Appendix C TURBINE LISTING

Castle Rock Ridge Wind Farm - Phase 2

WTG Type:	Vestas V136 4.2MW
WTG #	7
Total Output	32.2 MW
Date:	January 10, 2018
Revision #	A006

Turbine #	UTM ZONE 12 NAD 83		NAD 83 DATUM		Decimal Degrees		MW	Rotor Diameter (m)	Hub Height (m)	Foundation Thickness (m)	Center Ground Elev (m)	Lowest Ground Elev (m)	Lowest Top of Foundation Elev (m) = Lowest Ground Elev +200mm	Highest Top of Foundation Elev (m) = Lowest Ground Elev + 450mm	Top of Foundation Elev (m.)	Top of Ring Elevation (m.)	Base of Foundation <below mudslab> Elev (m)	Foundation Class*	Bouyant Foundation**	Foundation Diameter (m.)	Foundation Drain Tee Invert (m.)	Sheet	TOTAL HEIGHT (m.) Hub+Blade	HUB ELEV. (m.)	Comments
	Northing	Easting	Latitude	Longitude	Latitude	Longitude																			
1	5494590.000	284193.000	49 33 55.38	-113 59 04.70	49.5653836621	-113.984639	4.2	136	82	2.75	1247.27	1247.05	1247.25	1247.50									150	150.00	
2	5494274.000	284405.000	49 33 45.43	-113 58 53.54	49.5626207144	-113.9815382	4.2	136	82	2.75	1229.93	1229.50	1229.70	1229.95									150	150.00	
3	5493865.000	284290.000	49 33 32.06	-113 58 58.45	49.5589058955	-113.9829023	4.2	136	82	2.75	1213.44	1213.10	1213.30	1213.55									150	150.00	
4	5493494.729	284117.162	49 33 19.87	-113 59 06.31	49.55551833	-113.985086	4.2	136	82	2.75	1196.49	1196.10	1196.30	1196.55									150	150.00	
5	5494219.000	285398.000	49 33 44.93	-113 58 04.06	49.562479	-113.967795	4.2	136	82	2.75	1242.60	1242.45	1242.65	1242.90									150	150.00	
8	5493877.000	286287.000	49 33 35.00	-113 57 19.20	49.5597218074	-113.9553326	4.2	136	82	2.75	1251.69	1251.45	1251.65	1251.90									150	150.00	
9	5493499.000	286321.000	49 33 22.82	-113 57 16.77	49.55633832	-113.954657996	4.2	136	82	2.75	1241.71	1240.90	1241.10	1241.35									150	150.00	
MET	5493764.000	284027.000	49 33 28.46	-113 59 11.32					82		1201.96				1202.00										

Appendix D AEP APPROVAL

Alberta Environment and Parks

Wildlife Management
Operations Division
530 8th Street South, 2nd Floor
Lethbridge, Alberta, T1J 2J8

May 10, 2018

Ashley Smith
Environmental & Permitting Specialist
Enel Alberta Wind Inc.
1755 East Plumb Lane, Suite 155
Reno, NV 89502 USA
Ashley.Smith@enel.com

Transmitted via email

Dear Ms. Smith,

Subject: Castle Rock Ridge 2 - Amendment and updated AEP-WM Project Risk Ranking

Alberta Environment and Parks-Wildlife Management (AEP-WM) has reviewed the Technical Memorandum Amendment Request for the Castle Rock Ridge 2 wind project received on May 8th 2018 (hereafter referred to as the Technical Memo) from Enel Alberta Wind Inc. (the proponent). This Technical Memo provides an update with changes to the layout of Turbine 9 and associated infrastructure (including access road, collection line, temporary work space, etc.) provided in the original Environmental Evaluation (hereafter referred to as the Original Layout), which was the basis for the AEP-WM Renewable Energy Referral Report, dated April 9th, 2018 (hereafter referred to as the Referral Report). The purpose of this letter is to provide an amendment to the Referral Report outlining the project changes and updating the risk ranking of the Castle Rock Ridge 2 Wind Project.

Project Amendments

The proponent has relocated Turbine 9 based on the assessment of risk outlined in the Referral Report. The Original Layout was identified as a higher risk due to the proximity to the active golden eagle nest and the Oldman Reservoir as well as the siting of infrastructure within native grassland habitat. The proponent had identified alternative mitigation to address these risks, however, the overall risk was determined to be high. The new location of Turbine 9 is in UTM Zone 12, NAD 83 Northing 286321 Easting 5493499. The new location of this turbine has directly addressed a number of the issues identified in the previous Referral Report. A summary of each issue and the subsequent updated risk to wildlife is detailed below.

Proximity of Turbine 9 and its associated infrastructure to the golden eagle nest: The original issues regarding Turbine 9 and the golden eagle nest are detailed in the Referral Report on page 9 under the heading *Raptor Nests*. The new location of Turbine 9 is 3698 meters S.E. of the golden eagle nest. The associated infrastructure including the access roads, collection line, and temporary work space has also been relocated more than 3000 meters from the nest site. The new location of Turbine 9 and its associated infrastructure adheres to the requirements outlined in AEP-WM policy. In addition to addressing the risk of disturbance at the nest site from the construction and operation of the facility, this change will also result in reduced risk of golden eagle mortality at

Wildlife Management
Operations Division
530 8th Street South, 2nd Floor
Lethbridge, Alberta, T1J 2J8

Turbine 9. It should be noted that the risk of mortality is reduced, but not eliminated. Post-construction monitoring identified in the original Referral Report must be completed and if mortality is deemed high by AEP-WM, mitigation will be required.

Based on the alterations to the Original Layout the disturbance risk to the golden eagle nest has been adequately addressed and therefore the Castle Rock Ridge 2 project is considered an overall low risk for impacts to the golden eagle nest.

Proximity of Turbine 9 to the Oldman Reservoir: The original issues regarding Turbine 9 and its proximity to the Oldman Reservoir are detailed in the Referral Report on page 9 under the heading *Lakes and Large Waterbodies* and on page 12 under the heading of *Bird Mortality*. The original location of Turbine 9 was on a high point of land surrounded on three sides by the Oldman Reservoir, which significantly increased the risk of bird mortality for species using the reservoir. There are limited post-construction mitigation measures available to reduce bird mortality and therefore proper project siting is paramount to limit mortality risk of birds. The new location of Turbine 9 is over 3000 meters from the Oldman Reservoir and set back from the valley breaks. This change meets the requirements outlined in the *Directive* and reduces the overall risk of bird mortality at the facility.

Based on the alterations to the Original Layout the overall risk of bird mortality associated with the project has been reduced from high to moderate.

Siting of infrastructure within Native Grasslands: The original issues regarding Turbine 9 and associated infrastructure sited on native grassland are detailed in the Referral Report on page 8 under the heading *Habitat Loss, Degradation and Fragmentation Concerns.* The movement of Turbine 9 has resulted in all infrastructure including turbines, access roads, collection lines, temporary work space and other related disturbances being sited on previously disturbed land. The original Referral Report identified that 0.08 hectares of native grassland would be impacted, this has been reduced to zero footprint on native grassland. This change is consistent with AEP-WM policy.

The siting of infrastructure off native grassland has reduced the Castle Rock Ridge 2 risk from moderate to a low risk for wildlife and wildlife habitat.

Wildlife Risk Ranking Summary

The movement of Turbine 9 has significantly reduced the risk of disturbance to the golden eagle nest, mortality risk of birds associated with the proximity to the Oldman Reservoir and the impacts to wildlife and wildlife habitat on native grassland. The project is still a high risk for bat mortality because of the high bat activity rate that was found to be 6.79 migratory bat passes per detector night during the fall migration period. The proponent has identified and committed to post-construction monitoring and implementing mitigation to reduce mortality to meet AEP-WM policy. Based on the information provided and the commitments made by the proponent the mortality risk for bats has been assessed as moderate. Aside from the mortality risk, the project siting and

Wildlife Management
Operations Division
530 8th Street South, 2nd Floor
Lethbridge, Alberta, T1J 2J8

mitigations identified in the original submission and subsequent Technical Memo address all site selection, project layout and construction and operation mitigation requirements of AEP-WM policy.

AEP-WM has determined the wind energy project proposed by Enel Alberta Wind Inc. called the Castle Rock Ridge 2 Wind Project, as proposed, poses an overall moderate risk to wildlife and wildlife habitat.

Sincerely,

Brandy Downey
Senior Species at Risk Biologist
Operations Chair of the AEP Renewable Energy and Wildlife Committee

cc:
Kim Morton, AEP-WM - Kim.Morton@gov.ab.ca
Kristin Cline, AEP-WM - Kristin.Cline@gov.ab.ca
Victor Engle, Enel Alberta Wind Inc. - Victor.Engel@enel.com
Jeff Drain, Stantec Consulting Ltd. - Jeff.Drain@stantec.com
Alison Peacock, Stantec Consulting Ltd. - Allison.Peacock-Giles@stantec.com

Appendix E HISTORICAL RESOURCES ACT CLEARANCE

The Proponent has submitted an application to the Alberta Culture and Tourism and is pending a response.

Appendix F ALBERTA ELECTRICAL SYSTEM OPERATOR

Castle Rock Ridge Wind Power Facility Connection (Phase II Development)

Functional Specification

(Project Number 462)

Issued to

AltaLink Management Ltd. (as the **legal owner** of a **transmission facility)**, and to

Enel Alberta Wind Inc. (as the **market participant)**

May 31, 2018

Version V1

APEGA Permit-to-Practice P-8200 1/6/18

	Name	Signature	Date
Author	Henry Ng, P. Eng.		May 31, 2018
Checked – Manager, Project Engineering	Changling Luo, P. Eng		May 31, 2018
Approved – Manager, Project & System Access Studies	Maz Mazadi, P. Eng	Mazadi	May 31, 2018
Approved – Director, Transmission Engineering and Standards	Dan Shield, P. Eng		1/6/18

REVISION HISTORY

Version #	Description	Author	Date
V1D1	For internal review	Henry Ng	May 23, 2018
V1	Foe Issuance	Henry Ng	May 31, 2018

TABLE OF CONTENTS

1. INTRODUCTION

(1) The purpose of this document (the "Functional Specification") is to set out the technical specifications, requirements and approved variances related to the design, construction, development and commissioning of certain new or modified facilities that have been proposed for or are related to a physical facilities connection with the Alberta **interconnected electric system** (AIES) (the "Purpose") as outlined herein (the "Project"). This Functional Specification is issued by the Alberta Electric System Operator (AESO) to:

(i) AltaLink Management Ltd., in its capacity as general partner of AltaLink, L.P., ("AltaLink"), as the **legal owner** of a **transmission facility** described in the Functional Specification.

(ii) Enel Alberta Wind Inc., (Enel), as the **market participant** that has submitted a request for **system access service**.

(2) This Functional Specification is issued for the Purpose only. All of the parties named in Section 1(1) must comply with the Functional Specification provisions.

(3) The AESO is not responsible for any facilities designed by or for any third party, or installed on a third party's behalf, to accomplish the connection of the Project facilities.

(4) This Functional Specification includes:

(i) certain specific engineering, technical and functional requirements for the Project;

(ii) the requirements to comply with **ISO rules**, including Operating Policies & Procedures (OPPs), **reliability standards**, technical standards, and **ISO tariff** provisions (collectively called the "Authoritative Documents");

(iii) the electrical system environment in which the connecting facilities must be designed and operated; and

(iv) any approved variances from requirements set out in any applicable AESO Authoritative Documents.

2. INTERPRETATION AND VARIANCES

(1) Subject to Section 2(2), any revision or variance to any of the Functional Specification provisions by the parties named in Section 1(1) is prohibited.

(2) Any party named in Section 1(1) may make application, jointly or individually, in writing to the AESO requesting a variance to this Functional Specification, and the AESO may in writing approve of the variance after the AESO has completed an analysis of the implications to the AIES with respect to the requested variance.

(3) Words or phrases appearing in bold have the meanings set out in the *Consolidated Authoritative Document Glossary*.

3. PROJECT OVERVIEW

In accordance with the AESO Terms and Conditions ("T&Cs") of Service, which form part of the ISO Tariff Castle Rock Ridge Wind Corporation filed a Preliminary Assessment Application on December 30, 2004 for the connection of an **aggregated generation facility** - Castle Rock

Ridge Wind Power Facility (the "Facility"). Subsequently, **the** Facility was transferred from Castle Rock Ridge Wind Corporation to Enel Alberta Wind Inc.

The AESO issued a functional specification for the Facility. The **maximum authorized real power** (MARP) for the Facility was 115 MW[1] and the **maximum capacity** (MC) was 115 MW. The **market participant** and the AESO entered into a rate STS, *Supply Transmission Service*, contract capacity for 115 MW and a rate DTS, *Demand Transmission Service*, contract capacity for 0.2 MW.

The **market participant** notified the AESO in a letter dated September 7, 2012 that they have energized only 76.23 MW (Phase I) of its approved 115 MW, which is now referred to as Phase I of the Project. They intended to construct and commission the remaining 32.3 MW as the second phase of the Project (Phase II).

Subsequently, Enel Alberta Wind Inc. entered into a Renewable Electricity Support Agreement (RESA) with the AESO in December 2017 for 30.6 MW, which now forms Phase II of the Project.

The **maximum authorized real power** (MARP) for the Facility is 106.83 MW and the **maximum capacity** (MC) is 106.83 MW.

The **market participant** has proposed the following solution to integrate Phase II:

- The facility in Phase II (the "Phase II Facility") shall be connected to the **market participant**'s Castle Rock Ridge 205S Substation which was built as part of Phase I.
- A revenue meter designated to the Phase II Facility to be added.
- The proposed development for Phase II as referenced in Appendix 7.1.1 and Appendix 7.1.2.

At the completion of the Phase II Facility, The **market participant** and the AESO will enter into the following System Access Service (SAS) Agreements:

For Phase I - a rate STS, *Supply Transmission Service*, contract capacity of 76.23 MW; and a rate DTS, *Demand Transmission Service*, contract capacity for 0.2 MW.

For Phase II - a separate STS contract capacity of 30.6 MW; and a separate rate DTS, *Demand Transmission Service*, contract capacity for 0.0 MW.

The scheduled in service date of Phase II is Nov 1, 2019.

4. FORECAST OF FUTURE DEVELOPMENT IN THE PROJECT AREA

Proposed long term developments in the Fort Macleod (Area 53) are described in the AESO 2017 Long-term Transmission Plan. Please refer to the AESO's website (www.aeso.ca) for more details of the long term transmission developments in the area.

[1] Note that the nameplate rating of the transmission step-up transformer in the collector station proposed by the **market participant** is 115 MVA, which is insufficient for the full capacity of the WAGF when the reactive power is taken into consideration. However, the **market participant** provided an engineering assessment letter to confirm that the rating of the transformer is 128MVA based on maximum ambient temperature in Pincher Creek area. The AESO has accepted the engineering assessment letter and agreed that the step-up transformer is sufficient for a MARP of 115 MW.

5. SCOPE OF WORK

5.1 GENERAL

The **legal owner** of a **transmission facility** and the **market participant** must:

(1) complete all engineering, design, land or land-use acquisition, siting, public consultation, applicable regulatory approvals and permits, material procurement, construction, commissioning, and associated permitting requirements for the Project facilities.

(2) coordinate with each other, as required, on all Project facility design details, including protection and control, grounding, insulation, **point of connection**, and site layout with proper consideration of maintenance coordination.

(3) develop joint operating procedures and any connection agreements, as required, such that all connecting **transmission facilities** will operate safely and reliably.

(4) deliver to the AESO all final design and as-built Project facility information and records in the format and content required by the AESO, to enable the AESO to update and maintain its transmission technical records and system models.

(5) submit the Project information and records referred to in subsection (4) above, under the professional stamp and signature of a registered professional engineer in Alberta who assumes responsibility for the preparation and accuracy of the content of the information and records.

(6) mutually agree on each party's roles and responsibilities regarding inspection of all facilities of the Project prior to energization of the facilities.

(7) ensure prior to energization of any or all of their respective Project facilities, that the facilities to be energized have been inspected by qualified personnel, so that the facilities are declared to be:

(a) safe for operation; and

(b) in compliance with this Functional Specification and any Authoritative Documents for which the Project must comply.

(8) Not energize any Project facilities until an energization authorization has been issued by the AESO in accordance with the ISO rules.

5.2 COMPLIANCE WITH AESO AUTHORITATIVE DOCUMENTS

Any party named in Section 1(1) must comply with the Authoritative Documents provisions which are applicable to the Project and which must be satisfied and incorporated into the design, construction, commissioning and operation of the connecting facilities and other connection Project work, including but not limited to these provisions contained herein:

- AESO Operating Policies and Procedures
- Alberta Reliability Standards
- AESO Measurement System Standard Rev. 1 (dated September 18, 2007)[2];

[2] The AESO considers this standard to remain in effect, notwithstanding the statement in clause 1.5 in the standard. Efforts to revise the stand are currently underway.

- AESO Generation and Load Interconnection Standard (dated September 19, 2006)[2].
- **ISO rules** including:
  - Section 304.3, *Wind and Solar Power Ramp Up Management* (effective September 1, 2018) [3];
  - Section 304.9, *Wind and Solar Aggregated Generating Facility Forecasting* (effective September 1, 2018)[3];
  - Section 502.1, *Aggregated Generating Facilities Technical Requirements* (effective September 1, 2018) [3];
  - Section 502.3, *Interconnected Electric System Protection Requirements* (effective September 1, 2018) [3] ;
  - Section 502.4, *Automated Dispatch and Messaging System and Voice Communication System Requirements* (effective March 27, 2015);
  - Section 502.8, *SCADA Technical and Operating Requirements* (effective September 1, 2018) [3] ;
  - Section 502.9, *Synchrophasor Measurement Unit Technical Requirements* (effective March 27, 2015);
  - Section 502.16, *Aggregated Generating Facilities Operating Requirements* (effective September 1, 2018) [3];
  - Section 505.3, *Coordinating Synchronization, commissioning, WECC Testing and Ancillary Services Testing* (effective December 31, 2012);
  - Section 505.4, *Coordinating Operational Testing* (effective December 31, 2012)

5.3 MODELLING DATA REQUIREMENTS

All modelling data shall be provided as per the Information Document ID# 2010-001R Facility Modelling Data (issued March 23, 2017), which relates to Section 502.15 of the **ISO rules**, *Reporting Facility Modelling*.

5.4 WIND/SOLAR POWER FORECASTING AND METEOROLOGICAL DATA REQUIREMENT

All forecasting data and meteorological data requirements shall be provided as per proposed Section 304.9 of **ISO rules,** *Wind and Solar Aggregated Generating Facility Forecasting*. Refer to the Table 1 of Section 304.9 of **ISO rules** for detailed meteorological data requirements.

5.5 SCOPE OF WORK FOR THE LEGAL OWNER OF A TRANSMISSION FACILITY

5.5.1 General Requirements

- Coordinate with the **market participant** to develop necessary connection agreements and joint operating procedures.

[3] The AESO has published these new or amended ISO rules on AESO's website. Future facilities that are not yet operational will be required to comply with the ISO rules as of the effective date.

- Complete all site preparation, fencing, foundations, grounding, support structures, termination structures, cabling, bus work, station service, control building, etc., as required.
- Ensure project safety is appropriately managed from design through energization.

5.5.2 Castle Rock Ridge 205S Substation

Protection and Control Requirements

- Complete system protection coordination studies and coordinate with the **market participant**, as required, to establish settings appropriate for the facility additions and AIES operations.
- Install or modify equipment as required to implement the remedial action schemes in Section 6.3.

Telecommunication Requirements

- Coordinate and work cooperatively with the **market participant** to install new or modify /upgrade the existing communications system as required and establish appropriate communication interface such that tele-protection, SCADA, operational voice, and operational data requirements are met.

5.6 SCOPE OF WORK FOR THE MARKET PARTICIPANT

5.6.1 General Requirements

- Coordinate with the **legal owner** of a **transmission facility** to develop necessary connection agreements and joint operating procedures.
- Undertake all required grounding studies, testing, and mitigation to ensure the connecting transmission facilities are safe.
- Ensure connection project safety is appropriately managed from design through energization.
- For wind aggregated generating facilities:
  - The wind aggregated generating facility may not cause a phase-to-phase voltage unbalance greater than 1.0%.
  - Any off-nominal frequency protection relays must function at 80% or greater rated voltage

5.6.2 Castle Rock Ridge 205S Substation

Refer to Appendix 7.2 for **market participant**'s proposed Phase II single line diagram.

Facility Equipment

- Coordinate all alignments with the **legal owner** of a **transmission facility**, as required, to connect the **market participant**'s facility addition in Phase II to the existing 34.5 kV collector bus.
- Complete insulation coordination studies and coordinate with the **legal owner** of a **transmission facility** as required to establish appropriate insulation levels.

- Install the equipment proposed by the **market participant** at the Castle Rock Ridge 205S Substation as shown in Appendix 7.2.

Protection and Control Requirements

- Complete protection coordination studies and coordinate with the **legal owner** of a **transmission facility** as required to establish settings appropriate for the **market participant**'s Facility additions and AIES operations.
- Install all the required protection and control equipment as required.

SCADA Requirements

- Establish communications interface point such that SCADA data can be transmitted back to the AESO's System Coordination Centre (SCC) and Back-up Coordination Centre (BUCC).
- All new Remote Terminal Units (RTUs) shall have Global Positioning System (GPS) signaling for time synchronization.
- Implement control center data mapping and verification of SCADA information for the proposed transmission facility additions and modifications, and any associated changes required at other area substations as per section 502.8 of **ISO rules**. A complete listing of energy data requirements can be found in Appendices 7.3 and 7.4 of this document.

Revenue Metering Requirements

- Install revenue meters on 34.5 kV feeder breakers for facility addition in Phase II.
- For **market participant** owned facilities, provide the AESO with the metering single line diagram to show physical revenue meter location.

6. TRANSMISSION SYSTEM OPERATING CHARACTERISTICS

The following sections provide the characteristics of the electrical environment in which the facilities outlined in the Specification will operate. TFOs and customers shall incorporate these characteristics into their facility designs and operating procedures as deemed appropriate.

6.1 SHORT CIRCUIT CURRENT LEVELS

(1) The short circuit current levels set out in Tables 1, 2 and 3 have been developed by the AESO based on information provided by the **legal owner** of a **transmission facility,** any connecting **generating units,** and adjacent operating areas. Available fault current levels will continue to increase as generation, transmission, and system inter-ties are added to the AIES. The **legal owner** of a **transmission facility** and **market participant** must continue to review the fault levels and their equipment ratings for adequacy.

(2) Any future equipment upgrades or protection system setting changes required due to increasing fault levels are the responsibility of the **legal owner** of a **transmission facility** or the **market participant**, as applicable.

(3) The following assumptions were incorporated into the AESO short circuit current models:

(i) All expected Alberta generation is dispatched.

(ii) All transmission elements are in service.

(iii) The proposed Project facility is connected as per this document.

(iv) Vbase = Vbus, MVAbase = 100

Table 1: Estimated Maximum Short Circuit Current Levels (Pre-project – 2019SP)

Substation Name and Number	Base Voltage (kV)	Pre-Fault Voltage	Pre-Fault Voltage (pu)	3-Φ Fault (kA)	Positive Sequence Thevenin Source Impedance (R1+jX1)	Positive Sequence Thevenin Source Impedance (R1+jX1) (pu)	1-Φ Fault (kA)	Zero Sequence Thevenin Source Impedance (R0+jX0)	Zero Sequence Thevenin Source Impedance (R0+jX0) (pu)
Peigan 59S	138	142.08	1.03	7.5	1.70+11.45j	0.009+0.060j	6.6	2.14+16.06j	0.011+0.084j
Castle Rock Ridge 205S	240	242.32	1.01	7.4	2.95+19.80j	0.005+0.034j	6.1	5.86+32.97j	0.010+0.057j
Goose Lake 103S	240	241.92	1.01	7.3	2.89+19.82j	0.005+0.034j	6.4	4.37+29.18j	0.008+0.051j
	138	141.5	1.03	7.8	0.89+10.95j	0.005+0.057j	7.8	1.38+11.07j	0.007+0.058j
Fidler 312S	138	142.08	1.03	7.5	1.70+11.45j	0.009+0.060j	6.6	2.14+16.06j	0.011+0.084j
	240	242.32	1.01	7.4	2.95+19.80j	0.005+0.034j	6.1	5.86+32.97j	0.010+0.057j

Table 2: Estimated Maximum Short Circuit Current Levels (Post-project – 2019SP)

Substation Name and Number	Base Voltage (kV)	Pre-Fault Voltage	Pre-Fault Voltage (pu)	3-Φ Fault (kA)	Positive Sequence Thevenin Source Impedance (R1+jX1)	Positive Sequence Thevenin Source Impedance (R1+jX1) (pu)	1-Φ Fault (kA)	Zero Sequence Thevenin Source Impedance (R0+jX0)	Zero Sequence Thevenin Source Impedance (R0+jX0) (pu)
Peigan 59S	138	141.33	1.02	7.5	1.67+11.33j	0.009+0.060j	6.7	2.28+15.62j	0.012+0.082j
Castle Rock Ridge 205S	240	241.2	1.01	7.6	2.79+19.14j	0.005+0.033j	6.8	7.01+25.99j	0.012+0.045j
Goose Lake 103S	240	240.85	1	7.5	2.75+19.26j	0.005+0.033j	6.8	5.29+25.44j	0.009+0.044j
	138	141.01	1.02	7.9	0.86+10.80j	0.005+0.057j	8.0	1.54+10.24j	0.008+0.054j
Fidler 312S	138	141.33	1.02	7.5	1.67+11.33j	0.009+0.060j	6.7	2.28+15.62j	0.012+0.082j
	240	241.2	1.01	7.6	2.79+19.14j	0.005+0.033j	6.8	7.01+25.99j	0.012+0.045j

Table 3: Estimated Maximum Short Circuit Current Levels – 2027 WP

Substation Name and Number	Base Voltage (kV)	Pre-Fault Voltage	Pre-Fault Voltage (pu)	3-Φ Fault (kA)	Positive Sequence Thevenin Source Impedance (R1+jX1)	Positive Sequence Thevenin Source Impedance (R1+jX1) (pu)	1-Φ Fault (kA)	Zero Sequence Thevenin Source Impedance (R0+jX0)	Zero Sequence Thevenin Source Impedance (R0+jX0) (pu)
Peigan 59S	138	138.72	1.01	7.6	1.39+10.44j	0.007+0.055j	7	1.60+13.22j	0.008+0.069j
Castle Rock Ridge 205S	240	246.71	1.03	8.3	2.16+16.98j	0.004+0.029j	8.4	3.36+16.98j	0.006+0.029j
Goose Lake 103S	240	247.03	1.03	8.2	2.17+17.38j	0.004+0.030j	7.7	3.83+20.59j	0.007+0.036j
	138	138.76	1.01	8.2	0.64+9.81j	0.003+0.052j	8.5	1.05+8.64j	0.006+0.045j
Fidler 312S	138	138.72	1.01	7.6	1.39+10.44j	0.007+0.055j	7.0	1.60+13.22j	0.008+0.069j
	240	246.71	1.03	8.3	2.16+16.98j	0.004+0.029j	8.4	3.36+16.98j	0.006+0.029j

6.2 VOLTAGE LEVELS

Table 4 provides the steady state voltage range in the area of the proposed facility.

Table 4: Steady State Voltage Range (kV) during Normal and Contingency Events

Substation Name and Number	Nominal Voltage (kV)	Emergency Minimum Voltage (kV)	Desired Normal Minimum Voltage (kV)	Desired Normal Maximum Voltage (kV)	Emergency Maximum Voltage (kV)
Castle Rock Ridge 205S	240	216	234	252	264
Castle Rock Ridge Wind Power Facility	240	216	234	252	264

Notes:

1. The Desired Normal Operating Minimum and Desired Normal Operating Maximum are generally associated with Category A events and system normal.
2. The Emergency Minimum Voltage and Emergency Maximum Voltage are generally associated with Category B and C events and system abnormal.
3. The facilities must be capable of continuous operation at voltages up to and including the Emergency Maximum Voltage.

6.3 OPERATIONAL CONSTRAINTS AND SPECIAL PROTECTION SCHEMES

The AESO performed operations planning studies to assess the impact of Castle Rock Ridge and other REP 1 projects on the existing procedures and RASs in the southwest transmission system. The study did not observe any next contingency thermal and transient stability performance violations during N-0 operation. However, existing RAS #129 would require no changes for CRR REP 1. Existing RAS would continue allow local wind aggregated generation facilities in the area to operate without constraints during N-1 planned and forced outages. The RAS #129 also mitigates N-2 contingencies of existing 240 kV double circuit transmission lines 955L, 956L, 1048L and 1049L.

The functional details for the existing RAS #129 are listed in Table 5 for information only as no changes required for the CRR portion of REP1 named as CRR Phase 2.

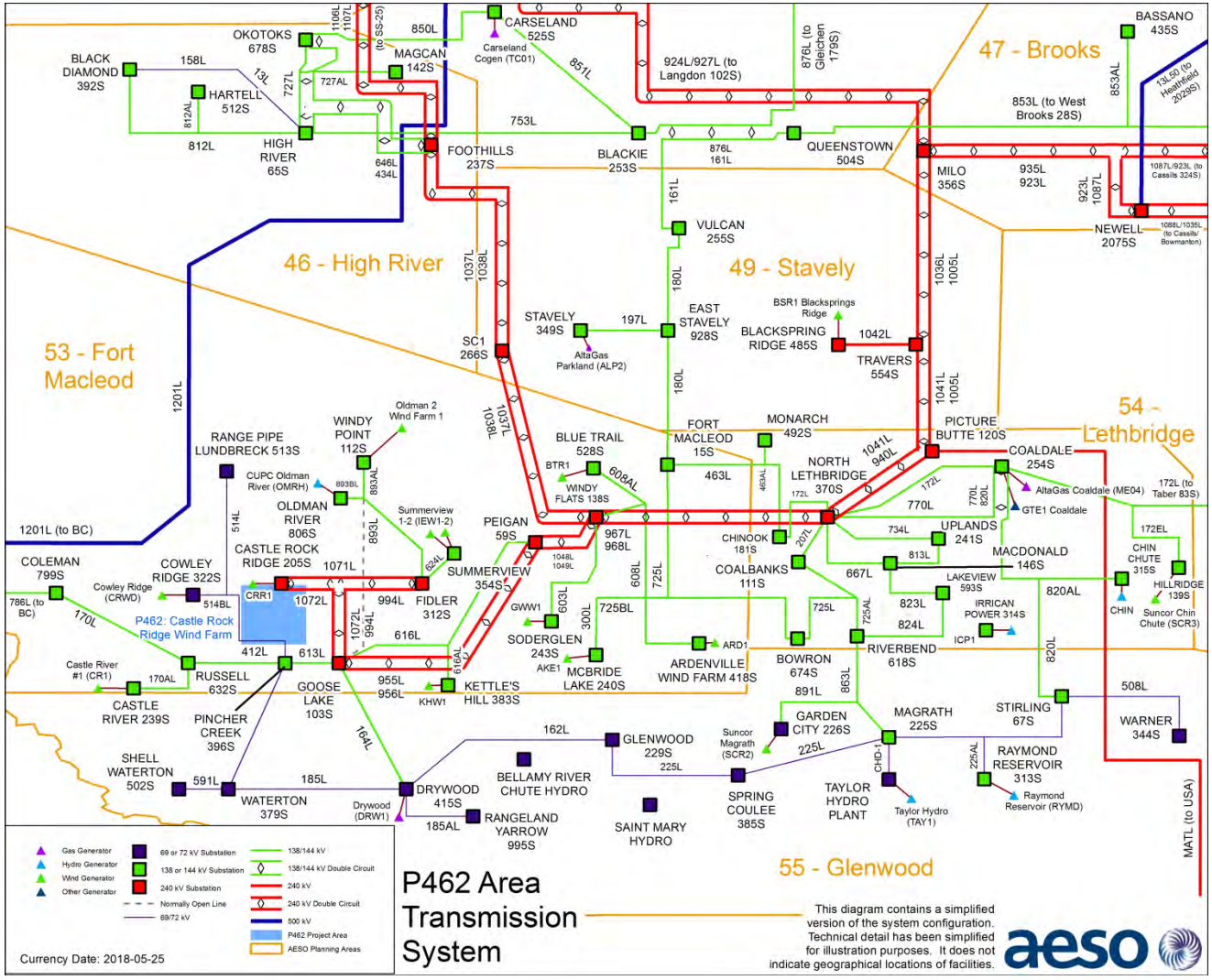
Table 5: Remedial Action Scheme 129 to mitigate N-1-1 and N-2 Constraints

Scheme Number: 129
Scheme Name: Goose Lake 103s 613L Overload Mitigation Scheme
Scheme Location: 103S Goose Lake
Scheme Classification: LAPS
Scheme Redundancy: Yes
Scheme Remote Enable Yes/No: No
FS Design Notes: 1. Castle Rock Ridge Phase 2 portion of REP 1 would be automatically included in RAS action due to its connection configuration. 2. All RAS components (relays/SCADA, enabled/disabled status if designed and telecommunication) failures must be monitored and alarmed. 3. TFO owned Telecommunication path failure for one or both RAS schemes will not cause automatic tripping of generation. Requirement for RAS Redundancy is similar to line protection schemes.
FS Defined Terms: • DTT = Direct Transfer Trip. • LTO = Defined as when line breaker(s) open 3-pole or breaker(s) in maintenance position at either terminal.

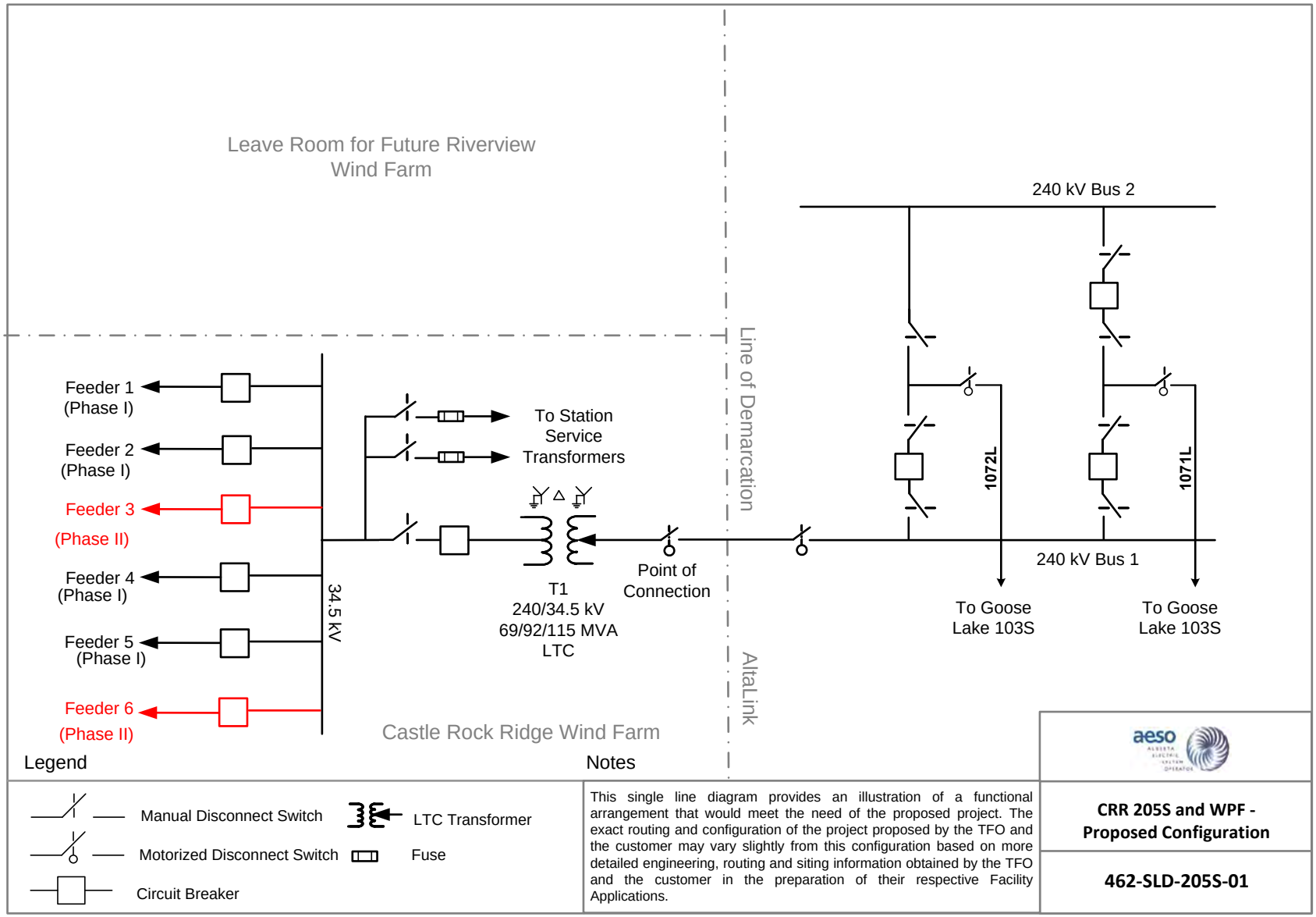
Scheme Monitoring	Scheme Settings	Scheme Actions
At Goose Lake 103S: • 613L current and its direction. • 955L breaker status and multi-phase protection pickup. • 956L breaker status and multi-phase protection pickup. At Peigan 59S: • 955L breaker status and multi-phase protection pickup. • 956L breaker status and multi-phase protection pickup. • 1048L breaker status and multi-phase protection pickup. • 1049L breaker status and multi-phase protection pickup. At Windy Flats 138S: • 1048L breaker status and multi-phase protection pickup • 1049L breaker status and multi-phase protection pickup. **Note:** All above monitoring is existing for RAS 129.	Runback/Overload Alarm Settings (no change): • 613L flow >= 100% seasonal continuous rating in MVA, converted to current using 138 kV voltage for 10 seconds with current direction out to 396S Pincher Creek. Runback Alarm Reset Setting Logic: • The RAS relay contact once pick up for the above condition should reset for 613L Loading <= 98% of continuous rating for 1 sec. Trip Settings #1 (no change): • Runback/overload alarm continues for 10 minutes • OR • 613L Loading > seasonal 10 minutes rating in MVA (converted to current using 138 kV base voltage) for 10 sec with direction out to 396S Pincher Creek. Trip Setting Reset Logic for exceeding 10 minutes rating : • The RAS relay contact once pick up for the above condition should reset for 225L Loading <= 100% of continuous rating for 1 sec. Trip Settings #2 (no change): • [1048L LTO = True OR 1048L multi-phase protection pickup at either end. • AND • 1049L LTO = True OR 1049L multi-phase protection pickup at either end.] • OR • [955L LTO = True OR 955L multi-phase protection pickup at either end. • AND • 956L LTO = True OR 956L multi-phase protection pickup at either end.] RAS Failure: • Communication and other RAS Failure	Runback Alarm Action: • Send overload alarm signal to Castle Rock Ridge WAGF until line loading is at 98% of line's seasonal thermal rating. • Send alarm to AltaLink ACC and AESO SCC Trip Setting #1 Action (No change): • Send DTT to trip 34.5 kV breaker 52M1 at 205S of Castle Rock Ridge WAGF. • Send alarm to AltaLink ACC and AESO SCC Trip Setting #2 Action: • Send DTT to trip 34.5 kV breaker 52M1 at 205S of Castle Rock Ridge WAGF (no change). • Send alarm to AltaLink ACC and AESO SCC

7. APPENDICES

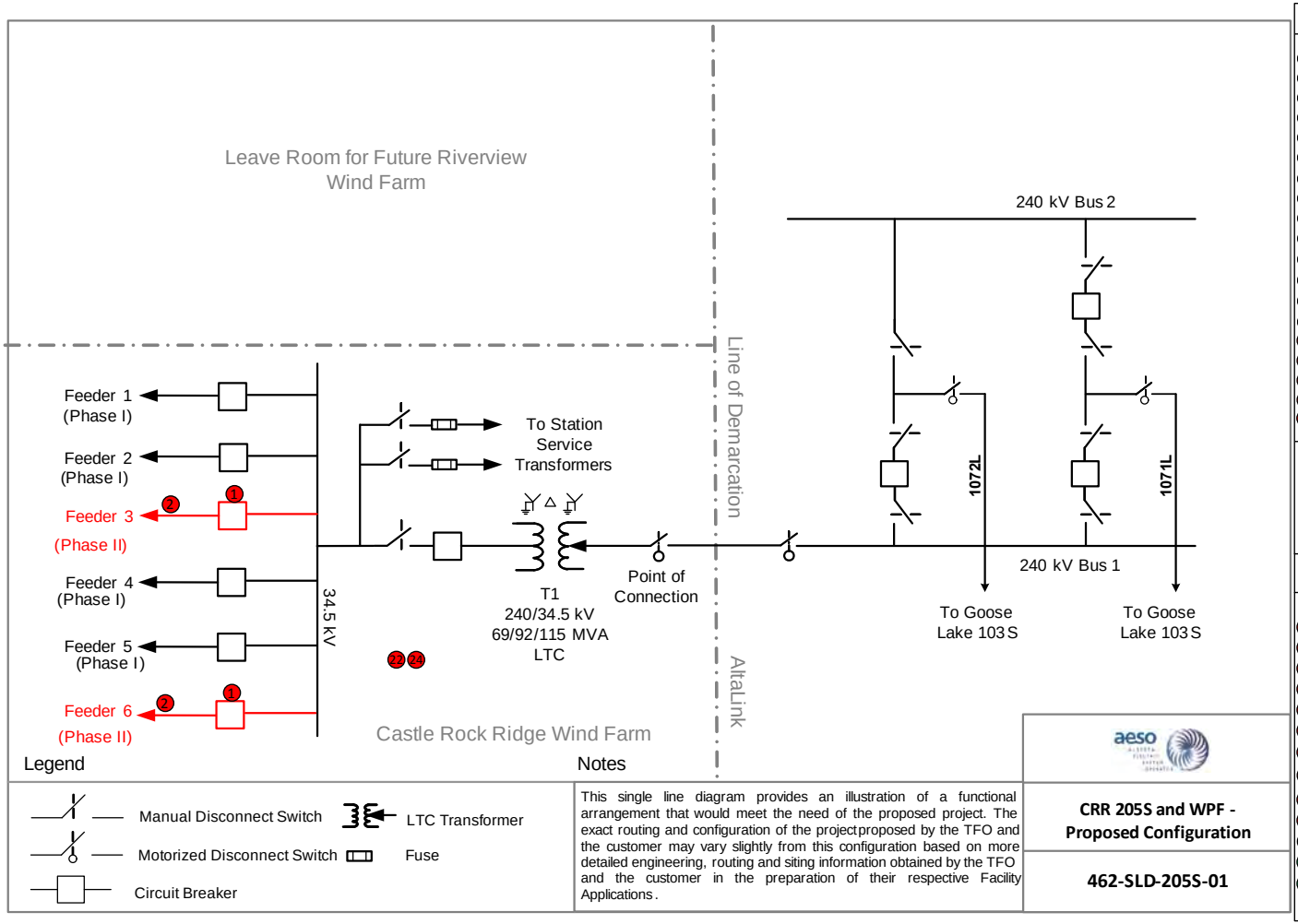
7.1 AREA TRANSMISSION MAP



7.2 CASTLE ROCK RIDGE 205S SUBSTATION AND WIND AGF – PHASE I AND PHASE II DEVELOPMENT



7.3 SCADA REQUIREMENT – CASTLE ROCK RIDGE 205S SUBSTATION



7.4 STATIC DATA REQUIREMENTS – CASTLE ROCK RIDGE 205S SUBSTATION

Facility/ Location	Device	Element	Indication	Update Rate/Mode	Notes
Castle Rock Ridge - Phase 2	34.5kV CB	CB1 for collector Feeder3	Status	15s	May already exist
	34.5kV CB	CB2 for collector Feeder6	Status	15s	May already exist
	34.5kV Feeder	Feeder3 Real power	MW	15s	
	34.5kV Feeder	Feeder3 Reactive Power	MVAr	15s	
	34.5kV Feeder	Feeder6 Real power	MW	15s	
	34.5kV Feeder	Feeder6 Reactive Power	MVAr	15s	
	Meteorological Data	Ambient Temperature	DEGC	15s	
	Meteorological Data	Barometric Pressure	hPa	15s	
Note	**1. MW and MVAr SCADA data shall be gathered independently of the revenue metering data**				
	2. This list was prepared using the best available information. Final SCADA point will be determined based on the applicable SCADA Standard (502.8)				

Appendix G NAV CANADA

File No. 18-2810 has been created for Castle Rock Ridge Phase II Project application.

Pincher Creek, L.P.
by its general partner Enel Alberta Wind Inc.
(subsidiary of Enel Green Power North America, Inc.)

1110–1255 Boulevard Robert Bourassa
Montréal, Québec, H3B 3W7
www.enelgreenpower.com

NAV CANADA
Aeronautical Information Services
Data Collection Unit / Land Use Office
1601 Tom Roberts
P.O. Box 9824, Station T
Ottawa, ON
K1G 6R2

May 30, 2018

Castle Rock Ridge 2 Wind Power Plant Land Use Proposal

Please find attached the Land Use Proposal Submission Form, Site Map and Proposed Lighting Plan, and Multiple Obstacle Spreadsheet for turbines and permanent Metrological tower coordinates for the Castle Rock Ridge 2 Wind Project. This proposed Project is the second phase of the Castle Rock Ridge I Wind Farm, which has been operational since May 2012. The project consists of 7 turbine locations and one permanent Metrological tower.

The project will comply with Transport Canada Standard 621 Section 12.2 *Marking and Lighting of Wind turbines of Total Height Equal to or Less than 150 m.* In support of the residents of Pincher Creek a, radar lighting system will be utilized on the turbines designated to be lighted. This radar lighting system will only illuminate the designated lights when a nearby aircraft is detected. We are still in the process of selecting a specific radar lighting system, and will update NAV CANADA of the manufacturer once a contract has been executed.

Please feel free to contact me if there are any questions or concerns regarding this application package.

Sincerely,

Ashley Smith

Environmental Specialist
Enel Green Power North America
1755 East Plumb Lane, Suite 155
Reno, NV 89502
T: (775) 622-5526
E: Ashley.Smith@enel.com

NAV CANADA Serving a world in motion navcanada.ca

LAND USE PROPOSAL SUBMISSION FORM

Date Received by NAV CANADA		NC file N°./ Ref N°	TC File N° / Ref N°

GENERAL INFORMATION:

Company/Owner Name: **Enel Alberta Wind Inc.**		Contact Person: Ashley Smith	
Address: 1111 Deer Avenue		City: Pincher Creek	Prov: AB	Postal Code: T0K-1W0
Tel: 775-622-5526	Cell: 775-622-5526	Email: ashley.smith@enel.com	
Applicant: Enel Alberta Wind Inc		Contact Person: Ashley Smith	
Address: 1111 Deer Avenue		City: Pincher Creek	Prov: AB	Postal Code: T0K-1W0
Tel: 775-622-5526	Cell: 775-622-5526	Email: ashley.smith@enel.com	
Airport Authority : CZPC (If within 6 km of a lighted aerodrome)		Airport Manager: L.J. Leo Reedyk, Director of Opertaions, Municipal District of Pincher Creek #9	
Address: P.O. Box 279		City: Pincher Creek	Prov: AB
Postal Code: T0k-1W0	Tel:403-627-3130	Cell:	Email: lreedyk@mdpinchercreek.ab.ca

DETAILS OF PROPOSAL:

- Please provide the data in the highest resolution as it was obtained.
- For geographic coordinates, provide up to four (4) decimal places of a second.
- For ground elevation and tower height, provide up to four (4) decimal places of a metre or foot.

Project #, Street Address, etc.: Castle Rock Ridge 2 Wind Project				Nearest Town, Province: Pincher Creek, Alberta		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
Geographic Coordinates of Site in NAD 83:	Lat. N 49	/ 33	/ 55.38	Long. W -113	/ 59	/ 04.70
Linear Structures: Indicate Starting Point on 1st line and End Point 2nd line:	Lat. N 49	/ 33	/ 22.82	Long. W -113	/ 57	/ 16.77

Type of Structure: Wind Turbines & Meteorological Towers	New Structure? ☒Yes ☐No	Height Added (If Existing)		☐ft ☐m
Cranes to be used? ☒Yes ☐ No *If Yes*, see *instructions*		Ground Elevation (Above Sea Level)	1251.7	☐ft ☒m
Dimensions: 82m hub height, 132m rotor diameter, 148.7m tip height		Structure Height (Above Ground Level) **Including all Appurtenances**	150m	☐ft ☒m
Materials & Roof Shape (If Building):		Total Height (Above Sea Level) Structure Height + Ground Elevation	1401.7	☐ft ☒m
Proposed Construction Start Date: August 2018		Approximate Duration of Construction: 18 months		
If Temporary Structure, indicate Removal Date:		From: hrs	To: hrs	

Comments: This application is for 7 wind turbine generators and 1 permanent meteorological towers for the Castle Rock Ridge 2 Wind Project. Please see attached table for coordinates, height and ground elevations. The project is the second phase of the Castle Rock Ridge project (NC file 09-2361), which has been operational since May 2012.

ELECTRONIC / TELECOMMUNICATION INTERFERENCE (Check off the items which may cause interference and provide details)

High Voltage Equipment	☒ Details Above ground there will be a new metering, a new 240kV main transformer, and up to 6 circuit breakers installed at the existing Castle Rock Ridge subtation. Additionally, each turbine location will have a pad mounted 34.5kV transformer. Underground, there will be a 34.5kV collection system that will run between the turbine locations and the substation.
Arc Welding	☒ Details Intermittent arc welding may occur at the substation location intermittently during daytime hours between May and August. Minor arc welding for stairways at each turbine location may also occur during daylight hours between June and November.

Radar Emission	☒ Details A radar lighting system will be utilized for meeting Marking and Lighting requirements.
High Powered Transmissions	☐ Details None
VHF Radio	☐ Details None
Other	☐ Details None

OBSTRUCTION TO VISION ON AIRPORT WITH NAV CANADA SERVICES/CONTROL TOWER, FSS, CARS:	
Check the items which may cause obstructions to vision to the installation:	
Line of Sight	☒ Details The project will consist of 7 wind turbines with an 82m hub height and 136m rotor diameter.
Generation of Smoke/Vapour	☐ Details None
Reflectivity	☐ Details None
Aircraft Parking	☐ Details None
Exterior Lighting	☒ Details The project will utilize a radar lighting system and comply with Transport Canada Standard 621, Section 12.2 Marking and Lighting of Wind turbines of Total Height Equal to or Less than 150 m..

MAPS/DRAWINGS (Required for Supporting Documentation)

Proposals for structures not adjacent to an airport OR on airport without NAV CANADA Services

- 1:50,000 topographical map section with the location of the proposed structure clearly marked. The map must contain a legend indicating the map datum (NAD27 or 83) and the contour interval.
- Legal survey (if available)

Proposals adjacent within 2 km from an airport with FSS, Control Tower, Localizer or ILS navigational aids

- 1:50,000 topographical map section with the location of the proposed structure clearly marked. The map must contain a legend indicating the map datum (NAD27 or 83) and the contour interval.
- For localizer/ILS runways, site plan at 1:2000 scale, with distance bar, showing 90° distances to nearest runway centre line/centre line extension, and distance to nearest runway threshold. Note: reference TP 1247 to determine requirement when along an extended centerline of a localizer/ILS runway up to 6 km.
- For buildings, architectural drawings in both plan view (with north arrow indicator) detailing orientation of building and dimensions; and profile view detailing maximum height of building (including rooftop structures) and elevation at grade level.

Proposals on an airport with FSS or Control Tower Services, Weather Services, Localizer or ILS navigational aids

- 1:50,000 topographical map section with the location of the proposed structure clearly marked. The map must contain a legend indicating the map datum (NAD27 or 83) and the contour interval.
- Airport plan at 1:500 scale, with distance bar, showing orientation of structures including vehicle and aircraft entry/exit points.
- For sites with localizer/ILS runways site plan at 1:2000 scale, with distance bar, showing 90° distances to nearest runway centre line/centre line extension, taxiway, and distance to nearest runway threshold. Note: will require drawings for structures up to 6km along the extended centreline of the localizer/ILS runway.
- Site plan depicting entire airport and location of proposed structures and excavations/trenching include depth.
- Site plans at 1:2000 scale, with distance bar, showing line of sight to the mandatory viewing areas (runways and taxiways) identifying existing structures along the sightline in both cross section (profile) view and plan view format. Refer to NAV CANADA sightline requirements for criteria of mandatory viewing areas.
- For buildings, architectural drawings in both plan view (with north arrow indicator) detailing orientation of building and dimensions; and profile view detailing maximum height of building (including rooftop structures) and elevation at grade level.

Applicant/Representative Signature	Print Name	Date
Ashley Smith	Ashley Smith	5/30/2018

For a detailed description on NAV CANADA's requirements and additional information, refer to the NAV CANADA website at www.navcanada.ca > PRODUCTS & SERVICES > Land Use Program.

NAV CANADA's evaluation of land use proposals and construction proposals neither constitutes nor replaces any approvals or permits required by Transport Canada, other Federal Government Departments, Provincial or Municipal land use authorities, or any agency from which any approval is required.

Please Submit by email to landuse@navcanada.ca

Processing Times

NAV CANADA will endeavour to provide a response within 8 to12 weeks of receipt of the proposal. The accuracy and completeness of the initial documentation provided to NAV CANADA, and consequently the cooperation of the proponent to quickly rectify any deficiencies/inaccuracies will go far to expedite the process and ensure a timely response. Electronic submissions will also decrease the time required to properly assess a submission.

Contact Us

NAV CANADA
Aeronautical Information Management
AIM Instrument Flight Procedure Service Delivery / Land Use Office
1601 Tom Roberts Ave
Ottawa, ON K1V 1E5

Website: www.navcanada.ca > PRODUCTS & SERVICES > Land Use Program

Toll Free: (866) 577-0247
Fax: (613) 248-4094
Email: landuse@navcanada.ca ***Preferred method for submission***

Obstruction Marking and Lighting

Transport Canada is required to perform an assessment on the requirement for obstruction marking and lighting of man-made structures per Canadian Aviation Regulations (CAR). Obstructions are assessed by Transport Canada through the Aeronautical Assessment Form Process. *Note: outages in obstruction lighting deemed a requirement by Transport Canada are to be reported to the appropriate NAV CANADA Flight Information Centre (FIC) as per CAR 601.28.*

Kamloops FIC 1-866-541-4101

Edmonton FIC 1-866-541-4102

Winnipeg FIC 1-866-541-4103

London FIC 1-866-541-4104

Quebec FIC 1-866-541-4105

Land Use Proposal Submission Form Instructions

This section provides additional instructions for each section of the Land Use Submission Form.

Airport Authority: If site location is within 6 km of a lighted aerodrome provide the name of the airport and contact information if available.

Applicant: If not the same as owner, the name of consultant, contractor, or other who is applying on behalf of the owner. Note: all correspondence will be forwarded to the applicant.

Approximate Duration of Construction: Specify time of operation for temporary structures of short duration. This may be required for NOTAMing purposes.

Arc Welding: If any construction taking place on your site requires arc welding, please complete this field. Specify the anticipated duration of arc welding. Welders can potentially interfere with the reliability of the ILS systems of an airport and must therefore be brought to our attention.

Blasting Operations: The following additional information will be required for blasting activities for a Land Use Assessment and possible NOTAM / publication action:

Blast Area: Geographic coordinates (latitude & longitude in NAD83) of the blasting area corners or centre coordinates with a blasting radius.

Blasting Times: specify period during the day (for example, daylight hours or 0800 to 1600 local time Monday to Friday, one-time event, etc.).

Duration of Operation: estimated amount of time (months/years) expected to operate at specified location.

Elevations: Highest ground elevation (above sea level) within blasting zone, maximum height of fly rock or debris (above ground level), and shockwave/overpressure height (above ground level, if applicable). Indicate use of blast mats (if applicable).

Topographical map: (1:50 000 scale) depicting the blasting area.

Company/Owner Name: Owner of the proposed structure or development.

Cranes: For construction projects (such as a new building, placement of roof top structures, flare stack, etc.) where a crane will be required and where the maximum operating height will be higher than the overall height of the proposed structure, the applicant is to provide details for both mobile and temporary cranes on a separate submission form **at least 30 working days in advance**. We ask that crane application(s) be cross referenced to the associated construction project and provide detailed crane specifications such as maximum height, boom length and swing radius. A drawing detailing the crane specifications and type would be beneficial, please reference the NAV CANADA Land Use Program web page for more details. *Note: A drawing showing the required specifications indicated below will be beneficial.*

> *Maximum Swing Radius:* In a manner similar to a large structure, a crane with a large swing radius can create a severe horizontal angle with respect to Navigation/Communication/Surveillance equipment, thereby compromising coverage. The maximum swing radius shall be provided so we can properly assess the situation and determine whether or not the swing radius is within an acceptable level. Note: maximum swing radius refers to the maximum that will be achieved during construction and not the maximum achievable swing of the crane (unless that specific setting is being used in the construction).
>
> *Boom Length:* This information is needed to determine the vertical angle of the crane with respect to any nearby NAV CANADA facilities.
>
> *Max Height Achieved During Construction:* This information is needed to determine the worst case scenario for vertical angles between the crane and nearby NAV CANADA facilities.

Date Received: Represents the date the application was received by NAV CANADA Land Use.

Details of Proposal: Project Number, Street address, etc.: A project name, number or street address that can be traced should the owner/applicant require follow-up status on a project.

Dimensions: Indicate structure design specifications. Certain equipment used by NAV CANADA (the radar equipment in particular) can potentially be disrupted by those structures which possess large horizontal dimensions. Such scenarios are assessed by determining the structure's horizontal angle with respect to the NAV CANADA site. For Cranes, include maximum height to which the crane will be raised, boom length and swing radius. A drawing with the specs is desired.

From / To:
Indicate the time of the day when the structure will be raised. For example: 08:00, 13:00
Indicate the time of the day when the structure will be lowered. For example: 11:00, 17:00

Geographic Coordinates: The geographic location in latitude and longitude of the proposed structure/development. Coordinates must be provided in degrees, minutes, and seconds for NOTAM and database updating purposes. It is an ICAO (International Civil Aviation Organization) requirement to provide accuracy to within 1/100th of a second.
For example, N46° 06' 44.67" W064° 40' 43.25".

Geodetic Datum: Coordinates are to be provided in NAD83 only. NAD 27 or UTM coordinates must be converted into the required format; the following are Natural Resources Canada online transformation links (these may change without notice):

NAD 27/83 and Geographic/UTM conversions: http://webapp.geod.nrcan.gc.ca/geod/tools-outils/ntv2.php?locale=en

NAD 27/83 and Geographic/UTM conversions: http://webapp.geod.nrcan.gc.ca/geod/tools-outils/trx.php

Reference the Natural Resources Canada webpage for information on this topic.

Ground Elevation: Should be consistent with the contour interval details shown on the 1:50,000 topographical chart. *Note: GPS readings (when not surveyed) or Google Earth readings are not considered reliable information. Please refer to topographical maps containing contour information or surveyed data. Where ground elevation has been surveyed, the finished grade is to be provided.*

Height Added: The structure currently exists. Specify any increase in height due to an addition.

High Powered Transmission: Such transmissions include AM, FM, or television broadcast signals. Such equipment should typically be located at least 8 km from NAV CANADA facilities. However, any equipment at the proposed site which falls under this category must be mentioned here.

High Voltage Equipment: Any equipment which carries a voltage of at least 2 kV must be mentioned here as such equipment can create electrical interference with NAV CANADA's radar systems. Voltages over 100 kV are especially worthy of mention, as they will potentially interfere with, not only the radar systems, but the ILS systems as well.

Linear Group of Structures: Cable crossing, telephone or power line, should have a beginning and end point of the line. Should there be intersection points along the route, applicant to provide a spreadsheet containing the geographic coordinates and ground elevation.

Note: Groups of Structures (Linear or Non-Linear): Groups of structures that are sufficiently close together can disrupt line of sight radio frequency (RF) coverage in a manner similar to a single, large structure. Therefore, a drawing of the group's layout is required in order to determine its bearing with respect to a NAV CANADA facility. From here, a horizontal angle between the site and the group of structures can be determined in order to assess the risk of coverage shadowing. Note: this requirement will be in addition to the map requirements listed on page 2 of the Land Use Proposal Submission Form.

MAPS/DRAWINGS

1:50,000 topographical map 8.5"x11" sectional with the location of the proposed structure clearly marked. The map submission must contain a legend indicating the map datum (NAD27 or 83) and the contour interval: NAV CANADA will accept the equivalent to the topographical maps produced by Natural Resources Canada which can be obtained digitally (by various mapping software companies) or in paper copy at most map supply stores. This will allow the Land Use Office to confirm possible discrepancies between the location shown on the map and the ground and geographic coordinates provided on the form. It will assist us in referencing where the proposed structure is with respect to the nearest airport, as well as any nearby NAV CANADA sites, and to reference the structures location within an instrument procedure design to determine possible penetration of the obstacle limitation surface on published instrument flight procedures.

Site Plan Depicting Entire Airport and Location of proposed structures: In cases where the proposed structure is close to an airport, within 6 km, or on an airport with a localizer/ILS (Instrument Landing System) runway, it is important to determine where the structure is with respect to any ILS at the airport. For this reason, site plans should include the *entire airport* and have the airport zoomed in as close as possible while still showing the proposed site in its entirety.

Proposals adjacent within 2 km from an airport with FSS or Control Tower: Certain equipment used by NAV CANADA (the radar equipment in particular) can potentially be disrupted by structures that possess large horizontal dimensions. Such scenarios are assessed by determining the structure's horizontal angle with respect to the site in question. This angle cannot be determined unless all horizontal dimensions and orientation of the structure are provided as well as the structure's bearing (that is, the map should include a north arrow).

For localizer/ILS runways, site plan with distance bar at 1:2,000 scale measure distances based at 90° to nearest runway centerline/extended runway centerline, and distance to nearest runway threshold. *Note: reference TP1247 to determine requirement when along an extended centerline of a localizer runway up to 6 km.*

Materials and Roof Shape: Indicate only the dominant materials of the structure, along with any metal which may exist. Indicate whether or not the roof (if applicable) of the structure is flat or sloped. *Note: Certain materials (such as metal) can cause undesirable reflections if they are sufficiently close to NAV CANADA equipment. Mentioning every material being used in the development is unnecessary, but metal in particular is worthy of mention, regardless of whether or not it is the dominant component of the structure. For example: A windmill made entirely of fibreglass with metal strips outlining the blades.*

Metres/Feet: Please identify whether heights provided are in feet or metres. All values will be converted into feet in the Land Use assessment and Notice of Construction as this is the required format for aeronautical publications and database purposes.

All metric/imperial conversions will be calculated as follows:

- Feet to Metres: To obtain metres, multiply the value (in feet) by 0.3048.
- Metres to Feet: To obtain feet, divide the value (in metres) by 0.3048.

NC File Number: If this submission is an amendment or is associated to a previous submission, applicant to indicate NAV CANADA file number assigned to the associated land use submission. For example, Revision to 07-0001 or Reference 07-0001 (building application).

Nearest Town: Closest town to where the development/project will take place.

New Structure: Replacement of a structure is considered a new structure; however, details on the old location and original owner are to be provided in the comments section for NAV CANADA database management. If submitting for an existing structure, NAV CANADA will consider the structure as 'new' if it is not currently recorded in our obstacle database.

OBSTRUCTION TO VISION ON OR ADJACENT TO AN AIRPORT WITH NAV CANADA SERVICES / CONTROL TOWER, FSS CARS: Controller/Specialist visibility requirements are based on dimensions defined in TP312, Aerodrome Standards & Recommended Practices and TP308, Criteria for the Development of Instrument Procedures. These Transport Canada publications define the airspace around aerodromes that has to be maintained free from obstacles to protect aircraft during either "an entirely visual approach or during the visual segment of an instrument approach". An aircraft on approach should be somewhere within this defined airspace, thus, controllers and specialists require line-of-sight to the areas overlying (above) these obstacle limitation surfaces. It is important to note that structures which meet these obstacle limitation surfaces could still interfere with controller/specialist line-of-sight.

Line of Sight: All aerodrome manoeuvring surfaces, unobstructed line-of-sight from the Tower Cab to the mandatory viewing area shall be provided. Line-of-sight is defined as a straight line from the 'ideal' controller/specialist eye-level position, established at 122 cm (48 in or 4 ft) above the floor and 91 cm (36 in) back from the perpendicular glass line, to any object in the mandatory viewing area. Line-of-sight shall not be obstructed by structures, parked aircraft, large vehicles and surrounding terrain/landscaping. Line-of-sight over buildings or other structures shall have a suitable margin of clearance to allow for snow build-up.

Generation of Smoke/Vapour: Line-of-sight can be impaired by visible contaminants such as steam, or heat distortion patterns. Consideration shall also be given to local weather phenomena that would restrict visibility due to fog or industrial haze from off airport sources.

Reflectivity: Line-of-sight can be impaired by direct or indirect sun glare and external light sources such as apron lights, parking area lights, street lights, or reflective surfaces (water pooling).

Aircraft Parking: Line-of-sight can be obstructed by structures such as parked aircraft, large vehicles and surrounding terrain/landscaping.

Exterior Lighting: Line-of-sight can be impaired by external light sources such as apron lights, parking area lights, street lights.

Other: Any high-powered electronic or telecommunications equipment which does not fall under the preceding categories should be brought to our attention if they can potentially interfere with equipment.

Radar Emission: High powered radio frequencies (in the GHz range) will potentially interfere with NAV CANADA radar performance. Any high powered frequencies originating from your proposed structure must be brought to the attention of NAV CANADA.

Reference: TP1247 Land Use in the Vicinity of Airports

Runway Certification Changes: To ensure Instrument Procedures meet design criteria requirements, NAV CANADA must be informed of any changes to runway certification (for example, precision to non-precision, non-precision to non-instrument, etc.). This includes temporary certification changes or changes occurring during a runway closure (the instrument procedure serving a closed runway may still be used for circling or other purposes).

Structure Height: This is the overall height of the structure above ground level.

> *Buildings:* Include roof top structures such as, antennas, advertising boards, architectural features or mechanical rooms above the building height.
>
> *Communication Towers:* Include the tower structure itself plus all appurtenances such as antennas, lightning rods, equipment, and obstruction lights.
>
> *Wind turbines:* Overall height of the structure including blade radius (blade in the 12 o'clock position); and to include height at the hub and blade length.
>
> *Cranes:* Maximum heights to which the crane will be raised when on site include height of mobile crane if used to install a tower crane.

TC Number: Applicant to provide the Transport Canada file number if known.

Temporary Structure: For structures with a planned removal date such as drilling rigs, cranes, meteorological towers, etc., please indicate the estimated removal date.

Total Height: Ground elevation plus the structure height at its highest point.

Type of Structure: The type of structure; for example, Hotel, Drilling Rig, Cranes, Hangar, Development, Wind Turbine, Communication Tower, Meteorological Tower, Flare Stack, Telephone/Transmission line, Cable Crossing, etc. *Note, where the structure is a flag pole, dimensions of maximum flag size is to be stipulated.* Should cranes be required during building construction, please refer to the Cranes section.

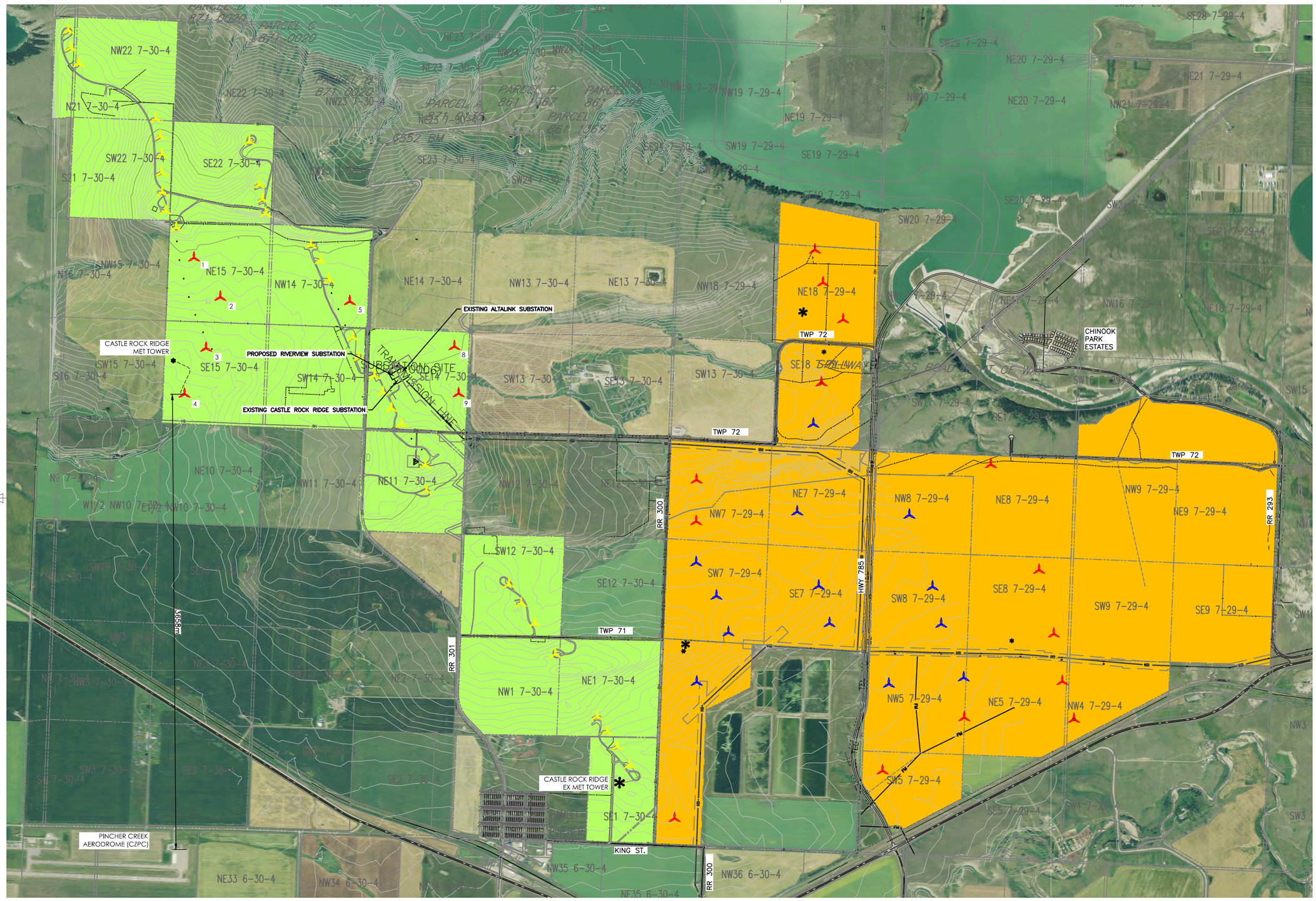
> *Tower or Support Structures:* Applicant to indicate whether they are guyed or self-support structures
>
> *Guyed Towers:* Applicant may be required to provide drawing with specifications on number of guyed lines, orientation of the structure (with north arrow) in both plan and profile view if available. Drawings may be required if the proposed structure is in close proximity to a NAV CANADA facility.
>
> *Self-Support Towers:* Applicant to provide a profile view detailing the dimensions of the structure if available. *Note: may be required if the proposed structure is located within 2 km of a NAV CANADA facility.*
>
> *Buildings:* Require architectural drawings in both plan view (with a north arrow indicator detailing the orientation of the building) and a profile (elevation) view (detailing maximum height of building including rooftop structures such as mechanical room, air conditioners, elevator shaft, etc. with the ground elevation at grade level). The North arrow indicator is particularly important in order to identify how the structure is oriented for azimuth calculations. *Note: should cranes be required during construction an additional land use submission will be required for assessment*.

VHF Radio: Frequency and Transmitter Power

VHF consists of all frequencies between 30 MHz and 300 MHz. Such frequencies will potentially cause interference with NAV CANADA's communications equipment. Any frequencies originating from the proposed site which fall within this range must be mentioned here, in order to rule out the possibility of interference.

For situations in which VHF radio will exist at a proposed site, NAV CANADA engineers must perform intermodulation studies in order to ensure that the performance of NAV CANADA communication sites is not compromised. These studies cannot be performed unless the proponent indicates the *specific* VHF frequencies being used onsite. Specify the transmitter power, as this is required to determine whether or not an overlap in coverage will take place.

Wind Farm: For clusters consisting of more than one turbine, the applicant can use one land use proposal submission form with a spreadsheet listing all turbines including turbine number, geographic coordinates (latitude/longitude) in NAD83, ground elevation and structure height. The 'Multiple Obstacle Template' spreadsheet sample is provided on the 'Proposal Submission Procedures' portion of the web site.



REV.	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED
0	2018/03/13	FOR NAV CANADA APPLICATION	S Kirby		J Drain

PRELIMINARY

NOT FOR CONSTRUCTION

Stantec
Quarry Park Boulevard SE
Calgary AB, Canada T2C 5H9
Phone: (403) 252-3436
Fax: (403) 252-3464

PROJECT: CASTLE ROCK RIDGE PH 2			
FILE NAME:			
CLASSIFICATION	COMPANY		
FORMAT: ANSI D	SCALE: FULL	PLOT SCALE 1:15000	SHEET: 1 of 1

Engineering & Construction

EGP VALIDATION

VALIDATED by	
VERIFIED by	
COLLABORATORS	

UTILIZATION SCOPE: BASIC DESIGN

TITLE: CASTLE ROCK RIDGE PH 2 WIND FARM NAV CANADA LIGHTING PLAN

EGP CODE

GROUP	FUNCTION	TYPE	ISSUER	COUNTRY	TEC.	PLANT	SYSTEM	PROGRESSIVE	REVISION
EGP	EEC	D	2 5	C A	W	3 5 5 3 4	1 2	0 0 1	0 0

NAV CANADA Serving a world in motion navcanada.ca

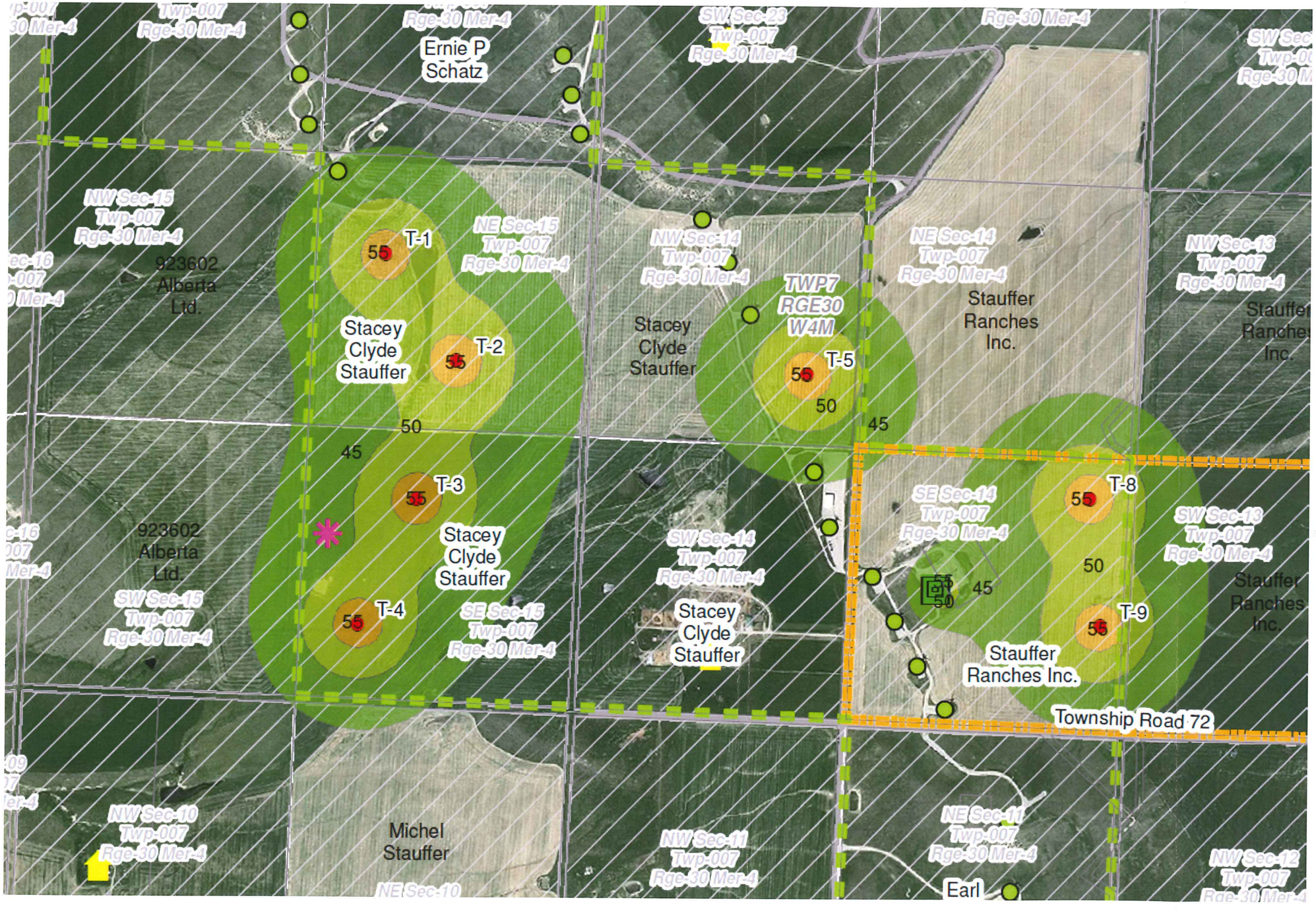
Z-LDU-100 Version 17.5 10 July 2017

Castle Rock Ridge Wind Farm Phase 2 Obstacle information											Upon completion		
Number	LAT dd mm ss.ss	LONG -ddd mm ss.ss	UTM NAD 83 Easting	UTM NAD 83 Northing	Ground Elevation (Meters)	Ground Elevation (Feet)	Structure Height (Meters)	Structure Height (Feet)	Total Height (Meters)	Total Height (Feet)	Lighted Y/N	Painted Y/N	Construction Date
1	49 33 55.38	-113 59 04.70	284193.000	5494590.000	1247.27	4092.09	150.00	492.00	1397.27	4584.09	Y	N	mm/dd/yyy
2	49 33 45.43	-113 58 53.54	284405.000	5494274.000	1229.93	4035.20	150.00	492.00	1379.93	4527.20	Y	N	
3	49 33 32.06	-113 58 58.45	284290.000	5493865.000	1213.44	3981.10	150.00	492.00	1363.44	4473.10	Y	N	
4	49 33 19.87	-113 59 06.31	284117.162	5493494.729	1196.49	3925.49	150.00	492.00	1346.49	4417.49	Y	N	
5	49 33 45.63	-113 58 01.72	285446.000	5494239.000	1242.60	4076.77	150.00	492.00	1392.60	4568.77	Y	N	
8	49 33 35.00	-113 57 19.20	286287.000	5493877.000	1251.69	4106.59	150.00	492.00	1401.69	4598.59	Y	N	
9	49 33 22.82	-113 57 16.77	286321.000	5493499.000	1241.71	4073.85	150.00	492.00	1391.71	4565.85	Y	N	
MET Tower	49 33 28.46	-113 59 11.32	284027.000	5493764.000	1201.96	3943.44	82.00	269.00	1283.96	4212.44	Y	N	

Appendix H AERONAUTICAL OBSTRUCTION CLEARANCE

The Transport Canada application has been submitted on May 30, 2018. Transport Canada has indicated that they will not review until within 90 days to construction.

Appendix I NOISE IMPACT ASSESSMENT


Twp-007
Rge-30 Mer-4
Ernie P
Schatz
SW Sec-23
Twp-007
Rge-30 Mer-4
NW Sec-15
Twp-007
Rge-30 Mer-4
923602
Alberta
Ltd.
T-1
NE Sec-15
Twp-007
Rge-30 Mer-4
NW Sec-14
Twp-007
Rge-30 Mer-4
TWP7
RGE30
W4M
NE Sec-14
Twp-007
Rge-30 Mer-4
Stauffer
Ranches
Inc.
NW Sec-13
Twp-007
Rge-30 Mer-4
Stacey
Clyde
Stauffer
T-2
T-5
50
45
T-3
T-8
SE Sec-14
Twp-007
Rge-30 Mer-4
SW Sec-13
Twp-007
Rge-30 Mer-4
SW Sec-15
Twp-007
Rge-30 Mer-4
T-4
SE Sec-15
Twp-007
Rge-30 Mer-4
SW Sec-14
Twp-007
Rge-30 Mer-4
T-9
Township Road 72
NW Sec-10
Twp-007
Rge-30 Mer-4
Michel
Stauffer
NW Sec-11
Twp-007
Rge-30 Mer-4
NE Sec-11
Twp-007
Rge-30 Mer-4
Earl
NW Sec-12
Twp-007
Rge-30 Mer-4

Appendix J SHADOW FLICKER ASSESSMENT