SCIENCE INTEGRITY KNOWLEDGE

ELECTROMAGNETIC FIELD (EMF) MANAGEMENT PLAN FOR 1198 – 1210 YONGE ST., AND 8 BIRCH AVE., TORONTO

December 7th, 2020

Prepared For:

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ELECTROMAGNETIC FIELD (EMF) MANAGEMENT PLAN FOR 1198-1210 YONGE ST., AND 8 BIRCH AVE., TORONTO

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1.0 INTRODUCTION

Intrinsik Corp. (Intrinsik) was retained by Birch Equities Limited to develop an Electromagnetic Field (EMF) Management Plan for the property located at 1198-1210 Yonge Street, and 8 Birch Avenue, (the Site) in Toronto. The Site is located opposite the street to a hydro/transformer station, based on the presence of which, the City of Toronto requires an EMF Management Plan for the property to accompany the rezoning application. Currently, the property contains five residential/commercial units, some of which include storage sheds in the backyards. The redevelopment at the Site will include a 12-storey luxury condo with commercial at grade.

2.0 MEASUREMENTS OF MAGNETIC FIELDS

2.1 Survey Procedure

Power frequency magnetic field measurements (i.e., magnetic flux density measured in units of milliGauss or mG) were obtained using a factory calibrated F.W. Bell ELF Gauss/Tesla Meter (model number 4180). The technical specifications of this meter are provided in Table 2-1. All measurements were collected in 3-axis mode (XYZ), which provides a summation of magnetic flux density from all three dimensions surrounding the meter, and offers an indication of overall magnetic field level.

Table 2-1 Specifications of Pacific Scientific ELF Gauss/Tesla Meter (Model 4180)

Basic Accuracy (>0.4mG, 40-80 Hz)	(± 2% +1 digit)
Additional Angular Directionality Error	typically <1%
Frequency Response (Display and USB)	25 to 1200Hz, ±5% 20 to 2000Hz, ±15%
Update Rate (Display)	1000msec single axis, 1200msec 3-axis mode
Measuring Range	0.1 to 599mG or 0.01 to 59.9 µT
Minimum Resolution	0.1 mG or 0.01µT
Display Type	LCD
Digits	3.5 digit
Units of Measurement	mGauss, µTesla
Battery Type	4 – AAA, Alkaline 1.5V or NiMH 1.2V
Battery Life (Typical)	30 hours (alkaline), 20 hours (850mAh NiMH)
Operating Temperature	-10 to +50°C
Storage Temperature	-20 to +60°C
Weight	Approximately 6.25oz (177g) (with batteries)
Size	4.7 x 3.0 x 1.45" (120 x 76 x 37mm)

Following standard EMF procedures, magnetic field strengths are reported at a nominal height of 1 meter above ground. An initial survey of the Site and adjacent transformer/hydro station was conducted to identify potential sources of EMF (Figure 2-1). Additionally, magnetic field readings were collected along the sidewalk along the hydro/transformer station (readings collected at 10 m intervals along “A”, as shown in Figure 2-3) to identify any additional sources and to determine typical levels along this power line corridor. This is intended to provide an estimate of baseline/expected levels of EMF experienced by the number of residences located immediately adjacent the transformer/hydro station.

Figure 2-1 Location of EMF Sources in Proximity to 1198-1210 Yonge Street and 8 Birch Avenue in Toronto

The field measurements are valid for the time of the measurement. However, ambient field levels vary with time as a function of the electrical load on the source wires. Accordingly, where fluctuations in readings were noted (following a 10 second stabilization time) in the present survey, the highest reading was recorded.

The properties at 1198-1210 Yonge Street and 8 Birch Avenue were divided into a grid-like pattern in order to obtain enough data to produce magnetic field contours (Figure 2-2). The grid lines (A-E) represent 10 metre transects perpendicular to the transmission lines with samples being collected every 10 m along those transects (i.e., A1, A2, A3, A4…etc.).

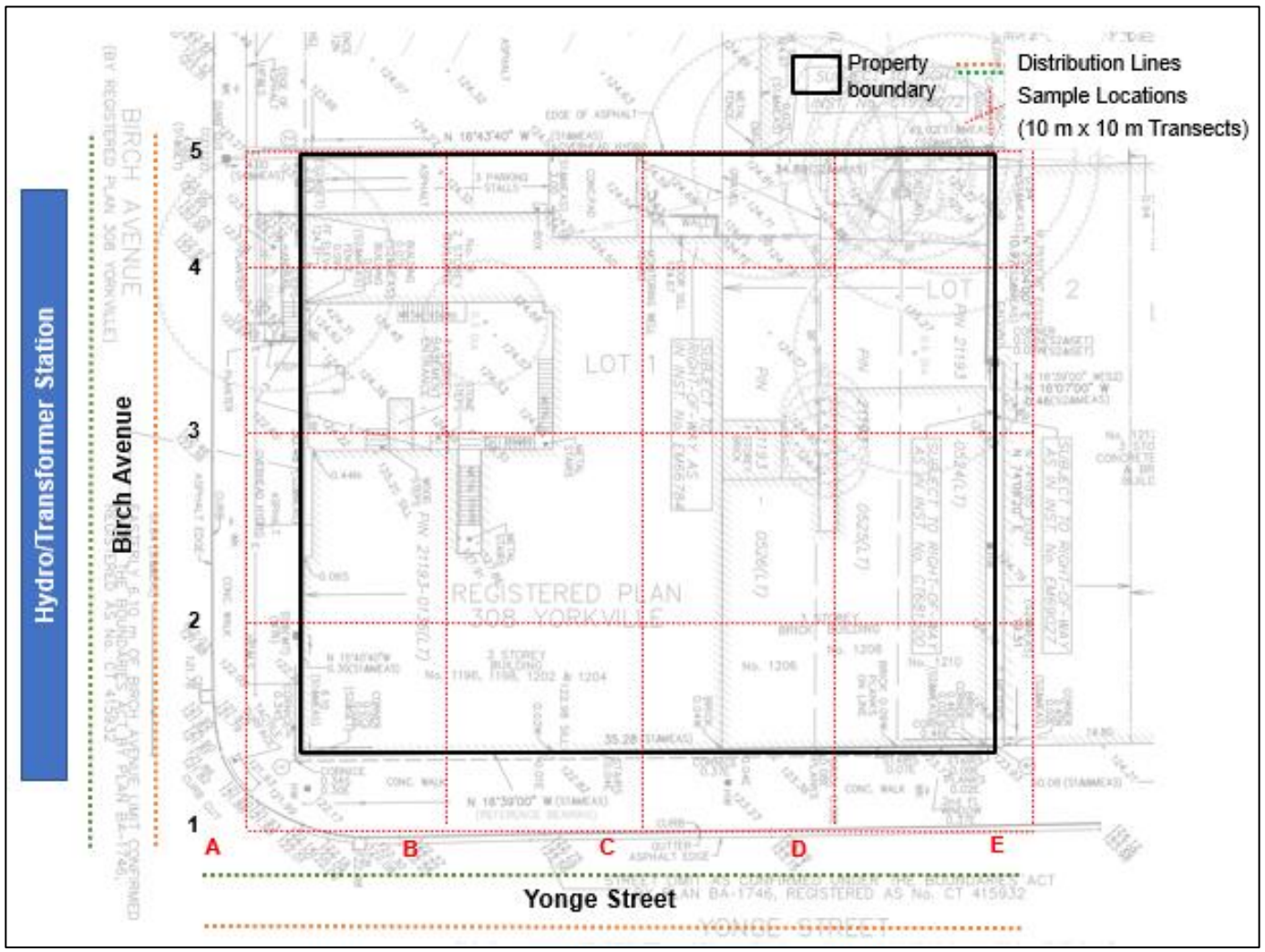

Figure 2-2 Magnetic Field sample locations for 1198-1210 Yonge Street and 8 Birch Avenue, Toronto

2.2 Test Locations and Results

Measurements of magnetic field strength were collected on August 5, 2020 between the hours of 10:00 AM and 4:00 PM. The data collected for the property and adjacent hydro/transformer station are provided in Appendix A. Weather conditions were clear sunny skies with steady winds of approximately 14 km/hr and the temperature ranging between 24 and 26 degrees Celsius.

Following completion of the magnetic field measurements using the ELF Gauss/Tesla meter, the data was analyzed in order to develop the magnetic field contours on the property. The

results for the hydro/transformer station and Site boundaries are shown in Figure 2-3 and Figure 2-4, respectively. The east and south sides of the Site are bounded by Yonge Street and Birch Avenue, respectively. The hydro/transformer station containing transmission line(s) is to the south of the Site. There are power distribution lines running along the eastern and southern property boundary lines where several readings were collected. All measurements taken within the property boundary were within the range of <1 to ≤4 mG (Figure 2-4), however, under the readings under the transmission lines along the sidewalk on Yonge Street and Birch Avenue were above 4 mG. Appendix D provides photos of hydro poles along these two streets which could be the source of the higher than normal EMF readings.

Figure 2-3 Magnetic Field Level Contours for the Adjacent Hydro/Transformer Station

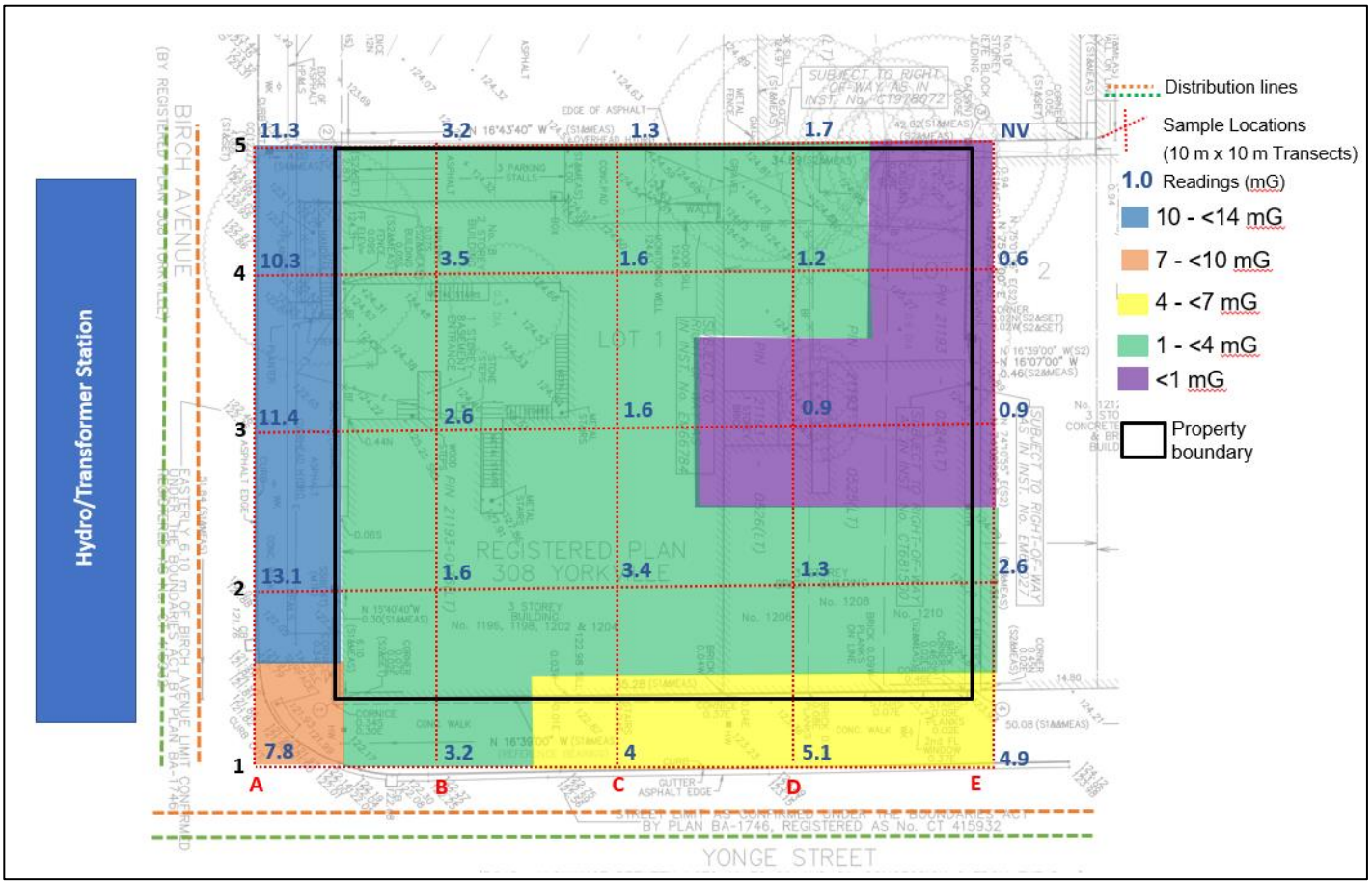

Figure 2-4 Magnetic Field Level Contours for 1198-1210 Yonge Street and 8 Birch Avenue, Toronto

The operator of the lines, Hydro One Networks Inc. (Hydro One), was contacted directly, as Toronto Public Health has indicated that due to the ongoing public health emergency due to the COVID-19 pandemic, they are unable to respond to hydro loading data requests and Hydro One should be contacted directly (Appendix C). Hydro One provide data regarding the load on the transmission line circuits, L14W and L18W for the property located at 1198-1210 Yonge St. and 8 Birch Ave., as well as any planned future uses (Appendix C).

3.0 MAGNETIC FIELD EXPOSURE TO CHILDREN

The magnetic field level measurements collected at the property are provided in Appendix A. The levels range from 0.9 mG to 3.5 mG. The mean of all sample locations between 1198-1210 Yonge Street and 8 Birch Avenue is 4.1 mG and the 50th percentile is 2.9 mG. The calculation for children's (<12 years) yearly average exposure was conducted using the mean and 50th percentile magnetic field levels collected from the site.

In response to our request, Hydro One provided the loading data for two transmission line circuits, L14W and L18W, for the property located at 1198 - 1210 Yonge Street and 8 Birch

Avenue in Toronto (Appendix C). On the day of the field survey the loading on L14W was highest from about 9:00 am to 9:00 pm. L18W was out of service on Aug 5, 2020 for planned work, however, the 50th and 85th percentile values for L18W were both lower than the values for the L14W circuit at the time of the field survey (08/05/2020 09:00:00s to 08/05/2020 17:00:00s) and were within range of the data collected on site. Therefore, the use of the mean and 50th percentile levels collected during the field survey is deemed reasonable.

The estimated exposure time for children residing on the property is 22 hours per day, 7 days per week for 52 weeks per year. This estimate is conservative in that it assumes any child living on the property only leaves the home for 2 hours per day, whereas, it is more likely that children will attend school or daycare on most days.

Mean increase in yearly average exposure for 1198-1210 Yonge Street and 8 Birch Avenue:

$$\frac{(22 \text{ hours/day} \times 7 \text{ days/week} \times 52 \text{ weeks/year}) \times (4.1 \text{ mG})}{8736 \text{ hours/year}} = \frac{32832.8 \text{ mG.hours/year}}{8736 \text{ hours/year}} = 3.76 \text{ mG}$$

50th Percentile increase in yearly average exposure for 1198-1210 Yonge Street and 8 Birch Avenue:

$$\frac{(22 \text{ hours/day} \times 7 \text{ days/week} \times 52 \text{ weeks/year}) \times (2.9 \text{ mG})}{8736 \text{ hours/year}} = \frac{23223.2 \text{ mG.hours/year}}{8736 \text{ hours/year}} = 2.66 \text{ mG}$$

4.0 RECOMMENDATIONS

Based on the results of the data collected, both on the property and adjacent hydro/transformer station, there are no low-cost/no-cost reduction measures recommended. The development that is being proposed will not result in exposure to power frequency electric fields that are higher than those already experienced by hundreds of residents living along this hydro/transformer station that extends through the heart of Toronto.

There are no readings collected within the property boundary lines where the EMF reading exceeds the 4 mG threshold, upon which the Toronto Public Health precautionary principle approach is based (Toronto Public Health, 2008). Although all locations across the sidewalks along Yonge St. and Birch Ave. recorded readings well above the 4 mG threshold, we believe that these exceedances are due to the presence of transmissions lines and hydro poles along these streets, and not due to the hydro/transformer station located south of the Site. Therefore, there are no “low-cost to no-cost” alternatives or recommendations required.

5.0 ACTIONS TAKEN

This particular hydro/transformer station is located in a densely-populated area of Toronto with housing developments consistently located immediately adjacent to (to the west of) the station. The development at 1198-1210 Yonge Street and 8 Birch Avenue that is being proposed is not dissimilar from other residential areas around the hydro/transformer station. This, combined with the measured magnetic field levels across the property (≤4 mG), suggest that exposures are

below levels of potential concern and are anticipated to be no different than it is for other residents living in this area. No low-cost/no-cost recommendations are required.

6.0 CONCLUSIONS

The levels of power frequency magnetic fields measured on this site are typical of levels expected for residential developments located adjacent to power line corridors in the City of Toronto, and fall within the range of magnetic field levels to which members of the public are routinely exposed. Therefore, no low-cost/no-cost recommendations are required.

7.0 CLOSURE

Thank you for the opportunity to work with you on this project. The report was written and reviewed by Dr. Faiza Waheed and Anushree Bhatt. If you have any questions, please contact Dr. Waheed at your convenience.

Yours sincerely,

INTRINSIK CORP.

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Anushree Bhatt, M.Env.Sc.
Environmental Risk Analyst | Health Impact Assessment Specialist

8.0 REFERENCES

Toronto Public Health. 2008. Guidance Manual for the Preparation of an EMF Management Plan for The City of Toronto. Available: http://www.rds.oeb.ca/HPECMWebDrawer/Record/189998/File/document

APPENDIX A: MAGNETIC FIELD AREA MEASUREMENTS AT 1198-1210 YONGE STREET AND 8 BIRCH AVENUE

EMF Management Plan
Location: 1198-1210 Yonge Street and 8 Birch Avenue, Toronto and along the adjacent hydro/transformer station
Sample Date: August 5, 2020
Sampling Time: 10 am – 4 pm
Weather: Mostly sunny with wind up to 14 km/hr and temperature ranging between 24ºC and 26ºC.
Collected by: Faiza Waheed and Anushree Bhatt

Table A-1 Magnetic Field Data Collected at the Hydro/transformer Station

Sample Location	Distance (m)	Magnetic Field (mG)	Notes
A1	0	6.3	
A2	10	3.7	
A3	20	4.3	
A4	30	5.1	
A5	40	5.5	
A6	50	2.9	

Table A-2 Magnetic Field Data Collected at 1198-1210 Yonge Street and 8 Birch Avenue

Sample Location	Distance (m)*	Magnetic Field (mG)	Notes
A1	0	7.8	This sample location was under a hydro pole along the intersection of Birch Ave. and Yonge St. See Appendix D for image.
A2	0	13.1	This sample location was under a hydro pole along Birch Ave. See Appendix D for image.
A3	0	11.4	This sample location was under a hydro pole along Birch Ave. See Appendix D for image.
A4	0	10.3	This sample location was under a hydro pole along Birch Ave. See Appendix D for image.
A5	0	11.3	This sample location was under a hydro pole along Birch Ave. See Appendix D for image.
B1	0	3.2	This sample location was under a hydro pole along Yonge St. See Appendix D for image.
B2	0	1.6	

Table A-2 Magnetic Field Data Collected at 1198-1210 Yonge Street and 8 Birch Avenue			
Sample Location	**Distance (m)***	**Magnetic Field (mG)**	**Notes**
B3	10	2.6	
B4	10	3.5	
B5	10	3.2	
C1	10	4	This sample location was under a hydro pole along Yonge St. See Appendix D for image.
C2	10	3.4	
C3	10	1.6	
C4	10	1.6	
C5	20	1.3	
D1	20	5.1	This sample location was under a hydro pole along Yonge St. See Appendix D for image.
D2	20	1.3	
D3	20	0.9	
D4	20	1.2	
D5	20	1.7	
E1	20	4.9	This sample location was under a hydro pole along Yonge St. See Appendix D for image.
E2	30	2.6	
E3	30	0.9	
E4	30	0.6	
E5	30	-	

Table A-3 Summary Statistics of Magnetic Field Measurements at 1198-1210 Yonge Street and 8 Birch Avenue	
Summary Statistic	**Result (mG)**
Maximum	13.1
Mean	4.1
50th Percentile	2.9
95th Percentile	11.4

APPENDIX B: REQUIRED FORMS

The following documents are included in this Appendix:

I) EMF Management Plan Checklist; and
II) Summary of Magnetic Field Exposure Reduction Options.

TORONTO Public Health

EMF MANAGEMENT PLAN CHECKLIST

A checklist of information for inclusion in an EMF Management Plan for developments within or abutting to a ROW.

ITEM TO BE INCLUDED	Y	N	COMMENTS OR JUSTIFICATION
1. The planned development was assessed to determine if children will congregate at the site.	x		
2. The plan contains a map of the ROW and, if appropriate, the adjoining property showing transmission lines and other electrical facilities?	x		
3. The plan contains the results of a magnetic field survey across the ROW and if appropriate, across the abutting property, encompassing the area where the development is planned? (The area surveyed should include nearby electrical facilities, e.g. distribution lines.)	x		
4. Data from Hydro One and Toronto Hydro were obtained relating line loadings during measurements to yearly average loadings.*	x		
5. The survey was performed during a typical load period.	x		
6. Information has been obtained from Hydro One and Toronto Hydro on planned upgrades, energizing of unused lines, and new lines or equipment*	x		
7. Calculations, extrapolations, substitutions of data from similar situations (e.g. mirror image, shift along the ROW) were performed to characterize locations where measurements were not feasible, and the results noted on the site map.			N/A
8. The survey data are presented on a map (preferable to a spreadsheet).	x		
9. Alternative designs or types of use been considered to minimize magnetic field exposures.		x	
10. The plan includes expected changes (addition or removal of lines and other electrical equipment) and their expected impacts on magnetic fields levels at the development site.	x		
11. A site map/spreadsheet has been prepared showing expected magnetic fields and electrical equipment, following the changes noted in Item 10.			N/A
12. Exposure reduction strategies have been considered for each alternative development plan. (Examples are locating areas occupied by children in low-field areas and away from sources.)		x	Exposure reduction strategies are not required.
13. The plan includes estimates of exposures for children aged 12 and under, for individual children and in the aggregate (number of children exposed).	x		*Aggregate number of children unknown.
14. The plan includes estimates of the aggregate and individual exposures avoided through various exposure reduction strategies. and the choice of alternative development plans.		x	Exposure reduction strategies are not required.
15. The plan includes the choice of the development plans and the exposure reduction measures to be implemented.		x	Exposure reduction strategies are not required.

*If the EMF Management Plan is complete and TPH has not yet provided this information please submit the plan and make note of the missing information. TPH will take this into account during the management plan review.

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TORONTO Public Health
EMF Management Plan

Summary of Magnetic Field Exposure Reduction Actions

Development Designation: Residential

Date: 08/26/2020 **Prepared by:** Intrinsik Corp.
Health Impact Assessment (HIA) Lead

Authorized by: Faiza Waheed **Title:** Environmental Health Scientist

Signature:

Reduction of Exposure Times:

Exposure reduction Option	Accept/Reject	Rationale for Rejecting Option
None required		

Reduction of Magnetic Fields:

Exposure reduction Option	Accept/Reject	Rationale for Rejecting Option
None required		

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APPENDIX C: HYDRO ONE LOADING DATA

From: [redacted]@HydroOne.com
Subject: FW: Request for Loading Information: EMF Management Plan for 1198 - 1210 Yonge Street and 8 Birch Avenue in Toronto
Date: December 4, 2020 at 18:52
To: fwaheed@intrinsik.com
Cc: [redacted]@HydroOne.com

[EXTERNAL EMAIL] This email originated from outside of the Intrinsik network. Do not click links or open attachments unless you recognize the sender and know the content is safe.

As requested/

Data for L14W and L18W transmission line circuits for the property located at 1198 - 1210 Yonge Street and 8 Birch Avenue in Toronto.

Please note that L18W was out of service on Aug 5, 2020 for planned work.

Time	L14W Amperes	L18W Amperes
8/5/2020 0:00	153	0
8/5/2020 1:00	155	0
8/5/2020 2:00	155	0
8/5/2020 3:00	155	0
8/5/2020 4:00	160	0
8/5/2020 5:00	176	0
8/5/2020 6:00	187	0
8/5/2020 7:00	202	0
8/5/2020 8:00	212	0
8/5/2020 9:00	225	0
8/5/2020 10:00	227	0
8/5/2020 11:00	237	0
8/5/2020 12:00	229	0
8/5/2020 13:00	227	0
8/5/2020 14:00	227	0
8/5/2020 15:00	246	0
8/5/2020 16:00	254	0
8/5/2020 17:00	215	0
8/5/2020 18:00	210	0
8/5/2020 19:00	195	0
8/5/2020 20:00	189	0
8/5/2020 21:00	183	0
8/5/2020 22:00	168	0
8/5/2020 23:00	157	0
50th Percentile	158	104
95th		

85th Percentile	270	236

Future Plans:
The line is required for the foreseeable future to supply the area loads. While Hydro One has no plans for this right of way, additional circuits may be added in the future depending on the load requirements. Timing is 10+ years.

Best Regards

[redacted]- Manager, Transmission Planning
Hydro One Networks Inc. •13th Floor, 483 Bay Street, Toronto, M5G 2P5 •[redacted] (cell):[redacted]• Email[redacted]

APPENDIX D: ADDITIONAL INFORMATION

Figure D-1 Hydropole located at sample location A1

Figure D-2 Hydropole located at sample location A5

Figure D-3 View from South of Birch Ave of the hydropoles located at sample locations A1 and A5

Figure D-4 Hydropole located near sample location B1

Figure D-5 Hydropole located near sample locations C1, D1 and E1