

From: Dylan Heide <dylan.heide@townofmahonebay.ca>

Sent: March 26, 2025 8:31 AM

To: Penney, Nicole <Nicole.Penney@novascotia.ca>; [REDACTED]

Cc: Wallace, Lisa <Lisa.Wallace@novascotia.ca>; Singh, Somesh <Somesh.Singh@novascotia.ca>; Lawson, Hollie <Hollie.Lawson@novascotia.ca>; Rita Koole <billing@riverportelectric.com>; David Maxwell <dmaxwell@chebucto.ns.ca>

Subject: RE: M12104 Riverport Electric Complaint - Tanner

**** EXTERNAL EMAIL / COURRIEL EXTERNE ****

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Good Morning Ms. Penney,

Please find the re-submitted M12104 response as directed, along with the report from Strum Engineering.

This email with its attachments has been copied to the address provided for Martin and Wendy Tanner. If anything additional is required as far as providing the documentation as directed, please don't hesitate to let me know.

Happy to help if there's anything else I can do. Thank you and have a great day!

Dylan Heide

Town of Mahone Bay CAO

On behalf of Riverport Electric Light Corporation

On February 23, 2025, customers of the Riverport Electric Light Commission (“RELC”) filed a complaint with the Nova Scotia Utility and Review Board (the “Board”) regarding the electrical distribution lines on their property at [REDACTED]. In its acknowledgement letter dated February 26, 2025, the Board directed RELC to file a response to the complaint with the Board and the complainants by March 12, 2025.

As noted in its February 26, 2025 letter, the Board’s role in resolving customer complaints is limited to determining whether the utility has properly followed and applied the Board’s approved regulations in its dealings with customers. In this case, there is nothing in RELC’s approved regulations that specifically addresses the minimum clearance distances required by electrical code standards. Nevertheless, in order to be responsive to its customers’ safety concerns, RELC contacted Strum Engineering to assess compliance with the relevant electrical code requirements.

Strum reviewed the matter in consideration of the Canadian Electrical Code requirements for vertical (Table 32) and horizontal (Table 33) clearances from an energized high voltage conductor to a building or protuberance and vertical clearance from the energized high voltage conductor to ground (Table 34) and found no compliance issues in this case. It should be further noted that the clearances are measured from the energized high voltage conductor toward the building as either a vertical or horizontal distance. The horizontal distance is not measured from a point on the ground directly under the energized high voltage conductor toward the building or protuberance, but from the conductor at the top of the pole.

RELC further notes that since it appears the deck in question was built after the distribution lines were originally placed on the property, the issue of the proximity of the deck to those distribution lines and equipment is likely a result of subsequent construction and so should not require changes to the pre-existing configuration in any event. In this regard, section 6.3 of RELC’s Board-approved Regulations states:

If changes in the Commission's plant and equipment installed to provide electric service to a customer, except for the purpose of supplying increased loads, are requested by a customer, the Commission shall, if it is able to do so without prejudice to safety and operational efficiency, make such changes, and the costs thereof shall be borne by the customer.

Consistent with these Regulations, RELC can work with the complainants on potential solutions to address their concerns, but only on the basis that the complainants confirm their obligation to bear all the costs associated with implementing the requested changes in the equipment installed to provide electric service to them.

Thank you for the opportunity to submit these comments.

David Maxwell

Chair of RELC

054-003

March 25, 2025

Mr. Dylan Heide
Riverport Electric Light Commission
3808 Highway 332
Riverport, Nova Scotia
B0J 2W0

Dear Dylan:

Review of Canadian and Utility Electrical Standards Regarding Vertical and Horizontal Clearances Required from Medium & Low Voltage Overhead Conductors and Buildings

On 28 February 2025, Strum Engineering was asked by the Riverport Electric Light Commission (RELC) to comment on the clearance requirements between an energized medium voltage conductor and a residential building; specifically, a home located at [REDACTED].

Strum Engineering did not visit the civic location; rather, we used information provided by the RELC, as well as Google Earth Street View images for our review.

We referenced the following applicable Canadian Standards Association (CSA) and Utility Standards:

1. CSA Standard C22.3 No. 1, "Overhead Systems"
2. CSA Standard C22.1-21, "Canadian Electrical Code (25th Edition)"
3. Nova Scotia Power Inc., "Overhead Distribution Standard"

The Standards Council of Canada oversees the CSA Standards. Nova Scotia Power Inc. maintains Overhead Distribution Standards based on their specific distribution system design criteria and voltage levels.

The following Google Street View snapshots show the existing 7.2kV single phase conductor and the 240/120V secondary service Conductors as they approach and pass by the residence at [REDACTED]:





It should be noted that the vertical and horizontal clearances presented in the referenced Standards are measured in a straight line extending at ninety (90) degrees horizontally and ninety (90) degrees vertically from the conductor toward the building. The horizontal distance is NOT measured from a point on the ground directly under the energized conductors toward the building or protuberance.

Table 9 from CSA Standard C22.3 No. 1 provides the minimum vertical and horizontal clearances for energized medium voltage conductors:

CSA C22.3 No. 1:20

Overhead systems

Table 9
Minimum design clearances from wires and conductors
not attached to buildings, signs, and similar plant
(See Clauses 5.7.3.1 to 5.7.3.3.)

Wire or conductor	Minimum clearance, m			
	To buildings*† and above-ground pipelines		To signs, billboards, lamp, and traffic sign standards, and similar plant	
	Horizontal to surface‡	Vertical to surface	Horizontal to object‡	Vertical to object
Guys, communication cables, and drop wires	0	0.08	0	0.08
Supply conductors				
0–750 V				
Insulated or grounded	1.0	2.5§	0.3	0.5
Enclosed in effectively grounded metallic sheath	0	0	0	0.08
Not insulated, grounded, or enclosed in effectively grounded metallic sheath	1.0	2.5§	1.0	0.5
> 0.75 kV				
Enclosed in effectively grounded metallic sheath	0	0	0	0.08
≤ 22 kV	2.0††	3.0**	2.0	2.5
> 22 k–V***	2.0 + 0.01 m/kV over 22 kV	3.6 + 0.01 m/kV over 22 kV	2.0 + 0.01 m/kV over 22 kV	3.6 + 0.01 m/kV over 22 kV

* Clearances over or adjacent to portions of a building normally traversed by persons or vehicles are specified in Tables 2 and 4.

† Clearances are applicable to non-metallic buildings or buildings whose metallic parts are effectively grounded. For other buildings, an assessment might be needed to determine additional clearances for electrostatic induction (see Clause 5.7.3.3).

‡ Conductor swing shall be added to these values in accordance with Clause 5.7.3.1.

§ This clearance may be reduced to 1 m for portions of the building or above-ground pipeline considered normally inaccessible.

** Conductors of these voltage classes should not be carried over buildings where other suitable construction can be used.

†† Where it is necessary to carry conductors of these voltage classes over buildings, it should be determined whether additional measures, including increased clearances, are needed to ensure that the crossed-over buildings can be used safely and effectively.

‡‡ This value may be reduced to 1.5 m where the building does not have fire escapes, balconies, and windows that can be opened adjacent to the conductor.

Note: Voltages are rms line-to-ground.

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CSA Standard C22.3 No. 1, “Overhead Systems”, indicates that the minimum horizontal clearance to any part of a building from an energized 7.2kV conductor shall be 2.0m and the minimum vertical clearance shall be 3.0m. The minimum clearance from a bare conductor rated <750V (secondary conductors) to any part of a building shall be 1.0m (3’-3”).

Section 5.7.3 of the “Overhead Systems” standard specifies:

5.7.3 Clearances of wires and conductors passing by or over buildings, above-ground pipelines, signs, billboards, lamps, traffic signs, standards, and antennas (not attached)

5.7.3.1 Basic clearances

The minimum horizontal and vertical clearances from wires and conductors to buildings, above-ground pipelines, signs, and similar plant specified in Table 9 shall apply under the following conditions:

- a) clearances shall apply to any part of a building, including balconies, fire escapes, antennas and their supporting structures, and other permanent fixtures;
- b) vertical clearances shall apply under conditions of maximum sag of the wire or conductor;
- c) horizontal clearances shall apply when the wire or conductor is in the position of swing, as determined in accordance with Clause 5.2.8; and
- d) guy wires, communication cables, and drop wires shall not be allowed to rub against buildings or other plant.

Canadian Electrical Code Rule 36-110 specifies the requirements for the guarding of live parts and exposed conductors, with reference to Tables 32, 33 and 34. The Canadian Electrical Code supports the requirements of CSA Standard C22.3 No. 1.

36-110 Guarding of live parts and exposed conductors

- 1) Bare conductors, insulated conductors unless enclosed in or in contact with grounded metal, and other bare live parts shall be
 - a) accessible only to authorized persons; and
 - b) isolated by elevation or by barriers.
- 2) Where the conductors or live parts mentioned in Subrule 1) are isolated by elevation, the elevations and clearances maintained shall be as specified in Tables 32, 33, and 34, except that
 - a) for voltages in excess of those specified in Tables 32, 33, and 34, the elevations and clearances maintained shall be in accordance with the requirements of CSA C22.3 No. 1; and
 - b) for conductors crossing highways, railways, communication lines, and other locations not covered in this Code, the elevations and clearances maintained shall be in accordance with the requirements of CSA C22.3 No. 1 or the applicable standard, whichever are greater.
- 3) For a given span, the clearances specified in Table 34 shall be increased by 1% of the amount by which the span exceeds 50 m.

Table 32 defines the minimum vertical distance required to separate exposed live parts from assessable areas; considering factors such as vehicular traffic, pedestrian access and snow load.

Table 33 defines the minimum horizontal separation required between live parts and nearby structures, such as buildings and other electrical equipment.

Table 34 defines the required vertical ground clearances for open line conductors based on maximum system voltage.

Table 32
Vertical isolation of unguarded live parts
(See Rule 36-110 and Appendix B.)

Maximum system voltage*, kV	Minimum separation from ground, m			
	Areas accessible to pedestrians only			Areas likely to be travelled by vehicles
	Indoors	Outdoors		
		Light snow area†	Heavy snow area†	
Not exceeding 15	2.9	3.4	4.0	4.7
25	3.2	3.7	4.3	5.2
34.5	3.2	3.7	4.3	5.2
46	3.2	3.7	4.3	5.2
69	3.5	4.0	4.6	5.5
120	4.0	4.5	5.1	6.0
161	4.4	4.9	5.5	6.4
230	4.8	5.3	5.9	6.8

* For ungrounded systems, the maximum system voltage is the phase-to-phase voltage, and for grounded systems, it is the phase-to-ground voltage.

† See Appendix B.

Note: Radial clearances from live parts shall be maintained in accordance with this Table where conductors overhang the edge of a building or structure, including any protuberances.

Table 33
Horizontal clearances from adjacent structures (including protuberances)*
(See Rules 26-302, 36-110, and Appendix B.)

Maximum system voltage†, kV	Clearance, m
Not exceeding 46.0	3
69	3.7

* See Appendix B.

† For ungrounded systems, the maximum system voltage is the phase-to-phase voltage, and for grounded systems, it is the phase-to-ground voltage.

Table 34
Vertical ground clearances for open line conductors*
(See Rules 36-110 and Appendix B.)

Maximum system voltage†, kV	Minimum vertical clearances above ground, m
Not exceeding 25.0	6.1
34.5	6.7
46	7
69	7.6

* See Appendix B.

† For ungrounded systems, the maximum system voltage is the phase-to-phase voltage, and for grounded systems, it is the phase-to-ground voltage.

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The NSPI "Overhead Distribution Standard" indicates that the required minimum horizontal clearance from a bare 7.2kV conductor to any part of a building shall be 1.5m (4'-11"). The required minimum clearance from a bare conductor rated <750V (secondary conductors) to any part of a building shall be 1.0m (3'-3").

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SECTION - V VOLTAGES AND CLEARANCES

The difference between maximum conductor final sag and initial sag at the time of construction shall be added to the minimum vertical clearances shown in the chart. Sag tables are included in Section 'C' of this manual, maximum sag whether loaded or thermal shall be added in calculating clearances.

Line clearances through farm land must take into account the likelihood of large farm machinery being moved about. Also additional clearances may be required near industrial and dumping areas where large machinery and dump trucks move about.

4.02 Height of Supply Equipment from Ground

The minimum vertical height of electrical equipment shall be in accordance with chart V-5M.

The heights of wires, supporting structures and equipment on land adjacent to, surrounding or near airports are subject to the regulations of Transport Canada and are not covered by this standard.

4.03 Clearances to Building

Minimum conductor clearances from buildings shall be in accordance with chart V-4M.

Where buildings exceed three storeys (or 15 m) in height, a clear space at least 2 m wide shall be left either adjacent to the building or beginning not over 2.5 m from the building to permit the raising of ladders for fire fighting.

Clearances apply to any part of a building, including balconies, fire escapes, antennas and their supporting structures, and other permanent fixtures.

Any wires, communication cables and drop wires shall not be allowed to rub buildings or other plant.

The minimum required vertical clearance to any given point on the building applies when the wire or conductor is above that point and closer horizontally than the specified minimum clearance. The vertical clearance from a wire

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**V-4M
REV. FEB 1990**

**MINIMUM CONDUCTOR CLEARANCES FROM BUILDINGS
(IN METRES)**

	MINIMUM CLEARANCE IN METRES FROM CONDUCTOR TO:							
	BUILDINGS				SIGNS, BILLBOARDS, LAMP AND TRAFFIC SIGN STANDARDS, AND SIMILAR PLANT			
	HORIZONTAL			VERTICAL * (A)	HORIZONTAL			VERTICAL * (A)
	1	2	3		1	2	3	
GUYS, COMMUNICATION CABLES, AND DROP WIRES	0	0.3	0.3	.08	0	0.3	0.3	.08
SUPPLY CONDUCTORS	1.0	1.5	2.5	2.5	0	1.5	1.5	0.5
0 - 750 V	1.5	1.5	3.0	3.0	0.6	1.5	2.1	2.5
OVER 0.75 TO 22 kV	1.8	1.5	3.3	3.6	1.0	1.5	2.5	3.6
OVER 22 TO 50 kV								

COLUMN 1: MINIMUM HORIZONTAL CLEARANCE TO READILY ACCESSIBLE SURFACE, AS PER CSA C22.3, NO. 1-M1979, TABLE 8.

COLUMN 2: CONDUCTOR SWING BASED ON 76 m NON-SHELTERED SPAN.

COLUMN 3: DESIGN HORIZONTAL CLEARANCE - TOTAL OF COLUMNS 1 AND 2.

NOTES:

- A. THE VERTICAL CLEARANCES APPLY UNDER CONDITIONS OF MAXIMUM SAG.
- B. THE HORIZONTAL CLEARANCES ARE FROM THE INITIAL SAG POSITION AND APPLY FOR A MAXIMUM SPAN OF 76 METRES.
- C. CONDUCTORS HAVING A VOLTAGE OVER 750 V ABOVE BUILDINGS SHOULD BE AVOIDED IF OTHER CONSTRUCTION CAN BE CARRIED OUT.
- D. THERE ARE NO HORIZONTAL CLEARANCES REQUIRED FOR GUYS, COMMUNICATION CABLES, DROP WIRES, AND CABLES ENCLOSED IN EFFECTIVELY GROUNDED METALLIC SHEATHING. HOWEVER, THEY SHOULD NOT ABRAID AGAINST THE BUILDING.
- E. IF THE BUILDING IS FLAT-ROOFED AND WILL ACCUMULATE SNOW, THE VERTICAL CLEARANCE SHOULD BE INCREASED ACCORDINGLY.
- F. FROM INACCESSIBLE SURFACES OF THE BUILDING THE HORIZONTAL CLEARANCE OF THE SECONDARY CONDUCTORS (0 - 750 V) MAY BE REDUCED TO 1.8 METRES AND THE VERTICAL CLEARANCE TO 900 MILLIMETRES.
- G. CLEARANCES APPLY TO ANY PART OF A BUILDING INCLUDING BALCONIES, FIRE ESCAPES, ANTENNAS AND THEIR SUPPORTING STRUCTURES, AND OTHER PERMANENT FIXTURES.
- H. ALL VOLTAGES ARE RMS TO GROUND.
- I. THE CLEARANCES ARE APPLICABLE TO NON-METALLIC BUILDINGS WHOSE METALLIC PARTS ARE EFFECTIVELY GROUNDED, OTHERWISE A 0.1 m/kV INCREMENT MUST BE ADDED.
- J. ALL CLEARANCES ARE IN METRES.

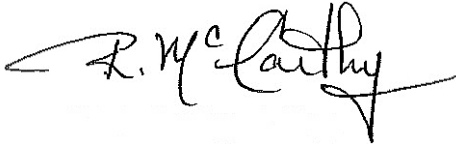
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Although not ideal, the bare 7.2kV medium voltage conductor and the bare 240/120V low voltage system neutral and secondary conductors have a minimum clearance that exceeds the vertical and horizontal clearance requirements of the three (3) applicable standards; CSA Standard C22.3 No. 1, "Overhead Systems", CSA Standard C22.1-21, "Canadian Electrical Code (25th Edition)" and the Nova Scotia Power Inc., "Overhead Distribution Standards", from any part of the residence, including the upper level balcony.

We trust that this explanation is satisfactory. If you have any questions, please do not hesitate to contact our office at your convenience.

Yours truly,

STRUM ENGINEERING ASSOCIATES LTD.

A handwritten signature in black ink, appearing to read "R. McCarthy", with a stylized flourish extending to the left.

Rick McCarthy, P. Eng.
Senior Electrical Engineer
Email: r.mccarthy@strumengineering.ca