approval of the proposed location for the meteorological station in writing.

   3.2.10 Additionally, the approval holder shall provide the results of the monitoring data of the meteorological station contemplated by condition 3.2.8 to the following parties on October 31 and March 30 of each year:
   a. the Director;
   b. the Natural Resources Conservation Board;
   c. the Rimrock Cattle Company Ltd.; and
   d. the publicly accessible website referred to in condition 3.2.11.

3.2.11 The approval holder shall make all monitoring data from the Facility available on a publicly accessible website. The data shall be posted on a daily basis.

3.2.12 The approval holder shall prepare an Emergency Response Plan for the Director to review and accept prior to the acceptance of any feedstock at the Facility.

3.2.13 The Emergency Response Plan must be developed in consultation with Foothills County and the Town of High River, and must include public input regarding emergency measures to ensure the protection of surrounding residents, including how to notify surrounding residents of emergencies, emergency exit routes, and any other measures necessary to protect the public.

(b) Condition 4.4.1 is deleted and replaced with "The approval holder shall only process feedstock as described in Table A and Table B of the Directive."

(c) Condition 4.1.33 is deleted and replaced with "The approval holder shall submit a proposal for a Fugitive Emissions Monitoring Program to the Director a minimum of one (1) month prior to the acceptance of any feedstock at the Facility to be finalized on commencement of operation."

2. All other conditions in the Approval are confirmed as issued.

LICENCE

PROVINCE OF ALBERTA

Water Act, RSA 2000, c.W-3, as amended

LICENCE NUMBER:	DAUT0010346
PRIORITY NUMBER:	1907-10-03-01
EFFECTIVE DATE:	2022-09-26
EXPIRY DATE:	2032-09-30
SOURCE OF WATER:	Highwood River
POINT OF DIVERSION:	SE-32-018-29 W4M
POINT OF USE:	NW 05-019-29-W4M, SW 05-019-29-W4M and NE 06-019-29- W4M
LICENSEE:	Korova Feeders Ltd.

This Licence is the result of a permanent transfer of a water allocation from Licence No. 0045742-00-01 issued to Hugh and Susan McPherson.

Pursuant to the Water Act, RSA 2000, c.W-3, as amended, a licence is issued to the Licensee to:

- operate a works and to divert up to 160,971 cubic metres of water per year from the source(s) of water at the point(s) of diversion at a maximum rate of 0.027* cubic metres per second for the purpose(s) of Industrial and Agricultural.
  * see condition 6980 for details on maximum rate of diversion

subject to the attached terms and conditions.

Designated Director under the Water Act: Craig Kraus

Date Signed: 2022-09-26

TERMS AND CONDITIONS

1. DEFINITIONS

6560. All definitions from the Act and the Regulations apply except where expressly defined in this licence.

6570. In all parts of this licence:

a. "Act" means the Water Act, RSA 2000, c.W-3, as amended;

b. "Application" means the written submissions to the Director in respect of application number DAPP0002975 and any subsequent applications for amendments of Licence No. DAUT0010346;

c. "Director" means an employee of the Government of Alberta designated as a Director under the Act;

d. "Instream Objective" means the water flow in the source of water that remains in the source of water immediately downstream of the Point(s) of Diversion, during the diversion of water by the Licensee;

e. "Point of Diversion" means the place in which water is diverted by the Licensee for the licenced purpose, specified in 6880;

f. "Point of Use" means the place in which the diverted water is used by the Licensee for the licenced purpose, specified in 6880;

g. "Regulations" means the regulations, as amended, enacted under the authority of the Act;

h. "Water Conservation Objective" means the amount and quality of water necessary for the protection of a natural water body or its aquatic environment, including water necessary for the rate of flow or water level requirements;

i. "Water Conservation Objective" means the amount and quality of water established by the Director under Part 2, based on information available to the Director, to be necessary for the protection of a natural water body or its aquatic environment, or any part of them, protection of tourism, recreational, transportation or waste assimilation uses of water, or management of fish or wildlife, and may include water necessary for the rate of flow of water or water level requirements.

j. "Water Use Reporting System" means the Alberta Environment and Parks secure internet website for submitting measuring and monitoring results electronically to the Director.

2. GENERAL

6770. The Licensee shall immediately report to the Director by telephone any contravention of the terms and conditions of this licence at 1-780-422-4505.

6780. The terms and conditions of this licence are severable. If any term or condition of this licence is held invalid, the application of such term or condition to other circumstances and the remainder of this licence shall not be affected thereby.

6790. The Licensee shall not deposit or cause to be deposited any substance in, on, or around the source of water that has, or may have, the potential to adversely affect the source of water.

6800. Unless otherwise specified in writing by the Director, the Licensee shall submit an application to the Director for the decommissioning of the works within six months after permanently ceasing operation of the works or diversion of the water.

6804. The Licensee will implement the Water Shortage Response Plan (WSRP) submitted on February 10, 2022 when water supply shortages occur.

6805. The Licensee will review the WSRP after each implementation of the Plan and provide revisions to the Director for review and approval.

6806. The Licensee will implement any revisions to the WSRP approved by the Director.

6810. The Licensee shall comply with the terms and conditions of the Water Use Reporting System User Consent.

3. PARTICULARS

6880. This licence is appurtenant to the following:

(a) the Point of Diversion described as the actual point of removal from the Highwood River at SE 32-018-29-W4 as described in Plan No.19110-5, as specified in Licence No 00032187-00-00; and

(b) the Point of Use located at NW 05-019-29-W4, SW 05-019-29-W4 and NE 06-019-29-W4 as shown on Plan No. DAPP000975-P001.

6890. The Licensee shall only undertake the Diversion of Water in accordance with Plan No. 19110-5 and DAPP0002975-P001.

6900. The works used to divert, convey and use the water to the Point(s) of Use authorized by this licence shall include, at a minimum, all of the following:

(a) the intake site as specified in 6890; and

(b) water supply lines, pumps, reservoirs, tanks, and any other works associated with the biodigester project.

6920. The Licensee shall undertake the diversion in accordance with the plans and reports as specified in 6890

6930. The Licensee shall divert water only for the purpose(s) specified in this licence.

6940. The Licensee shall divert water only from the source(s) of water specified in this licence.

6950. The Licensee shall divert water only from the Point(s) of Diversion.

6960. The Licensee shall divert the water only to the Point(s) of Use.

6970. The Licensee shall not divert more than 160,971 of cubic metres of water per year.

6980. The Licensee shall not divert water at a rate of diversion greater than 0.027 cubic metres per second, but this rate may be increased upto 0.056 cubic metres per second but only when all licensees and registrants with a numerically lower priority than 2015-05-08-001 in the Highwood River Basin have sufficient water to divert their whole allocation of water specified under the licence or registration.

6990. The diversion during winter season (November 1 to March 31) will have a priority number of 2022-02-10-001.

7010. The Licensee shall cause any water entering an intake pipe leading to pumps to first pass through a screen with openings no larger than 2.54 millimetres.

7030. Prior to diverting any water from the source of water, the Licensee shall equip the Point of Diversion with a meter which measures:

(a) cumulatively the quantity of all water diverted; and

(b) the rate of diversion in cubic metres per second.

7040. The Licensee shall maintain each measuring device referred to in 7030 at all times.

7050. The Licensee shall calibrate each measuring device referred to in 7030 in accordance with manufacturer's specifications.

7060. The Director may amend this licence to establish or change the:
(a) rate of flow requirement;
(b) instream objectives;
(c) water conservation objectives;
(d) water level requirements;
(e) exceedence flows; and
(f) cumulative allocations
upon a minimum of 12 months written notice to the Licensee.

7070. The instream objectives is set out in the Schedule 1 for the periods of time specified.

7080. The Licensee shall divert the water authorized by this licence only when there is sufficient water flow in the source of water to meet or exceed the requirement, instream objectives set out in 7070.

7090. The Licensee shall divert the water authorized by this licence only when the water level in the source of water is at or above the water level requirements set out in 7070.

7100. Unless otherwise authorized in writing by the Director, the instream objectives in 7070 is to be met:
(a) at Water Survey of Canada Station No. 05BL004 (Highwood River below Little Bow Canal)
(b) when diverting any water

4. MONITORING AND REPORTING

9200. Unless otherwise authorized in writing by the Director, the Licensee shall measure the total number of cubic metres of water diverted from the source of water on a monthly basis while water is being diverted.

9220. Unless otherwise authorized in writing by the Director, the Licensee shall measure the total number of cubic metres of water returned to the source of water on a ${daily, weekly, monthly, quarterly, annual} basis.

9230. Unless otherwise authorized in writing by the Director, the Licensee shall measure the rate of diversion from the source of water on a per second basis.

9250. The Licensee shall:
(a) record all of the following information:
(i) the place, date and time of all monitoring, measuring and sampling;
(ii) the results obtained pursuant to:
(A) 9220 and 9230,
(iii) the name of the individual who conducted the monitoring, measuring and sampling stipulated in (i); and
(b) retain the information in (a) for a minimum of 5 years after being collected.

9260. The Licensee shall report to the Director the results of the recording in 9250 using the "Water Use Reporting System" and any other information required in writing by the Director.

9270. The Licensee shall submit the report required in 9250 on or before the end of the year following of the year in which the information is based upon was collected.

5. COMPLAINTS

9370. The Licensee shall:
(a) make reasonable efforts to obtain further information regarding complaints of surface water and groundwater interference as a result of the diversion; and
(b) prepare a written report describing the steps taken to comply with (a) including, at a minimum, each of the following:
(i) a detailed description of the efforts taken by the Licensee to obtain further information regarding the complaints as required in (a);
(ii) all of the information obtained by the Licensee as result of the efforts required in (a);
(iii) recommendations for measures to remediate and mitigate the interference(s) with surface water and groundwater as a result of the diversion;
(iv) detailed information describing how the Licensee will implement the measures recommended in (iii);
(v) a schedule of implementation for the measures recommended in (iii); and
(vi) any other information required in writing by the Director.

9390. If the written report in 9370 (b) is found deficient by the Director, the Licensee shall correct all the deficiencies identified by the Director by the date specified in writing by the Director.

9400. The Licensee shall implement the measures in 9370 (b) as approved in writing by the Director.

Storage and Application of Digestate on Agricultural Land Directive

This Directive is made in conjunction with the Memorandum of Understanding (MOU) among Alberta Agriculture and Irrigation (AGI), Alberta Environment and Protected Areas (EPA), and the Natural Resources Conservation Board (NRCB) dated June 26, 2023, regarding the storage and application of digestate on agricultural land.

Purpose

The purpose of this Directive is to establish the parameters that allow digestate to be regulated as manure under the *Agricultural Operation Practices Act* (AOPA). This directive outlines the minimum manure content and the allowable feedstocks that can be used in combination with the manure. Digestate produced in compliance with this directive can be stored in manure storage facilities regulated under AOPA and land applied as manure under AOPA and in accordance with any permit conditions under the regulatory authority of the NRCB.

EPA in coordination with the NRCB regulate digestate that is created using manure as the primary feedstock. Digestate shall be considered "manure" as defined in section 1(c.2) of AOPA, whenever both of the following conditions are met:

a) manure comprises at least 50% by wet weight of the feedstock on an annual basis; and

b) the remainder of the feedstock consists entirely of one or more of the feedstocks listed in the Types of Feedstock tables below.

Any person planning to meet these conditions must contact EPA and the NRCB to determine the applicable authorizations or permit(s) required.

The *Storage and Application of Digestate on Agricultural Land Directive* supports the Memorandum of Understanding, as well as authorization(s)/permit(s) issued by Alberta Environment and Protected Areas (EPA) and the Natural Resources Conservation Board (NRCB).

Types of Feedstock

A. ORGANIC FOOD RESOURCES

A.1 Fats, Oils and Greases (FOG)		
Feedstock	**Description**	**Example Sources**
Dissolved Air Flotation slurry (DAF), Centrifuged Dissolved Air Flotation slurry (CDAF)	Fats & proteins skimmed from wash water	slaughterhouses meat packing operations
Grease trap fat Food interceptor solids	Fats, oils & greases captured in grease traps & food interceptors	food processors grocery stores restaurants cafeterias
Used vegetable oil	Vegetable oil used for deep frying	food processors grocery stores restaurants cafeterias

Mixed processed meat & fish wastes	Cooked & uncooked meat & fish residues	food processors meat packers canneries

A.2 Food Processing Residues		
Feedstock	**Description**	**Example Sources**
Oil seed processing residues	Residues from extracting oils from seed including canola cake, canola oil, bleaching clay	oil seed processors
Feed mill residues	Dust & wet grain residues	farm operations feed mills
Cereal, grain & spice processing residues	Grain dust, husks, hulls	elevators cereal processors grain processors flour mills
Fruit & vegetable residues	Pomace, peelings, rinds, juices	juice processors vegetable processors canneries wineries
Corn processing residues	Effluent from corn wet milling, stillage, distillers grain, silage, squeeze	distillers breweries ethanol plants food processors starch producers
Beet processing residues	Beets, beet tops, trash, tailings, molasses	sugar producers
Potato processing residues	Potato sludge, peelings, chips	potato processing plants
Dairy processing residues	Whey, milk, ice cream, proteins, wash water & other residues	dairy processors cheese factories
Paunch content	Partially digested material taken from an animal at the time of slaughter	meat plants
Aerobic sludge	Aerobic sludge from non-municipal wastewater treatment	food processors
(Anaerobic sludge)	Anaerobic sludge from non-municipal wastewater treatment	food processors
Pet food residues	Pet food	pet food processors
Process water	Liquid residues, wash water	food processors

A.3 Kitchen and Market Residues		
Feedstock	**Description**	**Example Sources**
Bakery and Bread Residues	Dough, flour, yeast and crumbs	bakeries pizza parlours restaurants cafeterias
Confectionary residues	Candies & cookies	food processors
Mixed food/kitchen residues	Cooked & treated vegetables, fruits & grains, frozen food	food processors grocery stores cafeterias/restaurants universities hospitals

B. OTHER

Feedstock	**Description**	**Example Sources**
Glycerin/glycerol	Alcohol by-product	industrial biodiesel production
Fusel oil	Fusel alcohol	distilleries
Horticultural residues	Residues from plants & flowers	greenhouses garden centers flower shops
Green (garden) residues	Grass	municipalities households
Energy crops	Silage (corn, grain, grass)	farm operations
Damaged/rejected crops	Crops which have been damaged and/or are unable to be marketed.	farm operations
Crop residues	Residues from the crop harvesting	farm operations
Pulp & paper residues	Sludge	paper mills
On-site domestic wastewater	Domestic wastewater from biogas facility	biogas facility washroom(s)

C. ANIMAL BY-PRODUCTS*

Feedstock	**Description**	**Example Sources**
Animal carcasses & animal parts	Deadstock (cattle, hog, poultry, horse, bison), roadkill (deer, elk, moose)	livestock operations slaughterhouses meat plants
Animal entrails	Stomach & intestines from slaughtered animals	slaughterhouses meat plants
Animal blood	Blood from slaughtered animals	slaughterhouses meat plants

*Animal by-products that are legally classified as Specified Risk Material (SRM) shall be pre-treated with thermal hydrolysis as required by the Canadian Food Inspection Agency (CFIA).

June 26, 2023

Subject: Memorandum of Understanding (MOU) among Alberta Agriculture and Irrigation (AGI), Alberta Environment and Protected Areas (EPA), and the Natural Resources Conservation Board (NRCB) regarding the storage and application of digestate on agricultural land.

The purpose of this MOU is to coordinate the regulation, under the *Agricultural Operation Practices Act* (AOPA) and the *Environmental Protection and Enhancement Act* (EPEA), of digestate produced using manure, as defined in section 1(c.2) of AOPA, and any feedstock listed in the *Storage and Application of Digestate on Agricultural Land Directive* (the Directive).

This MOU outlines the respective roles and responsibilities of AGI, EPA and the NRCB in ensuring the environmental risks associated with digestate storage and land application are appropriately managed while duplication of efforts and regulatory burden is avoided. This MOU applies to any person responsible for digestate who is applying to EPA for a permit, who elects to fall under the MOU and can demonstrate the digestate meets the requirements of the associated directive to the satisfaction of EPA and the NRCB.

Nothing in this MOU is intended to limit the NRCB Board members' discretion in considering any permit or nutrient management plan, or an order to enforce any such permit or plan or regulation under AOPA, in an adjudicative review under AOPA.

For this MOU:

- "Digestate" means any liquid or solid material formed from the production of biogas in a digester at a plant or facility that is regulated under EPEA, and
- "Feedstock" means manure as defined in section 1(c.2) of AOPA and any substance listed in the Directive that is used for the production of biogas in a digester at a plant or facility that is regulated under EPEA.

This MOU concerns the terms and conditions regarding the assumption of regulatory responsibility between EPA and the NRCB for:

(1) the storage of digestate at "confined feeding operations" as defined in section 1(b.6) of AOPA on agricultural land and in "manure storage facilities" as defined in section 1 (c.3) of AOPA; and

(2) the application of digestate to arable land, by any person (For this MOU, the term "arable land" has the same meaning as that used in section 24(1) of the *Standards and Administration Regulation, Alta. Reg. 267/2001,* under AOPA.)

hereafter referred to as the "two activities".

AGI, EPA and the NRCB agree as follows:

1. The NRCB assumes regulatory responsibility under AOPA for the two activities, whenever the Feedstock for the Digestate is comprised of at least 50 percent manure by wet weight on an annual basis, and otherwise meets the requirements of the Directive.
2. EPA will not assume regulatory responsibility for the two activities where the NRCB assumes regulatory responsibility under Clause 1. EPA will have regulatory responsibility under EPEA for the two activities where the NRCB does not assume regulatory responsibility under Clause 1.
3. To the extent permitted by law, EPA, AGI and the NRCB will endeavor to share with each other all relevant information so that each party can fulfill their respective regulatory responsibilities.
4. The Directive shall be referenced in any authorization or permit issued by EPA and the NRCB, as applicable.
5. Any authorization issued by EPA that is related to the two activities shall include feedstock and digestate monitoring and reporting requirements to show compliance with the Directive. The reporting shall be made available to the NRCB upon request.
6. Any permit issued by the NRCB for the two activities shall include soil and groundwater monitoring and reporting requirements, as applicable. The reporting shall be made available to EPA upon request.
7. The Directive shall be maintained by AGI and may be updated from time to time, as required and as agreed to by the relevant Executive Directors at AGI and EPA and by the Chief Executive Officer at the NRCB.
8. This MOU may be amended from time to time, as required and as agreed to by the relevant Assistant Deputy Ministers at AGI and EPA, and the Chief Executive Officer at the NRCB.
9. EPA and AGI commit to considering amendments to legislation in order to affect the coordinated regulatory approach in this MOU and ultimately render this MOU unnecessary.
10. This MOU will take effect upon the latest signature date listed below.
11. The MOU titled “Memorandum of Understanding (MOU) Among Alberta Environment and Parks (AEP), Alberta Agriculture and Forestry (AAF), and the Natural Resources Conservation Board (NRCB), Regarding On-Farm Storage and Land Application of Digestate", dated April 8, 2020, is hereby cancelled.

Stacey Smythe Date
ADM, Regulatory Assurance Division
Alberta Environment and Protected Areas

June 26, 2023
Sean Royer Date
Chief Executive Officer
Natural Resources Conservation Board

John Conrad June 26, 2023
John Conrad Date
ADM, Primary Agriculture Division
Alberta Agriculture and Irrigation

Alberta

HRA Number: 4515-21-0007-001
October 27, 2021

Historical Resources Act Approval

Proponent: Korova Feeders Ltd.
Box 65, 294044 Range Road, Acme, AB T0M 0A0
Contact: Kendra Donnelly

Agent: Bison Historical Services Ltd.
Contact: Sean Goldsmith

Project Name: **Rimrock's Biodigester NE 1/4, SEC. 6-19-29-W4M**

Project Components: Feedlot
Other - Biodigester

Application Purpose: Requesting HRA Approval / Requirements

Historical Resources Act approval is granted for the activities described in this application and its attached plan(s)/sketch(es) subject to Section 31, "a person who discovers an historic resource in the course of making an excavation for a purpose other than for the purpose of seeking historic resources shall forthwith notify the Minister of the discovery." The chance discovery of historical resources is to be reported to the contacts identified within Standard Requirements under the *Historical Resources Act*: Reporting the Discovery of Historic Resources.

Rebecca Traquair
Regulatory Approvals Coordinator
Alberta Culture and Status of Women

Lands Affected: All New Lands

Proposed Development Area:

MER	RGE	TWP	SEC	LSD List
4	29	19	5	12-14
4	29	19	6	9,16

Documents Attached:

Document Name	Document Type
Project Plans	Illustrative Material

APPENDIX E: REFERRAL AGENCY COMMENTS
E1 - FOOTHILLS COUNTY PUBLIC WORKS

FOOTHILLS COUNTY
309 Macleod Trail, Box 5605
High River, Alberta T1V 1M7
Phone: 403-652-2341
Fax: 403-652-7880
www.FoothillsCountyAB.ca

25R035 (Rimrock Cattle Company Ltd.): Engineering Review
REVIEW BY: Wiaan Kruger
DATE: May 28, 2025

Site Access:

- Only 1 approach (existing) is planned to be used. The TIA was also completed using 1 access. Previous plans showed another access to the south. If the south access is planned, Meridian St is to be upgraded to that southern most approach. If the southern most approach is no longer planned, upgrading Meridian St to the existing approach is required. Roughly 250m.
- 5m road widening along the east side of Meridian St will be required to be surveyed out.
- The road is to be upgraded to meet Foothills County's Industrial/Commercial Road Paved Standards.
    - With a 25m ROW, standard ditches could be used on the east side of the road, with v-ditches on the west side. To be determined during detail design.
- PW will require Rimrock to construct the road with all the following required:
    - Engineering
    - Estimates
    - 125% Deposit based on the estimates
    - Liability Insurance
    - All testing requirements of the road construction along with as-builts
- Berms are planned along Meridian St and Coal Trail.
    - Engineering will be required that meets the Alberta Infrastructure Highway Geometric Design Guide for minimum sight triangle.
        - D.4.2 Minimum Sight Triangle
        - Design speed 90km/hr.
        - 20m Right of Way to be used

TIA:

- Accepted by PW in 2022
- TIA typically has a 5-year shelf life, still relevant and no changes proposed since then

SWMP & Grading:

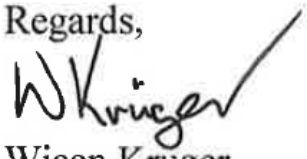
- All stormwater is contained by the digestate pond
    - Surface flows into the pond

- The pond is sized to meet zero discharge sizing, meaning it has adequate storage for a greater than 1:500-year event.
- Pond also acts as a secondary line of defence in the event of leaks/failures
- Groundwater monitoring wells will e installed
- Calculations consider 5% pre-development impervious state and 85% post-development impervious state.
- Will require the report to be stamped by the engineer.

As-builts/Grading completed to date:

- No concerns with the as-builts and grading completed up to now.
- Finish grading is required along with berms and landscaping.
- IFC plan required to show entire site, including berms.
- As-builts will be required upon completion along with a letter of conformation from an engineer for all site grading, SWMP and external road upgrades.

Regards,



Wiaan Kruger

MINIMUM SITE TRIANGLE IN ACCORDANCE WITH THE
ALBERTA INFRASTRUCTURE HIGHWAY GEOMETRIC DESIGN GUIDE.

APPENDIX F - AREA LANDOWNER LETTERS
F1 - LETTER FROM J. VENTON

From: Julia Venton
To: Public Hearings
Subject: Fwd: June 11th 1pm
Date: June 2, 2025 3:33:58 PM

You don't often get email from [redacted]. Learn why this is important

---------- Forwarded message ---------
From: **Julia Venton** [redacted]
Date: Mon, Jun 2, 2025 at 9:51 AM
Subject: June 11th 1pm

To whom it may concern,
I know this is a very contentious issue, but, why would you put 15000+ people at a health risk from an industrial biodigester 5kms from the town of High River? You say on your online information that you care about agricultural land, when surely this biodigester would be industrial, so I think that is a fallacy on your part that you care, surely this monstrosity could be sited elsewhere.
The size of the flare stack 52' will cover a wider area of toxins raining down on the population,
I am advocating for the non verbal, immune compromised, the elderly and our children and future generations.
The Alberta government went so far as to say that the views cannot be interfered with so WHY OH WHY do you propose to give permission for this carbuncle to be built. Please think of the health risks and the water situation in your deliberations
With Respect Julia Venton [redacted]

F2 - LETTER FROM C. DERISH

From: C & D Derish
To: Public Hearings
Subject: Public Hearing Rimrock Renewables Biodigester
Date: June 3, 2025 10:15:57 AM

Re: Rimrock Renewables Biodigester Council Meeting - June 11, 2025 @ 1:00pm

Do not share my personal information publicly

Carrie Derish
[redacted]

Please accept my submission of concerns below for your consideration why I am opposed to the requested Land Use Bylaw Amendments for the possibility to include Anaerobic Biodigesters, specifically the Rimrock Renewables Biodigester.

1. It has been scientifically proven that agricultural utilized soil stores carbon, which in turn offsets some of the emissions from GHG (Green House Gas emissions). Therefore, if the County continues to allow factories to be built on agricultural zoned land, you are then jeopardizing the natural process for bare land to offset GHG.

2. This facility is a industrial gas plant. The only difference being, it utilizes manure and waste products to produce gas. At the end of the day, it's just a different method of creating gas to be burned into the atmosphere. Alberta has an abundance of natural gas which is as harmful to the environment as Biogas. The manure can be trucked just like the organic wastes to a better situated site away from any residential homes.

3. We know gas is highly toxic and explosive. Common sense tells us that this facility should not be built near resident's homes. Would you want your castle and safe place near this facility? I know I wouldn't. There is documented accidents and explosions that have happened at these facilities. All it takes is a single lightening strike. If there ever was an explosion causing injuries or fatalities to the neighboring residents, the potential risk for lawsuits will be inevitable. Not only for Rimrock Renewables, the County of Foothills could also be held liable for allowing this gas facility approved as an industrial operation in it's current location.

4. There is no question that Biogas operations involve a level of greenwashing. Which I suspect, is why Rimrock Renewables dismantled their online project information when the Federal Bill 59 for Greenwashing was passed in 2024. To date the Foothills County website has continued to provide that link that is not accessible. I am unsure as to the reasons why this proposed project was even featured on the County's website to begin with?

5. The owners claim they are "capturing carbon", however, by doing so, ironically they are creating and increasing their own carbon footprint. There will be Increases in emissions from all of the diesel traffic required to haul organic wastes daily from their sources on multiple trips daily, all day, every day of the year. Not to mention the trucks on the premises hauling manure and digestate to the biodigester. As well as emissions to transport & spread digestate material on local farmlands.

6. Presently the estimated GHG from all of the Canada's Agriculture is between 5 to10%. The major contributor to Carbon Dioxide emissions is from fossil fuels from vehicles including farm machinery. There will never be enough biogas from Rimrock to offset these emissions. Any rejected low quality gas will in turn be flared into the atmosphere, instead of into the gas line. Again in the vicinity of residential homes.

7. The flare stack, which they are trying to amend the Bylaw to include up to 16 metres (52.49 feet) tall. Even at 12 metres on their application is an increased obstruction in front of the pristine Rocky Mountain views.

8. Increased traffic on County roads will cause traffic disruptions and additional wear and tear on roadways. If their taxes remain agricultural, their taxes will remain the same. Whereas, if zoned as industrial, it would increase the tax benefit to the County to offset the road maintenance that will be required. Otherwise in essence, the residential taxpayers will be subsidizing an industrial facility, for the road repairs and maintenance due to the insufficient agricultural tax rates.

9. They are rewriting the Agricultural Bylaws to include an industrial operation that will be manufacturing gas for the Carbon Credits for Fortis BC. This will set a dangerous historical precedent for the future.

10. Initially the infamous claim was it would reduce odors by 42%. This was in print and announced in the Town of High River Council meeting by Rimrock. Since then we have heard many guesstimates depending on who you ask or what you read. In my opinion, anytime you start disturbing the piles of manure whether in pens, on concrete, or sitting on the pad awaiting loading into a biodigester, you will still have odors. Plus additional odors will be created by the 20 acre uncovered effluent pond and digestate stock piles.
I can only assume the county residents and Town of High River will have no future reprieve. Which in turn will cause confusion as to whom we call and report these issues to, NRCB, Rimrock Renewables, AEPA or quite possibly just Foothills County.

One thing for certain, our local area we will be breathing in dangerous noxious air pollution, have increased health issues, light pollution, increased traffic, increased road maintenance, noise, loss of real estate values, and a general decreased quality of life.

Therefore, I ask you to please consider the human impacts by this facility being allowed on Agricultural land so close to County residents acreages and the Town of High River who reside downwind. Ideally it needs to be built in an industrial corridor much further away from resident's homes, especially given the size of the facility.

I wish to close with a quote I recently seen that seems fitting.

It's "good for the economy"...

"Explain that to future generations when they can't farm the land, breathe the air, or drink the water"

Author unknown

Thank you for your time.

Regards

Carrie Derish

F3 - LETTER FROM DEWRIGHT HOLDINGS LTD

Foothills County

Box 5605

High River AB T1V 1M7

Attn: Heather Hemingway

Re: Proposed Anaerobic Digester Facility in NW 05-19-29W4

We at Dewright Holdings Ltd, owners of NW, NE and SE 08-19-29W4 are in full support of this facility and can't wait until it is complete.

You 

David E. Wright

President

BYLAW XX/2025

BEING A BYLAW OF FOOTHILLS COUNTY TO AUTHORIZE AN AMENDMENT TO THE LAND USE BYLAW NO. 60/2014 AS AMENDED

WHEREAS pursuant to the provisions of the Municipal Government Act, Chapter M-26 Revised Statutes of Alberta 2000, and amendments thereto, the Council of Foothills County (hereinafter called the "Council") in the Province of Alberta, has adopted Land Use Bylaw No. 60/2014 and amendments thereto.

AND WHEREAS pursuant to Section 191(1) of the Municipal Government Act, Chapter M-26 Revised Statutes of Alberta 2000, the power to pass a bylaw under this or any other enactment includes the power to amend or repeal the bylaw.

AND WHEREAS the Council has received an application to further amend the Land Use Bylaw by including definitions for Anaerobic Digester Facility, Biogas, Digestate, Feedstock and Renewable Natural Gas (RNG) under Section 2.5 Definitions; amending definitions for Agricultural Processing and Distribution, Class II Compost, Utility Services, Major and Waste Incineration Energy Recovery under Section 2.5 Definitions; and amending Sections 5.3.2 and 9.27.24 as described within the attached Schedule 'A'.

AND WHEREAS Council has held a public hearing as required by section 692 of the Municipal Government Act, R.S.A. 2000, c.M-26, as amended:

NOW THEREFORE THE COUNCIL ENACTS AS FOLLOWS:

1. That Bylaw XX/2025 was introduced to Council to further amend the Land Use Bylaw by authorizing text amendments to Land Use Bylaw 60/2014 as described within the attached Schedule 'A'.

2. This Bylaw shall have effect on the date of its third reading.

FIRST READING:

_____
Reeve

_____
CAO

SECOND READING:

_____
Reeve

_____
CAO

THIRD READING:

_____
Reeve

_____
CAO

PASSED IN OPEN COUNCIL assembled at the Town of High River in the Province of Alberta this ___ day of _____, 2025.

SCHEDULE A

PROPOSED AMENDMENTS TO LAND USE BYLAW 60/2014

1. **THE FOLLOWING NEW DEFINITIONS ARE PROPOSED TO BE ADDED UNDER SECTION 2.5:**
   - ANAEROBIC DIGESTER FACILITY is a facility designed to convert organic waste, such as animal manure, food and agricultural residues, or septic waste, into Renewable Natural Gas (RNA) and digestate through a controlled, oxygen-free (anaerobic) biological process.

     An anaerobic digester may also include a range of ancillary facilities that support feedstock processing, biogas production, and energy generation, such as receiving docks, storage tanks or bunkers, pre-treatment systems (e.g., screening, grinding, or shredding), primary and secondary digesters with mixing, heating, and pumping infrastructure, biogas storage and cleaning systems, cogeneration units, digestate separation and storage systems, composting areas, control and monitoring equipment, environmental protection measures (e.g., leachate management, odor control, and stormwater systems), as well as administration buildings, maintenance areas, and safety infrastructure like fencing and fire suppression systems.

   - BIOGAS is a gas produced in an anaerobic digester, mainly composed of methane and carbon dioxide, resulting from the decomposition of organic materials. Biogas can be used for heat and electricity generation, as renewable natural gas for injection into pipelines or vehicle fuel, directly in industrial processes, or for household cooking and heating.
   - DIGESTATE is the residual material remaining after the anaerobic digestion of organic feedstock. Digestate typically consists of both solid and liquid fractions and may be used as a soil amendment or fertilizer,
   - FEEDSTOCK are materials used directly in manufacturing processes and transformed into an intermediate or finished material.
   - RENEWABLE NATURAL GAS (RNG) is biogas that has been upgraded for use in place of fossil natural gas.

2. **THE FOLLOWING AMENDMENTS ARE PROPOSED (IN RED) TO EXISTING DEFINITIONS UNDER SECTION 2.5:**
   - AGRICULTURAL PROCESSING AND DISTRIBUTION means the use of land or a building for the upgrading of a product, for distribution or for sale that was originally produced in an agricultural operation but does not include an abattoir or Cannabis production or sales, or an Anaerobic Digester Facility.
   - CLASS II COMPOST means an operation where only vegetative matter or manure is decomposed through a controlled bio-oxidation process, including a thermophilic phase, which results in a stable humus-like material but does not include an Anaerobic Digester Facility, on- site household composting or composing as part of agricultural general in accordance with Section10.8 or a manure storage facility.
   - UTILITY SERVICES, MAJOR means development for public or private utility infrastructure purposes which are likely to have a major impact on the environment or adjacent land uses by virtue of their emissions, effect, or appearance. Typical facilities would include sewage and/or water treatment plants, sewage lagoons, dams, power generating stations, cooling plants, incinerators, and, and high voltage electrical transmission towers but does not include an Anaerobic Digester Facility.
   - WASTE INCINERATION ENERGY RECOVERY means a waste management process that combusts waste to produce energy but does not include an Anaerobic Digester Facility.

3. SECTION 5.3.2 WITHIN *DECISION ON DEVELOPMENT PERMIT APPLICATIONS*, IS DELETED AND REPLACED TO READ AS FOLLOWS IN RED:

   ~~5.3.2 Notwithstanding Section 5.3.1, if a Development Permit application for a permitted use that requires a variance to any other provision of the Bylaw, the use is considered a Discretionary use, and the application must be dealt with under all provisions for Discretionary uses under this Bylaw.~~

   5.3.2 Notwithstanding Section 5.3.1, where a Development Permit application is made for a *permitted use* that does not comply with one or more other provisions of this Bylaw and therefore requires a *variance*, the application shall be considered a *Permitted Use with a variance*. In such cases, the Development Authority shall process the application in accordance with this Bylaw and may impose conditions pursuant to Section 5.4.3.

4. SECTION 9.27.24 WITHIN *SPECIAL SETBACK REQUIREMENTS,* IS AMENDED TO READ AS FOLLOWS WITH THE CHANGES IN RED:

Setbacks and Provincial Legislation and Approvals
~~Setbacks to Municipal Utilities and Services~~

9.27.24 All development shall comply with the applicable Provincial legislation and approvals with respect to setbacks contained therein ~~with respect to setback to Municipal Utilities and Services~~ unless the setback is varied by the Approving Authority ~~with the written consent of the Deputy Minister of Environment~~ as set out in the *Matters Relating to Subdivision and Development Regulation* and *Guidelines for Setback Reviews*, each as may be replaced or amended from time to time, and notwithstanding any other provision in this Bylaw, a variance granted thereunder

BYLAW XX/2025

BEING A BYLAW OF FOOTHILLS COUNTY TO AUTHORIZE AN AMENDMENT TO THE LAND USE BYLAW NO. 60/2014 AS AMENDED

WHEREAS pursuant to the provisions of the Municipal Government Act, Chapter M-26 Revised Statutes of Alberta 2000, and amendments thereto, the Council of Foothills County in the Province of Alberta, has adopted Land Use Bylaw No. 60/2014 and amendments thereto.

AND WHEREAS the Council has received an application to further amend the Land Use Bylaw by authorizing a Site-Specific Amendment to the Agricultural District land use rules to allow for an Anaerobic Digester Facility and to allow for a maximum height of 16m (52.49 ft.) for flare stacks for the purpose of the Anaerobic Digester Facility on the subject lands, in accordance with Section 12.1.7.6.c., as a Permitted Uses on a 77 +/- acre portion of the quarter sections described as Plan 2510333, Block 1, Lot 1, NW 05-19-29-W4 and N ½ 6-19-29-W4 (subject lands), and to allow for consideration of the future subdivision of the 77+/- acres.

NOW THEREFORE THE COUNCIL ENACTS AS FOLLOWS:

1. Under SECTION 12.1 AGRICULTURAL DISTRICT, the following shall be added under Section 12.1.4 PERMITTED USES on *Ptn. Plan 2510333, Block 1, Lot 1 ,NW 05-19-29 W4M, and Ptn. N1/2 06-19-29 W4M.*

   To allow for an Anaerobic Digester Facility and to allow for a maximum height of 16m (52.49 ft.) for flare stacks developed for the purpose of the Anaerobic Digester Facility on the subject lands, in accordance with Section 12.1.7.6.c. as a Permitted Uses on a 77 +/- acre portion of the quarter sections described as Ptn. Plan 2510333, Block 1, Lot 1, NW 05-19-29 W4M, and Ptn. N1/2 06-19-29 W4M (subject lands).

2. This Bylaw shall have effect on the date of its third reading and upon signing.

FIRST READING:

_____
Reeve

_____
CAO

SECOND READING:

_____
Reeve

_____
CAO

THIRD READING:

_____
Reeve

_____
CAO

PASSED IN OPEN COUNCIL assembled at the Town of High River in the Province of Alberta this day of 20 .