Appendix N

EMI Study

Detailed EMI Report

for the

Clydesdale Ridge Wind Farm

Prepared For

RMS Energy Inc.
1383 Mt. Thom Road
Salt Springs
Nova Scotia
B0K 1P0

May 16, 2012

Prepared By

Nortek Resource Solutions Inc.
RR # 1
Thorburn, Nova Scotia
B0K 1W0
Tel (902) 922-3607

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1.0 Introduction

The proposed Clydesdale Ridge Wind Farm is located approximately 29 km west of New Glasgow, Nova Scotia. The proposed wind farm is located along the border of Colchester and Pictou Counties and is situated west of the existing Dalhousie wind farm. The proposed Clydesdale Ridge Wind Farm consists of 28, 1.68 MW wind turbines that have a hub height of 80 m and a rotor diameter of 82.5 m.

This preliminary EMI Study is designed to apply the guidelines identified by the joint *Radio Advisory Board of Canada and Canadian Wind Energy Association Technical Information and Coordination Process Between Wind Turbines and Radiocommunication and Radar Systems*[1] (herein after referred to as the RABC). The technical guidelines have been developed to apply a consistent approach to determining if wind energy developments may impact existing radio, telecommunication and radar systems.

Additionally, CBC/Radio Canada has specific requirements to ensure that proposed wind farms will not have a negative influence on existing CBC/Radio signals. CBC/Radio Canada requires that specific spatial analysis and mapping be included in this preliminary report.

2.0 Point-to-Point Systems above 890 MHz

The existing RABC guidelines describe consultation zones for Point-to-Point Systems above 890 MHz include a 1.0 km consultation zone around existing transmitters and receivers as well as a variable “cylinder” between links that are based on the distance between links and the licensed frequencies.

A variable consultation zone along the line of sight between the transmitter and receiver recommended by RABC is calculated using::

$$L_C = R + 52\sqrt{D/F}$$

Where:

D = Path length in kilometers
F = Frequncy in gigahertz
L_C = Diameter of the cylinder in meters
R = Wind turbine rotor diameter in meters

Data obtained from the Industry Canada Technical and Administrative Frequency Lists accessed through the Spectrum Direct web site[2] is summarized in Table 1. There is a 1.85 GHz microwave link, call sign XMZ584, that connects Nuttby Mountain to MacLellans Mountain which passes through the wind farm (Figure 1). There are no turbines located within the RABC recommended consultation zone based on the link distance and frequency. Turbine S-43 is located 60 m from the consultation zone and in the interest of being a good corporate neighbor, the link licensee, Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) was contacted to discuss the proposed wind farm. The discussions are summarized in Appendix 3. There is a pre-existing turbine that is located within the recommended consultation zone.

Rogers Communications Partnership is a subsidiary of Rogers Communications Inc. which operates a number of links from a communications tower located within the 1.0 km of a number of proposed turbines. Rogers Communications Partnership has been contacted and discussions are ongoing to resolve any potential interference issues.

Table 1: Licensed Point-to-Point Links (>890 MHz) within the RABC Consultation Zones.

Licensee	Tx (MHz)	Rx(MHz)	Call Sign
Nova Scotia Department of Transportation and Infrastructure Renewal	1,850.0	1,741.500	XMZ584
Rogers Communications Partnership	6,875.00 11,225.00 6,875.000 6,345.490	6,535.00 10,735.00 6,535.000 6,093.450	CGE984 CIO386 CGE920 VEM431

Using RABC, it was determined that there are four radio links (>890 MHz) that are within the 1.0 km consultation zone. **The Licensee's of these links have been contacted and discussions are ongoing in regard to possible issues, remediation and mitigation measures for the site.**

3.0 Broadcast Transmitters

3.1 AM Transmitters

A 15 km consultation zone is recommended by RABC for AM radio transmitters utilizing multiple tower antenna systems. For single tower systems, a 5 km consultation zone is required (Figure 2). Hector Broadcasting Company Ltd. used to operate an AM Radio Transmitter at 1,320 kHz located at Abercrombie Point which is 20.2 km from the wind farm. This frequency is currently inactive at the radio station migrated to 94.1 FM. The next closest transmitter is located in Truro and licensed to Radio Atlantic (1997) Inc. The transmitter is located 31 km west of the proposed wind farm and is currently listed as inactive.

The proposed wind farm is not within the 15 km consultation zone of active or inactive AM Radio transmitters.

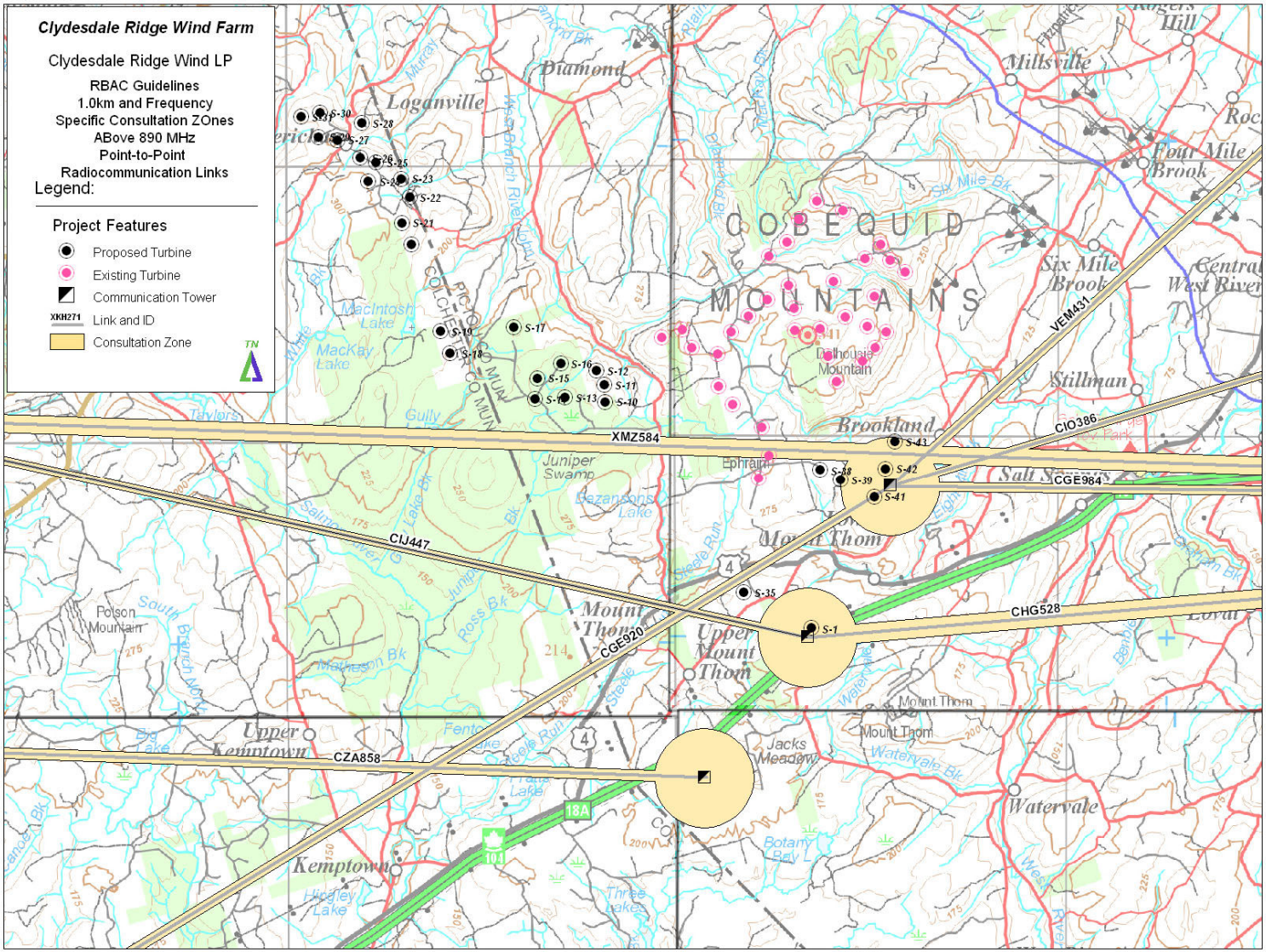

Figure 1: RBAC Guideline Consultation Zones for Point-to-Point Radio Links above 890 MHz.

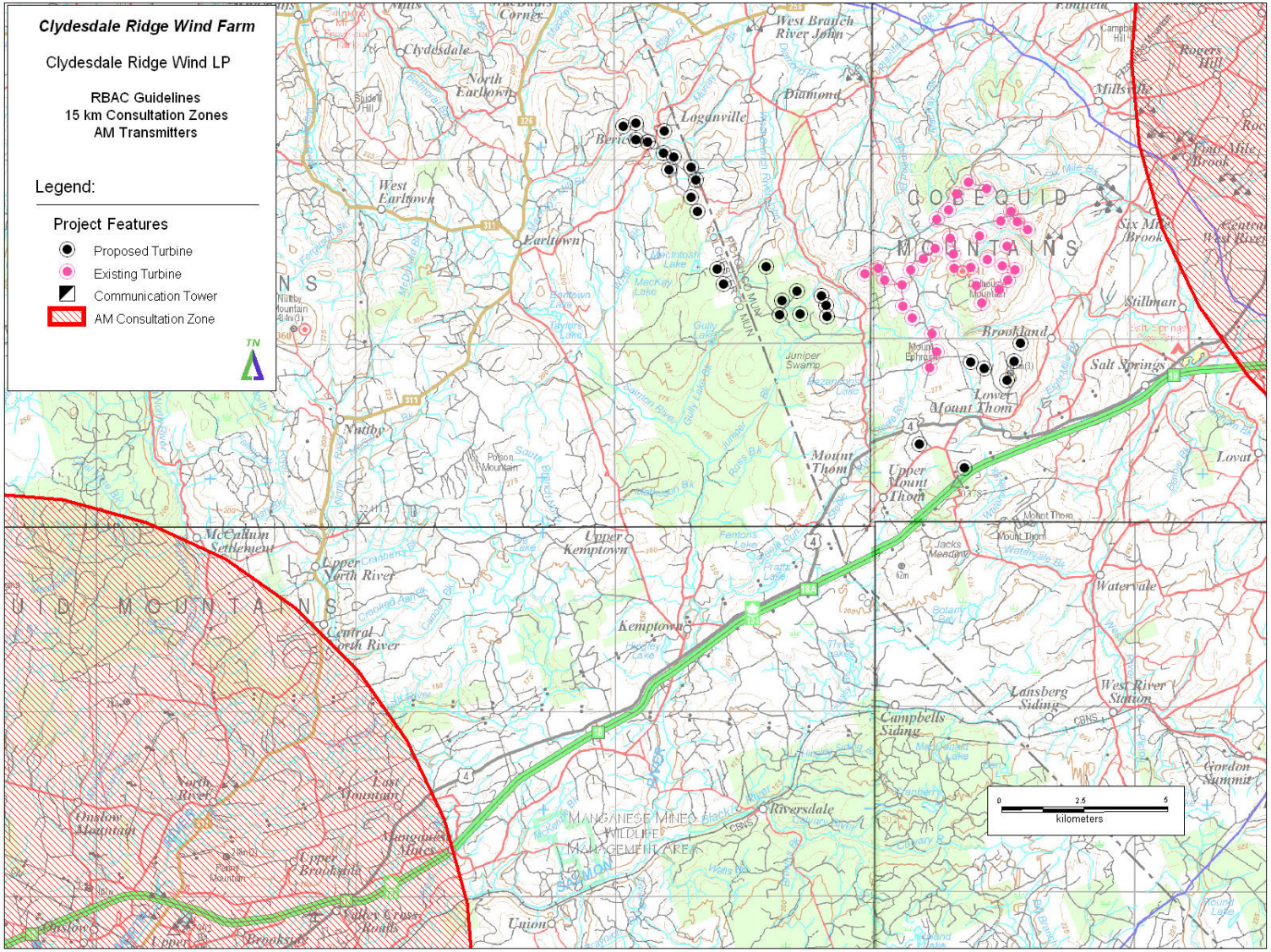

Figure 2: RABC Guideline Consultation Zones for Am Radio Transmitters

3.2 FM Transmitters

For proximity reasons, the RABC suggests a 2.0 km consultation zone around existing FM transmitters. Hector Broadcasting Company Ltd. operates a FM Transmitter (94.1 MHz) at its tower site located at Brookland, Pictou County (Figure 3). Hector Broadcasting Company Ltd. Is also in the process of obtaining approval to operate a second transmitter at 97.9 MHz from the same tower site. A total of 5 proposed turbines are located within the 2 km consultation zone recommended by RBAC. Hector Broadcasting Company Ltd. and the project developer have a pre-existing standing agreement in respect to the construction of wind turbines in close proximity to the transmitter and potential interference issues. It is anticipated that this agreement will be used if actual interference issues develop as a result of the construction of the wind farm.

The next closest FM transmitter is located at Nuttby Mountain. CKTO-FM transmits at 100.9 MHz and is located 12 km west of the proposed wind farm (Figure 3).

Continue discussions with the company that operates the current FM radio transmitter located at Brookland.

3.3 TV Transmitters

The closest TV Transmitter is located approximately 24 km east of the proposed wind farm and is located at McGregor Mountain, south of New Glasgow, NS (Figure 4).

There are no Television Transmitters located within 2 km of the proposed wind farm.

3.4 CBC Radio Transmitters

The following section describes the components outlined in the *CBC/Radio-Canada Involvement and Requirements Concerning Wind Energy Projects*[3] for a preliminary report.

The closest CBC transmitter site (FM and TV) is located 22.0 km west of the proposed wind farm and the site is situated on Onslow Mountain, north of Truro, Nova Scotia. The next nearest CBC transmitter site (FM and TV) is located 24.0 km east of the proposed wind farm at McGregor Mountain which is located south of New Glasgow, Nova Scotia (Table 2).

Table 2: Locations and Distances of the Two Closest CBC FM Transmitter Sites.

Location	Latitude	Longitude	Distance to Wind Farm (km)
Truro	45.453	-63.288	22.0
New Glasgow	45.534	-62.636	24.0

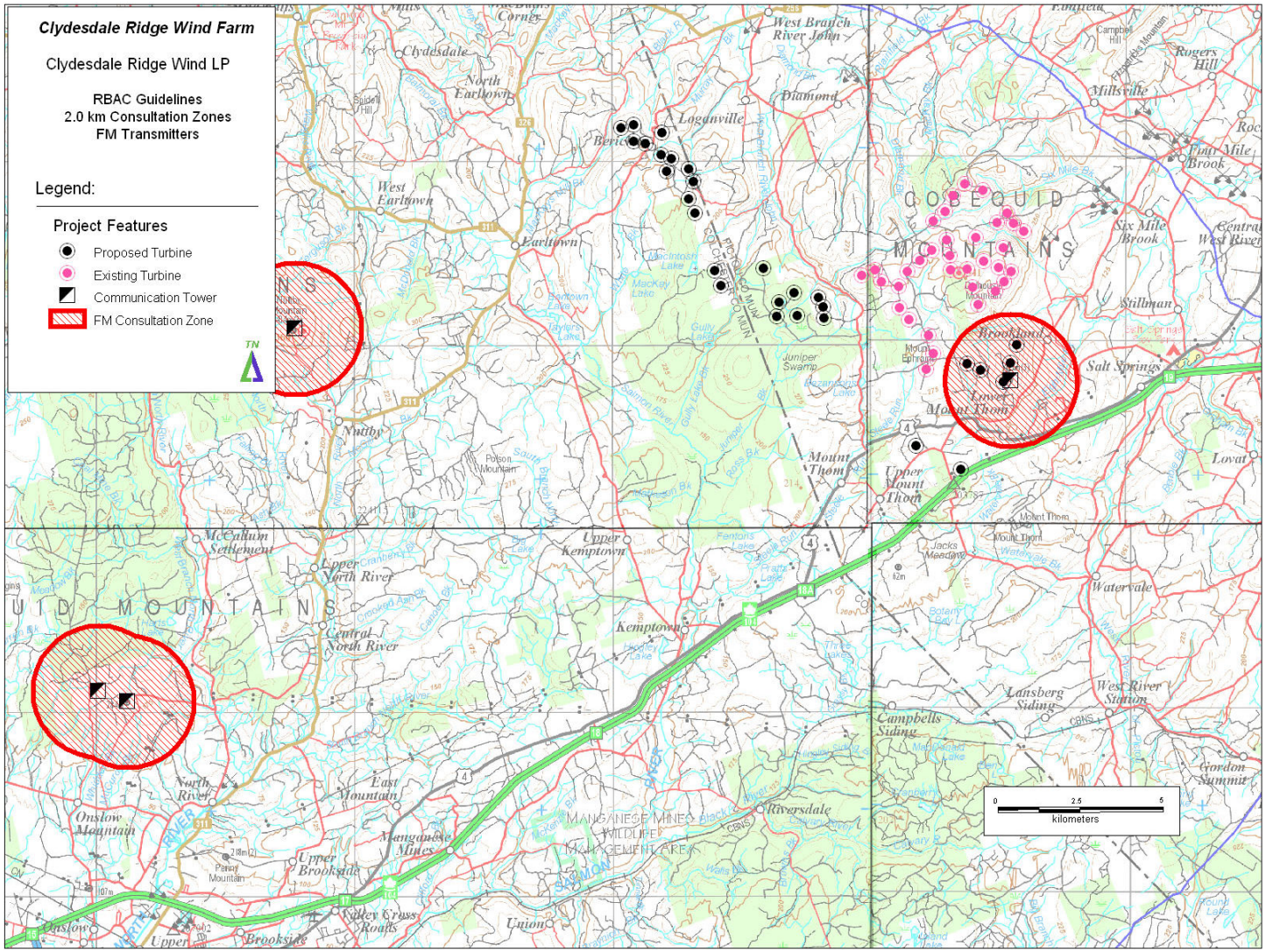

Figure 3: RBAC Guideline 2.0 km Consultation Zones for FM Transmitters. There is one FM Radio Transmitter within 2.0 km of the Proposed Wind Farm.

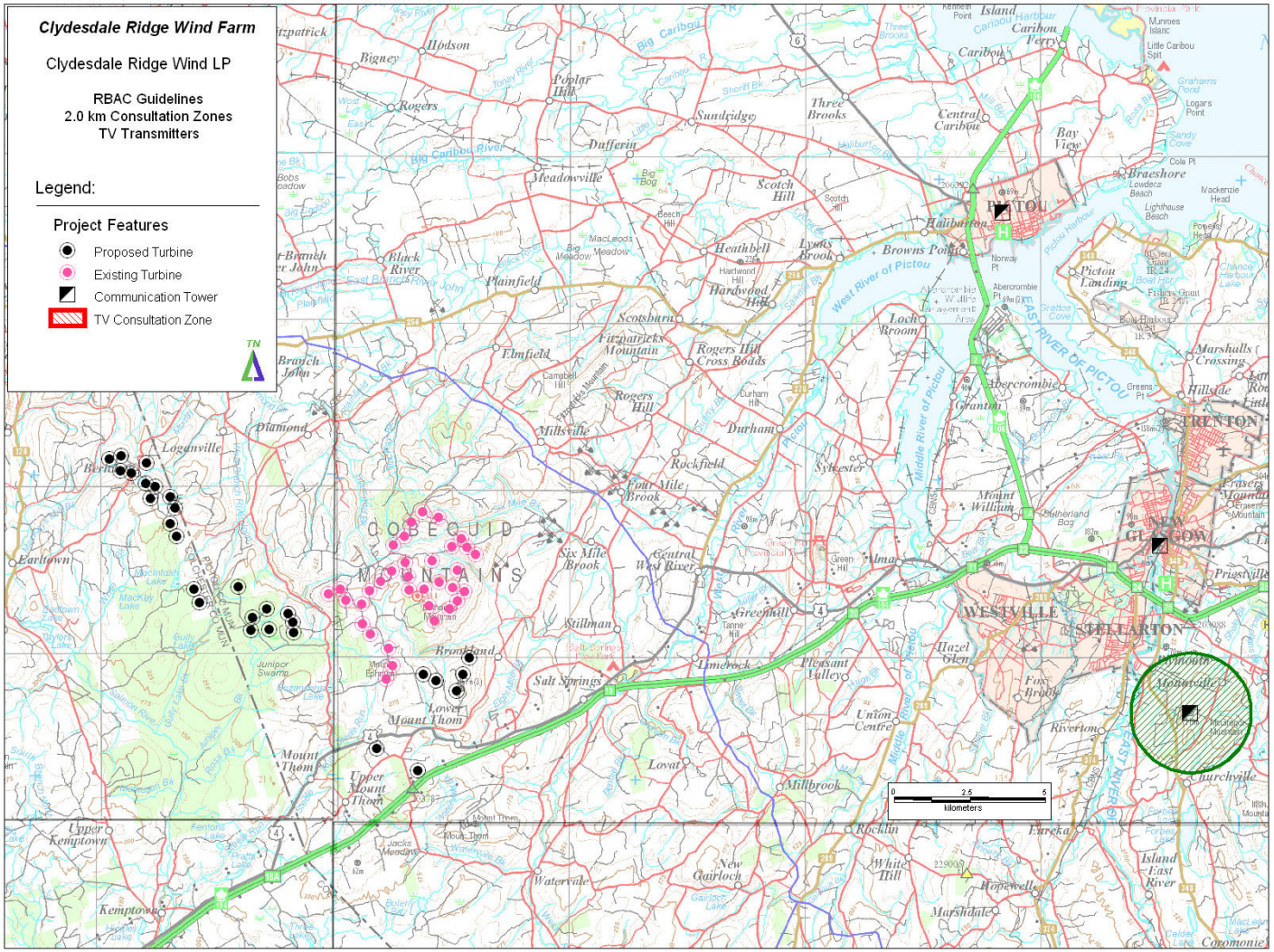

Figure 4: RBAC Guideline 2.0 km Consultation Zones for TV Transmitters. There are no TV Transmitters within 2.0 km of the Proposed Wind Farm.

Table 3 summarizes the type and call sign of the transmitters at each site and the transmitter locations are shown in Figure 5.

Table 3: CBC Call Signs for the Two Closest Transmitter Sites

Location	Type	Call
Truro	FM	CBHC-FM
	TV	CBHT-8
New Glasgow	FM	CBHN-FM
	FM	CBAF-FM-10
	TV	CBHFT-7
	TV	CBHT-5

There are no CBC AM or FM Radio Transmitters located within 5 km of the proposed wind farm.

3.5 CBC Television Transmitters

There a total of 10 CBC television transmitter sites located within 89 km of the proposed wind farm (Figure 6). The towers contain 14 transmitters and the details are contained within Appendix 2.

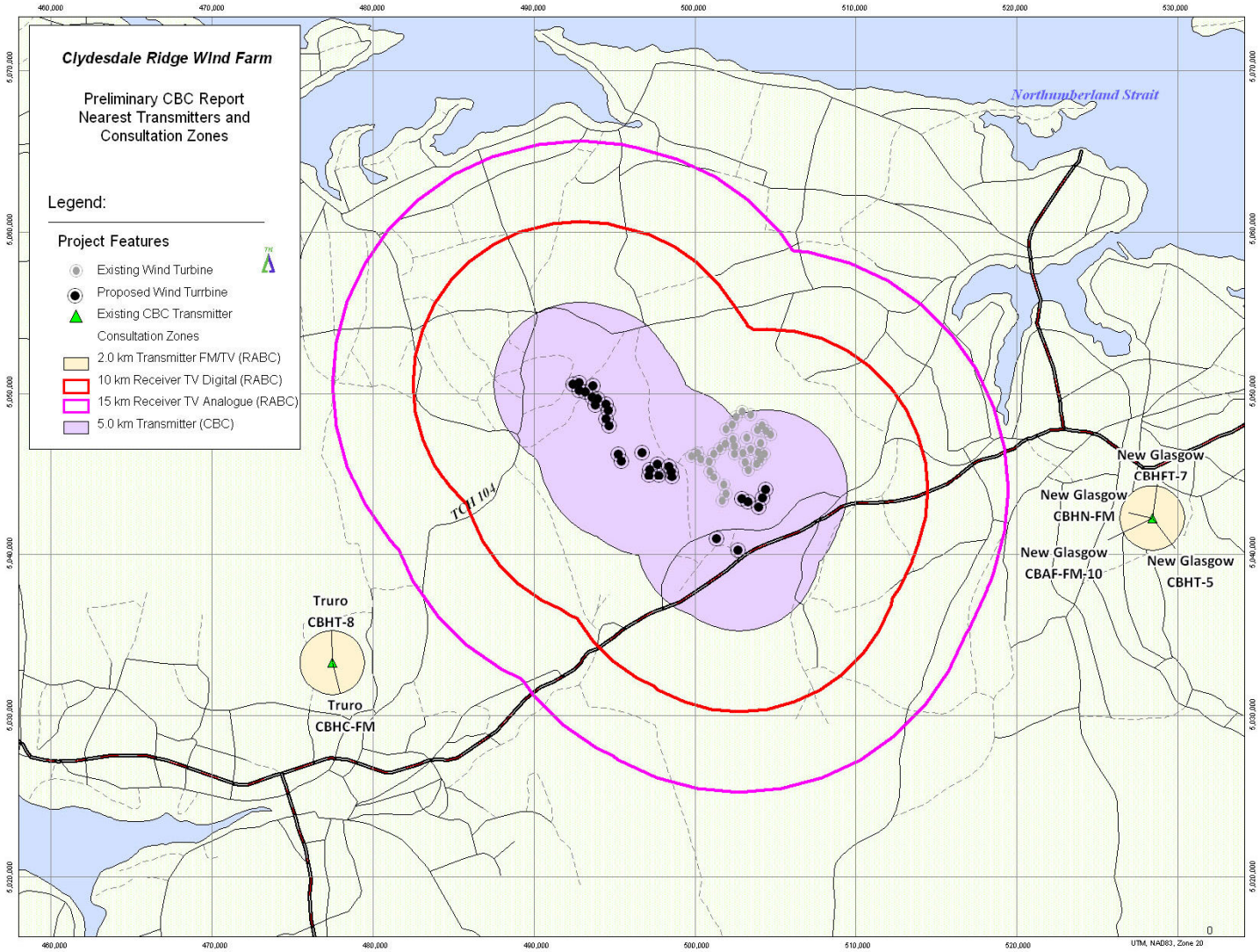

Figure 5: Closest CBC Transmitters to the Proposed Clydesdale Ridge Wind Farm.

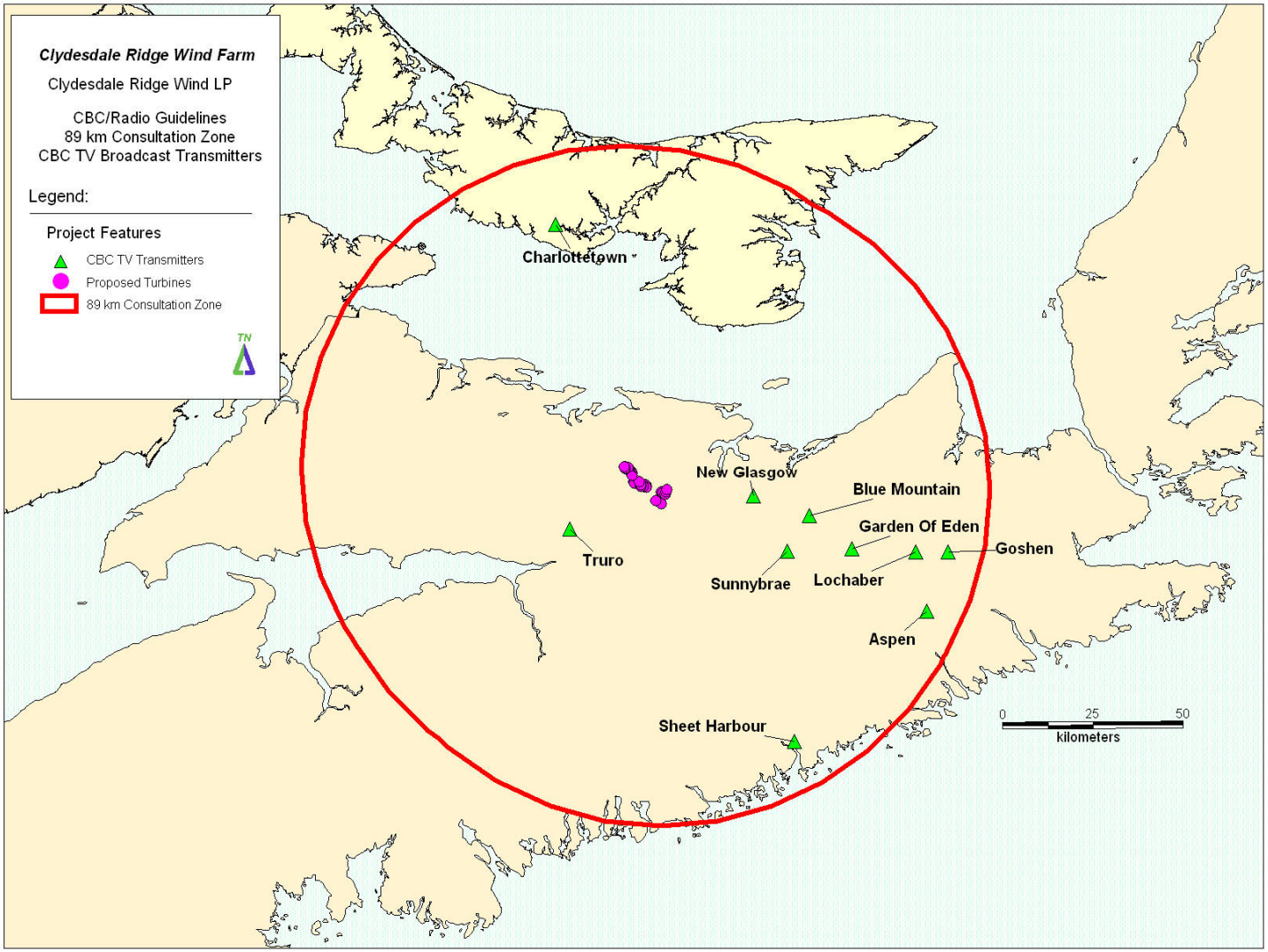

Figure 6: Television Transmitters Located within 89 km of the Proposed Clydesdale Ridge Wind Farm.

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4.0 Over-the-Air Reception

As of August 31, 2011, the CRTC has required that all TV transmitters that serve markets with a population greater than 300,000 be converted to digital technology. Typically, digital signals have a shorter reception range than analog signals and in some cases, channels and associated frequencies have been changed to free up limited band spectrum in crowded markets. In most cases, transmitters in larger urban areas have been upgraded to digital and re-transmitters that serve a smaller population base continue to operate with analog equipment until August 31, 2012.

The RABC recommends television receiver consultation zones based on the whether the broadcast is delivered using analogue or digital signals with consultation zones of 15 km and 10 km respectively. Television transmitters in close proximity to the proposed wind farm are currently broadcasting analogue signals.

The 15 km consultation zone covers a relatively large area and extends to Alma in the east, Denmark to the north, Upper North River to the west and Lansdowne to the south (Figure 7).

A Baseline Broadcast Reception Study is recommended to quantify the strength of current broadcast signals at various locations throughout the 15 km consultation zone. It is anticipated that this study will be initiated upon the successful bid for a PPA with Nova Scotia Power Inc.

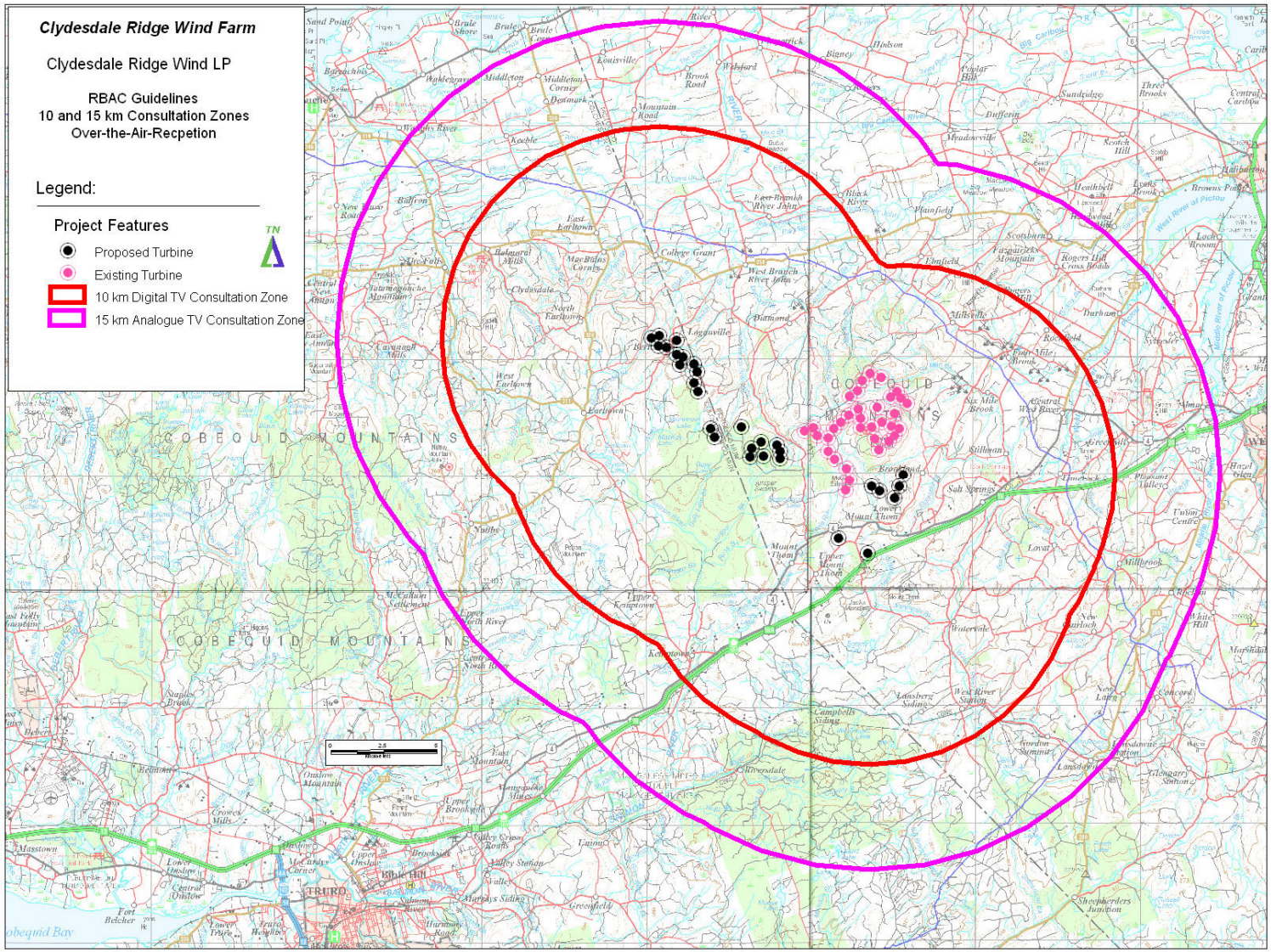

Figure 7: RBAC Guideline 10 km and 15 km Consultation Zones for TV Transmitters.

5.0 Cellular Type Networks

There are 2 cell phone transmitter sites within 1.0 km of the proposed wind farm (Table 4). Both Cell phone licensee's have been contacted in regard to the proposed wind farm and discussions are ongoing over potential impacts, remediation and mitigation scenarios.

Table 4: Cellular Stations located within the 1.0 km RAB Consultation Zone of the Proposed Wind Farm.

Call Sign	Licensee
Site 719529	Rogers Communications Partnership
Site 364743	Bell Canada

There are two cellular transmitters located within the 1.0 km consultation zone as outlined in RABC. Discussions are ongoing with the cell phone licensees.

6.0 Land Mobile Radio Networks and Point-to-Point Systems below 890MHz.

6.1 Land Mobile Radio Networks

There are no radio networks (< 890 MHz) that are located within 1 km of the proposed wind farm.

6.2 Non Disclosed Radio Operators

The RCMP where contacted on February 4, 2012 via email as per the RBAC Guidelines. No issues have been identified.

6.3 Point-to-Point Systems below 890 MHz

There are no radio links that operate below 890 MHz that are within the 1.0 km recommended consultation zone

7.0 Satellite Systems

7.1 Satellite Ground Stations

There are no satellite ground stations located within 500 m of the proposed wind farm. A 500 m consultation zone is recommended by RABC.

7.2 DTH Receivers

A preliminary review of Direct to Home Satellite receivers has been completed. The analysis is based on the physical turbine dimensions which are:

Hub Height = 80 m
Rotor Diameter = 82.5 m

The RABC recommends the following formula for determining the size of the cone:

$$L_{c(m)} = R + 104\sqrt{D/F}$$

where: L_c = Diameter of the cylinder (m)
D = Distance from the ground satellite receiver (km)
F = Frequency in GHz (11.7)
R = Rotor Diameter (82.5 m)

$L_{c\ (1\ km)}$ = 96.1 m
$L_{c\ (10\ km)}$ = 112.9 m

A cone based on 11.7 GHz was calculated and the satellite data from Table 5 were used for the analysis. The analysis involved identifying both horizontal and vertical zones where dwellings may be impacted by a wind turbine. The intersect of these two zones resulted in the final consultation zone (Figure 8). **A total of 3 buildings are located within the consultation zones identified in the analysis. The buildings are "camps" and used seasonally as recreational properties. It is not anticipated that DTH satellite Television reception will be an issue at these sites, however the owners of the buildings have been contacted and discussions are ongoing about potential interference issues and potential mitigative measures that may be utilized for these sites.**

Table 5: Direct-To-Home Geostationary Satellite Parameters.

Service Provider	Satellite ID	Geostationary Satellite Orbit (Lat, Long)	Local Azimuth (True North)	Local Inclination
Bell Expressvu	Nimiq 1 Nimiq 3	0° N, 91° W	216.7 °	30.7 °
Bell Expressvu	Nimiq 2 Nimiq 4iR	0° N, 82° W	205.7 °	34.3 °
Star Choice	Anik F1R	0° N, 111.1° W	237.3 °	19.7 °

8.0 Radar Systems

8.1 Air Defence Radar

There are no DND Air Defence radar installations located within 100 km of the proposed wind farm. DND has indicated that they do not anticipate any issues as a result of this project (Appendix 3).

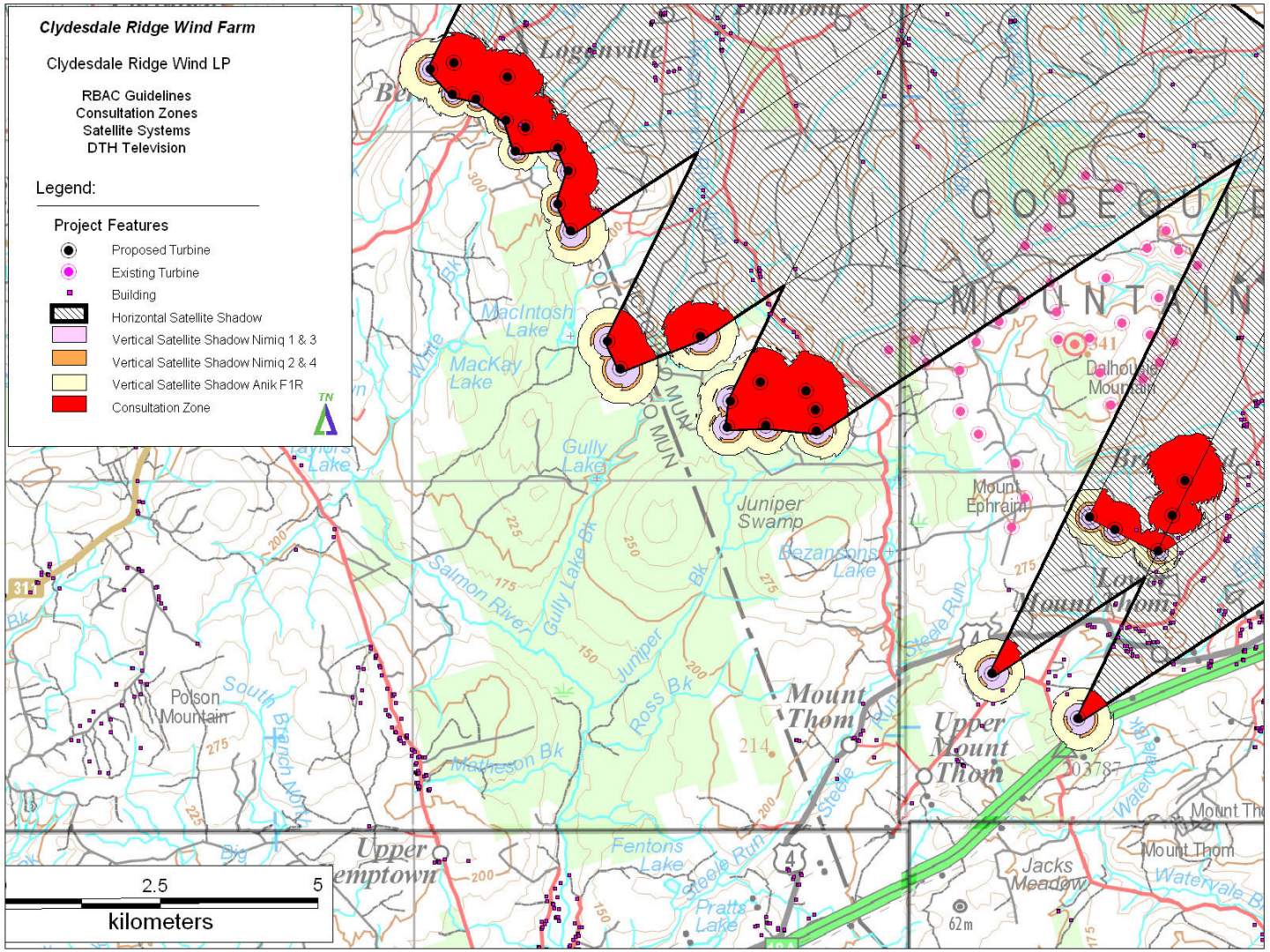

Figure 8: RABC Guideline Consultation Zones for Satellite Receivers Based on Line of Sight Cones.

8.2 Vessel Traffic Radar

The Canadian Coast Guard monitors vessel traffic through a series of radar installations. The RABC has recommended a 60 km consultation zone around existing stations. There are no Vessel Traffic Radar installations located within 60 km of the proposed wind farm. This has been confirmed through discussions with the Canadian Coast Guard (Appendix 3).

8.3 Air Traffic Control Radars

Air Traffic Control Primary Surveillance Radars (PSR) are a critical component for aircraft safety. The three closest civilian radars to the proposed wind farm are located in Halifax, Charlottetown and Moncton (Table 6). The RABC recommends that an 80 km consultation zone be applied around PSR's and the Halifax and Charlottetown sites are located within the 80 km consultation zone. Nav Canada has been contacted to verify that they have no concerns in regard to the proposed wind farm (Appendix 3).

Additionally, RABC recommends a 10 km consultation zone be applied around major civilian and military airfields. There are no major civilian airfields located within the 10 km consultation zone. The closest civilian airfield is Trenton (CYTN) which is located 28 km north east of the proposed wind farm.

Nav Canada has reviewed the proposed Clydesdale Ridge Wind Farm and has indicated that they currently have no objection to the project in regard to potential radar interference issues (Appendix 3).

Table 6: Nearest Air Traffic Control Radars.

ID	Latitude	Longitude	Distance to Wind Farm (km)
Halifax	44.910	-63.429	73
Charlottetown	44.910	-63.429	74
Moncton	46.189	-64.570	130

8.4 Weather Radars

Environment Canada operates a network of Doppler radar sites across the country that collectively is known as the Canadian Weather Radar Network. The radars are used for meteorological forecasting and detecting severe weather events as they occur. Weather radar picks up the Doppler signal from the tips of the rotating blades and the wake turbulence produced as the blades pass through the air.

There are two Doppler weather radar stations that are located in Nova Scotia and one in New Brunswick. The closest weather radar site is 74 km away from the proposed wind farm and is located at Gore, Hants County. The Chipman, NB station is 212 km and the Marion Bridge, NS radar site is 224 km from the proposed wind farm. All three of the

Doppler Radar sites are outside of the RABC recommended 50 km consultation zone (Table 7). Consultation with Environment Canada has confirmed that there are no issues with existing Doppler radar sites. (Appendix 3).

Table 7: Nearest Weather Radar Sites.

ID and Location	Latitude	Longitude	Distance to Wind Farm (km)
XGO Halifax, NS	45.114	-63.711	74
XNC Chipman, NB	46.220	-65.726	212
XMB Marion Bridge, NS	45.984	-60.212	224

9.0 VHF Omnidirectional Range (VOR)

These systems are ground based, short distance navigation aids which provide pilots with 360 degree directional information to or from a station. The frequency range is 108.1 to 117.956 MHz.

There are no VOR sites located within 15 km of the proposed wind farm. The Halifax (115.1 MHz) is located 75 km from the proposed wind from and the next closest station is the Moncton (117.3MHz) VOR site located 129 km from the proposed wind farm.

10.0 Summary

Table 8: Summary Results from the Preliminary EMI Report

System	Result
Point-to-Point Systems above 890 MHz	There are four radio links that are within 1.0 km of the proposed wind farm. The project proponents have opened a dialogue with the radio frequency licensee's to determine potential impacts and possible mitigative measures.
Broadcast Transmitters	No AM transmitter within the 15.0 km directional antennae consultation zone. One FM Transmitter within the 2.0 km consultation zone. Agreement is in place between the developer and the FM license holder. No TV Transmitters within the 2.0 km consultation zone.
Over-the-Air Reception	A large number of receivers are located within the 15 km consultation zone recommended by the RABC for analogue Television transmitters. A Broadcast Reception Study will be initiated .
Cellular Type Networks	Two within the 1.0 km consultation zone.

	Discussions with licensee's ongoing
Land Mobile Radio Networks and Point-to-point Systems below 890 MHz	Non within the 1.0 km consultation zone
Satellite Systems	No ground satellite stations located within 500 m of the proposed wind farm. No dwellings or buildings located within the projected consultation cone.
Air Defence Radars, Vessel Traffic Radars, Air Traffic Control Radars and Weather Radars	DND Contacted –No Issues. No issues with civilian Air Traffic Control Vessel Traffic Systems and weather radars.
CBC Preliminary Report	No CBC AM, FM or TV Transmitters within 5 km of proposed wind farm. 10 TV Transmitters are located within 89 km of the proposed wind farm.

11.0 References

[1] Radio Advisory Board of Canada and Canadian Wind Energy Association (CanWEA), *Technical Information and Coordination Process Between Wind Turbines and Radiocommunication and Radar Systems*, December, 2010.

[2] Strategis data base, Industry Canada, TAFL database, <http://spectrum.ic.gc.ca/tafl/tafindxe.html>, Accessed April 2012.

[3] CBC/Radio-Canada Involvement and Requirements Concerning Wind Energy Projects, CBC, 1400 Rene-Levesque Blvd. East, Montreal, Quebec. H2L 2M2.

Appendix 1

Proposed Turbine Coordinates And Elevations

Clydesdale Ridge Wind Farm
Proposed Turbine Coordinates and Base Elevations

ID	NAD83		Base	WGS(84)	
	Easting	Northing	Elev (m)	Latitude	Lonitude
1	494532	5049345	272	45.597626	-63.07011
2	493863	5049294	297	45.597162	-63.078687
3	493706	5049776	292	45.601499	-63.080707
4	495313	5046271	250	45.569963	-63.060067
5	495504	5045830	225	45.565995	-63.057615
6	492888	5050689	289	45.609709	-63.091209
7	494693	5048972	275	45.59427	-63.068042
8	494018	5049672	287	45.600566	-63.076704
9	502760	5040254	249	45.515814	-62.964663
10	498611	5045176	260	45.560121	-63.017798
11	498455	5045469	265	45.562758	-63.019798
12	498623	5044837	265	45.55707	-63.017643
13	497731	5045616	260	45.564079	-63.029076
14	497819	5044925	265	45.55786	-63.027945
15	497205	5044901	260	45.557642	-63.035812
16	497257	5045317	255	45.561386	-63.035148
17	496783	5046341	225	45.570602	-63.041228
18	494534	5048453	287	45.589598	-63.070074
19	493240	5050124	299	45.604627	-63.086687
20	493739	5050465	295	45.607701	-63.080292
21	492865	5050194	288	45.605253	-63.091496
22	492507	5050596	280	45.608868	-63.096094
23	501397	5040977	247	45.522326	-62.982112
24	502956	5043450	260	45.544581	-62.962134
25	503357	5043251	260	45.542788	-62.956999
26	504040	5042901	297	45.539634	-62.948253
27	504265	5043469	291	45.544745	-62.945366
28	504464	5044023	275	45.54973	-62.942812
29	494728	5048019.13	236	45.585694	-63.067589

Appendix 2

Summary of CBC Transmitters Located within 89 km of the Proposed Clydesdale Ridge Wind Farm.

Location	NAD83		Type	Licensee	Call Sign	Distance to Project (km)
	Latitude	Longitude				
Truro	45,27,10	63,17,17	TV	CBC/ Radio Canada	CBHT-8(1)	23.8
Truro	45,27,10	63,17,17	TV	CBC/ Radio Canada	CBHT-8	23.8
Truro	45,27,10	63,17,17	FM	CBC/ Radio Canada	CBHC-FM	23.8
New Glasgow	45,32,00	62,38,11	FM	CBC/ Radio Canada	CBAF-FM-10	30.5
New Glasgow	45,32,00	62,38,11	FM	CBC/ Radio Canada	CBHN-FM	30.5
New Glasgow	45,32,00	62,38,11	TV	CBC/ Radio Canada	CBHFT-7	30.5
New Glasgow	45,32,00	62,38,11	TV	CBC/ Radio Canada	CBHT-5	30.5
Sunnybrae	45,23,46	62,31,03	TV	CBC/ Radio Canada	CBHT-17	43.7
Blue Mountain	45,29,05	62,26,23	TV	CBC/ Radio Canada	CBHT-18	46.4
Garden Of Eden	45,24,02	62,17,20	TV	CBC/ Radio Canada	CBHT-19	60.2
Charlottetown	46,12,44	63,20,29	FM	CBC/ Radio Canada	CBAX-FM-1	76.4
Charlottetown	46,12,44	63,20,29	FM	CBC/ Radio Canada	CBCT-FM	76.4
Charlottetown	46,12,44	63,20,29	FM	CBC/ Radio Canada	CBCH-FM	76.4
Charlottetown	46,12,44	63,20,29	TV	CBC/ Radio Canada	CBCT-DT	76.4
Charlottetown	46,12,44	63,20,29	TV	CBC/ Radio Canada	CBCT	76.4
Charlottetown	46,12,44	63,20,29	TV	CBC/ Radio Canada	CBAFT-5	76.4
Charlottetown	46,12,44	63,20,29	FM	CBC/ Radio Canada	CBAF-FM-15	76.4
Lochaber	45,23,30	62,03,54	TV	CBC/ Radio Canada	CBHT-12	77.2
Sheet Harbour	44,55,29	62,29,52	TV	CBC/ Radio Canada	CBHT-4	82.0
Sheet Harbour	44,55,29	62,29,52	FM	CBC/ Radio Canada	CBAZ-FM	82.0
Aspen	45,14,40	62,01,37	TV	CBC/ Radio Canada	CBHT-14	85.6
Goshen	45,23,30	61,57,01	TV	CBC/ Radio Canada	CBHT-13	86.0

Appendix 3

Correspondence with Key Agencies and Licensee's

May 10, 2012

Your file
Clydesdale Ridge Wind Farm
Our file
11-4846

Ms. Lisa Fulton
Dalhousie Mountain Wind Farm
796 Dan Fraser Road
Westville, NS
B0K 2A0

RE: Wind Farm: 39 wind turbines - Pilton, NS
(See attached spreadsheet)

Ms. Fulton,

We have evaluated the captioned proposal and NAV CANADA has no objection to the project as submitted. Analysis shows that turbine 1 is visible and turbines 2-39 are marginally visible to the Halifax Radar and none are visible to the Moncton Radar. These turbines in this wind farm have the potential to be a constant source of false targets and could mask real aircraft in the vicinity of the wind farm. Any changes to this proposal would need to be re-assessed for possible impacts.

While these proposed 39 wind turbines are acceptable, it does not constitute NAV CANADA's approval for any additional structures at this location. The nature and magnitude of electronic interference to NAV CANADA ground-based navigation aids, including RADAR, due to wind turbines depends on the location, configuration, number, and size of turbines; all turbines must be considered together for analysis. The interference of wind turbines to certain navigation aids is cumulative and while initial turbines may be approved, continued development may not always be possible.

In the interest of aviation safety, it is incumbent on NAV CANADA to maintain up-to-date aeronautical publications and issue NOTAM as required. To assist us in that end, we ask that you notify us at least 10 business days prior to the start of construction. This notification requirement can be satisfactorily met by returning a completed, signed copy of the attached form by e-mail at landuse@navcanada.ca or fax at 613-248-4094. In the event that you should decide not to proceed with this project or if the structure is dismantled, please advise us accordingly so that we may formally close the file.

If you have any questions, contact the Land Use Department by telephone at 1-866-577-0247 or e-mail at landuse@navcanada.ca.

NAV CANADA's land use evaluation is valid for a period of 12 months. Our assessment is limited to the impact of the proposed physical structure on the air navigation system and installations; it neither constitutes nor replaces any approvals or permits required by Transport Canada, Industry Canada, other Federal Government departments, Provincial or Municipal land use authorities or any other agency from which approval is required. Industry Canada addresses any spectrum management issues that may arise from your proposal and consults with NAV CANADA engineering as deemed necessary.

Yours truly,

Aleksandar Trandafilovski
for
David Legault
Manager, Data Collection
Aeronautical Information Services

cc ATLR - Atlantic Region, Transport Canada (2011-544)

1601 Tom Roberts, P.O. Box 9824 Stn T, Ottawa, ON, K1G 6R2
Telephone: +1 (866) 577-0247, Fax: +1 (613) 248-4094

1601 Tom Roberts, C.P.9824 Succursale T, Ottawa, Ontario, K1G 6R2
Téléphone: +1 (866) 577-0247, Télécopieur: +1 (613) 248-4094

NOVA SCOTIA

Dept. of Transportation & Infrastructure Renewal
Public Safety & Field Communications Office

Johnston Building 2nd Floor
1672 Granville Street
PO Box 186 Halifax
Nova Scotia B3J 2N2

Bus: 1-902-424-5925
Web: http://www.gov.ns.ca/tran/
Fax: 902-424-0517

May 9, 2012

Mr. Kirk Schmidt
General Manager
Nortek Resources Solutions Inc.
RR #1
Thorburn, NS B0K 1W0

File: NSMIRS/Windfarms
Rev NC01

Subject: Clydesdale Ridge Wind Farm – RMS Energy Inc.

My Technical Advisor Norman Cook, P.Eng. advises that in the event you proceed with the Subject Proposal, there will have to be an Agreement between the Owner(s) and the Province which outline responsibilities of the Owner in the event the Wind Farm causes interference with the wireless signals transmitted from the Province's Adjacent Tower Facility Site(s), or interference to equipment located at adjacent Provincial Tower facility Site(s).

There is no radio frequency (rf) analysis tool available at present, nor is anticipated in the near future, to fully analyze the impact of Wind Turbine dynamics on the transmission of radio signals that will carry, in this Case, critical public safety radio frequency signals.

The Province's future public safety radio transmission network, planned for adjacent, or same, site(s) may deploy 2 types of radio signals, as follows:

Backhaul – 4940-4990 (4.9 GHz) Band (This band may be changed by Industry Canada in future)

Fixed (i.e. point-to-point, or multipoint) signals currently planned in the band 4940-4990 MHz which uses directional antennas, having a beamwidth of approximately 30; unless the radiated beam is within +/- 1.50 Azimuth of the direct signal the Wind Turbine should have minimum impact on the transmitted radio signals. Since there may be future point-to-point links added to link new telecommunications facilities, we cannot be certain if co-sited wind turbines will interfere with public safety signals.

150/700/800 MHz – Mobile Radio Bands

Mobile Radio Communications, unlike the Backhaul Links above, operate omnidirectionally, meaning they radiate signals in all directions. This type of transmission is required since a mobile radio user could be located anywhere (i.e. at any Azimuth, or horizontal angle) relative to our site(s). All Wind Turbines are in one, or more, omnidirectional transmission paths of the radio signals), whether interference occurs will depend on the actual location of an emergency incident where first responders use mobile radios. Mobile communications interference occurs in cases where a wind turbine exists in the signal path (i.e.

between tower and radio user). A portion of the latter mobile signal will be reflected from the embedded copper mesh, in the turbine blade, which can direct lightning to the turbine's grounding system; this may introduce an unknown level of multipath interference, which is dependent upon a), how many turbines are in the direct path of the signal and b) the proximity of the turbine blades, which could cause errors in voice/data transmission. The amount of multipath interference increases as the number of turbines in, or near, the direct radio path increases. A mathematical process called forward error correction (FEC) is employed in most modern digital signal transmission; this mitigates some signal errors due to 'lost signal bits' but FEC is fixed for a particular technology. If FEC is used to mitigate interference, as FEC increases, data throughput rates decrease, deteriorating radio signal quality.

Mitigation of turbine interference may require one, or more, turbines having to be stopped in the event a wind turbine is suspected of being the cause. The Owner of the Wind Farm shall provide a guarantee to the Province that s/he is prepared to take immediate measures if required, at no expense to the Province, should the Province require testing for interference to the public safety mobile radio system.

There could also be other interference issues due to proximity of the transmission line and turbine equipment causing noise into the radio site, either directly, or through rf coupling, or indirectly through the power grid and associated switching equipment.

The above text shall be used as a basis agreed to by the Subject Wind Farm Owner and would have to be included in any legal agreement if the Proposal is implemented.

With consideration to the above discussion focused on the Subject Wind Farm Proposal, the following Site Specific modifications are recommended to reduce potential interference to the Provincial Public Safety Mobile Site(s) adjacent to the Subject Proposed Wind Farm:

Recommendations:

A legal co-site/adjacent site Agreement be entered into between the Province and Wind Farm Owner based on technical requirements discussed in the technical text contained above.

If there is any clarification required, please contact me.

Regards,

Todd Brown
Transportation and Infrastructure Renewal
Director – Public Safety and Field Communications

c.c. N. Cook, P.Eng.

Nova Scotia Government Web Site
http://www.gov.ns.ca

Air Defence Radars

Kirk,

We have completed the initial analysis of the proposed wind farm under the project name Clydesdale Ridge Wind Farm located in Colchester and

Pictou Counties, NS. We have assigned a DND case number of WTA-2024, please include this number in any future requests related to this site.
The results of our analysis have shown that in relation to the Department of National Defence (DND) consultation zones outlined on our website [http://www.airforce.forces.gc.ca/8w-8e/units-unites/page-eng.asp?id=692] and in the RABC/CanWEA document Technical Information and Coordination Process Between Wind Turbines and Radio Communication and Radar Systems the site will have no or minimal impact to DND Operations. As such, with respect to the Department of National Defence; Air Traffic Control, Air Defence Radars and DND airports and NAVAIDS we have no objections with your project as submitted.
If however, the layout were to change/move, please re-submit that proposal for another assessment using the assigned WTA number listed above. The concurrence for this site is valid for 24 months from date of this email. If the project should be cancelled or delayed during this timeframe please advise this office accordingly.
It should be noted that our office looks at each submission on a case by case basis and as such, concurrence on this submission in no way constitutes a concurrence for similar projects in the same area, nor does it indicate that similar concurrence might be offered in another region.
Finally, the concurrence offered in this email extends only to the subject projects and current proponent. Should the project or any part of it be altered, or be sold to another developer, this office must be notified and we reserve the right to reassess the project.
Thank you for your patience on this matter and for considering DND radar and airport facilities in your project development process.
If you have any questions feel free to contact me.
Thank you.

<<Clydesdale Ridge Turbines Feb 3 2012.xlsx>>

Adin Switzer
Capt
AEC Liaison Officer
CCISF/ESICC
ATESS/ESTTMA
Défense nationale | National Defence
8 Wing Trenton, Astra, ON K0K 3W0
TEL: 613 392-2811 Ext4834 (CSN: 827-4834)
FAX: 613 965-3200
Gouvernement du Canada | Government of Canada ü Please consider the environment before printing this email | S'il vous plaît pensez à l'environnement a

I have reviewed your proposal in respect to DND's radio communication systems, and I have no objections or concerns.

Thank you for coordinating with DND.

Have a good Day.

Mr. Mario Lavoie
Spectrum Engineering Technician
National Defence | Défense nationale
Ottawa, Canada K1A 0K2
mario.lavoie2@forces.gc.ca

Telephone | Téléphone 613-992-3479
Facsimile | Télécopieur 613-991-3961
Government of Canada | Gouvernement du Canada

From: +WindTurbines@ATESS@TRENTON
Sent: Tuesday, 7, February, 2012 11:05 AM
To: Lavoie MJ@ADM(IM) J6 Coord@Ottawa-Hull
Subject: FW: Clydesdale Ridge Wind Farm NS, WTA-2024

Mario,

For your review.

Thanks.

Adin

Adin Switzer
Capt
AEC Liaison Officer
CCISF/ESICC
ATESS/ESTTMA
Défense nationale | National Defence
8 Wing Trenton, Astra, ON K0K 3W0
TEL: 613 392-2811 Ext4834 (CSN: 827-4834)
FAX: 613 965-3200
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Weather Radars

From: Rennie,Carolyn [Ontario] [mailto:Carolyn.Rennie@ec.gc.ca]
Sent: Wednesday, February 15, 2012 10:06 AM
To: Kirk Schmidt; Weather Radars Contact,National Radar Program [Ontario]
Cc: reubenburge@eastlink.ca
Subject: RE: Clydesdale Ridge Wind Farm

Dear Mr. Kirk Schmidt,

Thank you for contacting the Meteorological Service of Canada, a branch of Environment Canada, regarding your wind energy intentions.

Our preliminary assessment of the information provided to us via e-mail on February 4, 2012 indicates that any potential interference that may be created by the Clydesdale Ridge wind farm located in Colchester and Pictou Counties of Nova Scotia will be manageable. Although we would prefer our radar view to be interference free, this is not always reasonable. As a consequence, we do not have strong objections to the current proposal.

If your plans are modified in any manner (e.g. number of turbines, height, placement or materials) this analysis would no longer be valid. An updated analysis must be conducted.

Please contact us at: weatherradars@ec.gc.ca.

Thank you for your ongoing cooperation and we wish you success.

Best Regards,

Carolyn J. Rennie
Student - National Radar Program
Supervisor – Stephen Holden
Meteorological Service of Canada
Environment Canada
4905 Dufferin Street
Toronto, Ontario M3H 5T4
Phone : 416-739-4931

Vessel Traffic Radars

Dear Mr. Schmidt:

The Canadian Coast Guard does not have any communications or radar sites in the vicinity of the proposed location of the Clydesdale Ridge Wind Farm. Therefore, we do not expect any interference issues.

Sincerely yours,

Lee H. Goldberg, P.Eng.
Senior Engineer
Radio Communication Systems
Integrated Technical Services
Canadian Coast Guard

519.383.1925

lee.goldberg@dfo-mpo.gc.ca