

**IN THE MATTER OF** the *Ontario Energy Board Act*,  
1998, S.O. 1998, c.15 (Schedule B);

**AND IN THE MATTER OF** an application by Canadian  
Distributed Antenna Systems Coalition for certain orders  
under the *Ontario Energy Board Act, 1998* (the “CANDAS  
Application”).

July 23, 2012

**DOCUMENT BRIEF OF THESL**

(for oral submissions on the Preliminary Issue)

## DOCUMENT BRIEF OF THESL

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| 14.        | Selected Excerpts – CANDAS Interrogatory Responses <ol style="list-style-type: none"><li>CANDAS response to THESL IR#1.</li><li>CANDAS’ Response to THESL IR#2(b).</li><li>CANDAS’ Response to THESL IR#3.</li><li>CANDAS’ response to CEA IR#28(a)</li></ol>            |

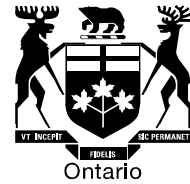
- e. CANDAS response to Energy Probe IR#7.
15. THESL's letter to the Board dated July 12, 2012 (the "**July 2012 Letter**").

TAB 1



Ontario Energy  
Board

Commission de l'Énergie  
de l'Ontario



**RP-2003-0249**

**IN THE MATTER OF** the *Ontario Energy Board Act 1998*, S.O.1998, c.15, (Schedule B);

**AND IN THE MATTER OF** an Application pursuant to section 74 of the *Ontario Energy Board Act, 1998* by the Canadian Cable Television Association for an Order or Orders to amend the licenses of electricity distributors

**BEFORE:** Gordon E. Kaiser  
Vice Chair and Presiding Member

Paul Sommerville  
Member

Cynthia Chaplin  
Member

### **DECISION AND ORDER**

The Applicant, Canadian Cable Television Association ("CCTA") seeks access to the power poles of the regulated electricity distribution utilities in Ontario for the purpose of supporting cable television transmission lines. Specifically, the CCTA is seeking an Order under section 74(1) of the *Ontario Energy Board Act* which would amend the licences of these utilities in a fashion that would specify the uniform terms of access including a province-wide uniform rate or pole charge for such access.

In the past, the CCTA members have rented space on the utilities' poles under private contract. That contract came to an end in 1996. Since then, the parties have been unable to reach further agreement with respect to rates.

## Background

In early 1997, the CCTA applied to the Canadian Radio and Telecommunications Commission ("CRTC") to set a charge for access by cable companies to the poles of the Ontario electricity distributors. After a lengthy proceeding, the CRTC set an annual pole charge of \$15.89.<sup>1</sup>

The Ontario Municipal Electric Association ("MEA") appealed that decision to the Federal Court of Appeal which held that the CRTC did not have statutory authority under the Telecommunications Act to regulate access by cable operators and telecommunication carriers to power poles.<sup>2</sup>

On further appeal by the CCTA the Supreme Court of Canada upheld the Federal Court of Appeal decision.<sup>3</sup> Given the Court's decision that the CRTC lacked jurisdiction, the CCTA filed an application with this Board on December 16, 2003 on behalf of the twenty-three cable companies that operate in Ontario. None of the parties questioned the jurisdiction of this Board.

The issues before this Board in this proceeding are as follows :

1. Is it necessary that this Board set access charges?
2. Which parties should have access?
3. What is the appropriate methodology?
4. How many attachers should be assumed in calculating the rate?
5. Should there be a province-wide rate?
6. What costs should be used in calculating the rate?
7. Should new licence conditions impact existing contracts?

## The Need to Regulate Access Charges

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<sup>1</sup> *Part VII Application - Access to supporting structures of municipal power utilities - CCTA v. MEA et al - Final Decision*, Telecom Decision CRTC 99-13, 28 September 1999. [hereinafter "Telecom Decision CRTC 99-13"]

<sup>2</sup> *Barrie Public Utilities v. Canadian Cable Television Assn.*, [2001] 4 F.C. 237.

<sup>3</sup> *Barrie Public Utilities v. Canadian Cable Television Assn.*, 2003 SCC 28.

The CCTA Application is opposed by the Electricity Distribution Association ("EDA") and the Canadian Electricity Association ("CEA"). The EDA represents virtually all licensed electricity distributors in this province (sometimes referred to as LDCs) while the CEA is a national association representing electricity distributors, generators and transmitters. The position of these two parties is supported by Hydro One Networks Inc., Hydro One Brampton Networks Inc., and Hydro One Remote Communities Inc.

The position of the EDA *et al* is that regulatory intervention by this Board is not necessary. The argument largely is that the Applicant has not demonstrated that there has been a systematic abuse of monopoly power and absent that showing, the Board should allow the parties to continue to negotiate.

There has been some evidence on both sides with respect to abuse. In the end the CCTA says that the electricity distributors do have monopoly power and the fact that the parties have been unable to come to an agreement for over a decade demonstrates the exercise of that monopoly power whether this results in abuse or not.

The Board agrees. A showing of abuse is not necessary to justify the intervention of this Board in this matter. The fact is the parties have been unable to reach an agreement in over a decade. This degree of uncertainty is not in the public interest.

The Board agrees that power poles are essential facilities. It is a well established principle of regulatory law that where a party controls essential facilities, it is important that non-discriminatory access be granted to other parties. Not only must rates be just and reasonable, there must be no preference in favour of the holder of the essential facilities. Duplication of poles is neither viable nor in the public interest.

The Board concludes that it should set access charges.

The EDA *et al* further submits that if the Board is going to set rates it should set a range of rates based on its proposed methodology as opposed to a specific rate. The CCTA opposes this. The CCTA argument is that a range of rates would simply lead to continued delay, that monopoly power would continue to be exerted and in fact, the upper range would become the rate. In another words, the bargaining power of the cable companies would be as deficient with a range of rates as it is at present. The Board accepts this view. There is no rationale for a range of rates in the current circumstances.

### **Who should have access?**

On this issue, the parties are in agreement. In the Settlement Agreement of October 19, 2004, all parties agreed that if the Board does set access conditions, these conditions should apply to access to the communications space on the LDC poles by all Canadian Carriers as defined in the Telecommunications Act and cable companies. The only exception is that these conditions would not apply to the current joint use agreements between telephone companies and electricity companies that grant reciprocal access to each others poles.

This Board has accepted the settlement agreement in this regard. In addition, the Board has heard submissions to the effect that the LDCs agree that their own telecommunication affiliates would access poles on the same conditions as other users of the communications space. The LDCs also confirmed that all users of the communications space should pay the same charge.<sup>5</sup>

This is an important clarification. This market is changing rapidly and industries are converging. Cable companies are now providing the telecommunication services just as the electricity distributors enter this industry. The fact that the two groups that have been warring over the past decade are fast becoming competitors is an additional reason for the Board to intervene and establish clear guidelines. From this Board's perspective, it is equally important that costs be properly allocated and that the electricity distributor (and ultimately, the electricity ratepayer) receives its fair share of revenue.

### **What is the appropriate methodology?**

There are two elements to the proposed rate. The first is the incremental or direct costs incurred by electricity distributors that results directly from the presence of the cable equipment. Second, there are common or indirect costs which are caused by both parties. The parties agree that the direct or incremental costs should be borne by the cable companies.

The dispute relates to what share of the common cost each parties should pay. The cable companies say the portion of the fixed or common cost they should bear should be based on the cable companies "proportionate use" of the usable space on the pole. Electricity distributors claim that the portion of the common cost each of the parties bear should be equal. In other words, the common cost should be divided equally among attachers on a "per capita" basis.

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<sup>5</sup> Tr. Vol. 2 at paras. 800 and 804.

Both parties called experts. The cable companies called Donald A. Ford while the electricity distributors called Dr. Bridger Mitchell. Reply evidence for the CCTA was presented by Patricia Kravtin and Paul Glist. All witnesses were qualified as experts.

The CCTA Application seeks a pole attachment rate of \$15.65, a similar amount to that decided by the CRTC. The rates proposed by the EDA are substantially higher.

The principal argument advanced by the cable companies is that proportionate use is the methodology adopted by the CRTC and it has also been followed elsewhere in Canada and the United States. They point out that there have been numerous reviews of this rate methodology and the methodology has never been set aside.<sup>6</sup>

The response of the electricity distributors is that these rates are unduly low and are driven by considerations of telecommunication policy. In particular, they were designed to foster competition in that sector. The witnesses, however, were unable to point to any particular articulation of that policy goal as the justification for the rate levels at least in the Canadian context.

In Canada, the two decisions that follow the CRTC decision have in fact been divided on this issue. The Alberta Energy Utility Board ("AEUB") established a pole attachment rate of \$18.34 in 2000 using the per capita approach.<sup>7</sup> The Nova Scotia Utility and Review Board ("NSURB") set a rate of \$14.15 in 2002 following the CRTC approach.<sup>8</sup> The Nova Scotia Board did point out however, they had not conducted any cost allocation studies on their own.

An additional argument to support the lower rate advanced by the cable companies is that they are only tenants while the electricity distributors own the poles. They argue that pole ownership confers a benefit.

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<sup>6</sup> *FCC v Florida Power Corp.* 480 US 245, (1987); *In the Matter of Alabama Cable Telecom Association v Alabama Power Corp.*; 16 FCC 12, 12, 209 (2001)

<sup>7</sup> *TransAlta Utilities Corporation*, Decision 2000-86 (Alberta Energy and Utilities Board), December 27, 2000 online:  
<<http://www.eub.gov.ab.ca/bbs/documents/decisions/2000/2000-86.pdf>>.

<sup>8</sup> *In the Matter of the Public Utilities Act and In the Matter of an Application by Nova Scotia Power Incorporated for Approval of an Increase in its Pole Attachment Charge*, Decision 2002 (Nova Scotia Utility and Review Board) NSUARB-1, January 24, 2004.

The electricity distributors deny this, claiming that ownership has costs; they have to install poles whether they have an attacher or not and may face stranded assets. In the end, the Board is not persuaded that the ownership of the poles should effect the level of rates. The Board agrees with the electricity distributors that the impact of ownership is neutral.

The CEA argues that electricity distributors should be allowed to raise the rates charged to the cable companies because cable companies are now generating "massive new sources of revenue" from the use of electricity distribution plant. In particular, they point out that revenues from high speed internet service have increased from \$0 in 1995 to over \$900 million annually by 2003. The CEA requested that the Board infer that a large portion of these revenues are from Ontario cable operations. The Board notes that there is very little evidence on this issue. Moreover, the Board believes that the methodology used to determine rates should be based on cost recovery, not some form of revenue sharing.

Another rationale advanced by the cable companies is that it makes no sense to have different methodologies for setting rates on power poles compared to telephone poles. The argument is that since the CRTC methodology is used to price access to telephone poles, the same methodology should be followed in pricing access to power poles. The Board is not convinced. This Board may have a different policy rationale than the CRTC particularly in terms of the electricity ratepayer and the serving utility. In any event, it is worth noting that the rental charge paid by the cable companies for access to telephone poles is \$9.60 per pole. This is certainly not the rate being advanced by the cable companies in this proceeding.

The most persuasive argument for equal sharing of the common cost is the practice that appears to take place when parties are in position of equal bargaining power. The LDCs point to the reciprocal agreements between the telephone companies and the power companies that have existed for a number of years. Under those agreements, each of the regulated utilities has access to the other's poles. They essentially split the common cost equally.

The cable companies question this proposition. They argue that these are regulated entities that have a bias to invest more than optional amounts of capital based on the Averch Johnson principle.<sup>9</sup> The Board notes however, that both sides face the same incentive in terms of investing capital in rate base assets. It can reasonably be assumed that the telephone companies and the power companies are in an equal bargaining position and the resulting solution is a meaningful guideline.

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<sup>9</sup> Harvey Averch and Leland L. Johnson, "Behaviour of the Firm under Regulatory Constraint," *Amer. Econ. Rev.* (December 1962) LII: 1052-1069.

The CCTA responds that its members are not in an equal bargaining position. In the Board's view, that is not relevant. The free and open negotiation between the telephone and power companies is offered as a proxy for a competitive market solution. No party holds an advantage over the other or is in a position to exercise monopoly power.

For many years, electricity and telephone companies in at least four provinces have openly negotiated reciprocal access agreements to telephone and power poles. In all cases, these agreements appear to reflect equal allocation of common costs. This suggests that the per capita or equal sharing methodology is the appropriate one. Moreover, as more and more parties attach to these poles, the notion that there is a discrete portion of space to be allocated to each becomes more problematic.

The Board recognizes that a case can be made for both the proportionate use and the equal sharing methodology. On balance, however, the Board prefers the equal sharing theory for the reasons stated.

#### **How many attachers should be assumed?**

When the CCTA filed its Application, it assumed two attachers. This position was amended in Final Argument when 2.5 attachers was proposed. The Reply Argument of the CCTA appears to revert back to two attachers with reference to the CRTC rate of \$15.65.

Two attachers were assumed in the CRTC decision. The industry however, has changed dramatically over the last five years. There is evidence that in one municipality there are as many as seven different parties seeking attachment. There is also evidence that poles are used by municipalities for the purpose of street lighting and traffic lights.

In addition, an increasing number of telecommunication providers are entering the market to compete with incumbent telephone company providing voice and data services. A number intervened in this proceeding and by virtue of the settlement agreement will have access to the poles in question. Finally, in a number of major markets the Ontario electricity distributors have established their own affiliates to offer telecommunication services. The LDCs have agreed that these affiliates should pay the same rates as the other parties attaching to the power poles. There is also evidence that Hydro One which accounts for a third of the poles in the province has more than two attachers.

The Board considers 2.5 attachers to be reasonable. Things have changed since the days of the CRTC decision. If anything, there will be more than 2.5 attachers in the future.

### **Should there be a province-wide rate?**

The cable companies argued for a standard province-wide rate. There is precedent for this in terms of the CRTC decision as well as the Nova Scotia and Manitoba decisions. A province-wide rate has the advantage that it is simple to administer. This is certainly one of the goals the Board hopes to achieve in this decision. Moreover, the cost data at the individual LDC level is incomplete. Calculating these costs for ninety different utilities will be a challenge for all concerned.

This is not to say there should not be relief available for electricity distributors who feel the province-wide rate is not appropriate to their circumstances. Any LDC that believes that the province-wide rate is not appropriate can bring an application to have the rates modified based on its own costing. Absent any application, the province-wide rate will apply as a condition of licence, as of the date of the Order.

### **What costs should be used to calculate the rate?**

The annual pole rental charge of \$15.65 proposed by the CCTA is a function of both the direct and the indirect cost as set out in Appendix 1. The direct costs consist of the administration cost and the loss of productivity. The total direct cost estimate of \$2.61 is based on the CRTC decision.

The EDA claims that there is no reason why the Board should use a \$1.92 estimate of loss of productivity as advanced by the CCTA. The EDA points to different data from five different LDCs which range from \$0.67 per pole in the case of Hydro One Networks to \$5 per pole in the case of Guelph Hydro. References are also made to the evidence of Manitoba Hydro filed by the CEA which calculated a loss of productivity of \$6.39 per joint use pole.

There is no question that there is a wide variation in these costs and estimates. The EDA recommends that if this Board determines that it should use the CCTA model to arrive at a uniform annual pole charge, the Board should use the highest Ontario data available to set that uniform rate. That rate would be \$32.81 using the Toronto Hydro data and the productivity loss estimate for Guelph Hydro. The Board disagrees and concludes that province-wide representative cost data are more meaningful in the circumstances. For the purposes of calculating the rate in this proceeding, the Board has adopted the direct costs set out in the CCTA application and reproduced in Appendix 1.



Next there are the indirect costs which consist of the net embedded cost per pole plus depreciation, maintenance expense and carrying costs. Again a wide range of costs were proposed by the EDA depending on the particular utility chosen. The Board has concluded that the depreciation, maintenance and carrying costs proposed by the CCTA are representative as set out in Appendix 1.

The CCTA's proposed rate is based on an average net embedded pole cost of \$478. This embedded cost is derived from material filed by Milton Hydro in the proceeding leading to the Telecom Decision of the CRTC 99-13 and is supported by the evidence of Hamilton Hydro in this proceeding that the embedded pole cost is \$477.47.

EDA argues that local costs vary significantly and if the Board considers it appropriate to set a uniform rate, the rate should reflect the cost of the utilities having the highest embedded pole cost. The EDA then submits that the parties should be free to apply to the Board for a lower rate where they can demonstrate lower costs.

While the Board recognizes local costs vary, there are advantages to having a province-wide rate. That rate should to a maximum extent possible, be based upon representative cost. The Board accepts the CCTA's estimated average net embedded pole cost of \$478.

The rate proposed by the CCTA assumed a pre-tax weighted average cost of capital of 9.5%. In response to an undertaking, the CCTA provided a revised weighted average cost of capital based upon a debt equity ratio of 50/50, an interest rate of 7.25% and a return on equity of 9.88% as provided for in the Board's current Rate Handbook. This cost of capital applies to distributors with a rate base of less than \$100 million. Given that a large majority of distributors in the province have less than this amount, the Board believes that this new weighted average of capital is an appropriate one to use in calculating a province-wide rate.

### **Calculation of the rate**

To calculate the rate, it is necessary to define the number of attachers as well as the embedded pole costs discussed above. It is also important to define the spacing on a typical pole.

The CCTA proposal assumes a typical pole height of 40 feet with two feet of communications space, 3.25 feet of separation space and 11.50 feet of power space. Mr. Wiebe, on behalf of CEA proposed slightly different space allocations. The CCTA argues that the space allocations adopted by Mr. Ford are virtually identical to those put forward by the Municipal Electric Association in the CRTC proceeding. In addition, the EDA put forward a model agreement developed co-

operatively by a number of LDCs (the Mearie Group) where the assumptions regarding space allocation for a typical 40 foot pole were identical to those used by Mr. Ford. The Board finds that the CCTA estimates are acceptable.

As stated, the Board believes that a single province-wide rate is in the public interest. As indicated, the Board believes its more realistic to use 2.5 as the number of attachers. The Board agrees with the EDA and CEA that the common costs should be shared equally among all attachers. On these principles and the cost data described above, the annual pole charge is \$22.35 per attacher as set out in Appendix 2.

### **Should there be a standard form of agreement?**

Under the Settlement Agreement, the parties agree to negotiate the terms and conditions once the Board has made its determination as to the rate. The parties agree to report back to the Board in four months as to the progress of these negotiations. The Board accepts this approach.

### **Impact on existing contracts**

In the Settlement Agreement all parties with one exception, agreed that any new rate set by the Board should not apply to existing contracts. The rate would only apply when the current term of existing contracts expired. Where no contract exists, the licence conditions would apply immediately.

The acceptance of this position appears to be driven by the fact that most existing contracts provide for retroactive rate adjustment in the event this Board determines a rate.

The CCTA states that it would not object to a Board ruling that existing contracts without a retroactivity clause are immediately subject to the Board's decision regarding new licence conditions. They claim however, that few contracts do not have retroactivity provisions.

MTS objects to the Settlement Agreement and submits that any pole access rates set by the Board should be applied to all existing contracts not just those with retroactivity clauses. The Board will provide that the new rates and conditions resulting from this decision will apply immediately to those agreements without a retroactivity clause. Those are apparently few in number. This should provide immediate relief to those who are unable to benefit from a retroactivity provision.

**THE BOARD ORDERS THAT:**

The licence conditions of the electricity distributors licenced by this Board shall as of the date of this Order be amended to provide that all Canadian carriers as defined by the Telecommunications Act and all cable companies that operate in the Province of Ontario shall have access to the power poles of the electricity distributors at the rate of \$22.35 per pole per year.

**Dated** at Toronto, March 7, 2005.

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Gordon E. Kaiser  
Vice Chair and Presiding Member

**Appendix 1: CCTA Recommended Charge (2 Attachers)**

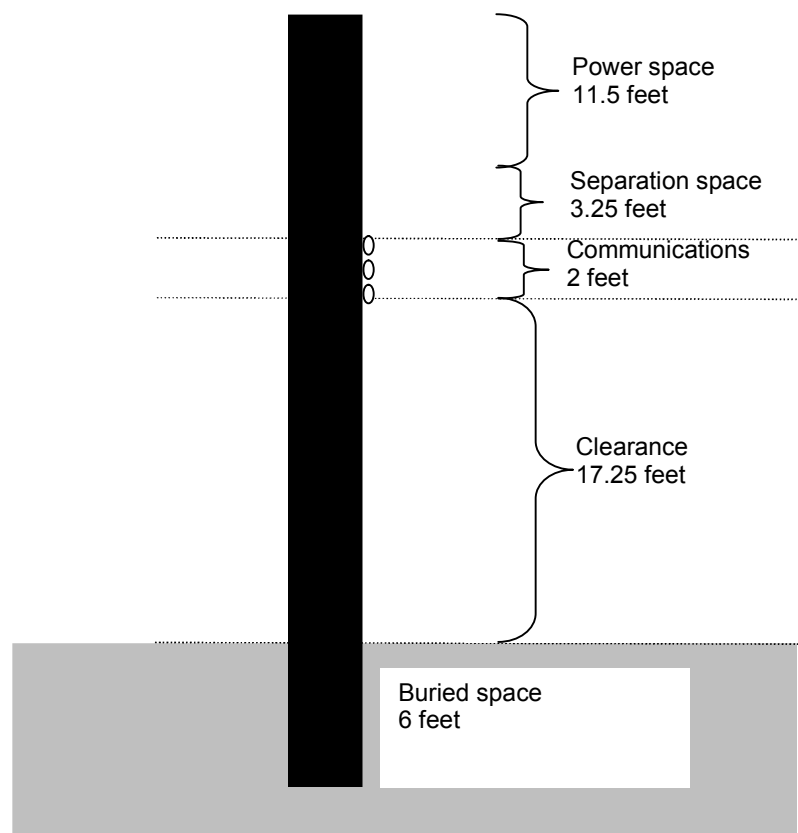
|   | <b>Price Component - Per Pole</b> | <b>\$</b> | <b>Explanation</b>                                                                      |
|---|-----------------------------------|-----------|-----------------------------------------------------------------------------------------|
|   | DIRECT COST                       |           |                                                                                         |
| A | Administration Costs              | \$0.69    | CRTC estimate 1999 \$0.62, plus inflation                                               |
| B | Loss in Productivity              | \$1.92    | MEA estimate 1991 = \$3.08, plus inflation, and divided between two pole attachers      |
| C | Total Direct Costs                | \$2.61    | A + B                                                                                   |
|   |                                   |           |                                                                                         |
|   | INDIRECT COSTS                    |           |                                                                                         |
| D | Net Embedded Cost per pole        | \$478.00  | Milton Hydro 1995 = \$478                                                               |
| E | Depreciation Expense              | \$31.11   | Milton Hydro 1995 = \$31.11                                                             |
| F | Pole Maintenance Expense          | \$7.61    | Milton Hydro 1995 = \$6.47, plus inflation                                              |
| G | Capital Carrying Cost             | \$45.41   | Pre-tax weighted average cost of capital 9.5% applied to net embedded cost per pole (D) |
| H | Total Indirect Costs per Pole     | \$84.13   | E+F+G                                                                                   |
|   |                                   |           |                                                                                         |
| I | Allocation Factor                 | 15.5%     | CRTC allocation                                                                         |
|   |                                   |           |                                                                                         |
| J | Indirect Costs Allocated          | \$13.04   | H x I                                                                                   |
|   |                                   |           |                                                                                         |
| K | Annual Pole Rental Charge         | \$15.65   | C + J                                                                                   |

## Appendix 2: 2.5 Attachers - Shared Costs Evenly Spread Amongst All Users

|   | <b>Price Component - Per Pole</b> | <b>\$</b> | <b>Explanation</b>                                                                        |
|---|-----------------------------------|-----------|-------------------------------------------------------------------------------------------|
|   | DIRECT COST                       |           |                                                                                           |
| A | Administration Costs              | \$0.69    | CRTC estimate 1999 \$0.62, plus inflation                                                 |
| B | Loss in Productivity              | \$1.23    | MEA estimate 1991 = \$3.08, plus inflation, and divided between 2.5 pole attachers        |
| C | Total Direct Costs                | \$1.92    | A + B                                                                                     |
|   |                                   |           |                                                                                           |
|   | INDIRECT COST                     |           |                                                                                           |
| D | Net Embedded Cost per pole        | \$478.00  | Milton Hydro 1995 = \$478                                                                 |
| E | Depreciation Expense              | \$31.11   | Milton Hydro 1995 = \$31.11                                                               |
| F | Pole Maintenance Expense          | \$7.61    | Milton Hydro 1995 = \$6.47, plus inflation                                                |
| G | Capital Carrying Cost             | \$54.59   | Pre-tax weighted average cost of capital 11.42% applied to net embedded cost per pole (D) |
| H | Total Indirect Costs per Pole     | \$93.31   | E+F+G                                                                                     |
|   |                                   |           |                                                                                           |
| I | Allocation Factor                 | 21.9%     | Allocation based on 2.5 attachers                                                         |
|   |                                   |           |                                                                                           |
| J | Indirect Costs Allocated          | \$20.43   | H x I                                                                                     |
|   |                                   |           |                                                                                           |
| K | Annual Pole Rental Charge         | \$22.35   | C + J                                                                                     |

TAB 2

**Figure 1: 40-Foot Joint-Use Pole**



Total Height: 40 feet.

TAB 3



**ONTARIO ENERGY BOARD**

**IN THE MATTER OF** the *Ontario Energy Board Act, 1998*,  
S.O. 1998, c. 15 (Schedule B);

**AND IN THE MATTER OF** an Application by the **Canadian  
Distributed Antenna Systems Coalition** for certain  
orders under the *Ontario Energy Board Act, 1998*.

**WRITTEN EVIDENCE**

**OF**

**TORMOD LARSEN**

**26 July 2011**



# AS-BUILT

FIBER OPTIC NODE INSTALLATION - 559  
1233 JANE ST, 2nd POLE NORTH OF CORNELL AVE, EAST SIDE, POLE # 253  
TORONTO, CANADA

SITE LOCATION MAP



(Latitude: N43.689265°)  
(Longitude: W79.500232°)

SITE LOCATION PHOTO



**Arizon**  
Technologies Inc.  
CONTACT: NEHA CANJAR  
27 RIVA CRESCENT  
TORONTO, ONTARIO M6W 3R1  
TEL: (416) 752-8899  
FAX: (416) 752-8899  
EMAIL: neha@arizon.ca  
www.arizon.ca

| REVISIONS |           | BY               |
|-----------|-----------|------------------|
| REV       | DATE      | DESCRIPTION      |
| 01        | SEP 01/09 | PERMIT DRAWING   |
| 02        | APR 15/10 | AS-BUILT DRAWING |
| 03        |           |                  |
| 04        |           |                  |
| 05        |           |                  |
| 06        |           |                  |
| 07        |           |                  |
| 08        |           |                  |



TITLE: AS BUILT  
FIBER OPTIC NODE 559  
INSTALLATION  
TORONTO, CANADA

|           |             |              |
|-----------|-------------|--------------|
| DRAWN BY: | CHECKED BY: | APPROVED BY: |
| A.E.      |             |              |

|                 |                    |
|-----------------|--------------------|
| PROJECT NUMBER: | 09-0015A           |
| FILE NUMBER:    | TORONTO NODE 559   |
| DATE DRAWN:     | SEPTEMBER 01, 2009 |
| SCALE:          | N.T.S.             |

|        |        |
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| 4. PROJECT PLAN VIEW           |

## GENERAL NOTES

Developer: DASCOM

ATTN: DAVE FASCHAUER  
3600 WARRENVILLE ROAD  
SUITE 400  
LISLE, IL 60532

Contractor: TBD

Engineer: G.G. SANI  
ARIZON TECHNOLOGY

### SCOPE OF WORK

1. INSTALLATION OF EX-TENET NODE EQUIPMENT, AND ALL RELATED APPURTENANCES FOR FIBER OPTIC CABLE INSTALLATION. SEE PLANS FOR EXACT LOCATION, LENGTHS, QUANTITIES, AND DIMENSIONS OF PROPOSED IMPROVEMENTS.
2. THE CONTRACTOR SHALL PROVIDE ALL MATERIAL, EQUIPMENT, LABOUR, INSTALLATION, RESTORATION, UTILITY RELOCATION CHARGES, JOB SITE DELIVERY COSTS TO COMPLETE THE DESCRIBED, OR ILLUSTRATED WORK UNDER THIS CONTRACT.

3. ANY CHANGE ORDER REQUEST MUST BE PRESENTED IN WRITING TO THE OWNER'S REPRESENTATIVE, AND APPROVED PRIOR TO PROCEEDING WITH THE REQUESTED CHANGE. DOCUMENTATION CONCERNING ANY AND ALL CHANGE ORDERS WILL BE REDUCED TO FORMAL RECORD, FILED WITH THE OWNER'S REPRESENTATIVE, AND BE MADE AVAILABLE FOR FUTURE REFERENCE.

4. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ASSUMING ANY LIABILITY FOR NEGLIGENCE, ACTS OR ERRORS OF OMISSIONS OF ANY CONTRACTOR, ANY SUB-CONTRACTOR, OR ANY OF THE CONTRACTORS OR SUB-CONTRACTORS' AGENTS OR EMPLOYEES OR ANY OTHER PERSONS (EXCEPT ENGINEERS' OWN EMPLOYEES) AT THE PROJECT SITE OR OTHERWISE PERFORMING ANY OF THE WORK OF THE PROJECT. ANY CONTRACTOR OR SUB-CONTRACTOR, AS WELL AS THE ENGINEER, WILL BE RESPONSIBLE FOR HIS OWN SAFETY PROGRAM. NEITHER THE PROFESSIONAL ACTIVITIES OF THE ENGINEER, NOR THE PRESENCE OF THE ENGINEER OR HIS OR HER EMPLOYEES AND SUB-CONSULTANTS AT THE CONSTRUCTION SITE, SHALL RELIEVE ANY CONTRACTOR OF HIS OR HER OBLIGATIONS, DUTIES AND RESPONSIBILITIES INCLUDING, BUT NOT LIMITED TO, CONSTRUCTION METHODS, SEQUENCE, TECHNIQUES OR PROCEDURES NECESSARY FOR PREVENTING SUPERSTRESSING OR COORDINATING ALL PORTIONS OF THE WORK OR CONSTRUCTION IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND ANY HEALTH OR SAFETY PRECAUTIONS REQUIRED BY ANY REGULATORY AGENCIES. THE ENGINEER AND HIS OR HER PERSONNEL HAVE NO AUTHORITY TO EXERCISE ANY CONTROL OVER ANY CONSTRUCTION CONTRACTOR OR OTHER ENTITY OR THEIR EMPLOYEES IN CONNECTION WITH ANY HEALTH OR SAFETY PRECAUTIONS.

### MATERIALS

1. ALL MATERIALS, INSTALLED WITHIN THE LIMITS OF THE PROJECT SHALL BE IN CONFORMANCE WITH STANDARD RECOMMENDATIONS OF THE NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION AND CANADIAN NATIONAL STANDARDS INSTITUTE.
2. ALL TRENCHED CONDUIT, ELBOWS AND COUPLINGS SHALL BE 100mm (4") HDPE, UNLESS OTHERWISE NOTED.
3. JOB SITE MATERIAL WILL BE DELIVERED TO, AND MAINTAINED AT, THE STREET WORK AREAS IN A WELL MANAGED MANNER, TO MINIMIZE CONGESTION OR INTERFERENCE TO OTHER WORKERS, OR CONTRACTORS WORKING UNDER ALTERNATE PERMITS.

### GENERAL NOTES

1. THESE NOTES SHALL BE CONSIDERED A PART OF THE WRITTEN SPECIFICATIONS
2. THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT APPURTENANCES AND LABOUR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
3. PRIOR TO THE SUBMISSION OF THE BIDS, THE CONTRACTORS SHALL VISIT THE JOB SITE AND BE RESPONSIBLE FOR ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS, AND CONSTRUCTION MATERIALS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOCATION OF THE CONSTRUCTION. ANY DISCREPANCIES ARE TO BE BROUGHT TO THE ATTENTION OF THE IMPLEMENTATION ENGINEER AND ENGINEER PRIOR TO PROCEEDING WITH THE WORK.
4. THE CONTRACTOR SHALL RECEIVE IN WRITING, AUTHORIZATION TO PROCEED BEFORE STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED OR IDENTIFIED BY THE CONTRACT DOCUMENTS.
5. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY INDICATED OTHERWISE OR WHERE LOCAL CODES OR REGULATIONS TAKE PRECEDENCE.
6. ALL WORK PERFORMED AND MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK, MECHANICAL AND ELECTRICAL SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
7. THE GENERAL CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK, USING THE BEST SKILLS AND ATTENTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATION ALL PORTIONS OF THE WORK UNDER THE CONTRACT INCLUDING CONTACT AND COORDINATION WITH THE ENGINEER AND WITH THE LANDLORD'S AUTHORIZED REPRESENTATIVE.
8. SEAL PENETRATIONS THROUGH THE RATED AREAS WITH ULL LISTED FIRE CODE APPROVED MATERIALS.
9. PROVIDE A PORTABLE FIRE EXTINGUISHER WITH A RATING OF NOT LESS THAN 2-A OR 2-A:10-B:CG WITHIN 75 FEET TRAVEL DISTANCE TO ALL PORTIONS OF THE PROJECT AREA DURING CONSTRUCTION.
10. DETAILS ARE INTENDED TO SHOW END RESULTS OF DESIGN. MINOR MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK.
11. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, PAVING, CURBS, VEGETATION, GALVANIZED SURFACES, ETC., AND UPON COMPLETION OF WORK REPAIR ANY DAMAGE THAT OCCURRED DURING CONSTRUCTION TO THE SATISFACTION OF EX-TENET.
12. KEEP GENERAL AREA CLEAN, HAZARD FREE, AND DISPOSE OF ALL DIRT, DEBRIS, RUBBISH AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY. LEAVE PREMISES IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST OR SMUDGES OF ANY NATURE.
13. REPRESENTATIONS OF TRUE NORTH, OTHER THAN THOSE FOUND ON THE OF SURVEY DRAWING, SHALL NOT BE USED TO IDENTIFY OR ESTABLISH THE BEARING OF TRUE NORTH AT THE SITE. THE CONTRACTOR SHALL RELY SOLELY ON THE PLAT OF SURVEY DRAWING AND ANY SURVEYOR'S MARKINGS AT THE SITE FOR THE ESTABLISHMENT OF TRUE NORTH, AND SHALL NOTIFY THE ENGINEER PRIOR TO PROCEEDING WITH THE WORK IF ANY DISCREPANCY IS FOUND BETWEEN THE VARIOUS ELEMENTS OF THE WORKING DRAWING AND THE TRUE NORTH ORIENTATION IS DEPENDENT ON THE CIVIL SURVEY. THE CONTRACTOR SHALL ASSUME SOLE LIABILITY FOR ANY FAILURE TO NOTIFY THE ENGINEER.
14. PENETRATIONS OF ROOF MEMBRANES SHALL BE PATCHED/FLASHED AND MADE WATERTIGHT USING LIKE MATERIALS IN ACCORDANCE WITH NRCA ROOFING STANDARDS AND DETAILS. CONTRACTOR SHALL OBTAIN DETAILING CLARIFICATION FOR SITE-SPECIFIC CONDITIONS FROM ENGINEER, IF NECESSARY, BEFORE PROCEEDING. PLANS ARE NOT TO BE SCALED AND ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE ONLY, UNLESS NOTED OTHERWISE.
15. ALL ITEMS REMOVED DURING CONSTRUCTION WORK (I.E. DRYWALL, PLYWOOD, CEILING PANELS, ETC.) SHALL BE REPLACED TO MATCH EXISTING.
16. PLANS ARE NOT TO BE SCALED AND ARE INTENDED TO BE DIAGRAMMATIC OUTLINE ONLY, UNLESS NOTED OTHERWISE.
17. DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALES SHOWN ON THE DRAWING. DIMENSIONS SHOWN ARE ESTIMATED AND SHALL BE VERIFIED BY A SURVEYOR OR BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
18. ALL SITE WORK SHALL BE CAREFULLY COORDINATED BY GENERAL CONTRACTOR WITH LOCAL UTILITY COMPANY, TELEPHONE COMPANY, AND ANY OTHER UTILITY COMPANIES HAVING JURISDICTION OVER THIS LOCATION.
19. CONTRACTOR IS ADVISED TO READ ALL NOTES ON DRAWINGS, CAREFULLY. THE CONTRACTOR SHALL CHECK AND VERIFY ALL CONDITIONS, CLEARANCES, AND DIMENSIONS AT THE SITE AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

20. THE CONTRACTOR SHALL PERFORM TEST HOLES AT ALL UTILITY CROSSINGS TO VERIFY THE LOCATION AND ELEVATION OF ALL UTILITIES PRIOR TO ANY EXCAVATION, AND TO LOCATE ANY POSSIBLE OBSTRUCTIONS. CONTRACTOR TO FIELD VERIFY LOCATIONS OF ALL OVERHEAD OBSTRUCTIONS PRIOR TO COMMENCEMENT OF WORK.
21. THE POSITION OF POLE LINES, CONDUITS, WATER MAINS, SEWERS AND OTHER UNDERGROUND AND ABOVE GROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN AS EXACT. THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL CONFIRM THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM. THE CONTRACTOR SHALL CONTACT ONTARIO ONE CALL (800-469-2262) TO REQUEST LOCATING AND MARKING OF EXISTING UTILITIES PRIOR TO PERFORMING ANY EXCAVATION WORK IN OR AROUND ANY UTILITY. THE CONTRACTOR SHALL OBTAIN ALL PERMITS FOR THE INSTALLATION OF THE NEW UTILITIES AND SHALL COMPLY WITH ALL REQUIREMENTS OF ALL AGENCIES HAVING JURISDICTION OVER THE WORK.
22. THE CONTRACTOR SHALL VERIFY EXISTING STREET RIGHTS OF WAY TO THE EXTENT NECESSARY TO VERIFY PROPOSED WORK REMAINS WITHIN THESE RIGHTS OF WAY AND DOES NOT INFRINGE ONTO A PRIVATE PROPERTY NOT OWNED BY THE OWNER.
23. ALL DISCREPANCIES SHOULD BE REPORTED TO EX-TENET SYSTEMS. ANY QUESTIONS OR COMMENTS THE CONTRACTOR MAY HAVE ARE TO BE DISCUSSED WITH THE OWNER AND ENGINEER PRIOR TO CONSTRUCTION COMMENTS.
24. FURTHER THE CONTRACTOR SHALL RECORD THE LOCATION AND ELEVATION OF ALL UTILITIES ENCOUNTERED, AND INSTALLATION OF NEW WORK, AS THE WORK PROGRESSES AND SHALL PREPARE RECORD DRAWINGS (REDLINES) BASED ON HIS RECORDS. THESE RECORDS TO BE SUPPLIED TO DASCOM SYSTEMS, AT COMPLETION OF WORK.
25. SCALE FOR DRAWINGS IS FOR GENERAL INFORMATION ONLY. LOCATIONS AND DIMENSIONS SHALL BE TAKEN AS SHOWN AND THE DRAWINGS SHALL NOT BE SCALED.
26. THE CONTRACTOR SHALL HAVE ALL PERMITS OBTAINED AND COMPLY WITH THE REQUIREMENTS OF ALL AGENCIES HAVING JURISDICTION OVER THE WORK AND SHALL COORDINATE HIS WORK WITH THE WORK PERFORMED BY OTHERS.
27. CONTRACTOR SHALL COORDINATE ALL WORK WITH ALL PUBLIC AND PRIVATE UTILITIES AS WELL AS CITY OF TORONTO.
28. CONTRACTOR SHALL TAKE ALL NECESSARY SAFETY PRECAUTIONS TO PROTECT UTILITIES, PEDESTRIANS, WORKERS AND VEHICULAR TRAFFIC. THE CONTRACTOR SHALL PROVIDE TEMPORARY FENCES, BARRICADES, ETC. AS REQUIRED TO PROTECT ADJACENT PROPERTY AND THE PUBLIC DURING ALL PHASES OF CONSTRUCTION.
29. THE CONTRACTOR SHALL INSTALL AND DESIGN WOODEN PASSAGEWAYS TO DIVERGE THE GENERAL PUBLIC AROUND THE CONSTRUCTION SITE IN A SAFE AND ORDERLY MANNER, AS REQUIRED.
30. NO STORAGE OF EQUIPMENT OR MATERIALS IN THE ROADWAY IS PERMITTED. UNLESS THE CONTRACTOR OBTAINS WRITTEN PERMISSION FROM THE CITY OF TORONTO.
31. CONTRACTOR SHALL ASSUME ALL CABLES ARE ENERGIZED AND SHALL BE SUPPORTED SO AS NOT TO STRESS AND PORTION OF THE CABLE.
32. CONTRACTOR RESPONSIBLE FOR OBTAINING AND PROVIDING REVIEW AND DESIGN OF ANY AND ALL TEMPORARY UTILITY SUPPORT SYSTEMS PRIOR TO CONSTRUCTION.
33. ALL CONSTRUCTION MUST COMPLY WITH:
  - a. EX-TENET STANDARDS
  - b. TRANSPORT CANADA GENERAL ORDERS E11.8, E12 AND CANADIAN STANDARDS ASSOCIATION STANDARD CAN/CSA-C22.3 No. 1487 AND CAN C22.3 No. 1484 AS APPLICABLE
  - c. ONTARIO ELECTRICAL CODE
  - d. EISA (ELECTRICAL UTILITIES SAFETY ASSOCIATION) RULEBOOK
  - e. OCCUPATIONAL HEALTH AND SAFETY ACT.



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EMAIL: ben@arizon.ca  
www.arizon.ca

| REV | DATE     | DESCRIPTION      | BY   |
|-----|----------|------------------|------|
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| 02  | 04/01/10 | AS BUILT DRAWING | A.E. |
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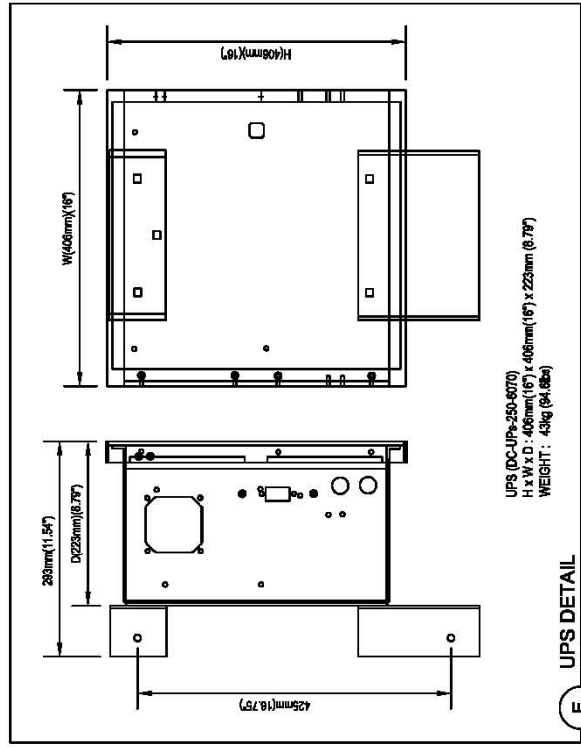
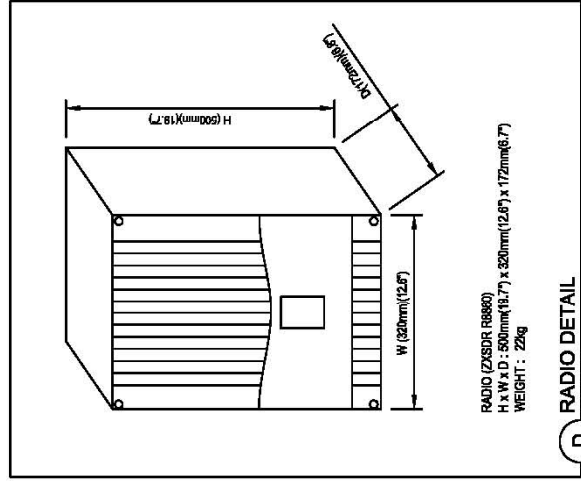
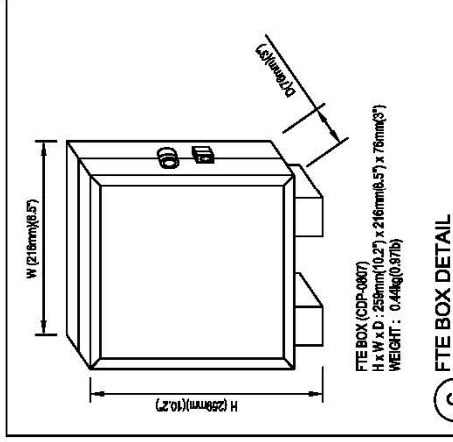
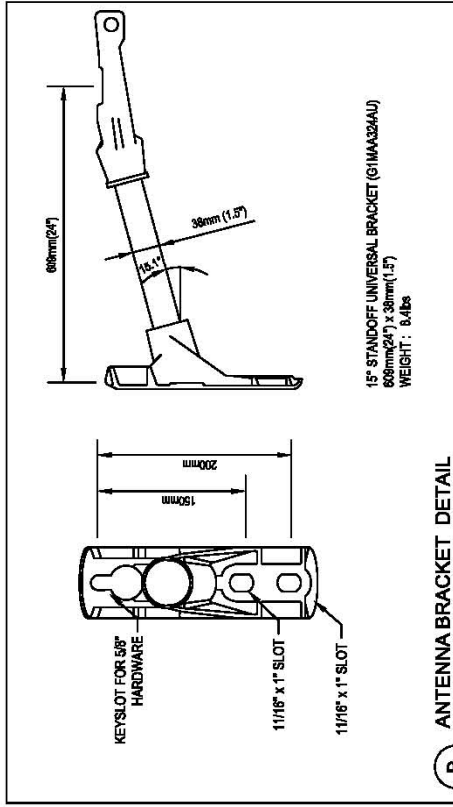
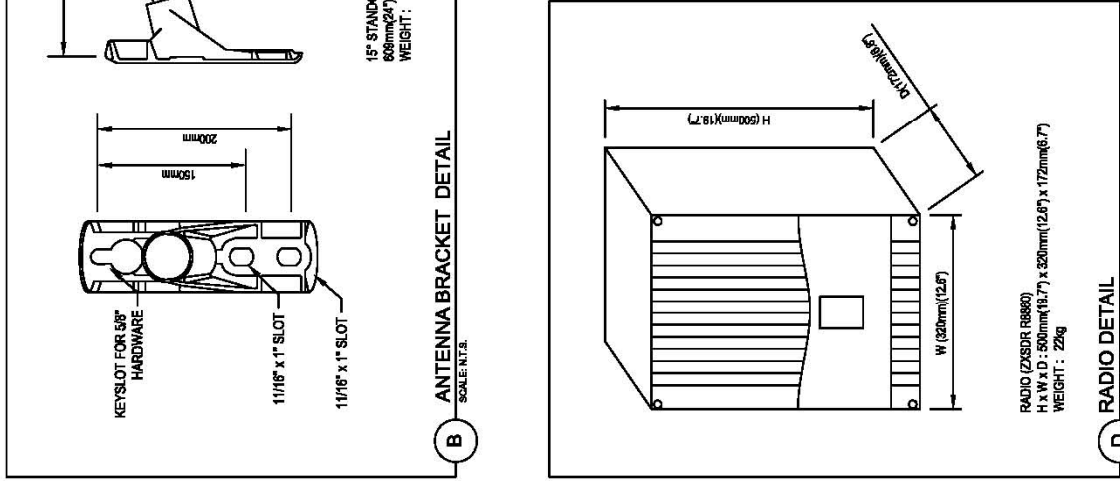
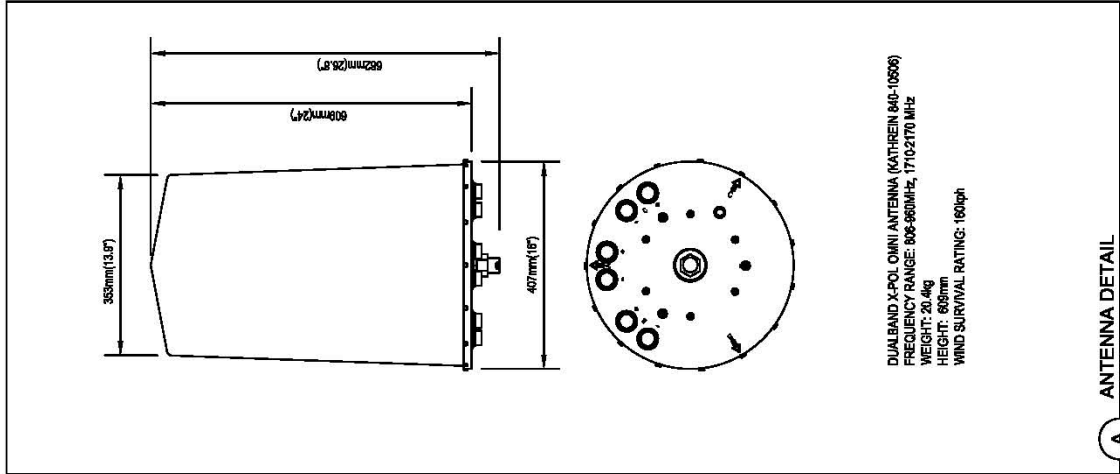


TITLE  
AS BUILT  
FIBER OPTIC NODE 559  
INSTALLATION  
TORONTO, CANADA

| DESIGNED BY:    | CHECKED BY:        | APPROVED BY: |
|-----------------|--------------------|--------------|
| A.E.            |                    |              |
| PROJECT NUMBER: | 09-0015A           |              |
| FILE NUMBER:    | TORONTO NODE 559   |              |
| DATE DRAWN:     | SEPTEMBER 01, 2008 |              |
| SCALE:          | N.T.S.             |              |
| SHEET:          | 2 OF 4             |              |



# EQUIPMENT SPECIFICATION



**Arion**  
Technologies Inc.  
CONTACT: NEIL KAMAR  
27 ELM STREET  
TORONTO, ONTARIO M4W 3R1  
TEL: (416) 945-4220  
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EMAIL: n.kamar@arion.ca  
www.arion.ca

| REV | DATE       | DESCRIPTION      | BY   |
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TITLE: AS BUILT  
FIBER OPTIC NODE 559  
INSTALLATION  
TORONTO, CANADA

|              |      |             |  |              |  |
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| PROJECT NUMBER: | 09-0015A           |
| FILE NUMBER:    | TORONTO NODE 559   |
| DATE DRAWN:     | SEPTEMBER 01, 2009 |
| SCALE:          | N.T.S.             |

SHEET: 3 OF 4

## NOTES

1. EQUIPMENT/ANTENNA PLACING NEAR POWER LINES AND COMMUNICATION CABLES INSTALLED PER POLE OWNERS/UTILITY COMPANY SPECIFICATIONS.
2. EQUIPMENT MOUNTING HEIGHTS AND ORIENTATION ARE SHOWN FOR ILLUSTRATION PURPOSES & MAY VARY. EQUIPMENT INSTALLED PER POLE OWNERS/UTILITY COMPANY SPECIFICATIONS.

**CERTIFICATE OF APPROVAL**

THIS CONSTRUCTION STANDARD MEETS THE SAFETY REQUIREMENTS OF SECTION 4 OF ONTARIO REGULATION 2204

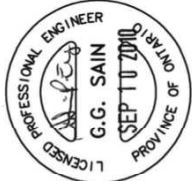
**SEP 10 2010**

**DATE**

**Susan P. Chow**

**Susan P. Chow**

**REGISTERED PROFESSIONAL ENGINEER**



**ARIZON**  
Technologies Inc.

CONTACT: NEHA CAHAR  
27 FINA CRESCENT  
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[www.arizon.ca](http://www.arizon.ca)

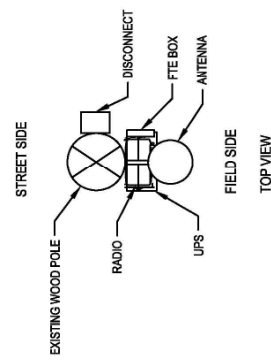
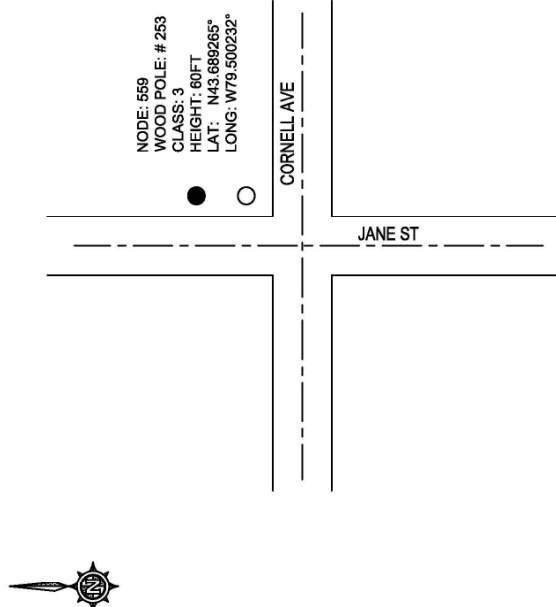
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| TITLE: AS BUILT      |             | APPROVED BY: |
| FIBER OPTIC NODE 559 |             |              |
| INSTALLATION         |             |              |
| TORONTO, CANADA      |             |              |
| DRAWN BY:            | CHECKED BY: |              |

|                |                    |  |
|----------------|--------------------|--|
| A.E.           |                    |  |
| PROJECT NUMBER | 09 - 0015A         |  |
| FILE NUMBER    | TORONTO NODE 559   |  |
| DATE DRAWN     | SEPTEMBER 01, 2009 |  |
| SCALE          | N.T.S.             |  |

SHEET: 4 OF 4



|                                                                                                                                       |                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b>RECORD OF INSPECTION STAMP</b><br><b>THIRD PARTY AS CONSTRUCTED</b>                                                                |                                                                                                                                          |
| <b>RECORD OF INSPECTION</b>                                                                                                           |                                                                                                                                          |
| <input type="checkbox"/> AS CONSTRUCTED<br><input type="checkbox"/> AIRBATH INSTALLATION<br><input type="checkbox"/> URN INSTALLATION | WORKSHEET<br><input type="checkbox"/> SOUTH DISTRICT<br><input type="checkbox"/> EAST DISTRICT<br><input type="checkbox"/> WEST DISTRICT |
| WITH CHANGES FROM THIS DRAWING<br>DRAWING NUMBER _____<br>OWNER _____                                                                 | DATE _____<br>PRINT NAME _____<br>POSITION _____<br>SIGNATURE _____                                                                      |
| The installation work covered by this plan meets the<br>Safety Requirements of section 4 of<br>Ontario Regulation 2904                |                                                                                                                                          |

**LOW GROUND CONSTRUCTION NOTES:**

**STANDARD GROUNDING NOTES:**

- 1. CONDUIT TESTED AT 5 OHMS OR LESS.
- 2. 20mm X 2.5m ROD, C&D WELD BOLD GRADE.
- 3. 4" WOOD MOLLING STARTED EVERY 1m AND AT EACH END.
- 4. 6" STANDARD ROD PLACED MINIMUM 1m FROM POLE.

**STANDARD CONDUIT NOTES:**

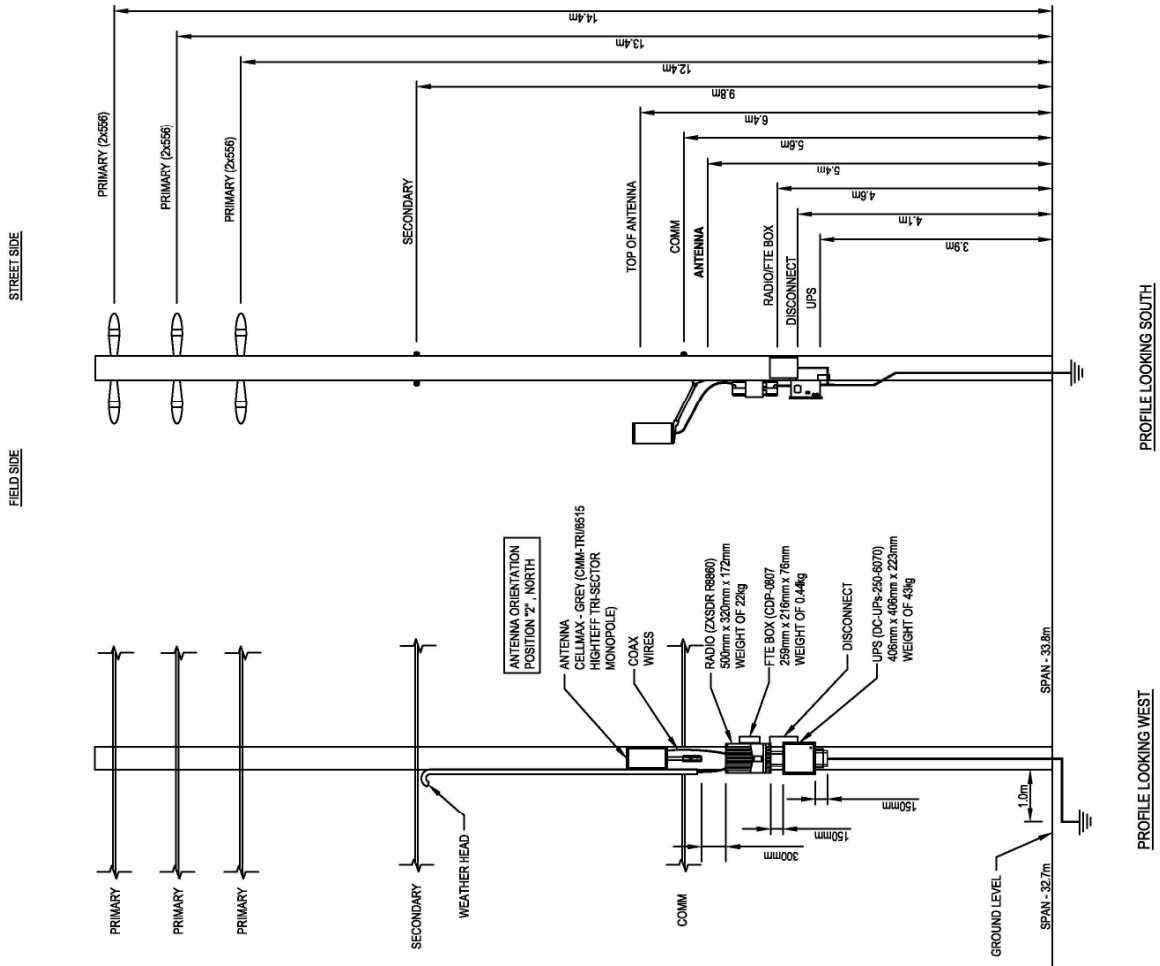
- 1. FOR UNDERGROUND USE SCHEDULE 40.
- 2. FOR RISERS USE SCHEDULE 80.
- 3. CONDUIT FOR ANY CONDUIT UNDER 80mm CONVERT 100mm JASCON CONDUIT TO 80mm AT BASE POLE.
- 4. GC TO LIFT UP POLE 25mm W/80mm POWER CONDUIT. POWER CO. ALL CONDUIT WILL BE EQUIPPED WITH ROPE.

**STANDARD TRENCHING NOTES:**

- 1. MANTIN 1.0m MINIMUM COVER FOR ELECTRICAL CONDUIT.
- 2. MANTIN 175mm MINIMUM COVER FOR COMMUNICATIONS CONDUIT

**LOW VOLTAGE POLE CONSTRUCTION NOTES:**

- 1. NO BOLT THREADS TO PROTRUDE MORE THAN 40mm.
- 2. FILL ALL HOLES LEFT IN POLE FROM REARRANGEMENT OF CLIMBERS.
- 3. ALL CLIMB STEPS LEFT TO CLIMB SHALL HAVE EXTENDED STEPS.
- 4. CABLE NOT TO IMPEDER 30cm CLEAR SPACE OFF POLE FACE (1200mm).
- 5. AT SPOKE SHEETS CONDUIT WITHIN ANGLE CABLES ONLY. TRANSITION TO 100mm CABLES TO BE USED FOR ALL OTHER CABLES.
- 6. USE POLE CLAMPS TO SECURE CABLE TO ANGLE. PLACE 50mm EXTERNAL CABLE ID TAGS ON BOTH SIDES OF ANGLE.
- 7. USE W/CONNECTION AT THE CABLE CONNECTION TO OWNI DOWN ANTENNAS.
- 8. PLACE GRP ON ANGLE WITH SOUTHERN SKY EXPOSURE AT MINIMUM 20cm FROM ANGLE.
- 9. USE 100mm CABLE ON ANTENNAS UNLESS OTHERS SPECIFIED.
- 10. FILL VOID AROUND CABLES AT CONDUIT OPENING WITH FOAM SEALANT TO PREVENT WATER INGRESS.



TAB 4

Gowling Lafleur Henderson LLP | Barristers & Solicitors | Patent & Trade Mark Agents

**GOWLINGS**

Suite 5800, Scotia Plaza  
40 King Street West  
Toronto, Ontario  
Canada M5H 3Z7  
Telephone (416) 369-7200  
Facsimile (416) 369-7250  
www.gowlings.com

October 19, 2004

**VIA COURIER**

Mr. John Zych  
Board Secretary  
Ontario Energy Board  
26th Floor  
2300 Yonge Street  
Toronto, Ontario  
M4P 1E4

Dear Mr. Zych:

**Re: RP-2004-0249/EB-2003-0310 – Settlement Agreement**

Please find attached the Settlement Agreement for the RP-2003-0049 proceeding. All listed parties have agreed with the Settlement Agreement.

Sincerely,



Tom Brett

Enclosure

cc: Ms. Lori Assheton-Smith (CCTA)  
Ms. Bernadette Corpuz (Gowlings)  
TOR\_LAW\5863626\1

Tom Brett  
Direct (416) 369-4628  
tom.brett@gowlings.com  
**RECEIVED**

OCT 19 2004

ONTARIO ENERGY BOARD

RP-2003-0249

| OEB BOARD SECRETARY |              |
|---------------------|--------------|
| File No:            | SubFile: 19  |
| Panel               | GK/PS/CC     |
| Licensing           | JF/ZC/BLH/ML |
| Other               |              |
| 00/04               |              |

## **Canadian Cable Television Association Proceeding**

# **SETTLEMENT AGREEMENT**

## **October 19, 2004**

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- 2 -

#### **DRAFT ADR AGREEMENT (October 14, 2004)**

This Alternative Dispute Resolution Agreement ("Agreement") is for the consideration of the Ontario Energy Board ("the Board") under Docket No. RP-2003-0249. Attached as Appendix A to the Agreement is the Board's issues list which was issued through Procedural Order number 3 dated July 7, 2004. The Agreement identifies the issues on the Board's list for which agreement has been reached. The Agreement is supported by the evidence filed in RP-2003-0249.

Issues fall into three categories:

- (a) issues on which there is no agreement;
- (b) issues on which there is complete agreement; and
- (c) issues on which parties take specific positions as shown

It is acknowledged and agreed that none of the completely settled provisions of this Agreement are severable. If the Board does not, prior to the commencement of the hearing of the evidence in RP-2003-0249, accept the completely settled provisions of the Agreement in its entirety, there is no Agreement (unless the parties agree that any portion of the Agreement the Board does accept may continue as a valid Agreement).

It is further acknowledged and agreed that parties will not withdraw from this Agreement under any circumstances except as provided under Rule 32.05 of the Ontario Energy Board's Rules of Practice and Procedure.

It is also acknowledged and agreed that this Agreement is without prejudice to parties reexamining these issues in a future proceeding.

The parties agree that all positions, information, documents (including any subsequent revisions), negotiations and discussion of any kind whatsoever which took place or were exchanged during the Settlement Conference are strictly confidential and without prejudice, and inadmissible unless relevant to the resolution of any ambiguity that subsequently arises with respect to the interpretation of any provision of this Agreement.

The role adopted by Board Staff in Settlement Conferences is set out on page 5 of the Board's Settlement Conference Guidelines. As noted in that document, "Board Staff who participate in the settlement conference are bound by the same confidentiality standards that apply to parties to the proceeding." Board Staff is not a party to this Agreement.

By Procedural Order No. 4 dated October 1, 2004, the Board scheduled a Settlement Conference to commence October 13, 2004. The Settlement Conference was duly convened, in accordance with Procedural Order No. 4, with Ms. Gail Morrison as facilitator. The Settlement Conference proceeded until October 14, 2004.

- 3 -

The following parties participated in the Settlement Conference:

The Canadian Cable Television Association ("CCTA")  
The Canadian Electrical Association ("CEA")  
The Electricity Distribution Association ("EDA")  
MTS Allstream Inc.  
Hydro One Networks Inc. ("Hydro One")  
Energy Probe  
360 Networks / London Connect  
Power Workers Union ("PWU")  
Quebecor Media Inc.

- 4 -

**Preamble:**

The parties agree that this settlement agreement was entered into under the direction of the facilitator to assume for purposes of engaging in this settlement process and assisting the OEB that Issue No. 1 is answered in the affirmative. The positions and/or agreements of the CEA, EDA, and Hydro One in respect of Issues Nos. 2 through to 5 are not to be construed as their acknowledgement or agreement that regulation of access to LDCs' poles in any form should exist.

The parties' positions on each of the issues are as follows:

**1. Should the Board set licence conditions for distributors with respect to joint pole use providing for conditions of access, including the charge for such access?**

Position of the CCTA, MTS Allstream, Quebecor Media, and Energy Probe, 360 Networks/ London Connect:

Yes

Position of the EDA, CEA, PWU and Hydro One:

No

Position of the Power Workers Union

The PWU agrees with the EDA, CEA and Hydro One that the Board should not regulate the charge for access, but believes that the Board should set certain core conditions of access. For example, the PWU's position is that the Board should impose conditions that access should only be permitted to the extent that it does not have an adverse impact on the safety, system reliability, or other operational requirements of the LDC's distribution system.

However, the PWU is content that the issue of what conditions should apply be deferred to form part of issue four, at a subsequent stage of this hearing.

**2. If the Board does set conditions of access, to what types of cable or telecommunications service providers should these conditions apply to?**

All parties agree as follows:

If the Board does set conditions of access, these conditions should apply to access to the communications space on an LDC's poles by Canadian Carriers as defined in the *Telecommunications Act* and cable companies; provided, however, that these conditions shall not apply to joint-use arrangements between incumbent local exchange carriers and hydro distributors that grant reciprocal access to each other's poles.

- 5 -

**3. If the Board does set conditions of access, what is the appropriate charge for joint pole use?**

- a. What principles, elements and methodology should be considered in the calculation of the charge?**
- b. How should the charge be applied?**
- c. Should it be a uniform charge for the entire province?**

**Issue 3(a)**

The parties agree that:

(a) With respect to the issue of what principles, elements and methodology should be considered in the calculation of the charge, the principles of economic efficiency, fairness, and competitive neutrality should be considered, and the pole charge should reflect the fact that poles are monopoly assets;

(b) Assuming that one time costs are recovered through one time charges, recurring charges should be not less than incremental costs and not more than stand-alone costs; and

(c) Recurring charges should (1) provide for full recovery of incremental costs and (2) contribute towards embedded costs.

The parties disagree upon the method to determine the contribution toward embedded costs.

Position of the CCTA, MTS Allstream, 360 Networks/London Connect and Quebecor Media:

The contribution should be determined as a usage-based allocation of fixed costs measured on an embedded basis (as recorded in the books of the utility). The usage-based allocation should reflect the actual usage of the communications space on the pole (the 2 feet immediately above the clearance space) plus a proportional share of the neutral separation space (the 3.25 feet between the communications space and the power space).

Position of the EDA, CEA, PWU and Hydro One:

The EDA, CEA and Hydro One believe that local negotiations should determine the proper contribution.

If local negotiations fail, a procedure, to be put in place by the Board, should be available so that the parties can have the matter determined. In the context of that process (whether it be an application to the Board or submission to some

- 6 -

form of ADR process), the LDC would be required to justify the rate it seeks to charge on one or more of the following bases, among others:

- (a) Take as a departure point a hypothetical joint use pole where each user has the same requirements. The costs of these requirements would be shared equally, and the additional costs of each user's incremental requirements would be borne by each user individually.
- (b) Allocate shares of total cost based on the relative costs that would be borne by each user on a stand-alone basis.
- (c) Divide the savings realized from a joint-use pole, relative to stand-alone support structures, on an equal basis.
- (d) A relevant consideration may be relative revenues.

Other allocation methodologies might be appropriate, excluding the CCTA's recommended usable pole space methodology, but in any case the onus is on the LDC to justify its chosen methodology.

#### Position of Energy Probe

With respect to the recovery of embedded costs, Energy Probe believes that it is not practicable to determine costs on a utility by utility basis in advance of a cost rebasing exercise, which is not anticipated in advance of 2008. Energy Probe reserves its position with regard to which methodology best addresses the appropriate cost recovery principles.

#### Issue 3(b)

With regard to the question of how the charge should be applied, the parties have not reached agreement but have summarized their positions as follows:

#### Position of the CCTA, MTS Allstream and 360 Networks/London Connect and Quebecor Media:

Because costs are most readily determined on a per-pole basis, the charge should be applied on a per-pole, per-user basis and not on a per-attachment basis.

Applying the charge on a per-attachment basis would result in over-recovery of incremental costs and an over-contribution toward fixed costs.

Each user (i.e. single corporate entity entering into a joint-use agreement) should only be charged one charge per-pole, regardless of the number of attachments on the pole and the number of services offered by the user to its customers.

- 7 -

**"Attachment"** for these purposes should be defined as agreed in s.1.5 of Revision No. 5 of the MEARIE/CCTA draft model agreement, a copy of which is attached as Appendix B.

Position of the EDA, CEA, PWU and Hydro One

The way the charge should be applied would be consistent with the methodology chosen by the negotiating parties to underlie their agreement.

Where the parties are unable to agree, application to the Board/ADR process could be made and the LDC would be required to justify the method of applying the charge as flowing from the methodology agreed upon by the parties, or determined by the Board/ADR process.

Position of Energy Probe

These parties reserve their position.

Issue 3 (c)

With regard to the question of a uniform charge for the entire province:

Position of the CCTA, MTS Allstream, Quebecor Media and 360 Networks / London Connect:

Yes, there should be a uniform rate for all LDCs based on representative costs of LDCs, using CCTA's proposed methodology referred to in 3(a) above.

Notwithstanding the above, if the application of the uniform rate to a particular LDC would result in a significant under or over-recovery of costs, either party may seek a different rate from the Board on a case-by-case basis.

Position of the EDA, CEA, PWU and Hydro One:

No.

Position of Energy Probe:

Yes, if significant under or over recovery of costs is addressed as noted above.

- 8 -

**4. What are the appropriate terms and conditions for a joint use agreement for access to the poles of electricity distribution companies?**

**a. Should there be a standard form of agreement for the entire province with the provision for bilateral negotiation of individual terms and conditions?**

Position of the parties:

The parties agree that the terms and conditions contemplated in Issue 4 can be dealt with separately by the parties after the Board makes a determination with respect to the other issues on the Issues List.

Following the Board's decision with respect to the other issues, and if the Board answers Issue One in the affirmative the parties will, within four months report to the Board progress to date on their negotiations respecting terms and conditions, and may seek such further orders or directions as may be appropriate including orders or directions respecting: (a) which terms or conditions, if any, should be mandatory and (b) which terms are open to individual negotiations between the parties.

Pending the outcome of the negotiations referred to above, CCTA, CEA and EDA have agreed to recommend to their respective members not to deny access or withhold permits for the sole reason that no agreement is in place provided that the user is paying the rate established by the Board.

**5. How should the new licence conditions be implemented?**

**a. What should be the impact on existing contracts?**

All parties, except MTS Allstream agree as follows:

The new license conditions should not impact existing contracts, except as contemplated in those contracts.

The licence conditions will be deemed to apply at the expiry of the current term of each existing contract.

Where no contract exists at the time of the decision, the licence conditions will apply immediately.

Process

- 9 -

With respect to the Oral Hearing process, the parties recommend that the final argument be presented in writing.

**APPENDIX A**

**ISSUES LIST**

1. Should the Board set licence conditions for distributors with respect to joint pole use providing for conditions of access, including the charge for such access?
2. If the Board does set conditions of access, to what types of cable or telecommunications service providers should these conditions apply to?
3. If the Board does set conditions of access, what is the appropriate charge for joint pole use?
  - a. What principles, elements and methodology should be considered in the calculation of the charge?
  - b. How should the charge be applied?
  - c. Should it be a uniform charge for the entire province?
4. What are the appropriate terms and conditions for a joint use agreement for access to the poles of electricity distribution companies?
  - a. Should there be a standard form of agreement for the entire province with the provision for bilateral negotiation of individual terms and conditions?
5. How should the new licence conditions be implemented?
  - a. What should be the impact on existing contracts?



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## APPENDIX B

### ARTICLE 1 – DEFINITIONS

The terms defined in this Article for the purposes of this Agreement shall have the following meanings unless the context expressly or by necessary implication otherwise requires.

1.1 **“Affix”, “Affixed” and “Affixing”** means to fasten, by the Licensee or its contractors, the material, apparatus, equipment or facilities of the Licensee to poles or other equipment of the Owner or In-span.

1.2 **“Annual License Fee”** means the annual payment by the Licensee to the Owner determined in accordance with Article 11.

1.3 **“Annual Maintenance Tree Trimming Fee”** means the optional annual fee for vegetation management discussed in Articles 10 and 11.

1.4 **“Approval” or “Approved”** means the permission granted by the Owner, to the Licensee, for the Licensee to Affix its Attachments, as specified in the Permit, to poles or other equipment of the Owner or In-span.

1.5 **“Attachment”** means any material, apparatus, equipment or facility owned by the Licensee which the Owner has Approved for Affixing to poles or other equipment of the Owner or In-span, including, but without limiting the generality of the foregoing:

- Licensee-owned cable not directly attached to a pole, but Over Lashed to a cable or Support Strand not owned by the Licensee;
- Service Drops Affixed directly to the Owner's poles;
- Service Drops Affixed In-span to a Support Strand supported by poles of the Owner; and
- Attachments owned by the Licensee but emanating from a cable not owned by the Licensee.

**[Attachment excludes wireless transmitters and power line carriers.]**  
**NOT AGREED.**

1.6 **“Cable Riser/Dip”** means a cable attached along a vertical portion of a pole to allow the cable to change its position from/to an underground route to/from an overhead route.

1.7 **“Clearance Pole”** means a single pole, owned by the Owner and used by the Licensee solely to establish and maintain clearance for its Service Drops.

- 11 -

1.8 **“Communications Space”** means a vertical space on the pole, usually 600 mm in length, within which Telecommunications Attachments are made.

T940053\TOR\_LAW\ 5860601\2



Gowling Lafleur Henderson LLP | Barristers & Solicitors | Patent & Trade Mark Agents |



RECEIVED

OCT 20 2004

ONTARIO ENERGY BOARD

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40 King Street West  
Toronto, Ontario  
Canada M5H 3Z7  
Telephone (416) 369-7200  
Facsimile (416) 369-7250  
www.gowlings.com

Tom Brett  
Direct (416) 369-4628  
tom.brett@gowlings.com  
File No. T940053

October 20, 2004

VIA COURIER

Mr. John Zych  
Board Secretary  
Ontario Energy Board  
26th Floor  
2300 Yonge Street  
Toronto, Ontario  
M4P 1E4

Dear Mr. Zych:

Re: RP-2004-0249/EB-2003-0310 – Settlement Agreement

Please find attached an amended page 4 to the Settlement Agreement for the RP-2003-0049 proceeding. I unintentionally mischaracterized the PWU position on Issue One. The amended page contains the correct version of their position. I regret any inconvenience.

Sincerely,

Tom Brett

Enclosure

cc: Ms. Lori Assheton-Smith (CCTA)  
Ms. Bernadette Corpuz (Gowlings)  
TOR\_LAW\5864140\1

| OEB BOARD SECRETARY |              |
|---------------------|--------------|
| File No:            | SubFile: 19  |
| Panel               | GK/PS/CC     |
| Licensing           | JF/TB/BLH/ML |
| Other               |              |
| 00/04               |              |
| del. 21/10/04       |              |

- 4 -

*See Revised Page*

**Preamble:**

The parties agree that this settlement agreement was entered into under the direction of the facilitator to assume for purposes of engaging in this settlement process and assisting the OEB that Issue No. 1 is answered in the affirmative. The positions and/or agreements of the CEA, EDA, and Hydro One in respect of Issues Nos. 2 through to 5 are not to be construed as their acknowledgement or agreement that regulation of access to LDCs' poles in any form should exist.

The parties' positions on each of the issues are as follows:

**1. Should the Board set licence conditions for distributors with respect to joint pole use providing for conditions of access, including the charge for such access?**

Position of the CCTA, MTS Allstream, Quebecor Media, and Energy Probe, 360 Networks/ London Connect:

Yes

Position of the EDA, CEA, PWU and Hydro One:

No

Position of the Power Workers Union

This party reserves its position on this issue.

**2. If the Board does set conditions of access, to what types of cable or telecommunications service providers should these conditions apply to?**

All parties agree as follows:

If the Board does set conditions of access, these conditions should apply to access to the communications space on an LDC's poles by Canadian Carriers as defined in the *Telecommunications Act* and cable companies; provided, however, that these conditions shall not apply to joint-use arrangements between incumbent local exchange carriers and hydro distributors that grant reciprocal access to each other's poles.

TAB 5

August 3, 2005

Mr. John Zych  
Board Secretary  
Ontario Energy Board  
26<sup>th</sup> Floor  
2300 Yonge Street  
Toronto, Ontario  
M4P 1E4

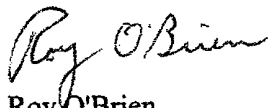
Dear Mr. Zych:

**Re: RP-2003-0249- Report to the Board on Negotiations Regarding a Model Joint Use Agreement**

Further to our joint letter to you dated July 6, 2005, we are pleased to report to the Board that the Canadian Cable Telecommunication Association (CCTA) and The MEARIE Group have completed the establishment of a model joint use agreement. The document is attached. The model agreement is now being used by the LDCs and CCTA members to put together local agreements.

In the negotiation, the CCTA represented all its members while The MEARIE Group represented sixty LDCs. A revised list of the participating LDCs and a list of all CCTA members are attached.

Yours truly,



Roy O'Brien  
Executive Director, Ontario Region  
CCTA



John Wong  
Director, Financial & Business Solutions  
The MEARIE Group

**MODEL AGREEMENT  
FOR  
LICENSED ATTACHMENT**

**To  
[Electricity Distribution Utility's NAME]**

**By  
[Cable Company Name or Telecommunications Company Name]**

**DATE OF ISSUE: \_\_\_\_\_**



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**AGREEMENT FOR LICENSED ATTACHMENT**

**THIS AGREEMENT made in duplicate on the \_\_\_\_ day of \_\_\_\_\_ is effective as of \_\_\_\_\_ (the “Effective Date”) through until \_\_\_\_\_ (the “End of Term Date”).**

**BETWEEN:**

**[Electricity Distribution Utility Name]**

**(hereinafter the “Owner”)**

**OF THE FIRST PART**

**AND:**

**[Cable Company Name /Telecommunications Company Name (other than Bell)]**

**(hereinafter the “Licensee”)**

**OF THE SECOND PART**

**WHEREAS the Licensee wishes to affix and maintain its material, apparatus, equipment or facilities to poles or equipment of the Owner;**

**AND WHEREAS all attachments by a cable company or a telecommunications company to poles or other equipment owned by the Owner require an approved permit;**

**AND WHEREAS the Owner consents to grant access to its poles and other equipment by the Licensee in accordance with the terms and conditions hereof;**

**AND WHEREAS the Ontario Energy Board released Decision No. RP 2003-0249, in the matter of access to poles;**

**NOW THEREFORE, THIS AGREEMENT WITNESSES that, in consideration of the premises and the agreements and other considerations herein contained, the sufficiency of which is hereby acknowledged, the parties hereto agree as follows:**

## ARTICLE 1 – DEFINITIONS

The terms defined in this Article for the purposes of this Agreement shall have the following meanings unless the context expressly or by necessary implication otherwise requires.

- 1.1 **“Affix”, “Affixed” and “Affixing” means to fasten, by the Licensee or its contractors, the material, apparatus, equipment or facilities of the Licensee to poles or other equipment of the Owner or In-span.**
- 1.2 **“Annual Licence Fee” means the annual payment by the Licensee to the Owner determined in accordance with Article 11.**
- 1.3 **“Approval” or “Approved” means the permission granted by the Owner to the Licensee for the Licensee to Affix its Attachments, as specified in the Permit, to poles or other equipment of the Owner or In-span.**
- 1.4 **“Attachment” means any material, apparatus, equipment or facility owned by the Licensee which the Owner has Approved for Affixing to poles or other equipment of the Owner or In-span, including, but without limiting the generality of the foregoing:**

- **Licensee-owned cable not directly attached to a pole, but Over Lashed to a cable or Support Strand not owned by the Licensee;**
- **Service Drops Affixed directly to the Owner's poles;**
- **Service Drops Affixed In-span to a Support Strand supported by poles of the Owner; and**

**Unless otherwise agreed by the parties, Attachment excludes Wireless Transmitters and Power Line Carriers.**

- 1.5 **“Attachment Licence Fee” means the licence fee payable in respect of an Attachment.**
- 1.6 **“Cable Riser/Dip” means a cable attached along a vertical portion of a pole to allow the cable to change its position from/to an underground route to/from an overhead route.**
- 1.7 **“Clearance Pole” means a single pole, owned by the Owner and used by the Licensee solely to establish and maintain vertical clearance for its Service Drops.**
- 1.8 **“Communications Space” means a vertical space on the pole, usually 600 mm in length, within which Telecommunications Attachments are made.**
- 1.9 **“Construction Verification Program” means the standards and requirements for conducting inspections and the qualifications of persons conducting inspections.**
- 1.10 **“Dispute Resolution” means the dispute escalation and referral mechanism, described in Article 21.**

- 1.11 **“Emergency Situation” means a situation that poses an imminent danger or threat to public safety or public welfare.**
- 1.12 **“Good Utility Practice” means any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry in North America during the relevant time period, or any of the practices, methods and acts which in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition.**
- 1.13 **“Guy Pole” means a separate pole, used to carry the strain of dead-ending or line deflection to ground.**
- 1.14 **“In-span” means a position between poles, at least one of which is owned by the Owner.**
- 1.15 **I.R.U. means Indefeasible Right of Use, which is the effective long-term lease (temporary ownership) of a portion of the capacity of a cable. IRU is granted by the company that owns the cable (usually optical fibre).**
- 1.16 **“Joint Use Pole” means a pole in respect of which its Owner has granted the Licensee Approval to Affix its Attachments.**
- 1.17 **“Joint Anchorage” means a common anchor system, including the anchor rod, to which two or more guy wires are attached, each guy wire providing guying for one party’s conductors and related equipment on a Joint Use Pole.**
- 1.18 **“Make-ready Work” means any necessary and required work by the Owner and/or an existing third party pole user solely to accommodate the Attachment and includes but is not limited to:**
- **initial Line Clearing,**
  - **any changes or additions to or Rearrangement of the Owner's poles or the Owner's Attachments; and**
- Without restricting the generality of the foregoing, Make-ready Work does not include the costs of repairing any pole in order to ensure that it meets the Standard prior to permitting the Licensee to place its Attachments on the said Joint Use Pole.**
- 1.19 **“Minor Relocation” means the relocation of a Support Strand up to one metre (1.0 m) in a vertical and/or horizontal direction and includes relocation associated with pole changes.**
- 1.20 **“Over Lash” means to place an additional wire or cable communications facility onto an existing cable or Support Strand.**
- 1.21 **“Permit,” means the formal written request for the adding, materially changing or removal of a Licensee’s Attachments to the Owner’s pole(s). The Permit form is**

entitled “Request for Licensed Occupancy of Poles”, in the form of Schedule "A" attached hereto, the form of which may be revised from time to time by the Owner.

- 1.22 “Power Line Carrier” means the use of existing electricity wire infrastructure to carry voice and data signals simultaneously by transmitting high frequency data signals through the electric power lines.
- 1.23 “Power Space” means a vertical space at the top of the pole within which electrical power attachments are made.
- 1.24 “Rearranging” or “Rearrangement” means the removal of Attachments from one position on a pole and the placing of the same Attachments in another position on the same pole.
- 1.25 “Service Drops” means Telecommunications cables or wires, whether Affixed In-span or to a Clearance Pole, owned by the Licensee and connected to a Telecommunications cable, whether owned or not owned by the Licensee, and leading to customers of the Licensee.
- 1.26 “Standard or Standards” means Canadian Standards Association Standard C22.3 No.1-M87 “Overhead Lines”; Occupational Health and Safety Act; Part II of Canadian Labour Code; the Ontario Electrical Safety Code; Electrical & Utilities Safety Association Rules and Safe Practices; Ontario Regulation 22-04 or any other applicable regulation administered by the Electric Safety Authority; and the Owner’s Standards, together with any amendments thereto from time to time, it being understood that changes to the Owner’s Standards are to be made at the sole discretion of the Owner.
- 1.27 “Support Strand” means a bare support strand whose main purpose is to support Telecommunications or low voltage wires or cables.
- 1.28 “Telecommunications” or “Communications” means the transmission of voice, data, video or information of any kind by electromagnetic or optical signals.
- 1.29 “Total Direct Cost” means the costs included in the annual pole access rate pertaining to administration and loss in productivity.
- 1.30 “Transferring,” means the removal of Attachments from one pole and the placing of the same Attachments on another pole.
- 1.31 “Wireless Transmitters” means stand-alone transmitters and/or receivers which use electromagnetic waves (rather than some form of wire or fibre optic cable) to carry voice, data, video or signals over part or all of the communication path.

## ARTICLE 2 – TERRITORY

TAB 6

**Ontario Energy  
Board**  
P.O. Box 2319  
2300 Yonge Street  
26th. Floor  
Toronto ON M4P 1E4  
Telephone: (416) 481-1967  
Facsimile: (416) 440-7656

**Commission de l'Énergie  
de l'Ontario**  
C.P. 2319  
2300, rue Yonge  
26e étage  
Toronto ON M4P 1E4  
Téléphone: (416) 481-1967  
Télécopieur: (416) 440-7656



**Compliance Office**

May 30, 2005

Compliance Bulletin 200505

To: All Licensed Electricity Distributors

Re: Access to Power Poles

---

**This bulletin is issued to inform licencees of the Chief Compliance Officer's expectations with respect to compliance with Distribution Licence conditions.**

On March 7, 2005 the Board issued a Decision and Order in respect of an application by the Canadian Cable Television Association ("CCTA") for access to the power poles of the regulated electricity distribution utilities in Ontario for the purpose of supporting cable television and telecommunications transmission lines.

In its Decision and Order, the Board ordered that:

*The licence conditions of the electricity distributors licensed by this Board shall as of the date of this Order be amended to provide that all Canadian carriers as defined by the Telecommunications Act and all cable companies that operate in the Province of Ontario shall have access to the power poles of the electricity distributors at a rate of \$22.35 per pole per year.*

Distributors are reminded that their obligation to provide access is in effect and that the rate of \$22.35 per pole per year is applicable. Distributors must therefore process any requests for new attachments in a timely manner.

Distributors are also reminded that this access obligation applies regardless of whether or not a service agreement has been negotiated with the Canadian carrier or cable company in question, or regardless of whether there are any outstanding disputes between the parties regarding past compensation.

Please direct any questions you may have on this matter to the Market Participant hotline at 416-440-7604 or by e-mail at [market.operations@oeb.gov.on.ca](mailto:market.operations@oeb.gov.on.ca).

A handwritten signature in black ink, appearing to be 'BH' or similar, enclosed within a circular scribble.

Brian Hewson  
Chief Compliance Officer  
Compliance Office

No statutory power of decision has been delegated to the Chief Compliance Officer, and the views expressed in this Compliance Bulletin are not binding on the Board. The Chief Compliance Officer may seek enforcement action by the Board under Part VII.1 of the *Ontario Energy Board Act, 1998*, in relation to non-compliance.



TAB 7

Pankaj Sardana  
14 Carlton St.  
Toronto, Ontario  
M5B 1K5

Telephone: 416-542-2707  
Facsimile: 416-542-2776  
regulatoryaffairs@torontohydro.com



2010 August 13

*via courier and email*

Ms. Kirsten Walli  
Board Secretary  
Ontario Energy Board  
P.O. Box 2319  
2300 Yonge St  
Toronto, ON M4P 1E4

Dear Ms. Walli:

***RE: THESL Policy Concerning Wireless Pole Attachments***

With this letter, Toronto Hydro-Electric System Limited (THESL) wishes to inform the Board that, in light of many safety and operational concerns about the attachment of wireless telecommunications equipment to its pole infrastructure that are set out in this letter and its Appendix, THESL has adopted a policy not to attach such equipment to its poles.

In adopting this policy, THESL considered the Board's March 7, 2005 EB-2003-0249 Decision and concluded that its policy does not conflict with that Decision. The reasons for that conclusion are set out in this letter.

Furthermore, this policy does not violate THESL's obligations to provide non-discriminatory access to its electricity distribution infrastructure.

For clarity, THESL emphasizes that it seeks no change whatsoever to its existing license condition pertaining to wireline attachments or to the existing ratemaking practice of treating all net revenues obtained from pole rentals as revenue offsets.

THESL refers here to 'wireline' attachments as any and all pole attachments consisting of wire, cable, or optical fibre, suspended from poles and running continuously between successive poles, used for the purposes of providing electricity distribution or telecommunications services to the public; and "wireless [communication] attachments" as any and all attachments used for the purposes of providing telecommunications services to the public that are not wireline attachments.

In the event that the Board has not at this point drawn the same conclusions as THESL regarding the non-applicability of the March 7, 2005 EB-2003-0249 Decision, THESL sets out in this letter and its Appendix information to assist the Board in its consideration of whether the above Decision should not apply to wireless equipment attachments. A general description of THESL's pole infrastructure and non-distribution attachments to it is provided in Appendix A to this letter for the Board's reference.

THESL requests that the Board notify THESL if it has any concerns around THESL's recent policy in this area. Should the Board determine that this is an issue which requires a further or a more formal process, THESL will participate actively in such a process.

### ***The 'CCTA Decision' Does Not Apply***

On December 16, 2003, the Canadian Cable Television Association ('CCTA') filed an application with the Board on behalf of the twenty-three cable companies that operated in Ontario, seeking terms of access and corresponding rates for attachment of their equipment to electricity distribution poles in Ontario.

On March 7, 2005, the Board issued its EB-2003-0249 Decision in that proceeding (the 'CCTA Decision'). In that Decision, the Board ordered that:

The licence conditions of the electricity distributors licenced by this Board shall as of the date of this Order be amended to provide that all Canadian carriers as defined by the Telecommunications Act and all cable companies that operate in the Province of Ontario shall have access to the power poles of the electricity distributors at the rate of \$22.35 per pole per year.

### ***Wireless Attachments Were Not Included in the CCTA Decision***

THESL has carefully reviewed the evidence, Settlement Agreement, transcripts, argument, and Decision in the CCTA proceeding. It is evident on the basis of that review that the Board did not actually consider the issues (including physical characteristics, hosting cost differences, and availability of hosting alternatives) presented by wireless attachments in arriving at its CCTA Decision, and that there was no substantive discussion with respect to wireless attachments in the CCTA Decision or during the hearing.

The sole reference to wireless attachments occurs in Section 1.5 of Appendix A of the October 19, 2004 Settlement Agreement, where the question of whether the definition of "Attachment" would expressly exclude wireless transmitters was "not agreed". Clearly the parties to the Settlement Agreement could not agree on the proper treatment of wireless attachments. Despite this, the transcript of the hearing contains no substantive discussion and the CCTA Decision does not deal with or even mention the unique issues and challenges posed by wireless attachments.

In addition, the CCTA Decision makes a number of assumptions and findings of fact (e.g., that attachments will fit within the 2 foot communications space and that there is an average of 2.5 attachments per pole) in calculating the \$22.35 per pole per year charge, which clearly pertain only to wireline attachments and do not reflect the physical differences and much higher costs associated with

wireless attachments. Among the most important physical differences is the fact that wireless communication attachments occupy substantially more pole space than the two feet allotted as 'communications space'.

Examined as a whole, the CCTA Decision makes clear that the mind of the Board was focused on traditional wireline communication attachments. The Decision was rendered before the substantive emergence of utility-pole-mounted wireless attachments and the distinctly different characteristics of wireless attachments were nowhere addressed.

These observations make any supposition that wireless attachments were meant to be included in the Board's ruling untenable.

### ***Additional Reasons Why the CCTA Decision Should Not Apply***

There are strong reasons, set out below, as to why the CCTA Decision should not apply.

#### ***There are Substantial Physical Differences between Wireline and Wireless Attachments***

Wireline communication attachments are similar in many respects to the electricity distribution equipment that THESL's pole infrastructure is designed and built to support. Both systems are largely composed of wire conductors which must run continuously between successive poles and terminate at the premises of customers in order to provide service.

In contrast, as a category wireless communication attachments are distinctly different from wireline attachments, and within the category they are highly variable in size and configuration. They consist of non-uniform equipment that is essentially self-contained and capable of being supported elsewhere than on utility poles, much as rooftop solar panels are, for example. Many alternative hosts for wireless attachments exist and are being used now. When mounted on utility poles, wireless attachments typically occupy a much greater portion of communication attachment space than wireline attachments, and require special assessments of engineering design and as-built construction.

#### ***Safety is Compromised***

The overhead electricity distribution system in Toronto operates at voltages ranging up to 27,600 volts. All high voltage equipment is inherently dangerous and must be electrically insulated from supporting structures. In addition, safe limits of approach are defined and practiced on the overhead distribution system such that a zone of separation is required between high voltage equipment and any other attachments, as well as any personnel working in proximity to the poles.

THESL is responsible for the safety of its pole infrastructure. For reasons both of safety and operational efficiency, THESL will not permit communications equipment including antennas to be installed on pole tops or otherwise within the distribution equipment zone. Working safely within the distribution zone in the vicinity of voltages up to 27,600 volts requires several years of training and specialized equipment. It would be dangerously irresponsible for THESL to permit

telecommunications personnel to work within the distribution zone without proper training and equipment, and given its own demanding workplans, THESL cannot commit its own trained staff to the installation and maintenance of non-distribution equipment.

Furthermore the presence of non-uniform wireless communication equipment in the distribution zone or elsewhere on the pole changes the physical equipment configuration faced by THESL linepersons and could present contact hazards which in THESL's view are unnecessary and unacceptable.

Wireless communications attachments outside the distribution zone also have the potential to impede safe and efficient access to both distribution equipment and other wireline attachments, particularly in situations involving unplanned emergency restoration work which occur frequently on THESL's system. In addition, the drilling of holes through poles to mount wireless communications attachments below the distribution zone incrementally weakens poles and creates stress concentrations in areas where structural integrity must be maintained to support the significant loads exerted by the distribution equipment above. The loss of structural integrity can lead to sudden and catastrophic failure (i.e., total fracture) of poles, which in turn creates unacceptable safety risks and service interruptions.

#### ***Pole Attachment Space is a Scarce Resource***

The primary purpose of THESL's pole infrastructure is to suspend its electrical distribution equipment securely and safely above public thoroughfares. Given that utility pole infrastructure is designed to suspend electrical distribution cables, and runs very extensively throughout utility service areas, it is incidentally very well suited to provide suspension of other wireline systems – specifically, telecommunications systems, which have traditionally been composed of telephone, television, and fibre optic cable equipment. Electricity and telecommunication wireline systems share the characteristics that:

- a) They must run continuously between successive poles or other points of suspension in order to convey electrical power or signals as the case may be;
- b) When run above ground they must be suspended securely above the public thoroughfare to prevent accidental damage and to ensure safety and reliability of service; and
- c) They must physically extend to every end-user terminal point in order to provide their respective services.

In any situation in which power or signal wireline equipment is required to be suspended above ground, there is no feasible alternative to utility poles, particularly as the systems reach their terminal points at homes and other premises. Since no other infrastructure meets the requirements of safety, access, and availability, utility poles are a practical necessity for the suspension of above-ground wireline systems.

At the same time, pole infrastructure is costly to erect and maintain, and impinges on the urban tree canopy as well as streetscapes. Duplication of pole lines along streets and elsewhere would not only represent a needless waste of resources but would also meet with strong public opposition for aesthetic and land use reasons. Therefore THESL cooperates with other utility pole owners and wireline

communication attachment owners to support all wireline equipment on the minimum number of poles consistent with safety and operational requirements.

Together with the fact that pole infrastructure is minimized for reasons of cost and public sentiment, the limited space available on poles for wireline communication attachments means that that space has become a scarce resource. On many THESL poles, that space is already fully occupied, and it is almost always partially occupied.

In contrast, although wireless communication equipment (antennas, power supplies, etc) needs to be connected to low voltage power and signal cables, that equipment can be secured and connected as necessary in a wide variety of settings other than on utility poles – buildings and rooftops, for example.

Furthermore, the demand for wireline communications capacity (i.e., fibre optic cable) to provide both wired and wireless internet access is growing very rapidly.

It is inappropriate in these circumstances to allocate scarce pole attachment space to devices that do not in fact require it. Utility pole infrastructure should be treated as an essential and scarce resource for the purpose of suspending wireline systems and should be reserved to that purpose with respect to communications attachment space. Mandated allocation of scarce pole space to uses that consume it but for which it is non-essential undermines the conceptual basis of the CCTA Decision.

#### ***Non-Discriminatory Access Requirements are Not Violated***

THESL will of course continue to provide non-discriminatory access to its system to generators, retailers and consumers for the purposes of electricity distribution. However, the principle of non-discriminatory access does not and should not apply in respect of wireless attachments, when there are many alternative hosts for wireless attachments in use at the present time, because the use of poles for such attachments involves neither the distribution of electricity nor access to an essential monopoly resource. The principle of non-discriminatory access as articulated in the Electricity Act, 1998 should be narrowly construed and should only apply to situations where the utility exercises monopoly power.

In the CCTA Decision at page 3, the Board justified regulatory intervention for wireline attachments in part on the basis of non-discriminatory access as follows:

“The Board agrees that power poles are essential facilities. It is a well established principle of regulatory law that where a party controls essential facilities, it is important that non-discriminatory access be granted to other parties. Not only must rates be just and reasonable, there must be no preference in favour of the holder of the essential facilities. Duplication of poles is neither viable nor in the public interest.”

This conclusion does not apply in respect of wireless attachments, because multiple, viable market alternatives for hosting wireless attachments exist and are being used today. The relevant question in this context is not whether THESL would exercise market power to extract monopoly profits, but

rather whether it would unduly withhold access to an essential facility. Since utility poles are not essential for wireless attachments, the answer to this question must be no.

### *Conclusion*

THESL has advised the Board of THESL's policy on this emerging issue because clarification of the regulatory framework pertaining to pole access will be helpful to all parties and the efficient planning and deployment of resources. THESL's policy, set out and explained above, is sound and operates in the best interest of ratepayers and furthers the safe and efficient operation of the electricity distribution system.

As noted earlier, THESL requests that the Board notify THESL if it has any concerns around THESL's recent policy in this area. Should the Board determine that this is an issue which requires a further or a more formal process, THESL will participate actively in such a process.

Yours truly,



Pankaj Sardana

VP, Treasurer and Regulatory Affairs  
[regulatoryaffairs@torontohydro.com](mailto:regulatoryaffairs@torontohydro.com)

Copy:

Aleck Dadson, Chief Operating Officer, Ontario Energy Board  
Mary Ann Aldred, General Counsel, Ontario Energy Board  
Anthony Haines, President, Toronto Hydro-Electric System Limited  
JS Couillard, Chief Financial Officer, Toronto Hydro-Electric System Limited  
Lawrence Wilde, General Counsel, Toronto Hydro-Electric System Limited  
Colin McLorg, Mgr, Regulatory Policy and Relations, Toronto Hydro-Electric System Limited

## General description of the THESL utility pole system and attachments

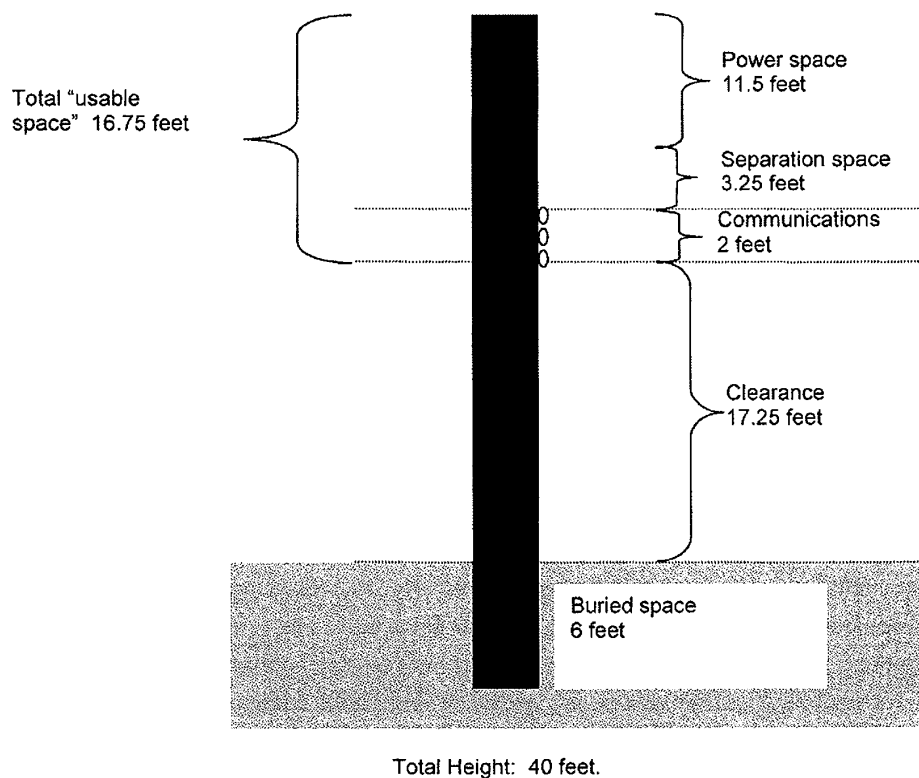
### Distribution Pole Infrastructure

1. THESL constructs, operates, and maintains an extensive network of utility poles, principally for the purpose of suspending its electrical distribution equipment safely above the public thoroughfares. Currently, THESL owns over 140,000 poles, located across its entire service area. The distribution equipment attached to poles consists primarily of conductors (electrical cables), cross-arms and brackets to fasten the conductors to the poles, insulators, transformers, switches, and system protection devices. Although most equipment is suspended above ground, certain switch components, as well as conductors transitioning from overhead to underground, travel up the sides of poles from ground level.
2. By themselves, the various pieces of electrical distribution equipment exert a substantial load on the poles and therefore the overhead distribution system must be engineered, constructed, and maintained to standards necessary to ensure its ongoing reliable operation and continued safety for the public and THESL employees. THESL is directly responsible for the design and safe operation of its overhead distribution system. Any situation in which wires are down or improper contact is made with wires (for example by fallen tree limbs or other objects) is treated as an emergency and is given highest dispatch priority.
3. Although the overhead distribution system is designed and constructed to provide a long service life, the overall as-built system is not static at any time. It is subject to continuous change due to requirements to connect new customers, replace end-of-life structures, convert local area distribution system voltages, move equipment for purposes of road widening and other land use and infrastructure changes, and perform repairs to or replacements of equipment damaged by collisions and other causes.
4. In addition, much of the overhead distribution system is located along heavily treed streets and other hydro rights-of-way. Trees and other forms of vegetation present a continuous requirement for both planned maintenance (by way of tree trimming and vegetation management) and emergency response (to clear fallen limbs and re-erect distribution equipment). Generally there is a direct tradeoff between the opposing goals of system reliability and public safety on one side, versus strong public sentiment to impinge as little as possible or not at all on the urban tree canopy on the other.
5. The overhead distribution system in Toronto operates at voltages ranging up to 27,600 volts. All high voltage equipment is inherently dangerous and must be electrically insulated from supporting structures. In addition, safe limits of approach are defined and practiced on the overhead distribution system such that a zone of separation is required between high voltage equipment and any other attachments, as well as any personnel working in proximity to the poles.



6. The composition and size of THESL distribution poles varies according to the loads suspended and the operating environment, among other factors. Poles carrying multiple distribution feeders may need to be taller and larger in diameter than poles carrying a lesser load. A typical pole could have an overall length of 40 feet, of which 6 feet are buried for pole anchorage. Of the remaining 34 vertical feet above ground, 17.25 feet are required for clearance over ground level, 2 feet are available for non-distribution attachments, 3.25 feet are required as the zone of separation, and 11.5 feet are available for distribution equipment. Taller poles would have the same clearance and separation zones, but would be buried more deeply, have a slightly larger attachment zone, and would have a larger zone for distribution equipment. Figure 1 depicts the vertical zones of a typical pole.

Figure 1. Vertical Zones of a Typical Hydro Pole

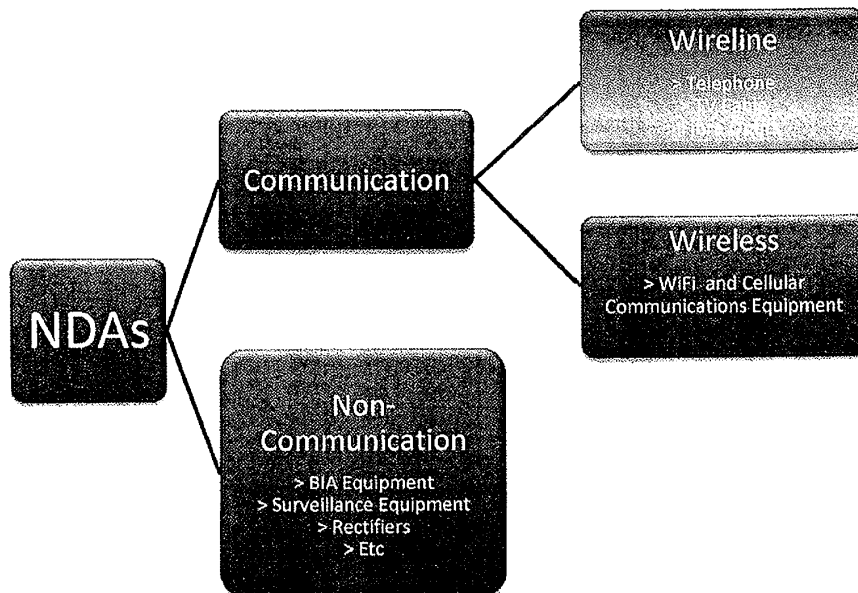


7. The vertical zone dimensions set out above are those determined by the Board for a typical pole in its RP-2003-0249 Decision on an application brought by the Canadian Cable Television Association.

## Non-distribution Attachments

8. In addition to distribution system equipment, THESL's pole infrastructure supports an extensive collection of non-distribution attachments (NDAs). NDAs fall into two broad categories: communication attachments, and non-communication attachments. The latter category includes Business Improvement Area decoration, surveillance devices, and other miscellaneous devices such as rectifiers used to impress direct currents on underground pipe networks for the purpose of corrosion protection. Figure 2 displays a classification of NDAs.

Figure 2. Classification of NDAs

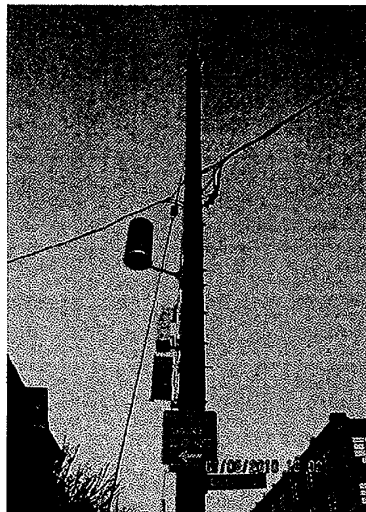


9. Communication attachments include wireline attachments, such as telephone, television, and fibre optic cables; and 'wireless' communication equipment attachments.
10. Historically NDAs have consisted mostly of wireline communication equipment and streetlights. Surveillance equipment is relatively new and limited in extent, while wireless equipment is also new and exhibits a very high rate of growth in the number of actual and requested attachments. A typical wireline installation is shown in Figure 3; wireless installations are shown in Figure 4.

Figure 3. Typical Non-Distribution Attachments



Figure 4. Wireless Attachments



11. Wireline attachments typically consist of signal-carrying cables supported by suspending cables, which are themselves connected under tension between successive poles. Tension must be applied to the suspending cables in order to avoid excessive sag in the spans of cable between poles, and signal cables are usually incapable of sustaining the degree of tension required. Power supplies for signal amplification and conversion are also present.
12. Electricity and telecommunication wireline systems share the characteristics that:
  - a. They must run continuously between successive poles or other points of suspension in order to convey electrical power or signals as the case may be;

- b. They must be suspended securely above the public thoroughfare to prevent accidental damage and to ensure safety and reliability of service; and
  - c. They must physically extend to every end-user terminal point in order to provide their respective services.
13. Since no other infrastructure meets the requirements of safety, access, and availability, utility poles are a practical necessity for the suspension of above-ground wireline attachments.
14. Duplication of pole lines along streets and elsewhere would not only represent a needless waste of resources but would also meet with strong public opposition for aesthetic and land use reasons. Therefore THESL cooperates with other utility pole owners and NDA owners to support all wireline equipment on the minimum number of poles consistent with safety and operational requirements.
15. Although the term 'wireless' is often used in connection with non-wireline communication NDAs, all attachments in this category require power supplies involving low-voltage electrical connections and may also need to be connected to signal cables. The major distinction signified by the term 'wireless' is that the equipment being supported is not itself primarily composed of cable which must run continuously pole to pole in order to function, which is a feature of wireline NDAs. Apart from their need to be connected to power supplies and signal cables, non-wireline communication attachments are effectively individual, free standing units, and could be supported with the necessary connections by other structures.
16. As indicated above, the vertical space available for NDAs is 2 feet, defined by the top of the clearance zone and the bottom of the separation zone. In many cases this space is fully occupied by existing wireline equipment. More generally, space for NDAs is a scarce resource, the supply of which is effectively fixed in a given local area due to the practical requirement to minimize the number of poles consistent with safe and reliable operation.
17. To ensure safety and avoid undue operational complexity, THESL does not permit communication NDAs in the distribution equipment space at the top of poles.

#### Operational and Regulatory Factors

18. As the distribution utility and asset owner, THESL is responsible for managing the attachment, safe operation, and removal or replacement of NDAs, and in doing so must maintain compliance with O. Reg. 22/04 (Electrical Distribution Safety).<sup>1</sup> The Electrical Safety Authority (ESA) also has responsibility generally for the safety of electrical installations in Ontario, and has produced Guidelines for use by distributors in interpreting

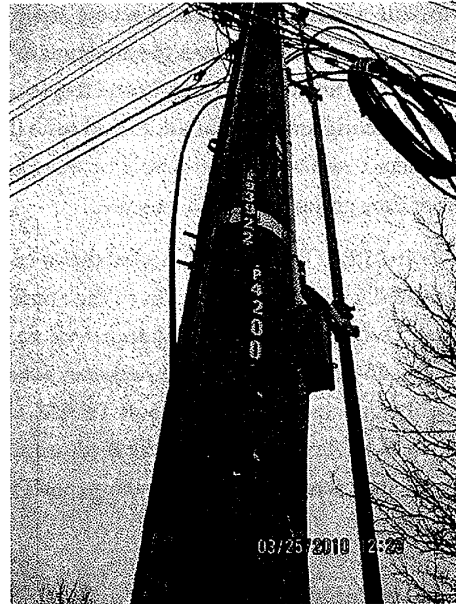
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<sup>1</sup> THESL is a distributor licensed to own and operate a distribution system under Part V of the *Ontario Energy Board Act, 1998*, and is subject to O. Reg. 22/04 rather than Electrical Safety Code referred to in O. Reg. 164/99.

and complying with O. Reg. 22/04 with respect to any work, including that involving NDAs, on a distribution system.

19. In summary, O. Reg. 22/04 and the Guidelines mandate that THESL operate a system for receiving, reviewing, and granting or denying applications for pole attachments. The system requires for each attachment that:
  - The prospective attacher provide to THESL prescribed information and drawings pertaining to the physical and other characteristics of the object(s) proposed to be attached;
  - The manner of attachment be approved by a professional engineer or exactly follow standards that have previously been approved and certified by a professional engineer or the ESA;
  - A site visit be conducted by THESL where necessary to confirm the condition and characteristics of the pole to which an attachment is to be made;
  - THESL assess each application for suitability and compliance with all requirements including confirmation of space availability and non-interference with existing distribution equipment and other NDAs;
  - THESL inspect and certify the installation for adherence to approved plans and maintain records of that inspection and certification.
20. The requirements for professional engineering approval of plans as well as prior and subsequent inspections by THESL stem from the needs to maintain public and employee safety and the continued operability of equipment already located on poles. Each successive attachment adds a further load to the pole and THESL must ensure that loads can be sustained by the pole. Safety of the public and employees needs to be ensured by confirming that the attachments pose no hazard either electrically or by becoming detached. The operability of existing equipment also needs to be maintained by confirming that the new attachment does not interfere with the operation of that equipment or present obstacles to safe access to distribution equipment and NDAs.
21. Generally attachers comply with the requirements of code, regulation, and THESL's application administration process. Nevertheless it is essential that THESL continuously monitor and enforce compliance, and there have been instances of unauthorized attachments being made without THESL's knowledge. Unauthorized attachments can threaten public safety through improper exposure to live electrical components, damage poles by the drilling of out-of-specification holes, interfere with the proper operation of electrical distribution equipment (such as disconnect switches), and consume electricity without payment. Figure 5 shows an attachment interfering with the operation of an overhead switch.

Figure 5. Interference with Distribution Equipment



22. Historically the number of new NDA applications has been proportional to the expansion of THESL's pole infrastructure, since those NDAs were mainly comprised of streetlights and wireline communication equipment. In recent years however the number of applications, particularly for wireless communication NDAs, has grown dramatically, due largely to the introduction of 'WiFi' as a wireless means of public internet access and the associated fibre optic network required to link WiFi networks to the rest of the internet. In 2007, THESL received 392 wireline attachment requests and 0 wireless attachment requests; in 2008 the corresponding figures were 564 and 0; in 2009, 1,193 wireline and 250 wireless; and in 2010 wireline requests are projected to reach 1,840 with wireless requests reaching 550, for a total in 2010 of 2,390 requests.

| Year           | Wireline Attachment Requests | Wireless Attachment Requests | Total Attachment Requests |
|----------------|------------------------------|------------------------------|---------------------------|
| 2007 Actual    | 392                          | 0                            | 392                       |
| 2008 Actual    | 564                          | 0                            | 564                       |
| 2009 Actual    | 1,193                        | 250                          | 1,443                     |
| 2010 Projected | 1,840                        | 550                          | 2,390                     |

23. The surge in requests for attachments has placed a severe strain on THESL staff resources and has unavoidably led to longer waiting times for attachment approval. A simple application takes approximately five hours of staff time to process in total; more complicated attachment requests take differing amounts of additional time depending on the complexity. Any requests involving make-ready work on the pole or on existing distribution equipment require significantly more time and planning to execute.
24. As host of the pole infrastructure, THESL also undertakes a considerable ongoing administrative burden related to NDAs in addition to the attachment application approval process described above. During the lifecycles of approved and installed attachments, THESL may be required at any time to manage emergency repairs to, or planned relocation of, the poles supporting the attachments. As a result THESL must coordinate with attachers to see that this work is done safely and properly. THESL must as well maintain records and a process to support invoicing attachers for the attachments THESL hosts.

TAB 8



## Exhibit 1

Affidavit of Michael Starkey

**BEFORE THE ONTARIO ENERGY Board**

**IN THE MATTER OF** the *Ontario Energy Board Act, 1998*, S.O. 1998, C. 15, (Schedule B);

**AND IN THE MATTER OF** an Application by **Canadian Distributed Antenna Systems Coalition** for certain orders under the Ontario Energy Board Act, 1998.

**AFFIDAVIT OF**

**MICHAEL STARKEY**

**ON BEHALF OF**

**TORONTO HYDRO-ELECTRIC SYSTEM LIMITED  
("THESL" or "Toronto Hydro")**

**Date: September 2, 2011**

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Attachment MTS-02 *American Tower - DAS Solutions Overview*

Attachment MTS-03 Cellular/PCS/AWS Antenna Arrays w/in 25 Km. of Toronto's City Center

Attachment MTS-04 Cellular/PCS/AWS Station Sites w/in 25 Kms. of the Center of Toronto

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Attachment MTS-06 Femtocell and other Small Cell Literature

Attachment MTS-07 South Korean Telecom Femtocell deployment

Attachment MTS-08 Alcatel Lucent Femtocell Literature

Attachment MTS-09 T-Mobile and O2 Wi-Fi Offload Strategy

Attachment MTS-10 Crown Castle DAS Deployment - William and Mary

Attachment MTS-11 Crown Castle DAS Deployment - Paradise Valley, AZ

Attachment MTS-12 City of Chicago Attachment Rates

1  
2 **IN THE MATTER OF** the *Ontario Energy Board Act, 1998*, S.O.  
3 1998, c. 15, (Schedule B);

4  
5 **AND IN THE MATTER OF** an Application by the **Canadian**  
6 **Distributed Antenna Systems Coalition** for certain orders under  
7 the *Ontario Energy Board Act, 1998*.  
8

9 **AFFIDAVIT OF MICHAEL STARKEY**  
10 **(sworn September 1, 2011)**  
11

12 I, Michael Starkey, in the City of Cottleville, State of Missouri, **MAKE OATH AND SAY:**

13 **I. INTRODUCTION**

14 **Q. PLEASE STATE YOUR NAME, OCCUPATION AND BUSINESS ADDRESS.**

15 A. My name is Michael Starkey. I currently serve as President of QSI Consulting, Inc., a  
16 consulting firm specializing in regulated industries and economics with special emphasis  
17 in telecommunications. My business address is 243 Dardenne Farms Drive, Cottleville,  
18 Missouri, 63304.

19 **Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND WORK**  
20 **EXPERIENCE.**

21 A. Included with this testimony as Attachment MTS-01 is a thorough description of my  
22 educational background and relevant work experience. In brief, I have been a consultant  
23 to government agencies, communications equipment manufacturers, communications  
24 providers, and other private communications stakeholders since 1996. Prior to my  
25 consulting experience I most recently served as the Director of Telecommunications for  
26 the state-wide agency assigned by the Maryland legislature to regulate utility services  
27 (i.e., the Maryland Public Service Commission). Prior to that I held the position of Chief

1 Telecommunications Policy Analyst for the Illinois Commerce Commission. I began my  
2 career as a Senior Economist at the Missouri Public Service Commission. Throughout  
3 my career I have spent a great deal of time studying telecommunications networks,  
4 including substantial time and effort aimed at developing rational, efficient means by  
5 which competing communications carriers can effectively access dominant carrier  
6 networks for purposes of entering monopolized markets. I have also analyzed the  
7 underlying economic characteristics of communications networks and markets and have,  
8 on numerous occasions, provided expert testimony regarding the costs of providing  
9 various telecommunications functionalities and access, including those associated with  
10 wireless networks.

11 **Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE ONTARIO ENERGY**  
12 **BOARD ("OEB" OR "BOARD")?**

13 A. No. However, I have been accepted as an expert in both wireline and wireless  
14 telecommunications and provided expert testimony before regulatory agencies in at least  
15 35 U.S. states, and the Federal Communications Commission ("FCC"), the Federal  
16 Courts, several state legislatures and various other state courts and administrative bodies  
17 in the United States. During my consulting career I have served as an expert witness  
18 roughly 150 times.

19 **Q. DO YOU HAVE EXPERIENCE WITH THE CANADIAN WIRELESS SERVICES**  
20 **MARKET?**

21 A. Yes, I do. With the help of QSI's in-house research team, I stay abreast of general  
22 wireless market trends and activities in both the United States and Canada, as well as

1 other parts of the World. For example, I recently (April 2011) assisted numerous other  
2 QSI experts in preparing a report filed with Industry Canada in relation to Canada  
3 Gazette Notice SMSE-018-10 (*Consultation on a Policy and Technical Framework for*  
4 *the 700 MHz Band and Aspects Related to Commercial Mobile Spectrum*). The QSI  
5 report was entitled: *In Band Auction Cap; Promoting Sustainable Competition in the*  
6 *Canadian Mobile Wireless Industry Through an Equitable Auction Design*. This report  
7 was prepared on behalf of Videotron G.P. (a wholly owned subsidiary of Quebecor  
8 Media, Inc.) and Shaw Communications, Inc. Likewise, I oversaw production of a  
9 similar 2007 report filed by QSI on behalf of Bell Canada in relation to Canada Gazette  
10 Notice No. DGTP-002-07 (*Consultation on a Framework to Auction Spectrum in the 2*  
11 *GHz Range including Advanced Wireless Services*). The QSI report was entitled: *The*  
12 *State of Wireless Technologies in Canada, A Comparison of Wireless Technologies in*  
13 *Canada and the United States*.

14 **Q. ON WHOSE BEHALF WAS THIS TESTIMONY PREPARED?**

15 A. This testimony was prepared on behalf of Toronto Hydro-Electric System Limited  
16 (hereafter "THESL" or "Toronto Hydro").

17 **Q. DESCRIBE THE PURPOSE OF YOUR TESTIMONY AND STATE YOUR**  
18 **CONCLUSIONS.**

19 A. I've been asked by THESL to review the CANDAS Application, supporting materials and  
20 the interrogatory responses, as well as the Board's CCTA Decision<sup>1</sup> and evaluate the

---

<sup>1</sup> *In the Matter of the Ontario Energy Board Act 1998, S.O. 1998, c.15, (Schedule B), And in the Matter of an Application pursuant to section 74 of the Ontario Energy Board Act, 1998 by the Canadian Cable Television Association for an Order or Orders to amend the licenses of electricity distributors, Decision and Order, RP-2003-0249, March 7, 2005 (hereafter "CCTA Decision").*

1 extent to which the findings therein can reasonably be attributed to attachments for  
2 wireless equipment of the type proposed by CANDAS in its Application.<sup>2</sup> I have also  
3 been asked to describe numerous alternatives that exist to DAS ("Distributed Antenna  
4 Systems") in the provision of wireless communications services and explain how those  
5 alternatives are being deployed by wireless carriers in the United States and in Canada.  
6 Based upon my analysis, I have reached the following conclusions that I discuss in  
7 greater detail below:

- 8 1. A reasonable reading of the CCTA Decision indicates that neither the Board, nor  
9 the intervenors, contemplated that the "attachments" at issue would include the  
10 type of wireless attachments proposed by CANDAS.  
11
- 12 2. The Board's determination that "power poles are essential facilities" was based  
13 upon the unique characteristics of wireline attachments. A similar analysis  
14 specific to wireless attachments shows that there are material differences in the  
15 underlying essential nature of power poles used for wireless attachments, in part,  
16 because numerous suitable alternatives exist and are being used extensively today  
17 in the marketplace.  
18
- 19 3. DAS, as contemplated by CANDAS for the use of Public Mobile, is but one of  
20 numerous technologies used by carriers to provide wireless services. Other  
21 carriers, including Public Mobile, rely on extensive networks already deployed  
22 throughout Toronto without the need for power poles to support DAS. They have  
23 accomplished these networks both by (a) using wireless technologies that do not  
24 require power pole attachments, and (b) by attaching their wireless equipment to  
25 structures other than power poles.  
26
- 27 4. A functioning market for the placement and maintenance of wireless equipment  
28 on stand-alone towers, rooftops and other non-power pole structures exists and is  
29 growing. All indications are that rates in that market substantially exceed the  
30 regulated rate adopted by the Board in its CCTA Decision for wireline  
31 attachments, further indication that the CCTA Decision and resultant rate are  
32 poorly suited for wireless attachments to power poles.  
33

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<sup>2</sup> *Application by Canadian Distributed Antenna Systems Coalition ("CANDAS"); Board File No.: EB-2011-0120, filed July 26, 2011 (hereafter "CANDAS Application " or "Application").*

1   **II.   THE CCTA DECISION DOES NOT APPLY TO WIRELESS POLE**  
2   **ATTACHMENTS AS REQUESTED BY CANDAS**  
3

4   **Q.   HAVE YOU HAD AN OPPORTUNITY TO REVIEW THE BOARD'S CCTA**  
5   **DECISION?**

6   A.   Yes, I have.

7   **Q.   DOES THE BOARD'S CCTA DECISION DISCUSS THE ATTACHMENT OF**  
8   **WIRELESS ANTENNAE OR OTHER SUPPORTING STRUCTURES?**

9   A.   No. The CCTA Decision includes no reference to wireless antennae or the attachment of  
10   any structures or equipment to support wireless antennae. Instead, the CCTA Decision  
11   focuses on two primary questions: (a) Should the Board intervene in the market and  
12   regulate wireline communications attachments to distribution poles and (b), if so, what is  
13   the appropriate wireline communications attachment rate. The Board's CCTA Decision  
14   is narrow, in part, because it adopts, and builds upon a Settlement Agreement reached by  
15   the parties on October 19, 2004. Among other things, the Settlement Agreement defines  
16   many of the terms in the case, with particular importance for this proceeding placed upon  
17   the definitions of "Attachment" and "communications space."

18   **Q.   WHY ARE THOSE TWO DEFINITIONS IMPORTANT IN THIS**  
19   **PROCEEDING?**

20   A.   Both definitions, and the way they are used by the Board in its CCTA Decision, help  
21   make clear that wireless antennae and supporting structure were not considered,  
22   especially as it relates to the attachment rental rate. For example, the extent to which  
23   wireless attachments should be included in the definition of "attachment" was one area



1 where the parties specifically could not reach agreement in the Settlement Agreement, as  
2 such, the inclusion of these types of attachments, or not, would have been something the  
3 Board would have needed to decide for the parties - but it did not. The Settlement  
4 Agreement at Appendix B, page 10, specifically states that the definition of attachment  
5 "excludes wireless transmitters...." but goes on to state that the parties had "Not Agreed"  
6 to that particular exclusion. In effect, by arguing that the CCTA Decision requires  
7 THESL to accommodate wireless attachments of the type proposed by CANDAS,  
8 CANDAS is attempting to redefine the definition of "Attachment" in a way that was  
9 specifically not agreed to by the parties, and adopted by the Board, in the Settlement  
10 Agreement.<sup>3</sup>

11 **Q. WHAT IS THE DEFINITION OF "COMMUNICATIONS SPACE" USED BY**  
12 **THE BOARD IN ITS CCTA DECISION AND WHY IS IT IMPORTANT?**

13 A. In the Settlement Agreement adopted by the Board, the parties agreed to the following  
14 definition of "communications space" within which all attachments would be found:

15 "Communications Space" means a vertical space on the pole, usually 600 mm in  
16 length, within which Telecommunications Attachments are made."<sup>4</sup>  
17

18 The Board specifically recognized that its findings in the CCTA Decision involved the  
19 Communications Space as agreed to by the parties: "In the Settlement Agreement of  
20 October 19, 2004, all parties agreed that if the Board does set access conditions, these  
21 conditions should apply to access to the communications space on the LDC poles...."

---

<sup>3</sup> While it could be argued that the language indicating wireless transmitters are specifically excluded was not agreed to and hence should not be considered, it is worth noting that the agreed to language in the definition of "attachment" clearly does not include language that would capture the types of wireless arrangements being proposed by CANDAS.

<sup>4</sup> Settlement Agreement, Appendix B, page 11.

Further, later in its CCTA Decision the Board adopted the CCTA's estimate of approximately 2 feet of "communications space" on a typical distribution pole, "within which Telecommunications Attachments are made." Yet, CANDAS admits that the wireless antennae and supporting structure that its members would intend to attach to THESL poles would not be confined to the "communications space" addressed by the CCTA Decision.<sup>5</sup> Indeed, the majority of the equipment to be attached by CANDAS members would fit outside of (rather than "within") the communications space.

**A. *The Communications Space***

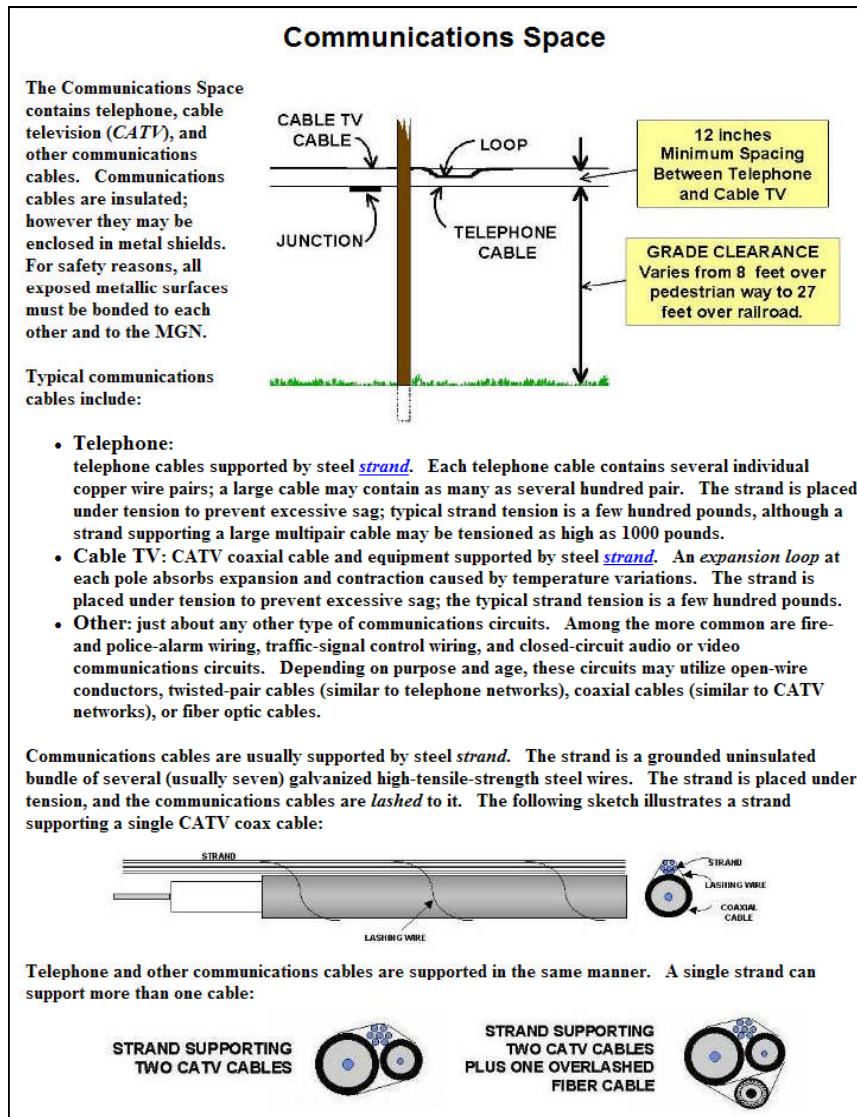
**Q. PLEASE DESCRIBE A TRADITIONAL POLE ATTACHMENT AS YOU USE THAT TERM.**

A. A communications attachment traditionally describes a telecommunications carrier or cable television ("CATV") company attaching coaxial, copper or fiber-optic cables, strung between multiple utility poles along a designed route. In the case of poles used primarily for the transmission and distribution of electricity, these attachments generally occur at the bottom of a pole's useable space in an area defined as the "communications space." In other words, beyond the definition provided within the Settlement Agreement discussed above, "communications space" is a generally understood term of art within the communications industry. For example, when a utility pole is used to distribute electricity and also to accommodate communications equipment, it is commonly referred to as a "joint use" pole. The following description taken from the expanded definition of

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<sup>5</sup> See CANDAS' response to THESL Interrogatory Number 39 and Exhibit D to the written evidence of Tormond Larsen.

“joint pole” as found in Newton’s Telecom Dictionary provides additional information as to how a communications attachment is generally appended to a joint use pole:<sup>6</sup>



As described above, the "communications space" is common terminology with specific inference to the attachment of cables in an area of the pole near the bottom of its useable space (i.e. below electricity distribution cables). Importantly, the Board adopted this

<sup>6</sup> Newton’s Telecom Dictionary, 18th Edition (New York: CMP Books, 2002, p. 410), expansion found at <http://annsgarden.com/poles/poles.htm>.

view when calculating the access rate in its CCTA Decision. At page 9 of its CCTA Decision the Board adopted the calculation of useable space on a utility pole put forward in the evidence of CCTA witness Donald A. Ford.<sup>7</sup> Mr. Ford's evidence clearly demonstrates that the "communications space" he was describing for the Board's benefit was a finite vertical space (2 feet) within which wireline attachments could be made:

- o The term "support structures" is used to denote facilities such as poles and duct (conduit) that are used to carry or contain electrical power and/or communications wires and cables. Given that the main support structures at issue in CCTA's application are poles, this evidence is restricted to matters related to utility distribution poles. (p.1)
- o The two foot communications space can accommodate a number of users and cables. The user will attach a steel strand to the pole, and lash one or more communications cables to the strand. Typical spacing of the strand attachments is one foot, which means that a maximum of three strands can be attached to each side of the pole.(p.2)
- o To ensure that subsidization of a cable operator by the owner of a support structure does not take place, the support structure owner must recover from the cable operator all direct costs associated with the use of a portion of the communications space by the cable operator. In other words, to avoid being subsidized by a support structure owner, a cable operator must reimburse a support structure owner for all costs caused by or attributable to the use of a portion of the communications space by the cable operator. (p.8)

**Q. IS IT SURPRISING THAT THE BOARD WOULD HAVE NOT CONSIDERED WIRELESS ATTACHMENTS IN ITS CCTA DECISION ISSUED IN MARCH 2005?**

A. No. For decades, the vast majority of utility pole communications attachment requests involved some type of cable attachment. Like those detailed above, the majority of requests were intended to support telecommunications or CATV applications using

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<sup>7</sup> See Appendix C to the CCTA Application.

1 coaxial or fiber-optic cable, strung from pole to pole along a given route. Only in the  
2 past 3-4 years have requests for wireless attachments become commonplace as demand  
3 for higher-speed wireless communications have risen (in large part because of the  
4 proliferation of "smart phones" that support not only voice, but also data-driven  
5 applications). Indeed, despite receiving hundreds, if not thousands of, attachment  
6 requests over the years, THESL did not receive any requests for wireless attachments  
7 from CANDAS until 2009 - some 4 years after the CCTA Decision was issued.<sup>8</sup>

8 **B. *Wireless Equipment Will Not Fit Within the Communications Space***  
9

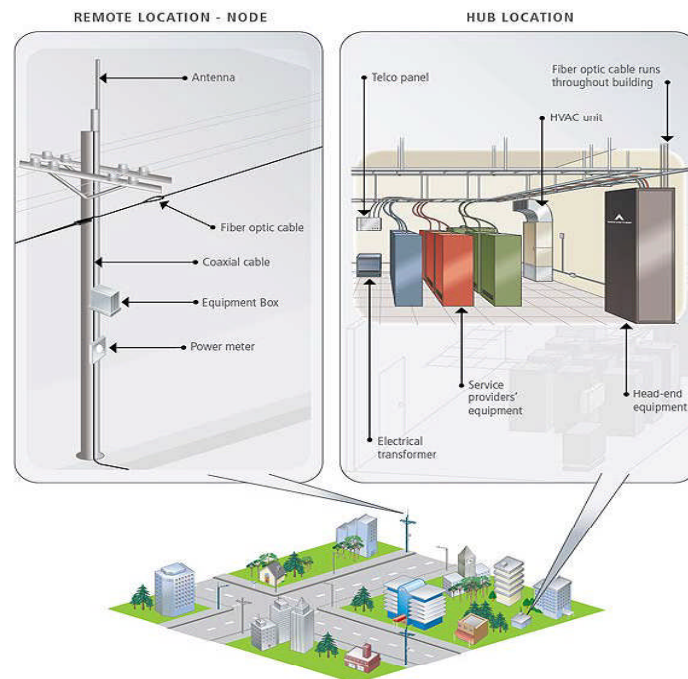
10 **Q. PLEASE GENERALLY DESCRIBE WIRELESS POLE ATTACHMENTS.**

11 A. There is no "typical or "standard" equipment or attachment process applicable to wireless  
12 equipment. Unlike traditional attachments intended to accommodate a self-contained  
13 cable within the communications space, wireless attachments come in many different  
14 shapes and sizes with as many different engineering requirements (intended to  
15 accommodate factors such as terrain, elevation, weather, etc.). Wireless pole attachments  
16 are likely to include some type of radio frequency ("RF") antenna, connections to  
17 transmission equipment (including a connection to fiber-optic cable either previously  
18 attached or appended in unison with the wireless attachment) in addition to power and  
19 control equipment attached to individual poles located throughout an engineered  
20 geographic region. The placement of these antenna is engineered in relation to the  
21 propagation properties of the equipment at issue in an attempt to provide necessary RF

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<sup>8</sup> See CANDAS' Application at Tab 3. See also the Affidavit of Mary Byrne on behalf of THESL (hereafter "Byrne Affidavit"), paragraph 18.

1 signal to as many potential customers as possible. An example of such an attachment is  
2 depicted below. This diagram is taken directly from the sales literature of American  
3 Tower, a leading provider of wireless tower sites and network design assistance for  
4 wireless networking.<sup>9</sup>



5  
6 The equipment detailed above comprises typical components of a Distributed Antenna  
7 System (“DAS”). DAS systems are designed to coordinate the use of several, smaller  
8 antennas spread throughout a geographic region. In today’s environment, DAS networks  
9 are generally used in combination with more traditional stand-alone wireless tower sites  
10 in areas where either high-traffic volumes or terrain (e.g., indoor areas surrounded by  
11 concrete and steel, densely populated outdoor venues, etc.) tax the traditional wireless

<sup>9</sup> A complete copy of the American Tower "DAS Solutions" brochure is included as Attachment MTS-02, and can also be found at <http://www.americantower.com/atcweb/SiteServices/UsSites/DAS+Networks.htm>.

infrastructure causing undesirable service deterioration (i.e., call blockage, dropped calls, low-bandwidth availability, etc.).<sup>10</sup>

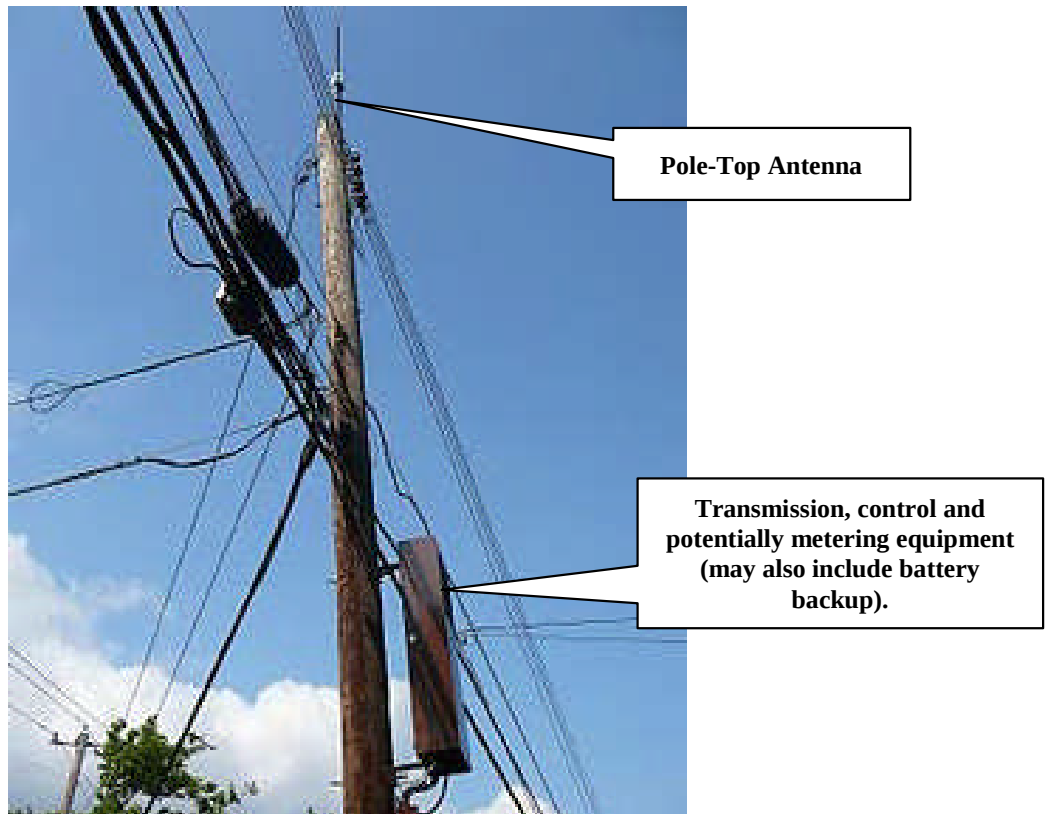
**Q. HOW DO THESE TYPES OF WIRELESS ATTACHMENTS COMPARE TO TRADITIONAL ATTACHMENTS?**

A. Wireless attachments of the type diagramed above are generally much larger and substantially more complex than traditional attachments, whether used for telecommunications carriers or CATV companies. In the example above, the outdoor wireless “attachment” actually includes the addition of numerous components to each the utility pole including: (a) an antenna; (b) an “equipment box” which houses necessary transmission and control equipment and, likely, battery backup equipment; (c) a power meter necessary to measure the amount of power being consumed by the attached wireless equipment; and, (d) cables connecting the various components of the antenna structure together. Also of note is the reference in the above diagram to the fiber optic cable. Those connections allow wireless operators to connect and coordinate multiple antenna sites geographically dispersed around a given service area. As detailed above, these various antenna sites are often connected to a local hub where the wireless transmission is transferred to the wireline network. An example of this type of DAS

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<sup>10</sup> For additional information on DAS systems, see the following: (1) *Distributed Antenna Systems*, Dr. Adriano Mauri, available at: <http://www.alino.com/Info/DistributedAntennaSystems/das.htm#DAS>, (2) *Distributed antenna systems: From niche to necessity*, Fierce Wireless, March 4, 2010, available at: <http://www.fiercewireless.com/story/distributed-antenna-systems-niche-necessity/2010-03-04>, or (3) *Distributed Antenna Systems: Connecting America’s hot spots*, RCR Wireless Special Report, April 2010, available at: <http://www.rcrwireless.com/ARTICLE/20100427/STATIC/100429911/special-report-distributed-antenna-systems-connecting-americas-hot>.

1 application in the field, using an existing utility pole as the necessary anchor, is provided  
2 below.<sup>11</sup>



4  
5  
6 **Q. ARE THERE OTHER TYPES OF WIRELESS ANTENNA SYSTEMS THAT**  
7 **WIRELESS CARRIERS MAY SEEK TO ATTACH TO POWER POLES?**

8 A. Yes. It is important to note that while CANDAS discusses primarily DAS antenna  
9 attachments in its evidence, its application is not limited only to DAS, but instead, would  
10 appear to encompass any wireless telecommunications attachment that its members or,

<sup>11</sup> <http://whitmanhighcelltower.blogspot.com/2010/03/alternative-to-cell-tower.html>.



1 for that matter, any Canadian Carrier may elect to propose at any point in time. In  
2 addition to DAS arrangements which tend to rely upon smaller antennas, there are  
3 numerous other types of wireless antenna systems, many of which can be attached to  
4 utility poles of varying size. These range from small WI-FI or WI-MAX antennas, to  
5 complete, stand-alone base-station units maintained for traditional cellular applications.  
6 I've provided just a few examples below:  
7



8  
9 The picture above, and the one below, are documentation maintained by the City of  
10 Portland as part of its *Strategic Vision* for municipal communications overseen by its  
11 Office of Cable Communications and Franchise Management. The City of Portland is  
12 somewhat unique in its documentation of wireless proliferation given the fact that  
13 Portland residents appear to have been particularly vocal about their objection to these

types of attachments being located in their neighborhoods or in close proximity to their homes.<sup>12</sup>



Both pictures above detail larger, more traditional cellular antenna array used by wireless providers.<sup>13</sup>

**Q. APPROXIMATELY HOW MUCH POLE SPACE ARE WIRELESS COMPONENTS OF A DAS LIKELY TO UTILIZE?**

**A.** Wireless attachments of the type being discussed by CANDAS use approximately 5 to 8 feet of pole space. For example, Niagara Mohawk Power Corporation (d/b/a National

<sup>12</sup> See, e.g., *A Hard Cell in Northeast Portland*, available at: <http://www.naturaloregon.org/2010/02/26/a-hard-cell-in-northeast-portland/>, also *Wireless Antenna Draws Heat*, The Portland Observer, January 21, 2010, available at: <http://portlandobserver.com/?p=573>.

<sup>13</sup> These pictures and additional materials (including the *Statement of Mission, Strategic Directions and Visions*) can be found at: <http://www.portlandonline.com/cable/index.cfm?c=47110>.

Grid), petitioned regulators in the State of New York to accept an agreement it had reached with its own affiliate National Grid Communications, Inc. for the placement of DAS wireless facilities on its electric transmission facilities.<sup>14</sup> The DAS facilities proposed by National Grid were similar to the diagram included above, i.e., a pole-top antenna in combination with an accessory panel (or equipment box), meter and connection to fiber-optic cable. Because the attached apparatus was so substantially larger than traditional communications pole attachments, the New York Public Service Commission (“NYPSC”) required a higher attachment rate than what the two affiliates had agreed to. The final approved rate was based upon the following variables:

1. 2 ft. of pole space to anchor the pole-top antenna, plus
2. 5 ft. of pole space assigned to the accessory panel, equal
3. 7 ft. of space assigned to this single attachment (37.84% of the pole's total useable space).

The NYPSC confirmed these dimensions in its Order:<sup>15</sup>

Each wireless attachment will consist of an antenna at the top of the pole, occupying about two feet of the current usable pole space, and an accessory panel that will occupy about five feet of pole space in the lower area of the pole. The antenna and panel are connected by a wire and are supplied with power by a wire attachment.

The Distributed Antenna System (“DAS”) requires:

- a host base station with a wireline connection to the DAS;
- distribution poles upon which DAS equipment can be installed;

<sup>14</sup> *Joint Petition of Niagara Mohawk Power Corporation and National Grid Communications, Inc. for Approval of a Pole Attachment Rate for Certain Wireless Attachments to Niagara Mohawk’s Distribution Poles*, Case 03-E-1578, Order Approving Petition with Modifications, April 7, 2004.

<sup>15</sup> *Id.*, pg. 3.

- a nearby fiber optic network (typically an existing system);
- a distribution pole network (Niagara Mohawk's distribution system);
- shared antennas and control boxes; and
- a neutral host for different wireless service providers.

The equipment attached to the distribution pole consists of an antenna varying in length from one to eight feet attached to the top two feet of the distribution pole. Between the communications space and the minimum grade level on the pole, the DAS equipment is mounted. This equipment includes (from top to bottom) a remote unit, a lightening protection box, an electrical ground within a u-shaped duct and an electric meter for the DAS service. The DAS contains a battery-powered back-up supply in the event of a distribution line loss of service.

**Q. ARE THERE OTHER IMPORTANT PHYSICAL DIFFERENCES BETWEEN WIRELESS AND WIRELINE ATTACHMENTS?**

A. Yes, as I have detailed above, wireless attachments are not confined to the "communications space" within which wireline attachments are generally found. Not only do these attachments use portions of the pole heretofore reserved for clearance or distribution facilities, they also require coordination between multiple pieces of equipment attached at varying points on the pole (e.g., pole-top antenna, management equipment below the neutral/separation space, battery back-up, etc.), oftentimes connected to low voltage power and coordinated with wireline attachments (e.g., fiber optics). In these circumstances the make-ready work and the ongoing management effort for poles that include these attachments may well give rise to relatively higher costs.<sup>16</sup>

**C. CANDAS' Proposed Pole Attachments**

**Q. HOW DOES CANDAS DESCRIBE THE WIRELESS ATTACHMENTS IT INTENDS TO USE FOR THE PROPOSED TORONTO DAS NETWORK?**

---

<sup>16</sup> Byrne Affidavit, paragraph 20.

1 A. The exhibits to Mr. Larsen's testimony provide images of numerous DAS nodes, or  
2 installations, each of which is substantially larger than traditional pole attachments.  
3 Moreover, these nodes all include equipment mounted outside of the communications  
4 space. Mr. Larsen's Exhibit D, for example, describes an "AS-BUILT" Toronto DAS  
5 Network node comprising: (1) an antenna; (2) an antenna bracket; (c) an FTE ("Fiber  
6 Termination Equipment ") box; (d) a radio box; and, (e) UPS ("Uninterruptable Power  
7 Supply") equipment. This equipment is attached to the pole in various locations outside  
8 the communications space beginning at about 3.9 meters above ground in an area  
9 generally described as the clearance space and extending upward to about 6.4 meters  
10 above ground through the communications space.<sup>17</sup> In total, CANDAS' proposed node  
11 uses approximately 2 1/2 meters of pole space, or about 8 feet, and is largely attached  
12 outside of the communications space. At Exhibit B of his testimony, Mr. Larsen provides  
13 photos of DAS nodes used by ExteNet in other cities. In most cases, these installations  
14 also include pole-top antennas supported by numerous equipment and power boxes which  
15 are mounted near but not wholly within the communications space. In each case, the  
16 total space used by these DAS nodes is substantially larger than traditional pole  
17 attachments that occur within the communications space and substantially different than  
18 any type of "attachment" considered by the Board in its CCTA Decision (or defined by  
19 the parties in the Settlement Agreement).

---

<sup>17</sup> At this height, equipment appears to be mounted in the separation space.

1 **D. *The CCTA Decision Contemplates Small Attachments Within The Communications***  
2 ***Space***  
3

4 **Q. DO THE WIRELESS POLE ATTACHMENTS DESCRIBED BY CANDAS**  
5 **APPEAR TO BE CONSISTENT WITH THE POLE ATTACHMENTS**  
6 **PROVIDED FOR IN THE CCTA DECISION?**

7 A. No, they do not. In fact, based upon my review of the CCTA Decision and underlying  
8 application, it is clear to me that the attachments CANDAS proposes here are materially  
9 different in at least three ways.

10 First, whereas CANDAS has requested pole-top attachments in this proceeding,  
11 the CCTA Decision specifically indicates that the conditions it adopted "apply to access  
12 to the *communications space* on the LDC poles." (*emphasis added*). In fact, at least one  
13 witness filing evidence on behalf of the CCTA clarified that the "top 11.5 feet (3.55  
14 meters) of the pole is power space."<sup>18</sup> Hence, CANDAS' pole-top request is clearly  
15 outside the scope of the plain language of the CCTA Decision as well as the CCTA's  
16 expert testimony and request in that proceeding.

17 Next, as I have previously described, CANDAS' proposal does not provide any  
18 limits, or even expectations, as to the pole space used by any particular wireless  
19 attachment. As I have shown, these attachments are likely to consume roughly 8 feet of  
20 pole space. By way of comparison, the CCTA had requested that cable companies be  
21 able to use the communications space - comprising 2 feet - and proposed specific prices  
22 considering "that a cable operator also uses half of the separation space for a total cable

---

<sup>18</sup> Appendix C, Evidence of Donald A. Ford, at p.2.

1 usage of 2.6 feet."<sup>19</sup> Hence, whereas the CCTA Decision limited attachment parameters  
2 to the communications space and calculated pricing based on a formula assuming no  
3 more than 2.6 feet of space may be used by all attachers, CANDAS is requesting that it  
4 not be limited in the amount of space it uses, but instead, be entitled to use as much space  
5 on the pole as necessary for its needs - which, in all likelihood, is 3 to 4 times more than  
6 the entire space allocation to be shared by all connectors in the CCTA Decision.

7 Finally, nothing that I could find in the CCTA Decision or the CCTA's  
8 application suggested that attachments would be mounted to poles below the  
9 communications space, adding to visual clutter much closer to eye level, as well as the  
10 ability for THESL personnel to manage other equipment on the pole.

11 In addition to these issues, it is reasonably clear to me that the CCTA and the  
12 Board likely did not contemplate the attachment of DAS network nodes by wireless  
13 carriers. As I have previously discussed, the CCTA's expert described poles as support  
14 structures "that are used to carry or contain electrical power and/or communications wires  
15 and cables" and that users of poles would "attach a steel strand to the pole, and lash one  
16 or more communications cables to the strand." Hence, the CCTA clearly was not  
17 contemplating wireless attachments when it filed its original petition with the Board and  
18 its expert did not discuss wireless attachments when proposing a pole attachment rate.  
19 The words "antenna," "DAS" and/or "wireless" cannot be found in the CCTA Decision at  
20 all. Hence, any suggestion that wireless antennas and supporting equipment similar to  
21 that discussed in CANDAS' Application and supporting evidence were contemplated by

---

<sup>19</sup> Appendix C, Evidence of Donald A. Ford, at p.21.

1 the Board and addressed in the CCTA Decision in early 2005 ignores the material  
2 differences between traditional pole attachments and the DAS attachments that are the  
3 subject of the CANDAS application.

4  
5 **III. POWER POLES ARE NOT ESSENTIAL TO WIRELESS SERVICES**  
6

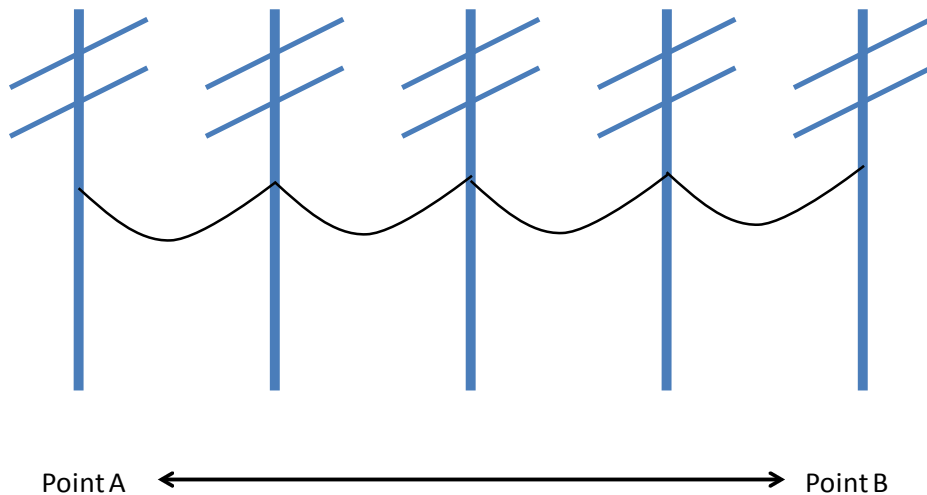
7 **Q. ARE WIRELESS ATTACHMENTS TO POWER POLES ESSENTIAL TO**  
8 **WIRELESS SERVICES AS SUGGESTED IN CANDAS' APPLICATION?**

9 A. No. I understand that CANDAS seeks access to power poles throughout Ontario under  
10 two theories. First, CANDAS argues that the CCTA Decision applies to wireless  
11 attachments and, therefore, it has already been determined that poles are essential  
12 facilities. Alternatively, CANDAS argues that if it is determined that the CCTA Decision  
13 did not already address wireless attachments, the Board should affirmatively apply that  
14 Decision to wireless attachments based upon a finding that power poles are essential to  
15 wireless services. I discuss above why I believe the CCTA Decision does not apply to  
16 wireless attachments. In this section I discuss why the Board should reject CANDAS'  
17 invitation to dramatically expand the scope of its original CCTA Decision. I demonstrate  
18 that attachments as they relate to wireless services are very different from traditional  
19 wireline attachments, not only in size and structure, but also in the economics that define  
20 "essential facilities."

21 **Q. WHY ARE THE ECONOMICS ASSOCIATED WITH WIRELESS**  
22 **ATTACHMENTS LIKE DAS ANTENNAE DIFFERENT FROM TRADITIONAL**  
23 **CABLE ATTACHMENTS?**



1 A. The primary difference is the "barriers to entry" that exist with respect to alternatives  
2 supporting traditional wireline attachments but are absent for wireless attachments. The  
3 primary theory supporting regulated rates, terms and conditions for utility pole  
4 attachments is the notion that utility poles represent an "essential facility."<sup>20</sup> In the case  
5 of wireline attachments, the primary basis of this theory generates from the relatively  
6 unique nature of utility poles and their organized deployment along a given route. For  
7 example, the right to attach cables to a single utility pole would be of little value to a  
8 telecommunications or CATV provider without the right to further extend the cable to  
9 additional poles. It is the ability to use utility poles in combination along a given route so  
10 as to convey necessary transmission cables contiguously from point A to point B that  
11 makes traditional utility pole attachments so valuable and unique (as diagramed simply  
12 below).



<sup>20</sup> CCTA Decision, pg. 3.

1 Likewise, it is this relatively unique contiguous nature of a pole-route's design that  
2 creates "barriers to entry" which realistically limits the number of alternative forms of  
3 supply, thereby arguably creating market power which regulation is intended to combat.<sup>21</sup>

4 In the case of wireless communication attachments, however, the equipment at issue does  
5 not rely to the same extent upon the contiguous nature offered by a pole-route. Instead,  
6 wireless attachments rely upon utility poles primarily for elevation, and to some extent,  
7 strategically placed right-of-way. However, these attributes can be found in numerous  
8 alternative forms, e.g., buildings, stand alone towers, billboards, commercial signage or  
9 nearly any other elevated structure. And, importantly, wireless providers have for some  
10 time taken advantage of these other alternatives.

11 **Q. IS IT IMPORTANT TO DEFINE THE PROPER PRODUCT AND GEOGRAPHIC**  
12 **MARKETS BEFORE DETERMINING WHETHER "MARKET POWER"**  
13 **EXISTS, AND THEREAFTER, WHETHER A GIVEN FACILITY IS AN**  
14 **"ESSENTIAL FACILITY?"**

15 A. Yes. Dr. Yatchew describes his analysis of the proper markets in his evidence. I  
16 understand that Dr. Yatchew has determined that for purposes of the CANDAS  
17 application (and THESL's request for forbearance), the relevant product market is the  
18 market for siting wireless attachments. Further, Dr. Yatchew determines that the  
19 CANDAS application is insufficient in defining a relevant geographic product market in  
20 that its request is very broad from a geographic perspective (i.e., all of Ontario), while its

---

<sup>21</sup> In the traditional case for regulated pole attachments, the substantial reproduction cost, difficulty in obtaining necessary access to rights-of-way and societal impact (e.g., aesthetics) of erecting competing pole routes increase the relative barriers to entry associated with the market for utility attachments.

evidence in support of its request is far more geographically limited (discussing primarily issues associated with the densest urban portions of Toronto).

**Q. DOES CANDAS DESCRIBE EITHER THE PRODUCT OR GEOGRAPHIC MARKET WITHIN WHICH IT BELIEVES POLES ARE AN "ESSENTIAL FACILITY?"**

A. No. CANDAS appears to rely solely upon the Board's prior decision that utility poles are "essential" in relation to wireline attachments, to extrapolate that those poles must also, therefore, be essential to wireless attachments. That logic completely ignores the material differences that exist between the two types of attachments. Further, it is important note that CANDAS' evidence is limited to a particular outdoor DAS-based network designed to support Public Mobile's plans to provide wireless services in the City of Toronto. According to CANDAS, the use of power poles is essential to the rollout of its proposed plan.<sup>22</sup> However, even if we take the CANDAS evidence as is, the extent to which a facility is "essential" should not be considered based upon the business plan and/or experience of a single market participant using a particular type of technology. Instead, I understand that the Board has already described the framework around which an "essential facility" may be evaluated based upon the potential for market power and the resultant level of competition necessary to protect the public interest.<sup>23</sup> It is the competitiveness of the market at issue that must guide that decision, not a given carriers' ability to enter the market using a particular entry strategy (e.g., DAS).

<sup>22</sup> See CANDAS response to THESL Interrogator No.3(b) wherein CANDAS indicates the network was planned to meet the needs of Public Mobile - and possibly - other wireless carriers.

<sup>23</sup> Ontario Energy Board, Decision in *Natural Gas Electricity Interface Review Proceeding* (NGEIR), EB-2005-055 I (November 6, 2006).

1 **Q. ARE THERE MULTIPLE CARRIERS IN THE WIRELESS SERVICES MARKET**  
2 **THAT PROVIDE SERVICE USING MEANS OTHER THAN ATTACHING DAS**  
3 **ANTENNAE TO UTILITY POLES AS CANDAS PROPOSES HERE?**

4 A. Yes, in fact, the predominate method of entering and expanding wireless service coverage  
5 in the wireless services market does not rely upon attaching antennae to utility poles. The  
6 primary method of providing wireless services in Toronto (and elsewhere) involve self-  
7 erected towers at elevation sufficient to serve a substantial geographic region,  
8 substantially larger than the region that would be served by a DAS location. These are  
9 generally referred to as "macro" sites (whereas DAS and other technologies are often  
10 referred to as "small" cell sites). For example, even Public Mobile was able to deploy a  
11 macro cell site-based network in which it placed numerous traditional macro cell sites  
12 throughout the city as a complete substitute for the DAS network it intended to build  
13 utilizing attachments to power poles.<sup>24</sup> Public Mobile apparently uses this macro-site  
14 network to offer its wireless services throughout Toronto today.<sup>25</sup>

15 **C. *Macro Cell Site Deployment Is A Good Substitute For DAS Based Deployment***

16  
17 **Q. IS THE MACRO CELL SITE DEPLOYMENT STRATEGY RELATIVELY**  
18 **QUICK TO IMPLEMENT IN TORONTO?**

19 A. Apparently, it is. Mr. O'Shaughnessy testified that Public Mobile switched to a  
20 traditional macro cell site deployment strategy at the end of 2009. And, although  
21 CANDAS refused to provide any specific detail in response to discovery as to the precise

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<sup>24</sup> See Written Evidence of Brian O'Shaughnessy at pp.8-9.

<sup>25</sup> *Id.*

1 timeline, locations and costs in comparison to the DAS deployment it had intended to  
2 use, Public Mobile was apparently able to launch services in Toronto in May of 2010,  
3 approximately 5 to 6 months after it changed its deployment strategy.<sup>26</sup>

4 **Q. HAS CANDAS BEEN ABLE TO DEMONSTRATE THAT PUBLIC MOBILE,**  
5 **USING ITS MACRO-SITE NETWORK, HAS LIMITED COVERAGE AREA OR**  
6 **OTHER DEFICIENCIES IN ITS SERVICE?**

7 A. No. When asked to provide information that would illuminate this issue, CANDAS and  
8 Public Mobile refused, indicating they did not understand the relevance of such  
9 information.<sup>27</sup> I suspect that had there been serious coverage issues which CANDAS  
10 wanted to bring to the Board's attention, they would have been disclosed in response to  
11 discovery. That said, Public Mobile's own website provides a coverage map for the  
12 Toronto area suggesting that the entire city of Toronto is fully covered.<sup>28</sup>

13 **Q. ARE THERE NUMEROUS TOWERS AND OTHER SITING FACILITIES THAT**  
14 **ALREADY EXIST IN TORONTO?**

15 A. Yes. Industry Canada maintains Canada's national database of radio frequency licenses,  
16 the Assignment and Licensing System ("ALS"), which includes detailed information on  
17 all registered antenna sites used by cellular, PCS ("Personal Communications Services"),  
18 and AWS ("Advanced Wireless Services") system operators.<sup>29</sup> This database  
19 demonstrates that there are roughly 4,000 cellular/PCS/AWS antenna arrays currently

---

<sup>26</sup> <http://www.theglobeandmail.com/report-on-business/public-mobile-launches-cellphone-service/article1580258/>

<sup>27</sup> See CANDAS response to THESL Interrogatory Numbers 50(f), 50(l) and 50(m).

<sup>28</sup> <http://www.publicmobile.ca/pmconsumer/coverage>

<sup>29</sup> See Industry Canada Spectrum Direct – Radiofrequency Search, at [http://www.ic.gc.ca/eic/site/sd-sd.nsf/eng/h\\_00025.html](http://www.ic.gc.ca/eic/site/sd-sd.nsf/eng/h_00025.html)

1 operating within 25 kilometers of the center of Toronto.<sup>30</sup> Moreover, the database also  
2 indicates that there are approximately 1,343 individual physical locations at which one or  
3 more radio communication carriers' antenna arrays are currently operating within the city  
4 of Toronto.<sup>31</sup> Each of these sites is a direct alternative to placing wireless antennae on a  
5 THESL utility pole for purposes of supporting the provision of wireless services.

6 The City of Toronto maintains a database similar to that managed by Industry  
7 Canada that identifies potential sharing sites. At present, the database includes 140 pages  
8 of company names, location addresses, city ward numbers and antenna heights.<sup>32</sup> These  
9 data identify more than 7,000 antennas operating within the city of Toronto. Moreover,  
10 they also identify more than 1,300 physical locations within the city of Toronto where  
11 site sharing, or co-location, is a possibility. To put this into perspective, there are, on  
12 average, more than 2 potential co-location sites per square kilometer in the Toronto area.  
13 The maps below identify each of the unique antenna sites located within 25 km of the  
14 center of Toronto, as described within the ALS database:

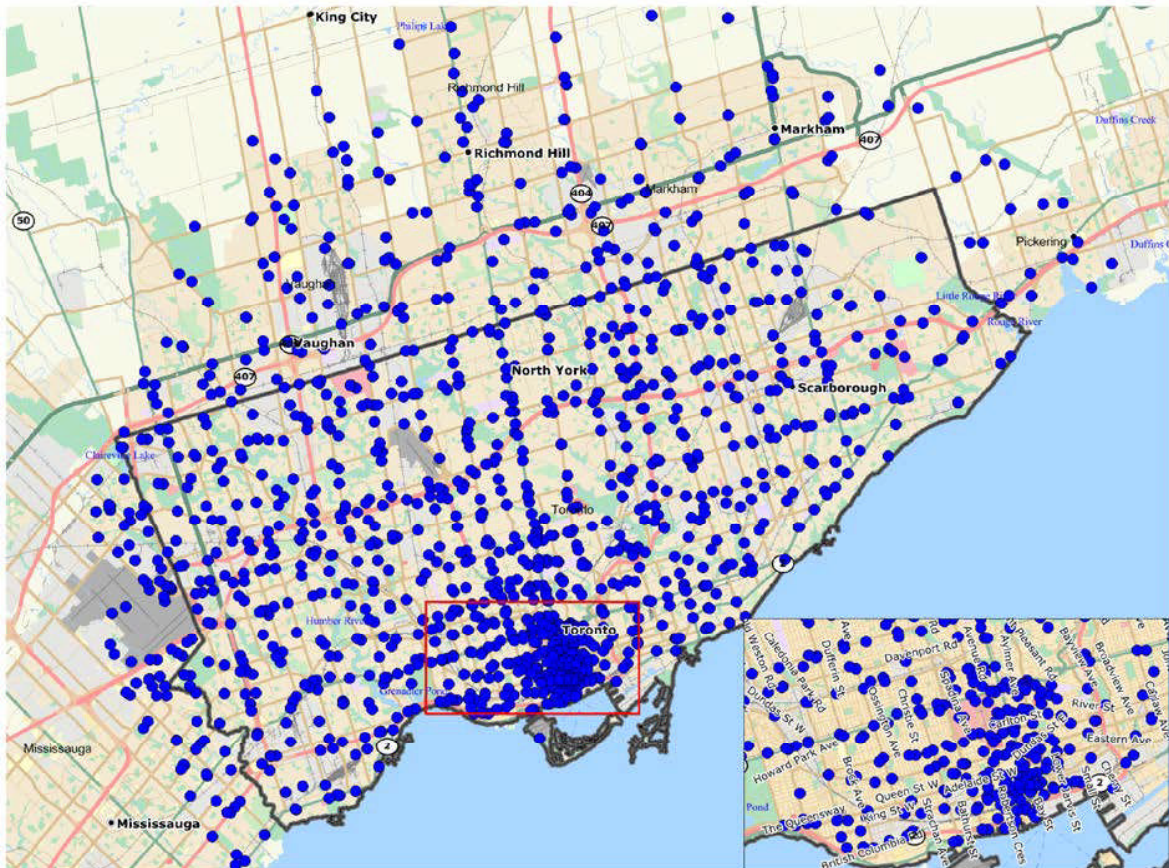
---

<sup>30</sup> See Attachment MTS-03 (Listing of Cellular/PCS/AWS Antenna Arrays w/i 25 Km. of Toronto's City Center). For purposes of this listing, an antenna array is defined as one or more antennas operating at the same licensed frequency at a single station site (i.e., physical location), by a particular wireless carrier. An antenna array may include several antennas oriented in different directions, and multiple carriers may be operating antenna arrays at the same station site. As described in Attachment MS-03, this data was compiled using the Spectrum Direct Geographic Area Search Tool, see [http://sd.ic.gc.ca/pls/engdoc\\_anon/web\\_search.geographical\\_input](http://sd.ic.gc.ca/pls/engdoc_anon/web_search.geographical_input)

<sup>31</sup> See Attachment MTS-04 (Listing of Cellular/PCS/AWS Station Sites w/i the City of Toronto). This listing was compiled from the data underlying Attachment MTS-03, by eliminating multiple antenna array entries at the same station location.

<sup>32</sup> See <http://www.toronto.ca/planning/telecommunications.htm>

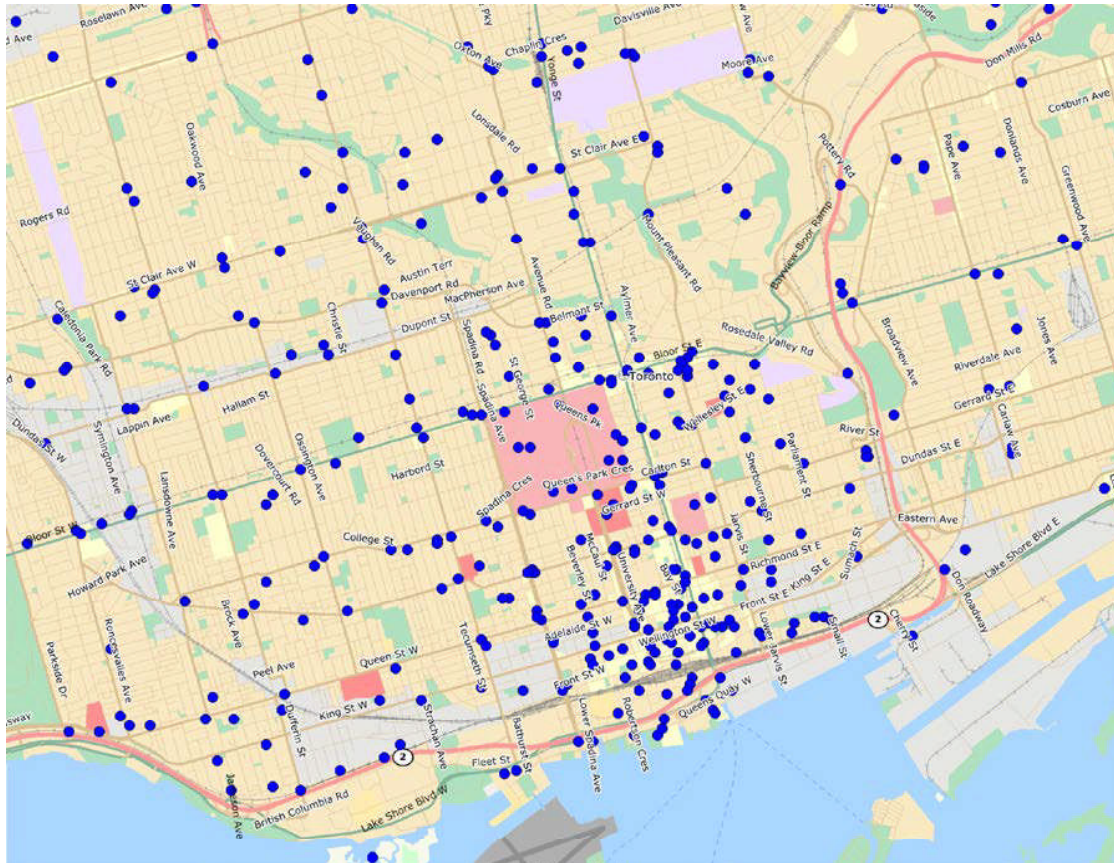
**MAP 1: ALS Listed Antenna sites w/in 25 Km of Toronto center**  
(see also Attachment MTS-03)



The map below provides a more detailed look at the excerpted portion above, representing the densest portion of the city:



**MAP 2: Detail of Toronto city center**  
(see also Attachment MTS-03)



**Q. OF WHAT SIGNIFICANCE IS THE INFORMATION YOU DESCRIBE ABOVE?**

**A.** The information above leads to two important conclusions. First, as pictured below, it is clear that there are roughly 1,300 unique locations in or near the City of Toronto that currently accommodate wireless antennae being used to serve the wireless services market. Those locations clearly exist as alternatives to THESL utility poles thereby undermining CANDAS' claim that THESL poles are an "essential facility." Second, it is clear that Industry Canada and the City of Toronto work diligently to ensure that the wireless services market is as efficient as possible when erecting additional antennae



1 sites. The Board should consider these efforts before providing wireless service  
2 providers relative *carte blanche* in accessing THESL poles for additional sites aimed at  
3 supporting a particular technology (DAS) that serves merely as a substitute for  
4 technologies already supported by existing sites.

5 **Q. HAVE YOU BEEN ABLE TO DETERMINE THE EXTENT TO WHICH PUBLIC**  
6 **MOBILE WAS ABLE TO LOCATE ANTENNAS WITHOUT THE USE OF THE**  
7 **TORONTO DAS NETWORK?**

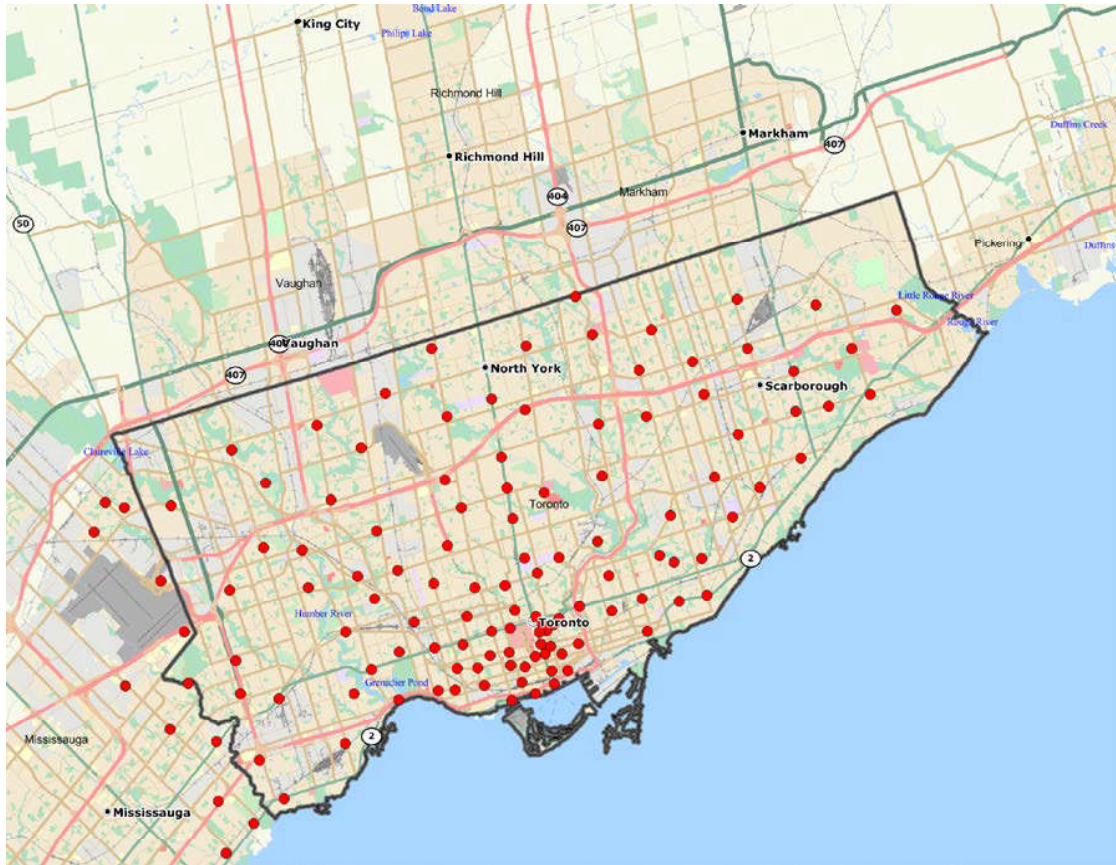
8 A. While Public Mobile and CANDAS refused to provide this information in response to  
9 THESL's interrogatories,<sup>33</sup> a good deal of information is available through the Industry  
10 Canada database discussed above. That database shows Public Mobile has established  
11 antennas in 125 unique locations within 25 kilometers of the center of Toronto.<sup>34</sup> The  
12 geographic distribution of Public Mobile's existing antenna locations is shown in the  
13 figure below.

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<sup>33</sup> See CANDAS response to THESL Interrogatory Numbers 50(b) and 50(j).

<sup>34</sup> See Attachment MTS-05 (Listing of Public Mobile's Cellular/PCS/AWS Antenna Sites Within 25 Km. of Toronto's City Center). This listing was compiled from the data underlying Attachment MS-03, by selecting only those records indicating Public Mobile was the license holder, and then eliminating multiple antenna array entries at the same station location.

**MAP 3: Public Mobile's antenna locations w/i 25 km. of Toronto center**  
(also see Attachment MTS-05)



**Q. PLEASE DISCUSS THE EXTENT TO WHICH COMPETITIVE TOWER AND/OR PROPERTY MANAGEMENT COMPANIES OFFER SITES FOR THE PLACEMENT OF ANTENNAS WITHIN TORONTO.**

A. While outdoor DAS<sup>35</sup> is still a relatively new deployment strategy in the wireless industry, traditional cell tower development and management has matured into big business. In the United States, for example, there were 253,086 cell sites in 2010, many of which were managed by large firms such as American Tower, Crown Castle and

<sup>35</sup> Also called "O-DAS."

1 SBA.<sup>36</sup> Data pulled from SBA's website alone shows there are 142 sites available  
2 throughout Ontario as of 8.20.11.<sup>37</sup> Another management company, Antenna  
3 Management also offers sites in the Toronto area.<sup>38</sup>

4 **D. *Substitutes for DAS in a Heterogeneous Wireless Network***

5  
6 **Q. ARE MACRO SITES AND SMALL CELLS (e.g., DAS AND OTHERS) OFTEN**  
7 **USED IN COMBINATION TO ENHANCE THE SERVING CAPACITY OF**  
8 **WIRELESS CARRIERS?**

9 A. Yes, they are. With increased demands on wireless networks resulting in large part from  
10 the proliferation of data applications, carriers are supplementing their macro-site  
11 networks with multiple small cell site technologies (DAS being one such technology)  
12 intended to provide them increased capacity, primarily in densely populated areas. This  
13 combination of technologies is often referred to as a "heterogeneous wireless network."  
14 Heterogeneous networks combine the advantages of traditional macro cell sites  
15 complimented by additional, lower power network layers, or small cells, each of which  
16 leverages existing technologies to provide the best possible wireless experience.<sup>39</sup> The  
17 diagram below was presented to Industry Canada by Rogers Communications in a recent  
18 consultation regarding 700MHz spectrum.<sup>40</sup> The diagram describes how Rogers intends

---

<sup>36</sup> See Year-End 2010 Top-Line Survey Results located at  
[http://www.ctia.org/media/industry\\_info/index.cfm/AID/10316](http://www.ctia.org/media/industry_info/index.cfm/AID/10316).

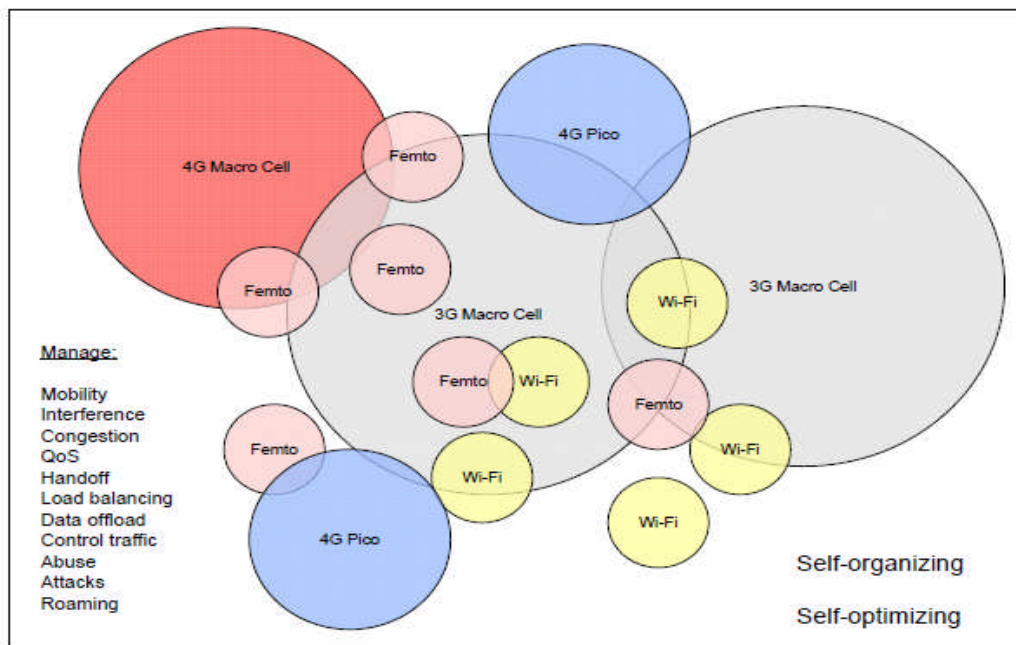
<sup>37</sup> <http://map.sbasite.com/>.

<sup>38</sup> <http://www.antennamgt.com/>.

<sup>39</sup> For a more detailed discussion of heterogeneous networks and the complimentary role lower powered small cell technologies play, see  
[http://www.ericsson.com/res/thecompany/docs/publications/ericsson\\_review/2011/heterogeneous\\_networks.pdf](http://www.ericsson.com/res/thecompany/docs/publications/ericsson_review/2011/heterogeneous_networks.pdf).

<sup>40</sup> <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf09997.html>

to increase its necessary wireless capacity, in the future, to accommodate increased demands. Rogers intends that traditional 3G and 4G macro cell sites will comprise the largest portions of its wireless network, with smaller, low powered cells (Wi-Fi and Femtocells in this example) delivering coverage in certain densely populated (or dense demand) areas as a compliment to the larger, more traditional macro sites. Note that Rogers does not indicate that it will rely upon DAS to further its wireless capacity needs, instead, it intends to rely upon Wi-Fi offload and femtocell technology (both of which are direct substitutes for the DAS network CANDAS described below):



**Q. PLEASE ELABORATE ON HOW THESE SMALLER CELLS COMPLIMENT THE MACRO NETWORK.**

1 A. Small cells - whether indoor, outdoor or both - are specifically intended to complement  
2 larger macro site based networks by providing enhanced/expanded coverage in target  
3 areas. Alcatel-Lucent describes the benefits of a heterogeneous network as follows:

4 Combining these different network layers can deliver a seamless service.  
5 At home the subscribers' mobile internet sessions are routed through the  
6 residential femtocell; on their commute into the city, their service is  
7 delivered by the wide-area 3G. Once in the city, data sessions are  
8 delivered by urban 4G LTE macro cells. As the subscriber stops for  
9 coffee and a croissant, service is then routed via a metro femtocell. As  
10 they walk into their office next door, data sessions are then routed through  
11 enterprise femtocells. Subscribers get a continuous, high-quality  
12 experience, and operators can meet the data demand both geographically  
13 and during peak loads.<sup>41</sup>  
14

15 While each of these technologies complement the larger, macro based network, they are  
16 competing technologies and serve as substitutes for one another (and for DAS networks)  
17 in certain, densely populated, or high traffic areas, or in areas which are difficult to cover  
18 through macro sites.

19 **E. *WiFi and Femtocells As Substitutes for DAS***

20  
21 **Q. PLEASE DESCRIBE THE "FEMTOCELLS" IDENTIFIED IN THE DIAGRAM**  
22 **ABOVE?**

23 A. A femtocell is used to improve mobile network coverage in small areas. They connect  
24 locally to mobile phones and similar devices through their normal GSM, CDMA, or  
25 UMTS connections, and then route the connections over a broadband internet connection

---

<sup>41</sup>See Attachment MTS-06 at p.2. See also, <http://www.wilson-street.com/2011/05/solving-the-capacity-crunch-small-cells%E2%80%99-role-in-a-4g-lte-network/>

1 to the carrier, bypassing the traditional cell sites.<sup>42</sup> Femtocells can be deployed in  
2 residential, enterprise and urban settings. A picture of a femtocell installed in an urban,  
3 or metropolitan, environment is provided below<sup>43</sup>



5  
6  
7 Femtocell technology is relatively new but its flexibility and effectiveness is fueling  
8 substantial deployment growth. It is estimated that there are approximately 2.3 million  
9 3G femtocells deployed worldwide as compared to roughly 1.6 million 3G macro cell  
10 sites.<sup>44</sup> Growth in femtocell deployment is also anticipated to increase substantially over  
11 the next several years with expectations that 48 million femtocells may be deployed by  
12 2014. Korea's SK Telecom, for example, has recently announced its plans to deploy

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<sup>42</sup> GSM ("Global System for Mobile"), CDMA ("Code Division Multiple Access") and UMTS ("Universal Mobile Telecommunications System") are standards by which wireless equipment is manufactured for purposes of interoperability.

<sup>43</sup> See Attachment MTS-06 at p.4. See also, <http://www.thinkfemtocell.com/Use-Cases/new-business-case-study-makes-the-case-for-metro-femtocells.html>.

<sup>44</sup> See Attachment MTS-06 at p.5. See also, <http://www.cellular-news.com/story/49671.php>

1 10,000 femtocell access points throughout South Korea's high traffic areas, including  
2 cafes, shopping malls, offices and apartment blocks. Alcatel-Lucent has released several  
3 statements regarding numerous carrier trials and the company has announced it holds  
4 more than 17 commercial deployment agreements in which carriers are deploying its new  
5 line of femtocells, including outdoor metro-femtocells.<sup>45</sup>

6 **Q. DO FEMTOCELLS TYPICALLY CARRY BOTH VOICE AND DATA?**

7 A. Yes, they do. Although I understand at least one carrier has restricted its femtocell  
8 deployment such that the small cells manage data connections only, leaving voice  
9 connectivity to the macro cellular sites currently deployed in the network.<sup>46</sup>

10 **Q. CAN FEMTOCELLS BE DEPLOYED WITHIN LARGE OUTDOOR, OR**  
11 **METRO TYPE, SETTINGS AKIN TO THE MANNER IN WHICH CANDAS**  
12 **INTENDS TO DEPLOY ITS DAS NETWORK IN TORONTO?**

13 A. Yes. In fact, Alcatel-Lucent recently reported that its second generation of "metro  
14 femtocells" provide a footprint up to 300 meters in inner cities and up to 2 km, if  
15 positioned high enough, in less densely populated locations.<sup>47</sup> Hence, newer, higher  
16 powered generations of this proven technology when adapted specifically to the outdoor  
17 environment provide a compelling substitute to DAS for purposes of carrying both voice  
18 and data traffic in urban environments as a complement to larger, macro cell sites,

---

<sup>45</sup>See Attachment MTS-06 at p.7. See also, [http://www.alcatel-lucent.com/wps/portal/!ut/p/kcxml/04\\_Sj9SPykssy0xPLMnMz0vM0Y\\_QjzKLd4x3tXDUL8h2VAQAURh\\_Yw!!?LMSG\\_CABINET=Docs\\_and\\_Resource\\_Ctr&LMSG\\_CONTENT\\_FILE=News\\_Releases\\_2011/News\\_Article\\_002354.xml](http://www.alcatel-lucent.com/wps/portal/!ut/p/kcxml/04_Sj9SPykssy0xPLMnMz0vM0Y_QjzKLd4x3tXDUL8h2VAQAURh_Yw!!?LMSG_CABINET=Docs_and_Resource_Ctr&LMSG_CONTENT_FILE=News_Releases_2011/News_Article_002354.xml)

<sup>46</sup> See Attachment MTS-07. See also, [http://www.lightreading.com/document.asp?doc\\_id=208549](http://www.lightreading.com/document.asp?doc_id=208549);  
[http://www.cieonline.co.uk/news/fullstory.php/aid/2442/picoChip\\_and\\_Contela\\_supply\\_SK\\_Telecom\\_in\\_first\\_commercial\\_luh\\_deployment.html](http://www.cieonline.co.uk/news/fullstory.php/aid/2442/picoChip_and_Contela_supply_SK_Telecom_in_first_commercial_luh_deployment.html)

<sup>47</sup>See Attachment MTS-08 at p.1. See also, <http://www.wilson-street.com/2011/03/easing-inner-city-congestion-with-public-service-femtocells/>

1 especially when costs are considered. Alcatel-Lucent, estimates that metro femtocells  
2 can cover the same area as a macro cell site for approximately 1/10 the cost.<sup>48</sup>

3 **Q. ARE POWER POLES NEEDED TO MOUNT METRO**  
4 **FEMTOCELLS?**

5 A. No. Alcatel-Lucent metro femtocells, for example, are designed be attached to building  
6 walls and street furniture. Alcatel-Lucent touts the ease of installing its metro femtocell  
7 sites in the following way: an "engineer simply needs to mount the access point on a  
8 building or street furniture, plug in the power and the broadband and its ready to go."<sup>49</sup>  
9 In other words, metro femtocell sites are specifically designed to operate by affixing them  
10 to existing buildings and other structures without complex utility pole attachments.  
11 Further, they rely upon existing broadband infrastructure to backhaul traffic to the  
12 necessary network, without the need, or expense, of extending fibre-optic cables to the  
13 antennae site.<sup>50</sup>

14 **Q. IN ADDITION TO FEMTOCELL TECHNOLOGY, ARE THERE OTHER**  
15 **ALTERNATIVES TO DAS NETWORKS?**

16 A. Yes. The industry press is replete with case studies where various low powered wireless  
17 technologies are used to supplement macro-site based services in densely populated  
18 areas. For example, consider the Bloomberg Businessweek described case study of  
19 Towerstream, a 12 year old company that specializes in providing broadband coverage to  
20 corporations. Towerstream is in the process of deploying an outdoor network comprised

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<sup>48</sup> See Attachment MTS-08 at p.2.

<sup>49</sup> See Attachment MTS-08 at p.1.

<sup>50</sup> *Id.*



1 of approximately 1,000 high end Wi-Fi routers in an area covering approximately 7  
2 square miles in Manhattan.<sup>51</sup> The network allows users of Wi-Fi enabled mobile phones  
3 to off-load data traffic onto the Wi-Fi network, increasing data speeds up to 26Mbps,  
4 from approximately 0.35Mbps over the traditional 3G network.<sup>52</sup> When traffic that  
5 would ordinarily be carried on the macro cell is off-loaded to the Wi-Fi network and  
6 supporting transport, the macro cell network is less congested and, therefore, better able  
7 to manage the balance of its voice and data needs.

8 Interestingly, Towerstream appears to have deployed its network in a layered  
9 wireless configuration that does not rely upon fiber-optic cabling (or any "wired" facility)  
10 to backhaul traffic from customer access points ("AP") to its backbone network. Instead,  
11 Towerstream relies upon a high-capacity microwave "ring" to gather traffic from multiple  
12 APs for transport back to its core network, as demonstrated in the following diagram  
13 taken from its website.<sup>53</sup>

---

<sup>51</sup> [http://www.businessweek.com/magazine/content/11\\_23/b4231036687850.htm](http://www.businessweek.com/magazine/content/11_23/b4231036687850.htm)

<sup>52</sup> *Ibid.*

<sup>53</sup> <http://www.towerstream.com/images/pics/wifi-diagram-large.jpg>



1  
2  
3 In December of 2010, AT&T described expansion of its outdoor Wi-Fi  
4 "hotzones" in New York City, including, for example, expansion of its existing Time  
5 Square Wi-Fi hotzone and new hotzones in Rockefeller Center and St. Patrick's  
6 Cathedral. In that same announcement, the company underscored similar deployments of  
7 this same technology in Charlotte, NC, Chicago, IL and upcoming projects in San  
8 Francisco, CA. In these situations, AT&T is managing its overall wireless network by  
9 "off loading" wireless demand that would normally require the participation of macro-cell  
10 equipment, using strategically placed Wi-Fi systems. As of July 2011, AT&T indicates

1 that it operated the United States' largest Wi-Fi network, with more than 24,000 hotspots  
2 and that it provides Wi-Fi access in more than 135,000 locations worldwide. Numerous  
3 other carriers, including T-Mobile and O2, for example, utilize Wi-Fi off load in the same  
4 way.<sup>54</sup>

5 **Q. DO ALL OF AT&T'S WI-FI SITES OPERATE IN OUTDOOR SPACES?**

6 A. No, much like DAS, Wi-Fi sites may be indoor or outdoor, depending upon the needs of  
7 the carrier. While AT&T didn't provided a specific breakdown, splitting the totals  
8 between indoor and outdoor applications, it is fair to assume a good majority of the Wi-Fi  
9 sites are operated indoors. That said, industry data suggest that somewhere between  
10 60%-80% of wireless data connections occur indoors.<sup>55</sup> Additionally, carriers like  
11 Rogers also offer Wi-Fi services in an effort to off- load voice traffic, even offering  
12 discounted pricing for its Wi-Fi voice service.<sup>56</sup>

13 **Q. DO WI-FI DEPLOYMENTS REQUIRE THE USE OF POWER POLES?**

14 A. No, they do not. In the case of AT&T, the majority of its Wi-Fi sites are able to use  
15 indoor infrastructure, including power and internet connections for backhauling traffic.  
16 Towerstream's deployment in New York, for example, relies upon locating Wi-Fi  
17 equipment with building property owners rather than accessing public rights of way,  
18 power poles, etc.<sup>57</sup>

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<sup>54</sup> See Attachment MTS-09.

<sup>55</sup> See, for example, Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2010-2015  
available at: [http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white\\_paper\\_c11-520862.html](http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.html).

<sup>56</sup> <http://www.telecompaper.com/news/rogers-launches-wi-fi-voice-service-for-smartphones>

<sup>57</sup> Towerstream also reported that it pays roughly \$50 to \$1,000 per month per site to locate and operate its  
equipment in New York City.

1   **Q.   DO YOU DRAW ANY GENERAL CONCLUSIONS BASED UPON THE**  
2       **PROLIFERATION OF SMALLER WIRELESS CELL SITES LIKE THOSE**  
3       **YOU'VE DESCRIBED ABOVE?**

4   A.   Yes, I conclude that multiple alternatives to utility poles exist for the placement of radio  
5       equipment used to support wireless services (including broadband access). Further, it is  
6       clear that manufacturers are quickly creating, and carriers are adopting and  
7       implementing, technologies that require less stringent siting requirements that will serve  
8       only to expand the number of available alternatives (and reduce siting costs) for these  
9       same purposes in the future.

10  
11   A.   ***CANDAS' Requested Relief Is Not Limited To Toronto***

12  
13   **Q.   IS IT YOUR UNDERSTANDING THAT THE SCOPE OF CANDAS'**  
14       **APPLICATION IS LIMITED TO THESL AND/OR TORONTO?**

15   A.   No, it is not. My understanding is that CANDAS' application requests an Order  
16       determining that the Board's CCTA Decision applies to all electricity distributors  
17       operating throughout Ontario. As such, the request would appear to apply to all power  
18       poles in Ontario regardless of who owns them and whether they are essential to the  
19       provisioning of wireless services. CANDAS' Application specifically requests the  
20       following:

- 21           (a) Orders under subsections 70(1.1) and 74(1) of the *Ontario Energy*  
22           *Board Act*, 1998 ("OEB Act"): (i) determining that the Ontario Energy  
23           Board's RP-2003- 0249 Decision and Order dated March 7, 2005  
24           ("CCT A Order") ***requires electricity distributors to provide***  
25           "Canadian carriers," as that term is defined in the  
26           *Telecommunications Act*, S.C. 1993, c. 38 ("Telecommunications  
27           Act"), with access to the power poles of such distributors for purposes

1 of attaching wireless equipment, including wireless components of  
2 distributed antenna systems ("DAS"); and (ii) directing all licensed  
3 electricity distributors to provide such access if they are not so doing;  
4

5 (b) in the alternative, an Order under subsection 74(1) of the OEB Act  
6 ***amending the licences of all electricity distributors requiring them to***  
7 ***provide*** Canadian carriers with timely access to the power poles of  
8 such distributors for purposes of attaching wireless equipment,  
9 including wireless components of DAS;  
10

11 (c) an interim Order under subsection 21(7) of the OEB Act ***directing***  
12 ***electricity distributors to refrain*** from adopting, implementing or  
13 enforcing, as the case may be, any policy or conduct that denies  
14 Canadian carriers timely access to the power poles of such distributors  
15 for purposes of attaching wireless equipment, including wireless  
16 components of DAS, pending disposition of the Applicant's requests  
17 for final orders;  
18

19 (d) an interim Order under subsection 21(7) of the OEB Act directing  
20 Toronto Hydro Energy Services Inc. ("THESI") to identify THESI's  
21 light standards, poles or other structures classified as distribution  
22 assets in accordance with the Board's Decision and Order issued on  
23 February 11, 2010 in EB-2009-0180 ("MADD Order") and to refrain  
24 from removing, selling or disposing of any DAS facilities currently  
25 affixed to any of the foregoing, pending disposition of the Applicant's  
26 requests for final orders. A copy of the MADD Decision and Order is  
27 included at Tab 1 of this Application;  
28

29 (e) an Order under subsections 74(1) and 70(2)(c) of the OEB Act  
30 ***amending the licences of all licensed electricity distributors requiring***  
31 ***them to include***, in their Conditions of Service, the terms and  
32 conditions of access to power poles by Canadian carriers, including the  
33 terms and conditions of access for the purpose of deploying the  
34 wireless and wireline components of DAS, such terms and conditions  
35 to provide for, without limitation: commercially reasonable procedures  
36 for the timely processing of applications for attachments and the  
37 performance of the work required to prepare poles for attachments  
38 ("Make Ready Work"); technical requirements that are consistent with  
39 applicable safety regulations and standards; and a standard form of  
40 licensed occupancy agreement, such agreement to provide for  
41 attachment permits with terms of at least 15 years from the date of  
42 attachment and for commercially reasonable renewal rights;  
43

44 ***(emphasis added)***

1  
2 With the exception of paragraph (d), which applies to THESL specifically, CANDAS'  
3 requests apply to "all electricity distributors," seeking to amend their licenses generally  
4 rather than in the specific geographic areas or markets in which the Board has determined  
5 that power poles comprise essential facilities regarding the provisioning of wireless  
6 telecommunications services. As I discuss below, the evidence CANDAS has offered in  
7 this proceeding does not even suggest access to power poles is essential to the  
8 provisioning of wireless telecommunications services in densely populated areas within  
9 Toronto, let alone the entire Province of Ontario.

10 **B. CANDAS' Evidence Is Limited To Toronto**

11 **Q. SETTING ASIDE WHETHER OR WHERE CANDAS' MEMBERS ARE**  
12 **ENTITLED TO ACCESS POWER POLES PURSUANT TO THE CCTA**  
13 **DECISION, HOW DOES CANDAS DESCRIBE ITS NEED FOR SUCH ACCESS?**

14 A. CANDAS states that it intended to attach the components of a DAS to 790 power poles in  
15 the City of Toronto in support of Public Mobile's wireless network:

16 Without access to existing power and lighting poles *in the City of Toronto*  
17 upon commercially reasonable terms and conditions, neither *the Toronto*  
18 *DAS Network, nor any other DAS network deployment in Toronto,*  
19 would be economically or technically feasible.<sup>58</sup> *(emphasis added)*  
20

21 **Q. HOW DOES CANDAS ENVISION THE TORONTO DAS NETWORK**  
22 **SUPPORTING PUBLIC MOBILE'S WIRELESS SERVICES IN TORONTO?**

---

<sup>58</sup> Application at paragraph 6.6.

1 A. Generally speaking, CANDAS states that DAS technology can function as a substitute  
2 for or as a complement to - in particular areas with particular demands - a traditional  
3 macro cell site architecture as follows:

4 Depending on the particular needs of a given wireless carrier, the  
5 customers it serves and the characteristics of the area in which services are  
6 to be provided, a DAS network may be: **(i) a complete substitute for a**  
7 **traditional macro cell site deployment (as detailed below);** or (ii) a  
8 **complement to a traditional deployment,** providing enhanced coverage  
9 and increased network capacity **in particular areas with high demands** for  
10 services.<sup>59</sup>  
11 **(emphasis added)**  
12

13 In this specific case, CANDAS has indicated the Toronto DAS Network was intended to  
14 be a substitute deployment strategy (i.e., Public Mobile would use the DAS rather than a  
15 traditional macro cell site deployment). Public Mobile's witness, Mr. O'Shaughnessy,  
16 indicates that DAS was public Mobile's "preferred solution for delivering new mobile  
17 wireless services to Toronto residents and local business" and that it "selected ExteNet  
18 Systems (Canada) Inc. ("ExteNet") to develop a DAS network in Toronto," rather than  
19 provisioning its services in Toronto based upon a traditional macro site deployment.<sup>60</sup>

20 **Q. HAS THE APPLICANT STATED WITH SPECIFICITY WHERE IN TORONTO**  
21 **IT BELIEVES ACCESS TO POLES IS NECESSARY TO PROVISION**  
22 **WIRELESS SERVICES?**<sup>61</sup>

23 A. Other than indicating in its Application that the Toronto DAS Network is to be comprised  
24 of 790 nodes designed to cover the city, it has not. In fact, CANDAS has specifically  
25 refused to answer interrogatories aimed at determining the precise geographic area the

---

<sup>59</sup> Application at paragraph 5.4.

<sup>60</sup> See Written Evidence of Brian O'Shaughnessy at p.3.

<sup>61</sup> Application at paragraph 6.3.

1 Toronto DAS Network was designed to address. For example, when asked to provide a  
2 map or other information detailing the coverage area to be supported by the node sites  
3 included in the planned network, CANDAS refused, indicating that the "information  
4 requested is not relevant to the issues raised by the Application" and that the production  
5 of such information would be "unduly onerous relative to its probative value."<sup>62</sup> Further,  
6 when asked to show the extent to which Public Mobile's current coverage area, call  
7 carrying and data carrying capacities differ from those to be supported by the Toronto  
8 DAS Network, CANDAS again refused to provide any information, this time indicating  
9 that it "does not understand the relevance of " the request and that requiring a response  
10 "having regard to the probative value, if any, would be unduly onerous." <sup>63</sup> It stands to  
11 reason that if Public Mobile had a need for the Toronto DAS Network, it would be easy  
12 for it to answer these questions and to demonstrate how and where macro cell site  
13 deployment fails as compared to the planned DAS deployment. Despite the Applicant's  
14 refusal to provide information related to the specific geographic area in which it claims  
15 poles are essential to its wireless services and the specific failing of its substitute network  
16 deployment, all of its evidence relates to City of Toronto as opposed to the whole  
17 Province of Ontario.

---

<sup>62</sup> See CANDAS' response to THESL Interrogatory number 12 (b)

<sup>63</sup> See CANDAS' response to THESL Interrogator Numbers 50(f) and 50 (m).



---

**IV. ALTERNATIVES TO WIRELESS POLE ATTACHMENTS FOR DAS DEPLOYMENTS**

**Q. CAN DAS BE PLACED ON STRUCTURES OTHER THAN UTILITY POLES?**

A. Yes. Canadian carriers are required by Industry Canada and the City of Toronto, to explore site sharing and co-location options. And, while it is likely that not all of the existing tower sites, roof tops and other structures currently supporting other wireless technologies may be suitable for any particular DAS deployment, they certainly offer a large set of potential site options. Moreover, as I discuss below, use of existing buildings, particularly those to which fiber facilities have already been deployed, existing city infrastructure and the placement of new poles and/or decorative fixtures are other alternatives carriers pursue when deploying a DAS in an urban environment. Moreover, as with the more traditional cellular tower options, additional alternatives are likely to evolve over time as the market for placement of wireless attachments matures.

**Q. CAN DAS ANTENNAS BE MOUNTED ON EXISTING BUILDINGS AND OTHER EXISTING INFRASTRUCTURE?**

A. Yes, they can. For example, in October of 2010 Crown Castle,<sup>64</sup> one of the United States' largest independent owners and operators of shared wireless infrastructure, announced it was constructing a DAS for the Colonial Williamsburg Foundation which "utilizes existing infrastructure for antenna placement, including rooftops, the cupolas of historic buildings" and stealth flagpoles.<sup>65</sup> The company also deployed a 42 node DAS covering 16 square miles in Paradise Valley, AZ without using any utility poles. In this case, the

---

<sup>64</sup> <http://crownccastle.com/das/index.aspx>

<sup>65</sup> See Attachment MTS-10. See also, <http://www.cellular-news.com/story/45750.php>.

1 company used a handful of traffic signals and dozens of new, decorative installations that  
2 were designed to conceal the wireless antenna equipment.<sup>66</sup>

3 **Q. CANDAS STRESSED THAT “DAS TECHNOLOGY DEPENDS ON LOW**  
4 **ELEVATION ATTACHMENT OF NODES NEAR FIBER OPTIC CABLING**  
5 **AND ELECTRIC POWER.”<sup>67</sup> ARE POWER POLES THE ONLY PLACES**  
6 **WITHIN TORONTO WHERE FIBER OPTIC CABLING AND POWER CAN BE**  
7 **LOCATED?**

8 A. No. CANDAS has stated in response to discovery that it seeks to use existing fiber  
9 resources where they are commercially available. Nonetheless, it appears CANDAS may  
10 have ignored the alternative of placing DAS antennas at commercial building sites where  
11 both optical fiber and electric power are readily available. With respect to the city of  
12 Toronto and greater Toronto area, for example, there are multiple providers of fiber  
13 connectivity to commercial buildings that have extensive networks in place. Cogeco,  
14 which is a partner in CANDAS’ planned DAS deployment in the city of Toronto,<sup>68</sup>  
15 indicates on its website that it “owns and operates over 500 kilometres of fibre optic  
16 network connecting more than 500 buildings throughout the city of Toronto.”<sup>69</sup>  
17 According to the Greater Toronto Marketing Alliance, “Bell has installed fiber under  
18 most major Metro Toronto roads and installs fiber entrance cables in new buildings

---

<sup>66</sup> See Attachment MTS-10. See also, <http://www.reuters.com/article/2011/03/30/idUS111907+30-Mar-2011+GNW20110330>.

<sup>67</sup> Application at pp. 16-17.

<sup>68</sup> Application at p. 15.

<sup>69</sup> See [http://www.cogecodata.com/about\\_us](http://www.cogecodata.com/about_us) (accessed 8/18/2011).

1 requiring 300 or more phone lines.”<sup>70</sup> As I discussed previously in this testimony,  
2 numerous wireless services providers, including CANDAS participant Public Mobile,  
3 have already installed (in aggregate) thousands of antenna arrays at commercial building  
4 sites throughout the city of Toronto and the greater Toronto area. Thus, it is clear that,  
5 while CANDAS might prefer to use utility poles as DAS antenna sites, other viable  
6 options exist.

7 **Q. CAN EXISTING MUNICIPAL INFRASTRUCTURE BE USED TO SUPPORT**  
8 **DAS ANTENNAS?**

9 A. Yes, it can. In fact, CANDAS indicated that fiber optic cabling was deployed in existing  
10 conduit and DAS nodes were attached to City infrastructure pursuant to City ordinances  
11 in Chicago, IL.<sup>71</sup> The photograph below is taken from an article discussing the ease with  
12 which AT&T was able to deploy a DAS in downtown Chicago as a result of City  
13 ordinances which permit telephone companies to utilize city infrastructure for the  
14 attachment of DAS antennas. In addition to favorable City ordinances, the article  
15 describes AT&T's use of micro trenching to reduce the overall time and costs involved  
16 with connecting node sites and hub locations with fiber optic cabling.<sup>72</sup>

---

<sup>70</sup> See <http://www.greatertoronto.org/economic-overview/7-telecom-a-utilities.html> (accessed 8/18/2011).

<sup>71</sup> See CANDAS response to THESL Interrogatory Number 3.

<sup>72</sup> <http://www.ospmag.com/issue/article/The-City-of-Big-Broadband-Shoulders>



**DAS equipment on traffic light pole near Grant Park**

**Q. IS THERE EVIDENCE TO SUGGEST THAT NEW STRUCTURES CAN BE USED TO SUPPORT DAS ANTENNAS?**

A. Yes. My understanding is that municipalities, in this case the City of Toronto, can elect to permit vendors to install decorative poles and other municipal furniture which can be located near existing fiber conduits and used for wireless attachments and, potentially, for purposes of concealing wireless antenna equipment if requested to do so by the municipality involved. In fact, in response to discovery, CANDAS indicated that ExteNet undertook this solution in Las Vegas to support a DAS deployment.<sup>73</sup>

---

<sup>73</sup> See, for example, CANDAS' response to CEA Interrogatory number 12(b) and Energy Probe Interrogatory number 7.

**V. WIRELESS ANTENNA SITE AND ATTACHMENT RATES VARY SUBSTANTIALY**

**Q. MR. BORON FROM PUBLIC MOBILE SUGGESTS THAT THE EXISTING ANNUAL POLE CHARGE, \$22.35 PER ATTACHER, IS APPROPRIATE FOR WIRELESS ATTACHMENTS. DO YOU AGREE?**

A. No, I don't. In the first instance, my belief is that CCTA Decision is inapplicable as it relates to wireless attachments, particularly those that will require attachments outside the "communications space" of the pole. Second, even if the CCTA Decision were to be applied in the case of wireless attachments, the rate taken from that Order is out of line. The Board when it set the current pole attachment rate for wireline attachments identified two primary areas of costs that would be incurred by electricity distributors in accommodating attachments: (1) Direct Costs and (2) Indirect Costs. The OEB described these costs as follows:

There are two elements to the proposed rate. The first is the incremental or direct cost incurred by electricity distributors that results directly from the presence of the cable equipment. Second, there are common or indirect costs which are caused by both parties. The parties agree that the direct or incremental costs should be borne by the cable companies.<sup>74</sup>

In its subsequent calculation of its pole attachment rate, the OEB assumed \$1.92 associated with direct costs (administrative costs and lost productivity), and \$20.43 of indirect costs, based upon an assumption of 2.5 attachers sharing the 2 feet of pole within the communications space.<sup>75</sup> As explained above, clearly these values do not properly recognize the more complicated nature of most wireless attachments, nor do they

<sup>74</sup> OEB Pole Attachment Decision, pg. 4.

<sup>75</sup> Id., pg. 13.

1 properly consider the fact that most wireless attachments will use substantially more of  
2 the pole's space (much of it outside the communications space).

3 **Q. HOW SHOULD WIRELESS ATTACHMENT RATES BE DETERMINED?**

4 A. The underlying theory that generally supports regulatory oversight in the area of utility  
5 pole attachments for wired applications - i.e., the existence of an "essential facility" and  
6 ensuing market power on the part of the utility - fails in the context of wireless  
7 attachments. There are numerous suitable substitutes to utility poles for the placement of  
8 wireless equipment and I have seen no indication that electricity distributors have  
9 discernable market power in what has evolved into a robust competitive market for these  
10 types of applications. Likewise, whereas traditional wired pole attachment arrangements  
11 are relatively homogenous and "standardized" rules related to rates, terms and conditions  
12 are an arguably workable method of regulating those attachments, the same is not true in  
13 the arena of wireless attachments. The shapes, sizes and applications relevant to wireless  
14 equipment that might be attached to a pole are still evolving. As such, a "one size fits  
15 all" approach like that applied to wire line attachments is almost certainly to fail, thereby  
16 slowing necessary access at a time when demand is increasing dramatically.

17 **Q. IS THERE EVIDENCE THAT A LIGHT-HANDED REGULATORY APPROACH**  
18 **WORKS IN SETTING RATES, TERMS AND CONDITIONS FOR WIRELESS**  
19 **PROVIDERS?**

20 A. Yes, there is. New York City, for example, is undoubtedly one of the most competitive  
21 wireless markets in the world, and one of the most challenging to serve from the  
22 perspective of a wireless provider given its geographically dense customer base and

erratic urban terrain. The regulatory agency responsible for regulating pole attachments in New York City is the New York Public Service Commission ("NYPSC"). The NYPSC has specifically declined to adopt regulations which would limit the ability of the competitive marketplace to set efficient rates, terms and conditions. The NYPSC articulated its opinion on the matter as follows:

Unlike telephone, cable and power facilities, which may only be attached to utility poles, wireless attachers have other options for attaching their facilities, such as buildings, existing towers, and newly constructed towers. Although attachers argue that it is sometimes difficult to get permission [\*9] from local governments to erect new towers, it is appropriate for local governments and community residents to be involved in considering whether tall antenna structures should be placed in their communities. If wireless attachers were given unrestricted access to all utility poles, local governments might be excluded from the decision-making process. (pgs. 3-4).

Wireless attachments occupy a much larger portion of a pole than the 12 inches used by a standard wire attachment. The wireless attachment contemplated by National Grid would use as much as 7 feet of pole space and include an antenna on top of the pole up to 9 feet tall. n6 Wireless attachment designs vary, which makes advance evaluation of their safety difficult. We are not applying pole attachment policies and rates to wireless attachments at this time. Because of the variation in wireless configurations, the status quo of a negotiated rate and process is more appropriate until more information is developed about wireless attachments generally on utility poles.<sup>76</sup>

I believe the conclusions reached by the NYPSC have merit and can be of benefit to the Board in this proceeding. They recognize that where numerous suppliers exist in a market, the public interest is best served by allowing those suppliers to compete for the business of prospective attachers - without the distorting effects that regulation can create. This is especially true in an area, like wireless communications, where technology, service offerings and infrastructure change so quickly. When the alternative of a competitive market exists, heavy-handed regulations which dictate connectivity

---

<sup>76</sup> *Proceeding on Motion of the Commission Concerning Wireless Facility Attachments to Utility Distribution Poles*, Case 07-M-0741, July 27, 2007, *Order Instituting Proceeding*, pg. 4.

1 options and/or rates, tend to unnecessarily slow innovation, reduce capital investment and  
2 put the regulator (rather than consumers) in the role of choosing “winners and losers.”  
3 Clearly, there are numerous alternatives that exist for the placement of wireless  
4 equipment, beyond the use of utility poles. With this in mind, and for the reasons stated  
5 above, I conclude that a light-handed regulatory approach to the issue of wireless pole  
6 attachments would best serve the public interest.

7 **Q. HAVE DAS NETWORKS BEEN DEPLOYED IN NEW YORK CITY DESPITE**  
8 **THAT THE NEW YORK PUBLIC SERVICE COMMISSION HAS STATED**  
9 **THAT ATTACHMENT RATES SHOULD BE THE PRODUCT OF**  
10 **NEGOTIATIONS?**

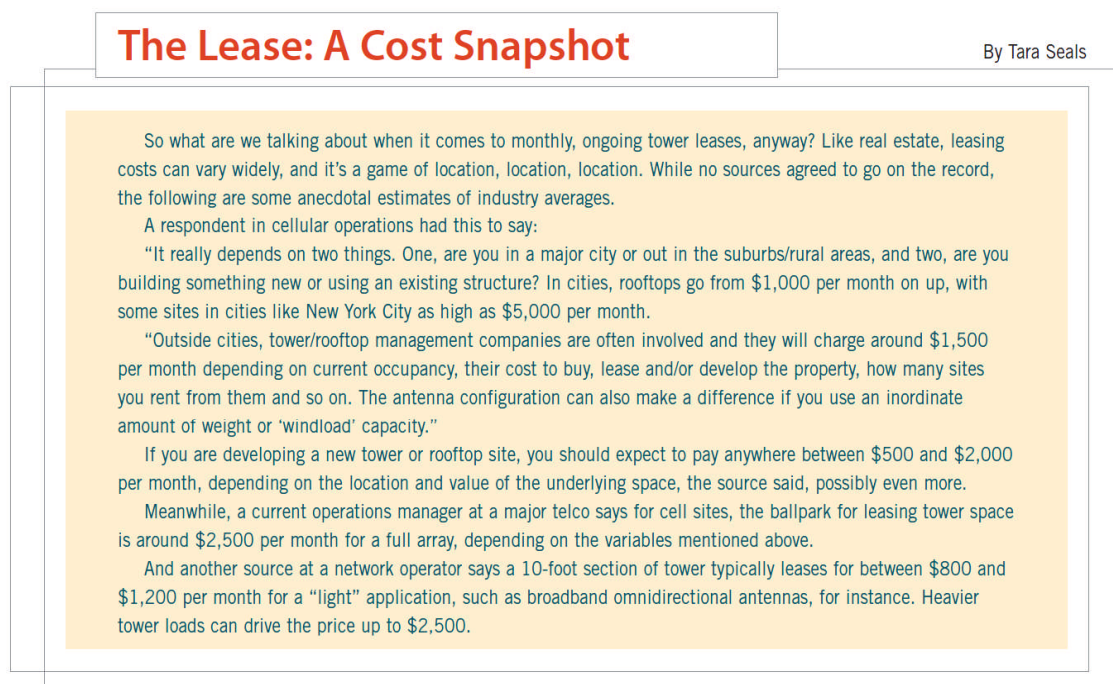
11 A. Yes, they have. In fact, Mr. Larsen noted at page 12 of his written evidence that more  
12 than 2,000 DAS nodes are currently in operation in the New York metro area alone.  
13 This, of course, is in addition to hundreds, if not, thousands of traditional macro cell  
14 sites, Wi-Fi hot zones and hot spots and untold femtocells (whether metro, enterprise or  
15 residential).

16 **Q. GENERALLY SPEAKING, IS THERE A RANGE OF RATES WHICH IS**  
17 **APPLICABLE TO THE SORT OF WIRELESS ATTACHMENTS DISCUSSED IN**  
18 **YOUR TESTIMONY?**

19 A. Rates clearly vary dramatically depending upon the location, elevation, anticipated  
20 coverage available, access to power/fiber and numerous other factors. Indeed,  
21 consultants who negotiate arrangements for, and management of, these types of leases  
22 abound. Unfortunately, as is the case in competitive markets, rates, terms and conditions



1 agreed to between suppliers and consumers are often confidential or difficult to obtain.  
2 Nonetheless, xChange magazine, in February 2007, published an ebook evaluating  
3 various aspects of WiMAX technology, including challenges faced by companies  
4 evaluating the introduction of WiMAX into their more traditional menu of wireless  
5 technologies.<sup>77</sup> As part of its analysis xChange evaluated what they termed  
6 “Towernomics” - the costs associated with gaining and maintaining access to suitable  
7 antenna sites. The analysis was presented as follows:<sup>78</sup>



<sup>77</sup> *Shouldering the Weight of WiMAX, Heavy Loads network Operators Must Bear*, February 2007, available at [www.xchangemag.com/ebooks](http://www.xchangemag.com/ebooks).

<sup>78</sup> *Id.* pg. 5.

1 In summary, prices differ substantially depending upon the variables I described above,  
2 but range from \$500-\$800 per month on the low side to \$5,000 per month on the higher  
3 side for the more traditional tower and rooftop access. For example, the City of Chicago  
4 currently assess fees of \$1,654 and \$3,307 per pole, per year for use of light poles and  
5 traffic signals, respectively.<sup>79</sup> Moreover, Chicago's prices increase automatically year  
6 over year and may be adjusted, at a later date, to include a revenue sharing component.<sup>80</sup>  
7 Additionally, as described in Section III, it was reported earlier this year that rates  
8 regarding the attachment of high end Wi-Fi equipment, which is substantially smaller  
9 than equipment used for more traditional macro cell sites, ranges from \$50-\$1000 per site  
10 per month in New York City.

11 **Q. DOES THAT CONCLUDE YOUR TESTIMONY?**

12 **A.** Yes, it does.

13 I make this affidavit in support of THESL's motion for a Decision and Order of the  
14 Ontario Energy Board:

- 15 a. that the CCTA Decision does not apply to wireless communications attachments;
- 16 b. that the Board refrain from exercising its powers on the basis that there is or will  
17 be competition in the wireless communications market sufficient to protect the  
18 public interest;
- 19 c. denying the relief sought by CANDAS and dismissing CANDAS' application;  
20 and

---

<sup>79</sup> See Attachment MTS-12 at p.4.

<sup>80</sup> See Chapter 10-29-040 of City of Chicago's ordinances which indicate, in part, that attachment rates may be adjusted to "add a revenue component or make other reasonable adjustments which are not in excess of prevailing municipal rates."

d. such other relief as THESL may request and the Ontario Energy Board may deem appropriate,

and for no other or improper purpose.

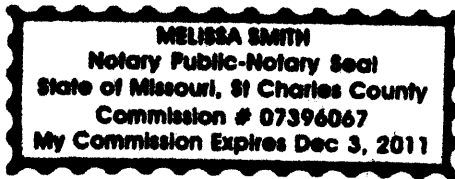
SWORN BEFORE ME  
at the City of Cottleville,  
in the State of Missouri,  
on September 1, 2011.



Name:  
A Notary, etc.



Michael Starkey



TAB 9

## Exhibit 2

Affidavit of Dr. Adonis Yatchew

# Regulation of Wireless Facilities On Joint-Use Poles

---

Affidavit of  
Adonis Yatchew, Ph.D.

Before the  
**Ontario Energy Board**

September 2011

Filed on behalf of Toronto Hydro-Electric System Limited

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**IN THE MATTER OF** the *Ontario Energy Board Act, 1998*, S.O. 1998,  
c. 15, (Schedule B);

**AND IN THE MATTER OF** an Application by the Canadian Distributed  
Antenna Systems Coalition for certain orders under the *Ontario Energy  
Board Act, 1998*.

**AFFIDAVIT OF ADONIS YATCHEW, PH.D.**  
(sworn September 1, 2011)

---

I, Adonis Yatchew, in the City of Toronto, Province of Ontario, **MAKE OATH AND SAY:**

**A. INTRODUCTION AND SUMMARY**

---

**Q. PLEASE INTRODUCE YOURSELF TO THE BOARD.**

**A.** My name is Adonis Yatchew. I am a Professor of Economics at the University of Toronto. I completed my Ph.D. at Harvard University in 1980 and have taught at the University of Toronto since that time. In the course of my research and teaching career, I have held visiting appointments at various institutions including the University of Chicago and Cambridge University, UK. I am also a senior consultant to Charles River Associates.

I have advised on energy matters since 1982 and have conducted numerous studies on energy markets in general, and on the electricity industry in particular. My research in econometrics and energy economics has appeared in leading peer-reviewed journals. Most of the examples and applications contained in the graduate level econometrics text which I have written are drawn from energy economics.

I am Editor-in-Chief of The Energy Journal, having served in this position since 2006. Prior to that time I was a Joint Editor of the Journal for approximately ten years. I am principally responsible for publications on the electricity industry as well as technical papers involving

1 mathematical and statistical tools. A detailed curriculum vitae is included as an appendix to  
2 this testimony.

3  
4  
5 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**  
6

7 A. Toronto Hydro-Electric System Limited (“THESL”) has experienced a dramatic increase  
8 in applications for attachments to its distribution poles, many of which are for wireless  
9 antenna mounts on behalf of companies seeking to launch new cellular telephone networks in  
10 the Toronto area.

11  
12 In this connection, I have been retained by THESL to review the CANDAS Application and  
13 to examine economic and regulatory issues related to the Application.  
14

15  
16 **Q. WHAT EXPERIENCE HAVE YOU HAD THAT RELATES TO THIS**  
17 **PROCEEDING?**  
18

19 A. In 2004 I coauthored testimony specifically on the pricing of attachment space for joint use  
20 poles. This testimony was filed before the Ontario Energy Board.<sup>1</sup> A similar analysis was  
21 filed before the New Brunswick Board of Commissioners of Public Utilities in 2005. In  
22 2008, I coauthored a study on the subject for the Canadian Electricity Association.<sup>2</sup> Since that  
23 time, I have also participated in processes and negotiations relating to attachments to utility  
24 poles.  
25

---

<sup>1</sup> “Joint Use Agreements For Power Poles: An Efficient and Equitable Standard, Report Prepared for the Electricity Distributors Association and the Canadian Electricity Association”, Bridger M. Mitchell and Adonis Yatchew, Charles River Associates, Ontario Energy Board, RP-2003-0249, August 14, 2003.

<sup>2</sup> “Cost Allocation for Joint Use Poles”, Bridger M. Mitchell and Adonis Yatchew, CRA International, February 2008.

1 My research, editorial and consulting work has included the regulation (and deregulation) of  
2 electricity industries, issues of market power and various public policy issues relating to the  
3 electricity industry.  
4

5 My expertise lies in economics generally, and more specifically in quantitative areas of  
6 economics, and in energy and regulatory economics. I have participated in numerous  
7 regulatory proceedings as well as litigations and other judicial processes. I have been  
8 qualified as an electricity industry and economic expert before this Board in past proceedings.  
9  
10

11 **Q. WHAT ISSUES DO YOU INTEND TO ADDRESS IN YOUR TESTIMONY?**  
12

13 A. My testimony will address the following issues:  
14

- 15 1. Does the 2005 OEB CCTA Decision apply to wireless attachments?  
16
- 17 2. Are utility poles an essential facility for CANDAS?  
18
- 19 3. Are utility poles a limited and valuable resource and if so how should this resource  
20 be best managed?  
21
- 22 4. Are there public interest issues that need to be considered in assessing the CANDAS  
23 application?  
24
- 25 5. What regulatory approach is best suited for dealing with the CANDAS application  
26 for access to THESL poles? Should the OEB forbear from regulating wireless  
27 attachments?  
28  
29  
30  
31

1           **Q. WHAT ARE YOUR CONCLUSIONS?**

2  
3           A. I will summarize my conclusions with respect to each of the above.

4  
5           1. The 2005 OEB Decision RP-2003-249 is not intended to apply to wireless attachers.

6           The central focus of the OEB proceeding was on wireline attachments, in particular,  
7           those belonging to cable companies. Wireless systems should not be subsumed  
8           under the Decision as they are fundamentally different from wireline attachments.  
9           Unlike wireline companies which require continuous connected corridors through  
10          which their cables must pass, and which must attach to myriad poles at short  
11          intervals, wireless providers can transmit and receive their signals from a relatively  
12          few number of facilities, placed on a range of possible support structures.

13  
14          2. Utility poles are not an essential facility for CANDAS. Perhaps the best evidence to  
15          support this conclusion is that Public Mobile was able to roll out its service in  
16          Toronto with minimal reliance on THESL poles for its wireless attachments.  
17          Moreover, it was able to commence its service in Toronto, where it did not have  
18          access to power poles, earlier than in Montreal, where it presumably had such access.

19  
20          It is difficult to reconcile CANDAS evidence that DAS systems are extremely  
21          flexible, adaptable and can be deployed in a broad spectrum of indoor and outdoor  
22          environments, with their assertion that there is no alternative but to attach to utility  
23          poles. It would seem that, particularly in urban environments, multiple structures are  
24          available for supporting wireless facilities, which do not have the same safety issues  
25          associated with power pole attachments. It is my understanding that the Canadian  
26          Electricity Association is putting extensive technical evidence before this Board  
27          which documents alternative support options.

28  
29          3. Utility poles are a limited and valuable resource. The deployment of technologies  
30          associated with smart meters, control of distributed generation and variable  
31          generation, outage response and other smart grid technologies will continue to

1 increase demand for pole space. The City of Toronto and the TTC have also  
2 demonstrated the need for attachment space and should be accorded priority access.  
3 Moreover, there will likely be increasing pressure to limit use in order to mitigate  
4 visual pollution associated with ever more cluttered poles. Consideration should be  
5 given to future use by these entities and by potential entities for whom it is a bona  
6 fide essential facility.  
7

8 4. The public interest is served if markets are permitted to accommodate the needs of  
9 wireless providers to the extent possible. Markets for wireless services have evolved  
10 rapidly and successfully without mandatory pole access for wireless facilities. There  
11 is an extensive siting market and a well established process for the placement of  
12 wireless antenna facilities. It is in the public interest to ensure that siting markets for  
13 all forms of wireless systems continue to evolve. It is not in the public interest to  
14 thwart that evolution by mandated access to poles for enterprises that have  
15 alternative attachment options. Nor is it in the public interest to transfer a resource  
16 from the public domain to a small group of private entities without consideration of  
17 alternative uses for that resource and of its market value.

18 5. The Ontario Energy Board should forbear from regulating wireless attachments.  
19 Perhaps most importantly, a case for regulatory action on the basis of urgency is not  
20 warranted as Public Mobile has demonstrably been able to launch its service. On this  
21 basis alone, a case for forbearing, and thus deferring the possibility of regulatory  
22 action, can be made.

23 Furthermore, given that wireless providers have alternatives for delivering their  
24 services, THESL, or any other Ontario distributor should not be compelled to render  
25 attachment services to such entities. If, for example, Toronto Hydro were to have  
26 spare office capacity, it would seem entirely inappropriate to direct it to lease that  
27 capacity to private sector enterprises under terms and conditions unsuitable for the  
28 Corporation, or at below market rents. Similarly, to the extent that there may be, at a  
29 given point in time, spare pole capacity, Toronto Hydro should not be directed to

1 lease that capacity to nonessential users. These entities should satisfy attachment  
2 needs through conventional siting markets.

3 Moreover, a regulatory precedent which requires Toronto Hydro to attach facilities  
4 which have alternative siting options could have long-term, far-reaching and adverse  
5 consequences, in part by limiting the evolution of siting markets. It would also  
6 create a precedential basis for future attachers and potentially lead to a deluge of  
7 applicants.

8 The preferred approach to satisfying nonessential demand for support structures is to  
9 allow siting markets to provide such services and to allow electricity distributors to  
10 participate in those markets as they see fit.

11  
12 **Q. WHAT OTHER MATTERS DO YOU INTEND TO ADDRESS?**  
13

14 A. I intend to directly address the “Grounds” which underpin the CANDAS application.<sup>3</sup>  
15 These include the assertion that THESL, as a public utility, has a higher duty to the “general  
16 public”; that THESL has breached its electricity distribution license; that it has engaged in  
17 unjust discrimination and undue preference; that its behaviour constitutes anti-competitive  
18 behaviour; and, that it and other Ontario utilities have acted with unfettered discretion.  
19

20  
21 **Q. PLEASE SUMMARIZE YOUR VIEWS OF THE GROUNDS UPON WHICH THE**  
22 **CANDAS APPLICATION IS BASED.**  
23

24 A. “Public Utilities vs. Private Corporations” Public utilities do have responsibilities to the  
25 “general public”. However, this does not necessarily imply a duty to one or another private  
26 corporation, or to an alliance of private corporations such as CANDAS. The evaluation of the

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<sup>3</sup> Application of CANDAS, Regarding Access to the Power Poles of Electricity Distributors for Purposes of Wireless Telecommunications, Volume I, pages 25-38.

1 public interest involves balancing many relevant factors to ensure that resources under the  
2 control of a public corporation are put to their best use, and that shareholders, ratepayers and  
3 the public receive the full measure of value for those resources.

4 “Breach of CCTA Order and Electricity Distribution Licences” In my opinion THESL is not  
5 in breach of the 2005 CCTA Decision and Order as that Order was not intended to apply to  
6 wireless attachments. At least two critical and underlying criteria for that Order are not met.  
7 First, wireless attachments do not typically fit within the 2 feet (or less) of communications  
8 space to which that Order applies. Second, unlike wireline facilities, utility poles are not  
9 essential facilities for wireless services.

10  
11 “Unjust Discrimination and Undue Preference” Differential treatment of entities which have  
12 differing characteristics does not imply discrimination. Wireless companies have practical  
13 alternatives in much the same way that able bodied drivers can exit their vehicles in narrower  
14 spaces than those that are wheel-chair bound or otherwise face challenges in physical  
15 mobility. Just as it is not discriminatory to provide wider reserved parking spots for such  
16 individuals, the provision of space on poles for wireline attachers and not for wireless  
17 companies constitutes neither discrimination nor undue preference.

18  
19 “Anti-Competitive Behaviour” The treatment of pole space as a valuable and limited resource  
20 by utilities does not constitute anti-competitive behaviour. Treating it as such and ensuring  
21 that sufficient space is available for current and future power company uses as well as the  
22 potential needs of entities for which power poles are an essential facility, constitutes prudent  
23 management of this resource. Its proper use and valuation contributes to ensuring that a  
24 viable siting market for wireless company facilities is not undermined. In the absence of  
25 proper valuation the siting market itself becomes distorted and may be limited in its  
26 development.

27  
28 “Ontario Utilities are Acting with Unfettered Discretion” Market discipline is provided by  
29 alternatives available to wireless companies, the sites where they may choose to attach and the  
30 technologies that they select. Ontario utilities operate under a host of legal, regulatory, policy  
31 and marketplace constraints or fetters.

## **B. BACKGROUND**

---

### **Q. WHAT ARE SOME OF THE KEY TRENDS IN THE COMMUNICATIONS INDUSTRY WHICH CAN IMPACT DEMAND FOR POLE SPACE?**

A. The demand for high speed internet services or ‘broadband’ has been growing prodigiously. The expansion of broadband access has stimulated rapidly growing demand for bandwidth intensive applications such as streaming and downloading of music and video. It is expected that these uses will continue to grow rapidly and that video transmission will take up the lion’s share of broadband capacity. The wireless spectrum auction conducted by Industry Canada in 2008 has brought new entrants into the wireless services industry, further increasing the demand for transmission sites.

The use of ever more advanced mobile devices also continues to expand rapidly. These ‘smart’ devices can now provide not only voice transmission, but full mobile access to the internet. They are creating increasing demand for wireline broadband infrastructure, and for systems which provide the initial wireless link. Indeed, in percentage terms, mobile broadband demand has been growing even faster than wireline demand. Some customers are no longer purchasing traditional landline services.

Various types of services are rapidly converging in the communications industry: voice communication, data transmission such as text and internet access, and video/television transmission are becoming progressively integrated over internet protocol (IP) based platforms. Traditional differences between telecom and cable are blurring and becoming anachronistic. Everywhere, the future is dominated by broadband. Telephone services are being delivered over the internet – voice over internet protocol (VOIP) – aptly exemplified by the meteoric rise of Skype.



1           **Q. WHAT ARE SOME OF THE KEY TRENDS IN THE ELECTRICITY INDUSTRY?**

2  
3           A. Major trends include decarbonization of electricity supply through development of  
4           renewables, conservation and demand management programs; the development and  
5           implementation of smart meter and smart grid technologies; and, the integration of variable  
6           energy resources and distributed generation into transmission and distribution grids. These  
7           changes are occurring in an environment of increased regulatory and political uncertainty and  
8           evolving regulatory models.

9  
10          Ontario has undertaken a major renewables development program. Some argue that this  
11          program is leading to dramatic cost increases to end-use customers. In addition, major  
12          refurbishment and overhaul of distribution infrastructure are being undertaken at many  
13          utilities as infrastructure ages. Smart-grid solutions are being implemented and Geographical  
14          Information Systems (GIS) are coming into increasing use.

15  
16          All this requires significant staff and equipment resources at a time when the electricity utility  
17          labour force is aging and many experienced employees are approaching retirement age. And,  
18          all these changes must be completed without compromising the reliability of the network.

19  
20          Current and future demand for pole space by distributing utilities is also growing as the  
21          industry rolls out smart metering; develops smart grid systems; and installs automatic  
22          switching devices.

23  
24  
25           **Q. HOW HAVE ATTACHMENTS TO JOINT USE POLES BEEN REGULATED IN**  
26           **CANADA?**

27  
28           A. Power, cable and traditional wireline telecom companies commonly share poles and other  
29           forms of infrastructure to support their lines and equipment. Attachments belonging to these  
30           telecom and cable companies are typically located within a two-foot segment of the joint-use  
31           pole referred to as the “communications space” (see Figure 1 below).

1 For many years, attachment rates and conditions were either negotiated or prescribed by the  
2 Canadian Radio-Television and Communications Commission (CRTC). These attachment  
3 rates were particularly favourable to cable companies.  
4

5 Through a series of judicial proceedings, it was determined that the CRTC did not have  
6 jurisdiction over electricity power poles. As a result, certain provincial energy regulators  
7 have, in recent years, begun to regulate electricity distribution pole attachment rates and  
8 related matters.  
9

10  
11 **Q. WHY HAS THERE BEEN A NEED TO REGULATE WIRELINE**  
12 **ATTACHMENTS SUCH AS THOSE OWNED BY CABLE COMPANIES?**  
13

14 A. Cable systems, of necessity, have had to construct their systems across populations of  
15 poles or networks of underground conduits. The need to regulate cable attachments rested on  
16 the argument that attachers could be denied access, or lacking cost-effective alternatives,  
17 could be charged excessively high rates by pole or conduit owners. To the extent that  
18 alternatives are available to certain classes of potential attachers, this rationale no longer  
19 applies.  
20

21  
22 **Q. FOLLOWING A REGULATORY PROCEEDING TO DETERMINE POLE**  
23 **ACCESS CHARGES FOR CABLE COMPANIES, THE ONTARIO ENERGY BOARD**  
24 **RENDERED ITS DECISION IN 2005 IN WHICH IT DECIDED TO REGULATE**  
25 **CABLE ATTACHMENT RATES. DOES A SIMILAR RATIONALE FOR**  
26 **REGULATION APPLY TO WIRELESS ATTACHMENTS?**  
27

28 A. It does not. In that Decision, the Board justified regulatory intervention for wireline  
29 attachments in part on the basis of non-discriminatory access as follows:  
30

31 “The Board agrees that power poles are essential facilities. It is a well established  
32 principle of regulatory law that where a party controls essential facilities, it is

important that non-discriminatory access be granted to other parties. Not only must rates be just and reasonable, there must be no preference in favour of the holder of the essential facilities. Duplication of poles is neither viable nor in the public interest.

The Board concludes that it should set access charges.”<sup>4</sup>

As I will explain further below, and as is documented elsewhere in the evidence, wireless attachments are fundamentally different from wireline attachments such as those supporting traditional cable television lines and fiber optic cable. Wireless attachments can be placed in a variety of locations, so long as they are sufficiently elevated. Indeed, the cellular phone industry has grown and prospered with very little in the way of wireless attachments to power or other utility poles. Power poles are therefore not an essential facility for the wireless industry.

## **C. ANALYSIS OF KEY ISSUES**

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### **1. THE CCTA DECISION DOES NOT APPLY TO CANDAS**

#### **Q. ARE THERE FUNDAMENTAL DIFFERENCES BETWEEN THE SITING OF WIRELINE AND WIRELESS FACILITIES?**

A. Yes. Wireline facilities belonging to cable, telecom and power companies have commonly shared support structures. The construction of independent populations of poles is not only economically inefficient but also undesirable from an aesthetic and environmental standpoint. Few communities would countenance further cluttering of their visual landscape by parallel systems of poles.

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<sup>4</sup> RP-2003-0249, IN THE MATTER OF the Ontario Energy Board Act 1998, S.O.1998, c.15, (Schedule B); AND IN THE MATTER OF an Application pursuant to section 74 of the Ontario Energy Board Act, 1998 by the Canadian Cable Television Association [CCTA] for an Order or Orders to amend the licenses of electricity distributors. Decision and Order, March 2004, page 3. Henceforth, the “CCTA Decision”.

1 Wireless facilities, on the other hand, can be placed in a variety of locations. These include  
2 rooftops of commercial, residential and industrial buildings; towers and other elevated  
3 structures. Rather than relying upon rights of way along corridors throughout a community,  
4 wireless systems require facilities to be installed at a relatively small number of locations.  
5 Moreover, the antenna systems themselves can generally be placed on private or on publicly  
6 owned structures. As a result, an active siting market has developed.

7  
8  
9 **Q. IN THEIR EVIDENCE, CANDAS PUTS FORTH THE POSITION THAT**  
10 **DISTRIBUTED ANTENNA SYSTEMS ARE ACTUALLY COMBINED WIRELESS**  
11 **AND WIRELINE ENTITIES THUS MANDATING ACCESS TO POWER POLES.**  
12 **DO YOU AGREE WITH THIS CHARACTERIZATION?**

13  
14 A. No. Distributed antenna systems have multiple wireless components. However, they are  
15 not wireline systems in the traditional sense of the term. Indeed, the requisite wireline  
16 facilities may not even be owned by the DAS owner.

17  
18 Unlike cable or electricity distribution networks which require continuous corridors in which  
19 the wires must lie, distributed antenna systems require access to wireline facilities at a discrete  
20 number of access points.

21  
22  
23 **Q. WHEN WIRELESS FACILITIES ARE ATTACHED TO ELECTRICITY**  
24 **DISTRIBUTION POLES, WHERE ARE THEY PLACED?**

25  
26 A. The placement of wireless facilities can vary substantially and differs from wireline  
27 facilities. In some cases wireless equipment are placed above electricity lines (e.g., pole-top  
28 antennae). Portions may be attached in the “communications space” and they may extend into  
29 the clearance space or the separation space. (See Figure 1 below for a typical configuration of  
30 a joint-use pole.) This in turn creates safety-related issues beyond those associated with  
31 traditional wireline facilities.

1       **Q. IN YOUR VIEW, ARE WIRELESS ATTACHMENTS COVERED BY THE CCTA**  
2       **DECISION BY THE OEB IN WHICH YOU FILED EVIDENCE?**

3  
4       A. No. That proceeding focused on wireline attachments which fit within the  
5       communications space. The application was brought by the Canadian Cable Television  
6       Association (CCTA) specifically with respect to cable attachments. In its decision, the Board  
7       accepted the configuration of a typical joint-use pole as depicted in Figure 1, including the  
8       definition of the communications space.<sup>5</sup>

9  
10      Over the course of the four day hearing, “wireless” technology was mentioned but twice, and  
11      that with respect to “wireless cable”.<sup>6</sup> There was no reference to distributed antenna systems.

12  
13      Much has changed during the intervening years. The CCTA has disbanded. Communications  
14      industries are constantly restructuring in the face of competitive forces and changing  
15      technologies. Demand for wireless services has been growing at an extraordinary pace and  
16      new companies and services have emerged. New swaths of spectrum have been auctioned.  
17      Markets have responded effectively to meet the needs of various wireless market participants.  
18      These dramatic changes in wireless technologies were neither discussed nor considered within  
19      the CCTA proceeding.

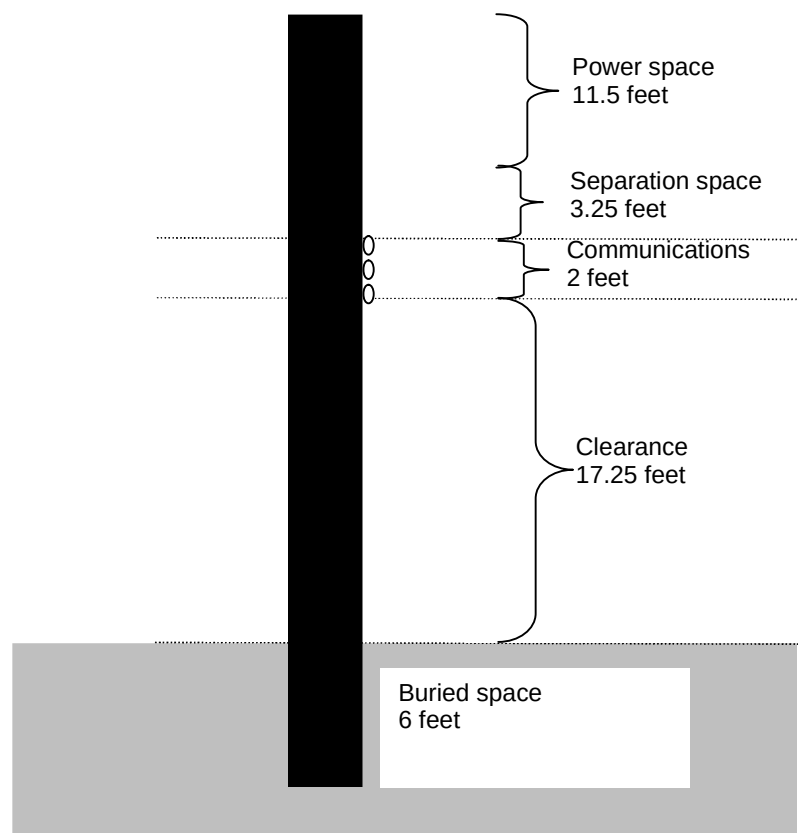
20  
21      Furthermore, as outlined above and supported extensively in other evidence before this Board,  
22      wireless systems are fundamentally different from traditional wireline systems. This in turn  
23      requires a separate determination as to the appropriate regulatory treatment of this aspect of  
24      the wireless business.

---

<sup>5</sup> CCTA Decision, page 10.

<sup>6</sup> Transcripts, RP-2003-0249, October 26 2004, lines 1510 and 1519.

**Figure 1: 40-Foot Joint-Use Pole**



Total Height: 40 feet.

1                    **2. UTILITY POLES ARE NOT AN ESSENTIAL FACILITY FOR CANDAS**

2  
3  
4                    **Q. ARE UTILITY POLES AN ESSENTIAL FACILITY FOR CANDAS?**

5  
6                    A. No. Utility poles are not an essential facility for the attachment of wireless equipment for  
7 the wireless communications industry. Nor are they an essential facility for CANDAS.  
8  
9

10                   **Q. PLEASE STATE THE REASONS WHICH LEAD YOU TO THIS CONCLUSION.**

11  
12                   A. In order to enter the wireless market, Public Mobile participated in the 2008 Industry  
13 Canada Spectrum Auction. Since that acquisition, Public Mobile has successfully launched  
14 its services in Toronto and in Montreal. It has done so with little, if any, reliance on utility  
15 support structures in Toronto for its wireless equipment.

16                   The Public Mobile network was “turned on” in Toronto approximately a month earlier than in  
17 Montreal, despite the absence of access to utility poles in Toronto.<sup>7</sup>

18                   Public Mobile rate offerings and service packages in Montreal (where CANDAS members  
19 have access to poles) and Toronto (where they do not) are comparable. This suggests that  
20 cost structures in the two markets are not sufficiently different to flow through to rates. The  
21 close similarity of offerings also suggests that competition in the wireless service market has  
22 not been adversely affected.

---

<sup>7</sup> “Public Mobile opened stores on March 18, 2010 in Toronto and Montreal. The network was turned on in Toronto on May 26, 2010, <http://blog.publicmobile.ca/blog/2010/05/26/our-network-is-ready-its-time-to-talk-toronto/> and in Montreal on June 25, 2010, <http://blog.publicmobile.ca/blog/2010/06/25/get-talking-montreal-our-network-is-live/>.

1 Public Mobile paid \$52 million for spectrum without having secured access to poles. This  
2 also suggests that their spectrum assets could be deployed cost-effectively in multiple ways,  
3 and that utility poles were therefore not an essential facility.  
4

5 **Q. ARE UTILITY POLES AN ESSENTIAL FACILITY FOR DISTRIBUTED**  
6 **ANTENNA SYSTEMS?**  
7

8 A. No. Wireless facilities that are required by DAS networks have numerous alternative siting  
9 options. A detailed study prepared by LCC International Inc., and filed before this Board by  
10 the Canadian Electricity Association provides examples of sites which are currently in use.  
11 These include private and public buildings of various kinds, street furniture, towers, flagpoles  
12 and structures that are specifically erected for the purpose of accommodating wireless  
13 communications. The affidavit of Mr. M. Starkey, filed before this Board on behalf of THESL  
14 also contains evidence of alternatives for attachment.  
15

16 **3. UTILITY POLES ARE A LIMITED AND VALUABLE RESOURCE**  
17

18 **Q. WHY DO YOU STATE THAT POLE SPACE IS A LIMITED RESOURCE?**  
19

20 A. Pole space is a limited for a number of reasons.  
21

- 22 ➤ the costs of augmenting space can be quite substantial;
- 23 ➤ there is likely limited public tolerance for ever increasing clutter on poles  
24 (sometimes referred to as visual pollution);
- 25 ➤ there are multiple future uses that should be considered, including wireline  
26 facilities, various electricity utility needs, the needs of the City of Toronto and the  
27 Toronto Transit Commission.  
28  
29



1           **Q. IS DEMAND FOR POLE SPACE LIKELY TO GROW?**

2  
3           A. Yes. The potential for continued growth in demand for pole space is very substantial.  
4           Technologies associated with smart metering and smart grid innovation often require  
5           components that need to be placed on poles. Exploding demand for bandwidth may also  
6           entail increasing need for wireline facilities which have no alternative but to attach to poles or  
7           run through conduits.  
8  
9

10          **Q. IN WHAT SENSE IS POLE SPACE A VALUABLE RESOURCE?**

11  
12          A. In addition to their critical importance as essential facilities, support structures such as  
13          poles constitute a valuable resource which, if appropriate conditions are met, may provide  
14          support services to nonessential facilities.  
15

16          For the purposes of providing a useful analogy, consider a circumstance where a public utility  
17          has spare office capacity. It may have a future need for that space, but to make best use of the  
18          resource, the utility may choose to lease the space for a short or even an extended period.  
19          Alternatively, it may choose to sell the asset if it does not expect to need it in the future. In  
20          either case, it would do so in the marketplace. It would be unreasonable and unnecessary to  
21          direct the utility to lease or sell the space. It would also be unreasonable to set a fixed price  
22          (say per square foot) independent of the location of the space as the value of the space would  
23          depend on its location and other attributes.  
24

25          Sites for wireless facilities are also valued by the marketplace. Their prices generally depend  
26          on location, suitability for a specific use, period of availability and so on. To the extent that  
27          utilities might find it in their interest to lease pole space to nonessential users, they should be  
28          permitted to do so at their discretion.  
29  
30  
31

1  
2  
3 **4. MARKETS SHOULD SERVE WIRELESS NEEDS TO THE EXTENT**  
4 **POSSIBLE**  
5

---

6 **Q. SHOULD MARKETS BE RELIED UPON TO PROVIDE SITING**  
7 **OPPORTUNITIES FOR WIRELESS FACILITIES?**  
8

9 A. Yes. It is important to keep in mind that regulatory solutions are generally a second best  
10 alternative to those that would be obtained in the marketplace. Indeed, in many cases the  
11 regulatory objective is to achieve, as closely as possible, outcomes that would occur if a  
12 market could operate. Even in cases where markets operate imperfectly, the possibility of  
13 regulatory imperfection or failure must be weighed carefully against the risk of market  
14 imperfection or failure.  
15

16  
17 **Q. IS THERE EVIDENCE THAT THE MARKET HAS FAILED IN THE PRESENT**  
18 **INSTANCE?**  
19

20 A. I am not aware of evidence that the market has failed CANDAS. On the contrary, Public  
21 Mobile is successfully providing services in its market areas. And there is broad evidence of  
22 vibrant siting markets for wireless facilities.  
23

24  
25 **Q. PLEASE DESCRIBE THE SITING MARKETS TO WHICH YOU HAVE**  
26 **REFERRED?**  
27

28 A. The existence of a very active, extensive and competitive siting market is well supported  
29 by the presence of companies whose primary business is the siting of wireless and other

1 communications facilities. Consider, for example the corporate profile of American Tower  
2 Corporation, a multi-billion dollar company:

3  
4  
5 “Founded in 1995, American Tower is a leading wireless and broadcast  
6 communications infrastructure company with a portfolio of over 35,000  
7 communications sites, including wireless communications towers, broadcast  
8 communications towers and distributed antenna system (DAS) networks. Our  
9 portfolio of wireless and broadcast towers consists of towers that we own and  
10 towers that we operate pursuant to long-term lease arrangements, including, as of  
11 December 31, 2010, approximately 20,900 towers in the United States and  
12 approximately 13,900 towers internationally in Brazil, Chile, Colombia, India,  
13 Mexico and Peru. Our portfolio also includes approximately 200 in-building DAS  
14 networks that we operate in malls, casinos and other in-building applications, and  
15 select outdoor environments. In addition to the communications sites in our  
16 portfolio, we manage rooftop and tower sites for property owners. Our primary  
17 business is leasing antenna space on multi-tenant communications sites to wireless  
18 service providers and radio and television broadcast companies. We also offer  
19 tower-related services domestically, including site acquisition, zoning and  
20 permitting services and structural analysis services, which primarily support our  
21 site leasing business and the addition of new tenants and equipment on our sites.”<sup>8</sup>  
22  
23

24 American Tower describes its competitive environment as follows:

25  
26 “Our rental and management segments compete with other international, national  
27 and regional tower companies, primarily Crown Castle International Corp. and  
28 SBA Communications Corporation in the United States and Indus Towers in  
29 India, as well as wireless carriers and broadcasters that own and operate their own

---

<sup>8</sup> American Tower Corporation, 2010 Annual Report, second unnumbered page.

1           communications site networks and lease space to third parties, numerous  
2           independent tower owners and the owners of non-communications sites, including  
3           rooftops, utility towers, water towers and other alternative structures. We believe  
4           that site location and capacity, network density, price and quality of service have  
5           been and will continue to be significant competitive factors affecting owners,  
6           operators and managers of communications sites.”<sup>9</sup>

7  
8           Similarly, Crown Castle USA (CCUSA), another multi-billion dollar supplier of siting  
9           services describes its competitive environment in the following terms:

10  
11           “CCUSA competes with (1) other independent tower owners which also provide  
12           site rental and network services, (2) wireless carriers which build, own and  
13           operate their own tower networks and lease space to other wireless  
14           communication companies, and (3) owners of alternative facilities, including  
15           rooftops, water towers, broadcast towers, DAS networks, and utility poles. Some  
16           of the larger independent tower companies with which CCUSA competes in the  
17           U.S. include American Tower Corporation, SBA Communications Corporation,  
18           Global Tower Partners and TowerCo. Wireless carriers that own and operate their  
19           own tower networks generally are substantially larger and have greater financial  
20           resources than we have. We believe that tower location and capacity, deployment  
21           speed, quality of service and price have been and will continue to be the most  
22           significant competitive factors affecting the leasing of a tower.

23  
24           Competitors in the network services business include site acquisition consultants,  
25           zoning consultants, real estate firms, right-of-way consulting firms, construction  
26           companies, tower owners and managers, radio frequency engineering consultants,  
27           telecommunications equipment vendors who can provide turnkey site  
28           development services through multiple subcontractors, and our customers' internal

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<sup>9</sup> Ibid, page 8.

1           staffs. We believe that our customers base their decisions on the outsourcing of  
2           network services on criteria such as a company's experience, track record, local  
3           reputation, price and time for completion of a project.”<sup>10</sup>

4           **Q. IN THEIR EVIDENCE, CANDAS SUGGESTS THAT DEPLOYMENT ON**  
5           **ALTERNATIVE STRUCTURES IS PRECLUDED BECAUSE IT WOULD REQUIRE**  
6           **HUNDREDS OF SEPARATE AGREEMENTS WITH SITE OWNERS.<sup>11</sup> WHAT ARE**  
7           **YOUR OBSERVATIONS ON THIS POSITION?**

8  
9           A. The requirement for arranging many agreements does not preclude deployment on  
10          alternative structures. Indeed, this is precisely one of the reasons that markets emerge – that  
11          is, to coordinate the needs and desires of diverse purchasers and sellers.

12  
13          To meet the demand side, companies such as American Tower, Crown Castle and others offer  
14          rapid online identification of possible attachment sites of various kinds and detailed  
15          characteristics of those sites (such as availability of fiber). In many cases, Google Earth and  
16          Google ‘street view’ permit the viewer to obtain a visual assessment without leaving his or  
17          her office.

18  
19          On the supply side, companies actively solicit sites that are suitable for placement of  
20          telecommunications facilities. These include buildings of all sizes, structures for stealth  
21          deployment and land. Companies also manage sites such as rooftops and arrange leases.<sup>12</sup>

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<sup>10</sup> Crown Castle, 2010 Annual Report, page 5.

<sup>11</sup> “In the case of the Toronto DAS Network, alternative solutions (e.g. placement of antennas on buildings), even if workable sites had been available, would have required literally hundreds of agreements with private property owners to permit placing the node equipment on their structures and providing the needed fibre connectivity would require taking fibre connections through many streets and sidewalks.” Written Evidence of Tormod Larsen, July 26, 2011,

<sup>12</sup> See, for example, Global Tower Partners, <http://en.gtpsites.com/about-gtp.aspx>.

1       **Q.    IN YOUR OPINION, WHY IS CANDAS SEEKING REGULATORY**  
2       **INTERVENTION?**

3  
4       A. Certainly there are a host of reasons why CANDAS is seeking mandated access to THESL  
5       poles, among them technical convenience.

6       However, fundamentally the critical factor is price. The regulated price of access to  
7       distributor support structures for essential uses is based on historic cost. I would expect that  
8       the current market price for alternative sites for nonessential users is higher, perhaps far  
9       higher.

10  
11       The underlying business model is extremely appealing if a company can obtain access to  
12       poles at historically based regulated rates, then resell that access combined with antenna  
13       services to wireless service providers at market rates. This may be seen as a form of  
14       regulatory arbitrage.

15  
16  
17       **Q.    IS THERE A RISK OF REGULATORY FAILURE IF THE OEB WERE TO**  
18       **INTERVENE?**

19  
20       A. Yes, there are significant risks.

21  
22       First, mandated access for nonessential facilities at rates based on historic costs could lead to  
23       a deluge of applicants. In this connection, CANDAS asserts in its evidence that all wireless  
24       providers will eventually move to a DAS architecture.<sup>13</sup> Assuming for the moment that this  
25       assertion is realized, there could be a rapid increase in demand for pole space by DAS  
26       providers. Indeed, once a precedent mandating access for nonessential private users is

---

<sup>13</sup> "Distributed network architectures are the way of the future." Written Evidence of George A. Vinyard, page 11. "It is likely that all wireless carriers will move towards a DAS-type architecture in the future." Written Evidence of Brian O'Shaughnessy, page 8.

1 established, wireless providers employing other technologies as well as other nonessential  
2 users could seek attachment privileges.

3  
4 Second, mandated attachment at other than market rates would distort and impede continued  
5 development of relevant siting markets.

6 Third, mandated attachment under conditions and rates not vetted by the market could, in  
7 effect, constitute an inappropriate wealth transfer from the ratepayers and the public to a small  
8 number of private corporations.

9  
10 Fourth, in the event that the regulatory authority attempts to mimic market outcomes, it will  
11 have a challenging task in determining what those prices should be, particularly as rates  
12 would need to vary by location and over time. The potential for error is significant.

13  
14 Fifth, the regulator and no doubt utilities will experience regulatory burden which could have  
15 been avoided. The determination of locational pricing for sites would be one source of  
16 significant regulatory costs.

17  
18  
19 **5. THE OEB SHOULD FORBEAR FROM REGULATING WIRELESS**  
20 **ATTACHMENTS**  

---

21  
22 **Q. IN YOUR OPINION, IS REGULATORY INTERVENTION URGENTLY**  
23 **NEEDED?**

24  
25 A. A case for regulatory action on the basis of urgency is not warranted as Public Mobile has  
26 demonstrably been able to launch its service. On this basis alone, a case for forbearing and  
27 thus deferring the possibility of regulatory action, can be made.

1           **Q. IN THE LONGER TERM, IS MANDATED REGULATED ACCESS FOR**  
2           **WIRELESS ATTACHMENT WARRANTED OR DESIRABLE?**

3  
4           A. Since wireless providers have alternatives for delivering their services, THESL should not  
5           be compelled to render attachment services to such entities.

6  
7           A regulatory precedent which requires THESL to attach facilities which have alternative  
8           siting options could have substantial adverse consequences. It could lead to excessive  
9           demand for pole space by nonessential users, it could thwart evolution of siting markets and  
10          result in regulatory failures stated earlier.

11  
12          The simplest and most appropriate approach would be to allow siting markets to provide these  
13          services to nonessential users and to allow electricity distributors to participate in them as  
14          they fit. Wireless providers and pole owners would negotiate attachment contracts, if  
15          appropriate. The presence of siting alternatives provides a check on the potential exercise of  
16          market power by the pole owner.

17  
18  
19          **Q. ARE THERE ADVANTAGES TO FORBEARING REGULATION?**

20  
21          A. Yes, there are important advantages. Siting markets will continue to develop without  
22          regulatory intrusions or distortions. This will result in more efficient allocation of resources,  
23          including THESL support structures. Significant regulatory burden will be avoided as well as  
24          risks of regulatory imperfections or failures.

25  
26  
27          **Q. WOULD FORBEARANCE BE CONSISTENT WITH GOOD REGULATORY**  
28          **PRACTICE?**

29  
30          A. Yes. In the debate about appropriate degrees of regulation one of the widely appreciated  
31          maxims has been “competition where possible, regulation where necessary”. It would be



1 appropriate to consider this saying in the present context. To the extent that forces in the  
2 siting market can be relied upon to provide alternative attachment options (with associated  
3 terms, rates and conditions) a regulatory approach is inferior. Moreover, the maxim is also  
4 consistent with a light-handed approach to regulation which is often seen as preferable to a  
5 regulatory approach that is overly prescriptive.

6  
7 **Q. IS YOUR RECOMMENDATION CONSISTENT WITH OEB STANDARDS ON**  
8 **FORBEARANCE?**

9  
10 A. Yes, it would be consistent with the framework and standards which the OEB has set for  
11 forbearing. Furthermore, it is my understanding that in seeking regulatory intervention, the  
12 burden of proof is normally on the applicant, in this case CANDAS. In my view, the  
13 applicant has failed to provide justification for the regulation of DAS wireless attachments.

14  
15  
16 **Q. WHAT ARE THE STANDARDS FOR FORBEARANCE SET OUT BY THE OEB?**

17  
18 A. In the course of a proceeding involving natural gas storage, the Board set out its criteria for  
19 forbearance.<sup>14</sup> The central objective is to determine whether the relevant market is  
20 sufficiently competitive to protect the public interest. The Board also notes that regulatory  
21 costs can influence the decision to forbear. Among these costs are the adverse effects that  
22 regulation can have on innovation and dynamic efficiency.

23  
24  
25 **Q. PLEASE OUTLINE THE ANALYTIC FRAMEWORK FOR DETERMINING**  
26 **WHETHER THERE IS SUFFICIENT COMPETITION TO PROTECT THE PUBLIC**  
27 **INTEREST.**  
28

---

<sup>14</sup> EB-2005-0551, Natural Gas Electricity Interface Review, Decision With Reasons, November 7, 2006.

1 A. The analytical framework consists of four components: identification of the product  
2 market; determination of the relevant geographic area; calculation of market shares and  
3 market concentration ratios; and, assessment of conditions for entry by new suppliers.  
4

5 In the present case, the relevant market is the market for siting wireless attachments. For  
6 purposes of this discussion, I will take the geographic area to be the Toronto Hydro service  
7 area.  
8  
9

10 **Q. BASED ON THIS FRAMEWORK, IS THERE SUFFICIENT COMPETITION TO**  
11 **PROTECT THE PUBLIC INTEREST?**  
12

13 A. There are thousands of wireless sites currently operating in Toronto and owned by entities  
14 other than THESL.<sup>15</sup> Public Mobile has availed itself of some of these sites to launch its  
15 services. Wireless attachments are affixed to THESL poles, but these are owned by the  
16 company itself, or in most other instances, by the City of Toronto or the Toronto Transit  
17 Commission. Consequently, though THESL plays a public service role in providing  
18 attachment space for public entities, it has a negligible share of the market for siting private  
19 wireless service provider attachments. The very fact that THESL does not have a material  
20 share in this market would support forbearance.  
21

22 One could ask whether, on a prospective basis, there will be sufficient competition in the  
23 siting market. It would be difficult to imagine otherwise.  
24

25 It is true that poles, in some respects, provide a convenient siting alternative for a certain, and  
26 at this point, narrow class of wireless attachments. Poles may be especially attractive if  
27 attachment rates are regulated at rates based on historic costs.  
28

---

<sup>15</sup> See, evidence of M. Starkey at page 27.

1 From the standpoint of an evolving siting market, there are myriad structures within the  
2 THESL service area of varying height, power supply is ubiquitous and fiber can be accessed  
3 in numerous locations. The empirical evidence indicates that ‘workably competitive’ siting  
4 markets have evolved as the need has arisen. Given the availability of key elements, there are  
5 therefore strong reasons to expect that they will continue to do so.

6 But it is not only markets that adapt and evolve; technology is also advancing constantly.  
7 Given the enormous market potential, technical advances with respect to siting can be  
8 expected to occur in the direction of greater not lesser flexibility of deployment. This  
9 ‘endogenous technological change’ is widely observed in many industries. Within the  
10 communications industry, spectrum re-use is an especially prominent example. Stealth  
11 deployment is another, less glamorous, but also valuable instance.

12  
13 I would therefore conclude that both on a current and a prospective basis, there is and, in all  
14 likelihood will be sufficient competition to protect the public interest. The source of this  
15 competition is rooted in economics, through continuing market evolution, and science,  
16 through technological change.

17  
18  
19 **Q. ARE THERE ANY OTHER REASONS THAT WOULD SUPPORT YOUR**  
20 **RECOMMENDATION OF FORBEARANCE?**

21  
22 A. Yes. As I indicated earlier, the Board identified regulatory costs as a second rationale for  
23 forbearance.<sup>16</sup> These costs were broadly interpreted to include not only financial costs on  
24 utilities and customers, but also adverse impacts on innovation, responsiveness in the  
25 marketplace and unnecessary use of resources.

26  
27 In the present case, I would suggest that the dampening of incentives for siting market  
28 response to DAS placement will reduce innovation in this segment of the siting market.  
29 Furthermore, acquiescing to CANDAS demands would open the door for other nonessential

---

<sup>16</sup> EB-2005-0551, Natural Gas Electricity Interface Review, Decision With Reasons, November 7, 2006, pages 25-26.

1        attachers, potentially leading to a fundamental shift away from the siting market model to a  
2        regulated model for numerous wireless and other attachers.

## 3 4 5 6 7        **D. GROUNDS UNDERPINNING CANDAS APPLICATION**

8  
9        **Q. ARE YOU IN AGREEMENT WITH THE GROUNDS UPON WHICH CANDAS**  
10       **HAS FOUNDED IT APPLICATION?**

11  
12       A. For the most part, I am not in agreement with the grounds set forth by CANDAS as stated at  
13       pages 25-38, Application of CANDAS, Regarding Access to the Power Poles of Electricity  
14       Distributors for Purposes of Wireless Telecommunications, Volume I.

15  
16       (a)        *"PUBLIC VS PRIVATE CORPORATIONS"*

17  
18       **Q. WHAT ARE YOUR THOUGHTS ON THE DIFFERENCES BETWEEN THE**  
19       **ROLES OF PRIVATE AND PUBLIC CORPORATIONS?**

20  
21       A. I agree with the Applicants that public corporations have a broader mandate than private  
22       entities. Unlike private corporations, they have an obligation to the public at large. This  
23       would generally include receiving fair value for any assets that they lease or sell.

24  
25       Public corporations are often required to fulfill certain policy objectives set by  
26       governments. At present, the Ontario electricity industry is implementing a highly  
27       ambitious renewables program that has been put in place by the Province. Some have  
28       argued that this program is contributing to large increases in the electricity prices which in  
29       turn is leading to cost pressures throughout the Province.

30  
31       In balancing corporate and various public interests, it would be difficult to conclude that  
32       wireless interests or any nonessential attachers should receive preferential treatment or that

resources presently in the public domain should be sold, leased or transferred at rates that do not reflect their market value.

*(b) "BREACH OF CCTA ORDER AND ELECTRICITY DISTRIBUTION LICENCES"*

**Q. IN YOUR VIEW, IS THESL IN BREACH OF THE CCTA ORDER?**

A. In substantive terms, THESL cannot be in violation as that Order applied to wireline attachments which fit into the communications space.

Furthermore, the intent of the Order is to regulate attachments to poles as essential facilities. For reasons given earlier, power poles are not an essential facility for the applicants.

*(c) "UNJUST DISCRIMINATION AND UNDUE PREFERENCE"*

**Q. DOES THESL'S POSITION CONSTITUTE UNJUST DISCRIMINATION AND UNDUE PREFERENCE?**

A. Wireline attachers are fundamentally different from wireless entities as the latter do not require continuous corridors for placement of their wireless facilities. Differential treatment therefore does not constitute unjust discrimination against wireless attachments or preferential treatment of wireline facilities.

*(d) "ANTI-COMPETITIVE BEHAVIOUR"*

**Q. DOES THESL'S POSITION CONSTITUTE ANTI-COMPETITIVE BEHAVIOUR?**

1  
2 A. No. Although THESL has a virtual monopoly on poles, it does not have a monopoly on  
3 support structures for wireless facilities, as is evidenced by the expeditiousness with which  
4 Public Mobile was able to launch its services.

5  
6 Furthermore, treatment of pole space as a limited and valuable resource is necessary to  
7 ensure that the resource is managed prudently.  
8  
9

10 *(e) "ONTARIO UTILITIES ARE ACTING WITH UNFETTERED DISCRETION"*

11  
12 A. Ontario utilities are not acting with unfettered discretion. On the contrary, they are  
13 required to comply with a broad range of regulations, laws and policy directives. In the  
14 competitive settings in which they participate, they must meet the rigors of the  
15 marketplace.  
16

17 In the present discussion, market discipline is provided by alternatives available to wireless  
18 companies, the technologies that they select, and the sites to which they may choose to  
19 attach. There is extensive evidence that private market respond vigorously to demand for  
20 siting solutions.  
21  
22  
23  
24

## 25 **E. CONCLUDING REMARKS**

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26  
27 **Q. CANDAS EVIDENCE REFERS EXTENSIVELY TO DAS DEPLOYMENTS IN**  
28 **OTHER JURISDICTIONS. IN PARTICULAR, IT SUGGESTS THAT IN SOME**  
29 **CITIES, DAS NETWORKS HAVE BEEN DEPLOYED LARGELY ON POLES. HOW**  
30 **DO YOU INTERPRET THIS EVIDENCE?**  
31

1 A. I would not conclude that DAS deployment on poles has occurred of necessity, that is, that  
2 distributed antenna systems have no alternative but to attach to utility poles. In my view, this  
3 is essentially a cost and price effect. The decision has been made in some jurisdictions to  
4 facilitate attachment of wireless facilities to utility poles (electricity and telephone) at  
5 favourable prices. As a consequence, in those areas DAS developers have not needed to adapt  
6 their designs so that they can be attached elsewhere, nor would there have been a need to seek  
7 other locations. This, in turn, would have had an adverse effect on the development of siting  
8 markets for DAS antennae.

9  
10 The decision to strongly encourage or mandate attachment, in some instances, has been made  
11 by a telecom regulatory authority that has favoured its own industry, sometimes at the  
12 expense of other industries and ratepayers. While this decision may be reasonable for a  
13 telecom regulator, an energy regulator might be more likely to consider the needs of the  
14 energy industry and its ratepayers, and arrive at a different conclusion.

15  
16 It is also worth noting that wherever power poles are owned by private sector companies,  
17 there is no issue of transferring a valuable asset from the public sector to the private sector.  
18 That is not the case in Ontario.

19  
20  
21 **Q. YOU HAVE ADVOCATED THAT THE OEB FORBEAR FROM REGULATING**  
22 **THE ATTACHMENTS OF WIRELESS FACILITIES. PLEASE SUMMARIZE YOUR**  
23 **REASONS.**

24  
25 A. It might be helpful to view the Application in a somewhat different light by considering  
26 the interests of CANDAS members. The retail service provider, Public Mobile, has multiple  
27 options for providing its services and has done so successfully. The urgent need for mandated  
28 attachment at regulated rates is evidently unjustified.

29  
30 DAS developers and other advocates of DAS technology that seek mandated attachment to  
31 utility infrastructure at regulated and non-market rates, seem to be motivated by a business

1 model which effectively involves a subsidy. As new wireless technologies which require  
2 denser node distributions proliferate, one would expect a vigorous response from siting  
3 markets, just as has occurred in the past.

4  
5 In short, there is no evidence that siting markets do not work effectively. This argument alone  
6 would seem to be a sufficient condition for forbearance. That is, in the absence of a market  
7 failure, regulatory intervention does not have a sound foundation.

8  
9  
10 **Q. SHOULD ELECTRICITY RATEPAYERS AND THE PUBLIC SUBSIDIZE THE**  
11 **DEPLOYMENT OF DAS SYSTEMS IN ONTARIO?**

12  
13 A. The subsidy of a specific technology by the public does occur from time to time.  
14 Presently, Ontario electricity ratepayers are subsidizing the development of renewable  
15 technologies, in particular solar and wind generation, through feed-in-tariffs. The costs have  
16 had a significant impact on retail electricity rates.

17  
18 It would be hard to argue that electricity ratepayers should also subsidize DAS development  
19 and deployment. If such a subsidy is deemed to be desirable, it would seem appropriate that it  
20 should come from the communications segment of the economy and not from the energy  
21 industry.

22  
23  
24 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

25  
26 A. Yes it does.

27  
28 I make this affidavit in support of THESL's motion for a Decision and Order of the Ontario  
29 Energy Board:

- 30 a. that the CCTA Decision does not apply to wireless communications attachments;



- 1           b.       that the Board refrain from exercising its powers on the basis that there is or will be  
2                   competition in the wireless communications market sufficient to protect the public  
3                   interest;
- 4           c.       denying the relief sought by CANDAS and dismissing CANDAS' application; and
- 5           d.       such other relief as THESL may request and the Ontario Energy Board may deem  
6                   appropriate,
- 7           and for no other or improper purpose.

8  
SWORN BEFORE ME  
at the City of Toronto,  
in the Province of Ontario,  
on September 1 , 2011.

\_\_\_\_\_  
John A.D. Vellone  
A Commissioner, etc.

Original signed by Adonis Yatchew

**Adonis Yatchew**

9                   \_\_\_\_\_

## APPENDIX – AUTHOR QUALIFICATIONS

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### CURRICULUM VITAE ADONIS YATCHEW

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Editor-in-Chief, The Energy Journal  
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Ph.D. Economics 1980  
Harvard University

M.A. Economics 1975  
University of Toronto

B.A. Mathematics and  
Economics 1974  
University of Toronto

Adonis Yatchew's research focuses on econometrics, energy and regulatory economics. He has held visiting appointments at Trinity College, Cambridge and the University of Chicago. He has written a graduate level text on semiparametric regression techniques published by Cambridge University Press. Dr. Yatchew has also written extensively on regulatory schemes in the area of electricity, and has served in various editorial capacities at The Energy Journal since 1995. Dr. Yatchew has conducted major studies in electrical utilities and oil pipelines as well as in the airline, natural gas, minerals and banking industries. He has advised public and private sector companies on electricity, regulatory and other matters for over 25 years and has provided testimony in numerous regulatory and litigation procedures.

### ACADEMIC EXPERIENCE

|      |                                                                                                                                                              |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2008 | Visiting academic, Department of Mathematics and Statistics, University of Melbourne                                                                         |
| 2008 | Visiting academic, School of Economics and Finance, Queensland University of Technology                                                                      |
| 2008 | Visitor, National Center for Econometric Research, Queensland University of Technology                                                                       |
| 2005 | Visiting Fellow, ARC Center of Excellence for Mathematics and Statistics of Complex Systems, Mathematical Sciences Institute, Australian National University |

|    |                  |                                                                       |
|----|------------------|-----------------------------------------------------------------------|
| 1  | 2004-present     | Professor of Economics, University of Toronto                         |
| 2  | 2001             | Visiting Fellow, School of Mathematical Sciences, Australian National |
| 3  |                  | University                                                            |
| 4  | 1986 to 2004     | Associate Professor, Economics, University of Toronto                 |
| 5  | 1989, 1990, 1991 | Visiting Research Associate, Harvard University                       |
| 6  | 1986             | Visiting Fellow Commoner, Trinity College, Cambridge U.K.             |
| 7  | 1980 to 1986     | Assistant Professor, Economics, University of Toronto                 |
| 8  | 1984             | Visiting Research Associate, National Bureau of Economic Research,    |
| 9  |                  | Cambridge, Massachusetts                                              |
| 10 | 1982 to 1984     | Visiting Assistant Professor, University of Chicago                   |
| 11 | 1976             | Lecturer, University of Toronto, Scarborough College                  |

## EDITORIAL AND PROFESSIONAL ACTIVITIES

### *Current*

Editor-in-Chief, The Energy Journal (2006-present)  
 Member, Board of Editors, Economics of Energy and Environmental Policy  
 Member, Editorial Board, Foundations and Trends in Econometrics

### *Past*

Editor, The Energy Journal, (2006)  
 Joint Editor, The Energy Journal (1995-2005)  
 Associate Chair for Graduate Studies, University of Toronto, 2006 - 2009  
 Joint Editor 1997, Distributed Generation, special issue of the Energy Journal  
 Advisory Editor, Economics Letters (1985-1997)  
 Member, Advisory Board, *Eurasia Foundation*, 1995-2007

## RECENT ACADEMIC PRESENTATIONS

December 2010: Invited paper on renewable energy, Fourth Asian Energy Conference, Hong Kong.  
 October 2010: Invited paper on quantile regression, Workshop on Quantile Regression Methods, Humboldt University in Berlin.  
 October 2008: Keynote speaker, Australian Conference of Economists, Gold Coast, Queensland.  
 Title of presentation: "Economics, Econometrics and Regulation".  
 August 2007: Keynote speaker, Cemapre Conference on Advances in Semiparametric Methods and Applications, Lisbon, Portugal. Title of presentation: "Data on Derivatives, Nonparametric Regression and the Curse of Dimensionality".  
 Seminars and presentations at Boston Univ., Columbia Univ., Georgetown Univ., Harvard Univ., Univ. of Maryland, M.I.T., Stanford Univ.

## BOOK

Yatchew, A., 2003, Semiparametric Regression for the Applied Econometrician, 213 pages, Themes in Modern Econometrics, Cambridge University Press.

## REFEREED PUBLICATIONS

Yatchew, A. and A. Baziliauskas 2011: "Ontario Feed-In Tariff Programs", Energy Policy, 39, 3885-3893.

Hall, Peter and A. Yatchew 2010: "Nonparametric Least Squares in Derivative Families", Journal of Econometrics, 157, 362-374.

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Pesando, J., and Yatchew, A., 1977, "Real vs. Nominal Interest Rates and the Demand for Consumer Durables in Canada", Journal of Money, Credit, and Banking, 428-436.

## **OTHER PAPERS / STUDIES**

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Yatchew, A., 1999, "Differencing Methods in Nonparametric Regression: Simple Techniques for the Applied Econometrician", 86 manuscript pages.

## **RECENT RESEARCH GRANTS**

2011-2014 SSHRC grant "Nonparametric regression when data on derivatives are available".

2007-2011 SSHRC grant "Nonparametric and semiparametric estimation when data on derivatives are available".

2004-2007 SSHRC grant "Semiparametric demand modeling and testing".

2003-2004: Grant to develop interactive web-based teaching software for undergraduate statistics at the University of Toronto.

1 **OTHER PROFESSIONAL EXPERIENCE:**

2  
3 (2010) Prepared testimony on behalf of Noranda Aluminum, Inc. Filed before the Public  
4 Service Commission of the State of Missouri.

5  
6 (2009) Prepared study for Ontario Power Generation on sufficient competition tests for  
7 boundary entities in the Ontario electricity market.

8  
9 (2009) Prepared testimony on worldwide paraxylene markets in the context of a  
10 contractual dispute before the International Court of Arbitration of the International  
11 Chamber of Commerce.

12  
13 (2008) Prepared analysis of incentive regulation of capital and operating costs and  
14 productivity growth for electricity distributors. Filed before the Ontario Energy Board.

15  
16 (2007) Prepared analysis of distributor benchmarking of capital and operating costs on  
17 behalf of the Electricity Distributors Association. Filed before the Ontario Energy Board.

18  
19 (2007) Filed evidence on market power before the Market Surveillance Panel in Ontario.

20  
21 (2005-2007) Prepared analyses of pricing of investor communications services.

22  
23 (2007) Prepared testimony on behalf of the Electricity Distributors Association on utility  
24 benchmarking of capital and operating costs. Filed before the Ontario Energy Board.

25  
26 (2004-2007) Prepared various analyses in a class action and settlement proceeding  
27 involving billing of natural gas.

28  
29 (2004, 2005, 2006) Prepared odds of winning prizes in promotions by a leading U.S.-based  
30 international fast-food chain.

31  
32 (2006) Prepared testimony on incentive regulation. Filed before the Ontario Energy Board.

33  
34 (2006) Prepared testimony on cost-sharing of capital and operating costs of joint-use  
35 power poles. Filed before the New Brunswick Board of Commissioners of Public Utilities

36  
37 (2005) Prepared testimony on cost-sharing of power poles by cable companies on behalf  
38 of Thunder Bay Hydro.

39  
40 (2004) Prepared testimony on cost-sharing of capital costs of power poles by cable companies.  
41 Filed before the Ontario Energy Board.

42  
43 (2003) Prepared testimony on behalf of large Ontario electricity distributors on distributor  
44 service area amendments. Filed before the Ontario Energy Board.

1 (2003) Prepared testimony on behalf of J.D. Irving Ltd. on rates of return, performance based  
2 regulation and benchmarking. Filed before the New Brunswick Board of Commissioners of  
3 Public Utilities.

4  
5 (1998-2006) Member, Board of Directors, *EnerConnect*.

6  
7 (1993-1998) Prepared major studies for the Municipal Electric Association on  
8 restructuring of the electric utility industry in Ontario.

9  
10 (1997) Prepared analysis of securities lending for Canada Trust.

11  
12 (1992) Prepared study on pipeline cost allocation.

13  
14 (1982-1995) Consultant to the Municipal Electric Association at the Ontario Hydro Rate  
15 Hearings before the Ontario Energy Board.

16  
17 (1991, 1992, 1993, 1994) Prepared short term market assessment and forecasts for Bell  
18 Mobility cellular telephone sales.

19  
20 (1991-1992) Research Director for the Municipal Electric Association in their intervention  
21 before the Environmental Assessment Board in connection with Ontario Hydro's 25 year  
22 Demand/Supply Plan.

23  
24 (1992) Prepared testimony on forecasts of electricity demand for Ontario. Filed before the  
25 Ontario Environmental Assessment Board.

26  
27 (1990) Prepared statistical analysis in connection with a legal proceeding on anti-  
28 competitive behavior relating to the supply of paper forms.  
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TAB 10

# **Outdoor Distributed Antenna Systems and their role in the Wireless Industry**

## Executive Summary

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Outdoor Distributed Antenna Systems (ODAS) of the type discussed by CANDAS are but one of a new set of tools intended to supplement capacity and coverage requirements for wireless communications. The wireless industry already uses a range of technologies and antennae installation solutions, and newer, smaller and more flexible solutions are gaining traction. ODAS may become a complement to more traditional wireless technologies, in part because of their flexibility of design and because key components, including antennas, can be located at a broad range of sites. Manufacturers understand that new antenna systems (including ODAS and others) must be flexible in terms of where they are placed and how they interact with core network components.

This report provides an overview of the wireless industry, and specifically the historical and current deployments of wireless networks using macro cells and microcells and how ODAS fits into this landscape. Because ODAS is but one of numerous new technologies at the disposal of the wireless network operators, ODAS is described in relation to other options used to "fill in" high-traffic and other difficult coverage areas.

At the core of this report is an analysis of the difference between wireline attachments and wireless attachments to "Joint Utility Poles". Utility Poles' historical use and the practical question of attachment of ODAS systems on utility poles is also reviewed from several perspectives, including engineering, safety, and practicality. This industry landscape culminates in a series of questions about the role of utility poles, attachment rights and ODAS.

Our analyses and conclusions are informed by extensive practical experience in the wireless industry.

Our main findings may be summarized as follows:

1. ODAS is but one of many technologies that is (and will) be used by wireless providers as they add capacity to existing networks.
2. It is highly unlikely that ODAS will evolve as a full substitute for traditional transmission engineering found today in the form of macro and multiple micro-site technologies. Instead, ODAS and multiple other technologies (e.g., Wi-Fi, pico-, femto-) will be used to "fill in" areas of high demand and/or unique terrain characteristics.
3. Wireless providers and network builders have multiple attachment alternatives when designing wireless networks, including those relying primarily upon ODAS. Manufacturers are aware of, and build to, the need for substantial flexibility in placing today's wireless hardware. Buildings, street furniture, stand-alone poles and other aesthetically designed apparatus exist, and are currently in use, to support ODAS and other wireless hardware.
4. Wireless facilities associated with ODAS networks are fundamentally different from traditional wireline facilities that are mounted on utility poles. It is not essential that utility poles be available as attachment options in the design and construction of wireless networks, including those that rely upon ODAS. Numerous other siting options are available.

## 1. About LCC International, Inc.

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LCC, the largest independent telecom services company in the world with local presence in over 50 countries, is a recognized leader in providing consulting and network services to the telecommunications industry.

A pioneer in the industry since 1983, LCC has performed technical services for the largest wireless operators in North and South America, Europe, The Middle East, Africa and Asia. The Company has worked with all major access technologies (including LTE, WiMAX, HSPA, EV-DO, CDMA, EDGE and GSM) and has participated in the success of some of the largest and most sophisticated wireless systems in the world. We bring local knowledge and global capabilities to our customers, offering innovative solutions, insight into cutting-edge developments and delivering solutions that increase business efficiencies. Our service offering includes consulting, design, deployment, performance and operations and maintenance services and training through the world-renowned Wireless Institute.

Over the past twenty-seven years of operation, LCC has continually expanded its capabilities and adjusted its service offerings to best suit the needs of the industry. LCC has been involved in the design and optimization of networks utilizing virtually every major transport technology ranging from traditional microwave and leased line to advanced technologies. Our desire is to take this knowledge, experience and skill, and apply it to the greatest benefit for our clients in the design, deployment, optimization and operations of their existing and future networks. Having started at the very inception of the mobile wireless industry, LCC has been fortunate to be intimately involved with - and in many cases leading - new technology at virtually every step of the way.

LCC's Enterprise Mobility Solutions Group provides operators and enterprise clients many services to address skyrocketing mobile data demands. By providing increased capacity with various solutions including indoor and outdoor Distributed Antenna Systems (DAS), data off-loading and mobility services are using both licensed radio and unlicensed (Wi-Fi) radio service solutions. In addition, LCC's Land Mobile Radio Group provides in depth engineering, network, and project management services to support Public Safety and Land Mobile Radio (LMR) solutions.

With the need to bolster coverage and increase capacity, wireless carriers and enterprise Chief Information Officers (CIO's) are looking at various technology solutions to support the ever increasing demand for bandwidth .

LCC's Enterprise technology experience includes;

- Passive Distributed Antenna Systems
- Active Distributed Antenna Systems
- WiFi – 802.11a/b/g/n & Mesh
- Public Safety Land Mobile Radios
- Bridging – point-to-multi-point

Each solution plays a role in meeting our clients demand to get the wireless signal closer to where the actual users are.



## 2. Wireless Industry Overview:

**How has the construction of mobile communications networks evolved, what are the key drivers, and how has the industry responded with new technologies?**

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From the inception of mobile communications systems, stand-alone cell towers have been the dominant way to illuminate service areas with radio signals. These installations are typically 50 feet or more above the ground, and are spaced a mile or more apart, and to the technical community the regions created by each of these antenna locations is called a macrocell. When a mobile user moves from one location to another, their signal is handed off from one cell to the next, to ensure the best coverage, capacity and quality of service. Yet, the wireless industry is at a turning point.

The confluence of end-user demand and proliferation of devices with advanced media capabilities is putting pressure on traditional macrocell deployment and its ability to provide necessary capacity and coverage in areas of high use. Growth in wireless devices is widely recognized to be exponential, in terms of both adoption rates and device capabilities. But the recent emergence of widescreen devices, such as tablet computers and advanced multimedia smartphones, has brought another dimension to traffic growth forecasts for the coming years.

Wireless Carriers are therefore being forced to (i) develop smaller cell sites to increase the reuse of available spectrum; and (ii) deploy alternative wireless strategies such as using unlicensed Wi-Fi to reduce the strain on capacity.

These smaller cells are called microcells, and are typically situated on rooftops and sides of buildings, . They may be spaced as little as a few hundred feet apart and at heights of less than 30 feet of elevation above ground level.

Not surprisingly, increases in demands for capacity and the need for more focused use of available spectrum has spurred innovation in the miniaturization of electronic components and the use of new types of antenna systems to provide higher levels of capacity, coverage and quality.

In the US, the cumulative capital expenditures on these types of systems has reached over \$ 300Bn, and continues to grow at approximately 8 to 10% per year (i.e. about \$ 25Bn per year).



### 3. Introduction to Macrocells, Microcells and DAS systems

#### How does a service provider transmit a signal (connection) to an end subscriber?

Over the past two decades, cellular networks have evolved from relying almost exclusively on large cells (called macrocells) where an antenna is spaced a mile or more apart to a point where they now include smaller cells (called microcells and picocell) where the coverage may be as little as a few hundred feet.

Various methods exist today which fall into several broad categories: Macro, Micro, Pico and Femto cells. There is no authoritative delineation between these categories, as these terms generally reflect relative coverage area of one group of technologies when compared to another.

- Macro Sites have a footprint which typically includes Cellular Towers & Rooftops, and cover “miles”.
- Micro Sites can cover “blocks” or buildings and Pico Cell coverage generally ranges from a few floors of large building to a diameter of several hundred meters in an outdoor setting.
- Femto cells have traditionally been used for short-range applications typically inside homes, apartment buildings, and enterprise locations, though newer “metro-femto” cells are being introduced that provide outdoor coverage of up to 300-600 meters.

Historically, the predominant deployment method for wireless networks has been by the use of dedicated cellular towers and rooftops of buildings, water towers, and various other facilities, where real-estate for equipment, power facilities, room for an antenna at a suitable height above the ground, as well as a safe area for maintenance, and connection to the conventional telephone network can all be installed.

In the competitive world of mobile operators, operators typically deploy a variety of locations, primarily tower locations, and in more urban settings rooftop locations. Each carrier will build their network to suit to the coverage and traffic needs of their customers. Deployment examples and pictures will demonstrate the antenna siting market is alive with ingenuity as it relates to mounting methods that do not involve Utility Poles. These techniques continue to be used, and will be used in most markets – these include macrocells, microcells, as will be described in this report.

The most critical factors for the deployment of an antenna site for wireless communication is what the industry terms “coverage and capacity”. Coverage is best engineered with the right height and type of antenna to illuminate the desired coverage area, taking into account the physics of radio propagation, including terrain, buildings, other obstacles, and environmental factors such as foliage and weather.

Today in the U.S. the vast amount of mobile communications traffic is transmitted via Macro and Micro sites. There are an estimated 275,000 macro and micro cell sites in the US. Since the typical range of a cell site is about a mile radius, the actual area covered by these two solutions represents most of the cellular infrastructure in the US.

Network operators typically choose a mix of macro and micro and increasingly pico cells, to provide high quality capacity and coverage, and to ensure that they can support the increasing bandwidth requirements of smartphones, tablets and mobile computing devices.

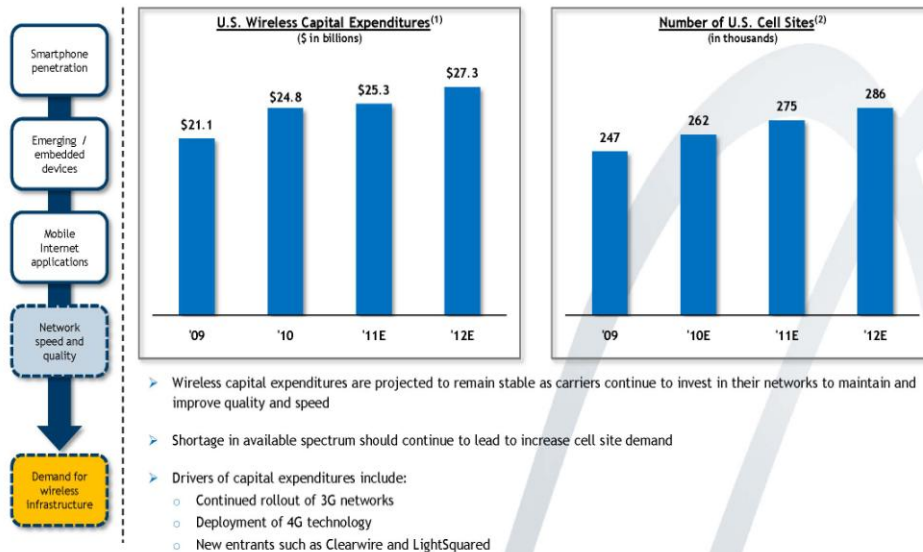
The principal drivers for this portfolio of different types of antenna installations have been variations in traffic density and terrain effects.

One technology that has emerged in this drive toward smaller, more focused antenna sites, is ODAS. ODAS uses a distributed set of small antennas fed by one radio transmitter. This use of a single transmitter sharing multiple antennas is somewhat unique, in that more conventional systems assign a single transmitter to each antenna. Industry estimates are that approximately 10,000 ODAS systems (representing less than 0.1% of the geographic coverage area of macro and microcells) have been deployed in certain select regions in the US.

This illustrates that Outdoor DAS is a small, but emerging segment of the market. However, it is important to note that ODAS is by no means a substitute for traditional cellular network planning and deployments for mobile communications. Nor is ODAS the only technology intended to supplement more traditional macro-site technologies. Indeed, with an installed base of approximately 275,000 macro and micro

cell sites cell antennas throughout the U.S., it is evident that ODAS will never function as a replacement or substitute for macro cell technology in the foreseeable future. Rather, ODAS and other emerging technologies will likely function in conjunction with macro cell sites to provide "in-fill" coverage and capacity in select areas.

## ...Lead to Strong Demand for Wireless Investments



Source: Wall Street Research

(1) Includes AT&T, Clearwire, Leap, Metro PCS, Sprint, T-Mobile, and Verizon

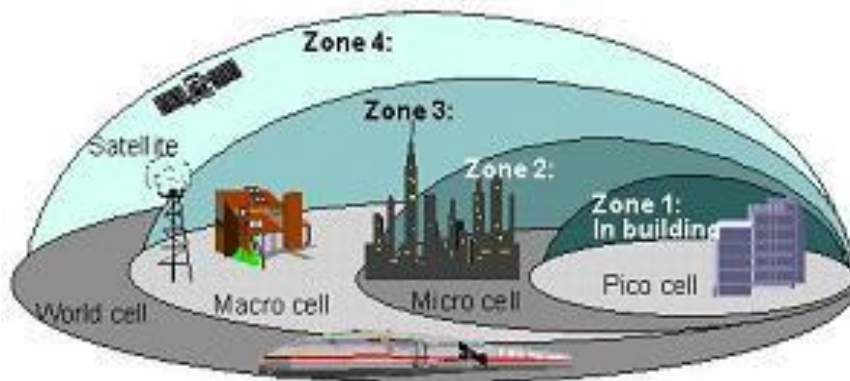
(2) A cell site is a transmitter/receiver location, operated by the wireless service provider, through which radio links are established between the wireless system and the wireless unit; there can be multiple cell sites on a single tower

16



In addition to ODAS, there are a wide range of other emerging technologies such as adaptive antennas, ultra-miniaturized micro- and pico-cellular products, and the use of WiFi networks to complement cellular networks to accommodate the bandwidth requirements of mobile customers. All of these technologies can be, and are currently, utilized by wireless carriers to achieve the same network coverage/capacity improvements that an ODAS system offers.

In order to illustrate graphically the progression of these wireless technologies, below are graphical descriptions of the terms used in this section:



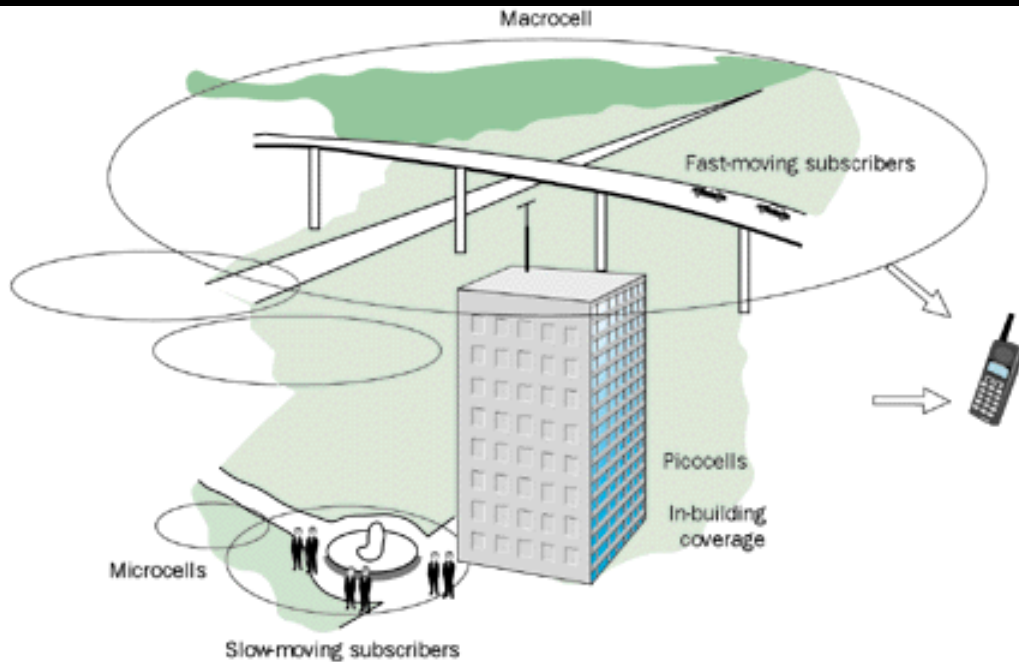
In the cellular standards industry, macrocells are described as locations where the radio base station equipment is connected to antennas on a tower or rooftop or a fixed structure in a single location, with typical cell range (of coverage) of 0.5 to 10 miles.

Most cellular systems have been built with these types of installations. Since wireless operators have limited licensed spectrum, and increasing demands for bandwidth consumption, the number of such macrocells deployed a decade ago has increased by a factor of ten or more. In parallel, the industry has made leaps in terms of technology, to handle higher capacity transmission technologies in the very same spectrum (for example, in the progression from 2G to 3G to 4G mobile systems).

Due to miniaturization of electronics, the industry has also developed Microcells: miniaturized versions of the equipment used to generate radio signals for macrocells, with physical size and shape that do not require a dedicated cell tower or rooftop, and can be deployed on light poles, sides of buildings and even disguised as street furniture, and have a cell coverage range of 0.5 miles down to a few hundred feet.

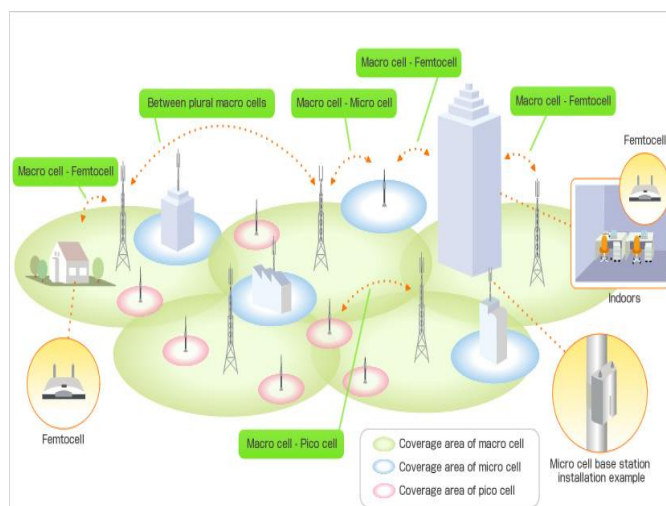
Pico cells have been used for in-building coverage (typically in businesses and factories or large multi-tenant facilities) and are now being used outdoors, as well. Femto cells (including metro femto cells) have been released as products that can be installed in a single home to provide high quality cell coverage indoors.





From a city-wide perspective, combinations of macro, micro and pico cells are used to adapt to the coverage and capacity requirements of wireless customers.

The skill of each network operator is to utilize available antenna sites of all types (such as towers, buildings etc) and combine the range of solutions to provide what is often described as a “hierarchical” cell structure. In a particular geographic area, each network operator will have developed and implemented their own “rf (radio frequency) plan”, based on the number of customers, traffic requirements, and the engineering of traffic and available facilities, based on the wide variety of network infrastructure products (macro, micro, pico and femto) from different manufacturers.



In addition, as shown above, these networks are designed with the ability to hand over a voice call or internet or video communications from one cell to another, so the consumer receives high quality service on their phone, smartphone or other mobile device, whether they are at work, study or play.

## 4. Outdoor Distributed Antenna Systems

Distributed Antenna Systems (DAS) are a complementary tool for providing high quality coverage and capacity in the portfolio of antenna systems for wireless communications service providers. DAS can be deployed indoors or outdoors.

The emerging technology of Outdoor DAS is one of numerous technologies used by network operators to provide wireless services. There are many novel and unique aspects to DAS technology that are captured in this report and their relevance to the question of attachment rights to Utility Poles.

ODAS is just one of multiple solutions that have emerged to improve the coverage and capacity of wireless networks in outdoor locations (i.e. on streets, neighbourhoods, etc.).

A technology called Indoor Distributed Antenna Systems also exists, which provides a unique way of improving the coverage and capacity of wireless networks indoors (in places such as schools, hospitals, shopping centers, etc.). These systems are not the subject of this report, as they do not rely on any outdoor installations, and in particular, have no requirement for attachment rights to Utility Poles, but for completeness, are described later in this report

DAS is the name given to a network of spatially separated antenna nodes connected to a common source of radio frequency signals that provides wireless service within a geographic area or structure.



*(Pictures from Crown Castle)*

ODAS has been proposed as an additional tool for the deployment of cellular antennas which are typically installed on towers, buildings and other structures such as water towers. The DAS acts like a radio tower, with special adaptations to transmit and receive signals in a localized area. Instead of broadcasting radio signals to cover a broad geographic area from antennas mounted on a tower or building rooftop, DAS converts radio signals to light using lasers and carries the signals to remote locations using fiber optic cable. Outdoor DAS systems are often used to fill “holes” in coverage and capacity from macro and micro cells.

These outdoor DAS deployments are typically done in selected geographic areas. In fact, it is difficult to deploy DAS uniformly in most geographic areas as the primary or dominant technology.

One can envision the macro and micro coverage as an “umbrella” coverage, and ODAS and other similar technologies as a “filler” where the capacity and coverage requirements and local terrain mandate a specialized solution.

In an ODAS configuration, equipment at the remote locations converts the light signal back to radio, amplifies it, and transmits it through an antenna system. In marketing terms, this feature is called a “Neutral Host” capability. This is relatively unique, as traditionally, different cellular operators may share the same cell tower, but not the same antennas and electronics and power. The term “neutral host” means the system provides access for all wireless carriers over common equipment. Phones, PDAs, and wireless modems communicate with the underground antennas to complete phone calls and data sessions.

One additional feature of a well-designed DAS solution is that the antennas can transmit not only one frequency band, but potentially support multiple frequency bands. For example, a single DAS system can be fed with signals from several competing mobile communications service providers. This neutral host capability creates an opportunity for the first installer of a DAS system to generate revenue from subsequent wireless operators seeking to use the equipment initially installed by the “first mover”. In the case of a telecom attachment on a utility pole, different operators can deploy fiber on the same pole, since the space and attachment process is well established.



## 5. Other emerging wireless technologies

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In addition to ODAS, where, as described above, a radio frequency signal is used to feed the distributed antenna, and the signal is transmitted over the air at various nodes on the ODAS, there are many other technical solutions which are also emerging.

As wireless operators upgrade from 2G to 3G and 4G networks, the inherent capacity, coverage, traffic handling, types of service and spectral efficiency are already on an accelerated trend. Also, as operators continue to acquire additional radio spectrum (their most precious asset), they continue to invest in their networks and services.

### Advanced Radio Technology

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Two examples of advances in mobile communications systems have various trade names such as Liquid Radio (from Nokia Siemens Networks) and Light Radio (from Alcatel Lucent). These technologies differ from ODAS, but can achieve the same purpose: to fill-in coverage and capacity as a supplement to conventional macro and micro cells.

These innovations are based on the use of software-defined radios (where traditional hardware components are superseded by advanced signal processors, software algorithms and miniaturised electronics). Certain implementations have shrunk the electronics that would have fit, a decade ago, into a coat closet, now to the volume of a small toaster.

These miniaturised devices have the ability to integrate the antennas into the box, so they can be installed as one attachment on buildings, towers and utility poles easily as “plug and play” components of a network that may already have deployed macro cells and micro cells. These products have the advantage of small size and power consumption, so they can be installed on towers, rooftops, water towers, on the sides of buildings of various types of poles, including utility poles, light poles and even “street furniture”.

Because of their size and shape, these products are small and unobtrusive. However, due to their advanced design, they have the coverage and range of a micro cell or even a small macro cell.

### Adaptive Antenna Systems

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In addition, instead of using an antenna with a fixed radiation pattern at a macro cell or microcell, “smart” antenna technologies (also called adaptive antennas) have been deployed commercially. For these, the antenna pattern adapts to the instantaneous traffic conditions by use of advanced digital signal processing and “beam-steering” to deposit radio energy only in the directions required (and doesn’t waste radio energy where there are no users).

The smart antenna technology can be applied to any wireless system, and have shown dramatic improvement in “spectral efficiency” (i.e. the measure of how much bandwidth can be sustained in a particular amount of radio spectrum) and coverage.

## Wi-Fi

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Wi-Fi which is the brand name for an unlicensed 802.11 specification, allows for users to connect to their local area network. Shipments of electronic products with embedded wireless local area networking technology (WLAN) will surpass 1 billion units for the first time ever in 2011 and then rise to more than 2 billion in 2015, according to iSuppli. Wi-Fi has become a very economical approach for network operators to off-load capacity constraints from their networks.

### **MetroPCS may be offloading at least 20% of its traffic to Wi-Fi**

August 26, 2011 — 6:27am ET | By Sue Marek

*An executive at the Wi-Fi connectivity firm iPass said her company's research indicates that MetroPCS may be offloading as much as **20 percent of its cellular traffic onto Wi-Fi networks**. During an interview with FierceWireless, iPass CTO Barbara Nelson said some operators are unwilling to offload traffic to Wi-Fi unless they own the network, while others, such as MetroPCS, are offloading a significant amount of traffic to Wi-Fi now. "Although they are not broadcasting it, we estimate 20 percent of MetroPCS' traffic is offloaded to Wi-Fi," Nelson said. MetroPCS would not confirm the iPass statistic. However spokesman Drew Crowell said the firm is "encouraged by what we are seeing with traffic offloaded to Wi-Fi."*

*In December, MetroPCS announced that its new Android-powered smartphones would automatically link to Wi-Fi hotspots. Specifically, the company said that the Huawei Ascent and LG Optimus M devices would be preloaded with Devicescape and Boingo clients, which can link customers' smartphones to Wi-Fi hotspots without users having to search, log in or instigate the connection.*

## Heterogeneous Networks

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The industry is also moving very rapidly into new areas, such as “heterogeneous networks” where a mobile phone may be on a cellular network, but can seamlessly transition to a low-power WiFi network, to improve battery life and to maximize bandwidth availability

Most major network operators have announced plans to use WiFi technology (with short range, and typically mounted on the sides of buildings or other fixed structures) to “offload” the traffic from the conventional macro cell and micro cell networks.

WiFi technology uses “unlicensed spectrum”, so the barrier to entry for network operators to deploy these heterogeneous networks is lower than having to purchase new radio spectrum. Also, most portable devices (including e-readers and tablet devices and gaming devices) have WiFi connectivity.

In this way, the operator can support a wide variety of services using technologies that would not have been contemplated as part of a cellular network even a few years ago.

WiFi radio products are also very small and can be mounted by way of a single attachment not only on poles and sides of buildings, but even on the cable strand between two utility poles.

One additional existing product used by wireless operators, especially those who already have deployed a cable network in a particular neighborhood, is a technology called Strand Mounted WiFi network. In this case, there is no requirement to do any new attachments to a utility pole, since the wireless equipment is built to mount directly on the cable, away from the utility pole. Below is the product description and photographs of one specific product that was purpose-built for this market.



## Mounting Strand Mount Picocell

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The BelAir100SP Strand Picocell is a compact wireless base station that leverages available broadband infrastructure enabling mobile carriers and cable operators to deliver mobile broadband internet via both licensed and unlicensed wireless spectrum. The BelAir100SP solves the problem of how to mount, power and backhaul small cell base stations. Now, large scale and small cell deployments can cost-effectively address mobile network congestion in areas of high user concentration.

The BelAir100SP is designed to be mounted on existing cable infrastructure, with both power and backhaul provided by the broadband hybrid fiber coax (HFC) plant. Available in a range of mounting options, the BelAir100SP can be deployed from cable plant installed on poles, in cabinets and pedestals and even underground. The modular design of the BelAir100SP currently supports a range of licensed 3G radios, with a migration to LTE, along with dual 802.11n Wi-Fi radios.



Another manufacturer has developed a product with a very small size that can also be mounted in very flexible locations.

The Powerwave Picocell family, which includes an outdoor pico cell, was first introduced in February, 2011. Both models are among the highest capacity pico cells, supporting up to 100 active outdoor users and 32 active indoor users, and up to 1,000 registered users. They support all 4G frequency bands in the 700MHz to 2.7 GHz range and feature a 2x2 MIMO antenna for additional capacity. They also feature an optional concurrent dual-band 2.4GHz and 5.8GHz 802.11a/b/g/n Wi-Fi radio that makes them a single system for all carrier and enterprise wireless needs.

Shown in the pictures below are Powerwave pico cell installations on the side of a building, and on a private light pole in a parking lot.



Summary:

Most cellular operators use combinations of all of these cellular and wireless technologies to provide mobile communications services. As will be described below, ODAS is but one component in the portfolio of tools available to any network operator.

## 6. Indoor DAS: an emerging solution to in-building coverage

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It is important to distinguish outdoor and indoor DAS.

The use of DAS for indoor coverage is attractive and is gaining broad industry acceptance, since it is very difficult to build macro or micro cells inside buildings to provide excellent indoor coverage. It is better engineering practice to illuminate an indoor location with low power distributed antenna systems which can snake through a factory, mall or educational institution.

Indoor DAS is a growth area since some 70 - 80% of mobile traffic originates from inside buildings for the wireless industry, as the mobile carphone has been superseded by the smartphone and personal communications device, where consumers and enterprises expect high quality coverage where people live, work and play.

Implementations of indoor DAS were described as early as 1987 at AT&T Bell Laboratories to provide improved coverage and capacity of wireless signals inside buildings.

These research results showed better coverage than from traditional cellular systems which often lack good coverage inside buildings due to poor penetration of radio signals through walls and windows. In this way, the combination of outdoor cellular networks and indoor DAS provided high quality coverage.

Carriers need to service their subscribers where they are, thus in-building DAS systems are much more important to solving the capacity constraints and have few substitute approaches compared to ODAS.

## 7. The Outdoor DAS Market: a nascent business

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The DAS market is, and will be for the foreseeable future, a complementary technology. There are no precise figures on how large it is.

The Wireless Infrastructure Association, PCIA, is the trade association representing the companies that make up the wireless telecommunications infrastructure industry. Members include the carriers, infrastructure providers and professional services firms that own and manage more than 125,000 telecommunications facilities throughout the world. The PCIA does not keep track of exact figures (in contrast to macro and micro cells, which are tracked accurately by the CTIA industry body) because it is difficult to track the differences between indoor and outdoor DAS systems.

It is currently estimated there are roughly 10,000 ODAS nodes, or site deployments, in the US.

According to Brian Regan of the PCIA, the number of DAS nodes in operation could double to 20,000 by the end of 2012, and estimated a total of 150,000 by 2017. Cumulative capital expenditure for DAS was estimated to reach over \$ 15Bn by 2017.



## 8. Attachment to Utility Poles

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Utility poles require contiguous connections between the generation of power and the distribution of that power via lines to homes, businesses, hospitals, factories, etc. Engineering factors such as weight, safety and maintenance to support a reliable power distribution system has created a well known set of operating and maintenance guidelines.

This same capability (i.e. a network of utility poles to which telecom wire, coaxial cable, or fiber is attached) is also of value to cable and wireline telecom companies who want to also create a contiguous network of connectivity from where they connect to cable video programming, or the Internet, or telephone switches to homes, businesses, public buildings, etc.

The most prevalent is the use of utility poles for telephone and cable TV lines. More recently, they have also been used for very high speed transmission of telephony, internet and video signals over optical fiber.

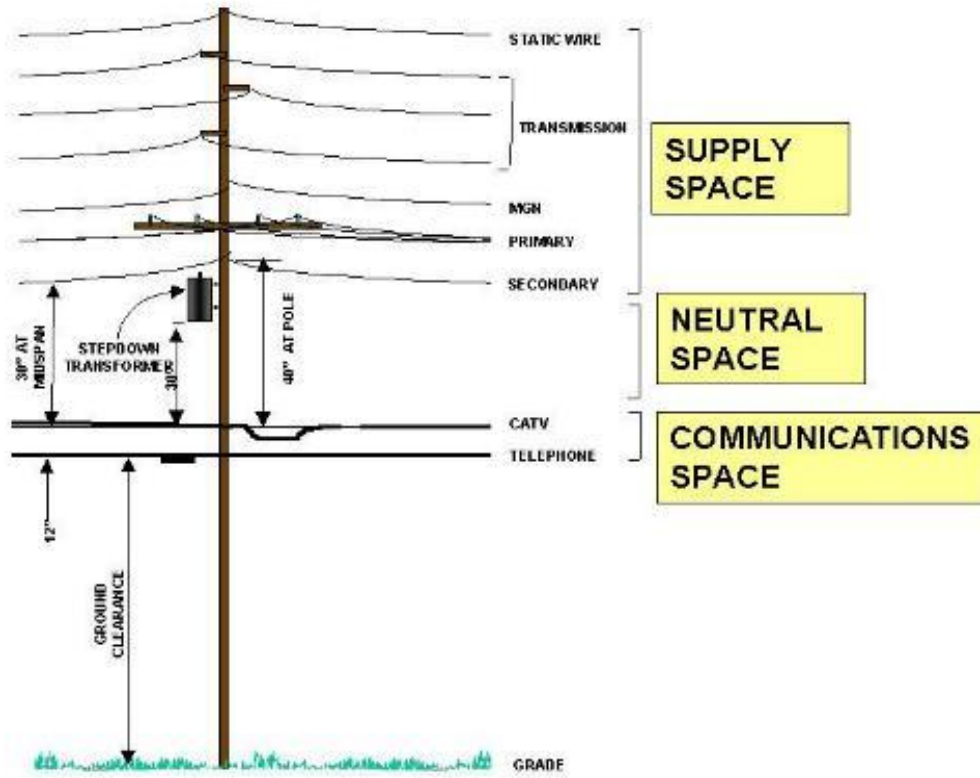
In all of these cases, the size, weight, power requirements and process of installation and maintenance is well understood, and there have been established guidelines on the safe and secure installation of these attachments on the same pole, as illustrated below.

A typical joint pole supports three facilities: electric power, cable television, and wireline telephone. Some joint poles also support all manner of other devices: streetlights, signs, traffic signals, seasonal decorations, fire and police call boxes, antennas, municipal communications systems, OPGW (optical ground wire) fire- and police-alarm signal wiring.

The following definition of Joint Pole is an expanded version of the definition found in Newton's Telecom Dictionary, 18th Edition (New York: CMP Books, 2002, p. 410; reprinted by permission of Harry Newton).

This figure illustrates the typical allocation of space on joint utility poles in the US; the allocation is similar in Canada except that cable television and telephone are sometimes lashed to the same supporting strand. Starting at the top and working down, facilities on the pole are allocated into three spaces: Supply Space, Safety Zone Space, and Communications Space.

The Communications Space contains telephone, cable television (CATV), and other communications cables. Communications cables are insulated; however they may be enclosed in metal shields. For safety reasons, all exposed metallic surfaces must be bonded to each other and to the MGN.



Typical communications cables include:

- Telephone: telephone cables supported by steel strand. Each telephone cable contains several individual copper wire pairs; a large cable may contain as many as several hundred pairs. The strand is placed under tension to prevent excessive sag; typical strand tension is a few hundred pounds, although a strand supporting a large multipart cable may be tensioned as high as 1000 pounds.
- Cable TV: CATV coaxial cable and equipment supported by steel strand. An expansion loop at each pole absorbs expansion and contraction caused by temperature variations. The strand is placed under tension to prevent excessive sag; the typical strand tension is a few hundred pounds.
- Other: just about any other type of communications circuits. Among the more common are fire- and police-alarm wiring, traffic-signal control wiring, and closed-circuit audio or video communications circuits. Depending on purpose and age, these circuits may utilize open-wire conductors, twisted-pair cables (similar to telephone networks), coaxial cables (similar to CATV networks), or fiber optic cables.

Moreover, since telecom and cable attachment rights only require safe and secure attachment to the existing poles (i.e. no further engineering or design effort, which as will be shown below differs for wireless attachments) the development of Joint Utility Poles is well established (both in terms of business processes and charging rates) for wireline networks, and there is a space allocated called "communication space" on utility poles for that specific purpose. Even though ODAS is also a communications technology, it does not have the same requirements for attachment of coaxial cable, copper wire or optical fiber.

## 9. Outdoor DAS: different from other Utility Pole attachments

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Unlike conventional wireless systems, ODAS is a network of spatially separated antenna sites called “nodes” connected to a common source that provides wireless service within a geographic area or structure. The DAS antennae are typically mounted 20-40 feet above the ground

The idea is to split the transmitted radio frequency signal from a single central hub site among several of these distributed antenna sites, separated in the neighborhood space so as to provide coverage over the desired coverage area instead of using a single antenna at the same location as the central hub site. Thus, a single antenna radiates at high power. The concept is similar to wiring a house with loudspeakers for each room rather than having a single stereo system in one room.

Before exploring utility pole usage, it is useful to define the physical components of ODAS, and which of these are the subject of attachment rights (i.e. devices that would have to be attached to a utility pole or other structure to make ODAS operational):

- a host base station with a wireline connection to the distributed antenna system
- distribution poles upon which DAS equipment can be installed
- a fiber optic network (typically an existing system) to carry the signals from the base station to the antennas
- shared antennas and control boxes
- neutral host for different wireless service providers
- lightning protection box
- connection to a power supply
- battery-powered back-up supply in the event of a distribution line loss of service

In a filing with the US FCC, dated August 2010, the Coalition of Concerned Utilities laid out a number of concerns regarding the use of ODAS and utility pole attachment. This filing focused on the various practical issues that a utility company must manage to allow ODAS on utility poles. Below, this report summarized the issues and quotes the specific text (in *italics*) to illustrate that ODAS attachments are fundamentally different from conventional attachments on utility poles.

### Wireless Attachments and Safety:

*Wireless attachments in general are more complicated and technical, raising numerous additional operational and safety concerns than those associated with wire attachments. Unlike standard wireline attachments, wireless antennas come in all shapes, sizes, power levels and RF emissions, depending on a carrier's needs at a particular location. Wireless devices emit radio frequency energy that is subject to maximum permitted exposure regulations for workers and the public.*

### Wireless Antennas and Equipment:

*Wireless antennas also require the installation of a variety of accessory equipment on poles, such as cabinets, electric distribution panels, work receptacles, electric meters, work lights and wires running the entire length of the pole to connect the cabinet to the antenna.*

### Wireless Antennas and Space:

*Wireless antennas themselves take up much more space than standard wireline attachments. Plus, while the communications space on poles is often similar from one pole to the next, many wireless companies wish to attach to pole tops, in the area designated for electric facilities known as the electric supply space.*

Wireless has other alternatives:

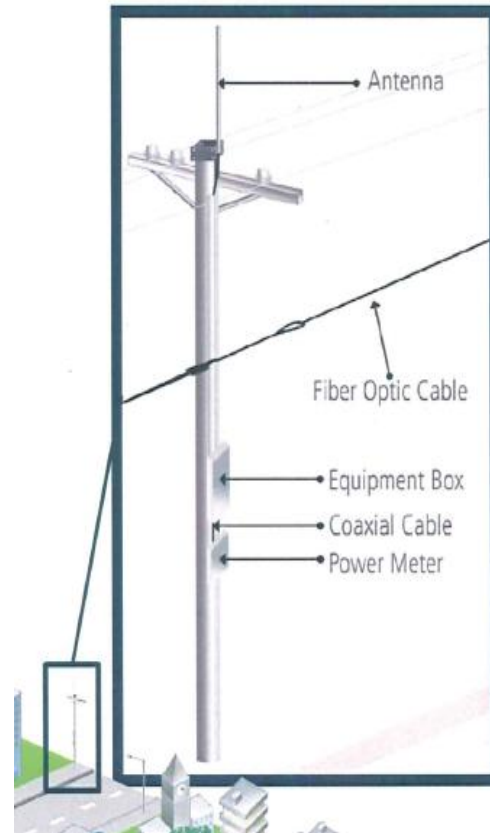
*The PSC recognized, for example, that unlike wireline attachers, wireless companies need not rely solely on utility poles to reach their customers:*

*Unlike telephone, cable and power facilities, which may only be attached to utility poles, wireless attachers have other options for attaching their facilities, such as buildings, existing towers, and newly constructed towers.*

Wireless and Additional Safety Concerns:

*The New York PSC also recognized that wireless attachments raise additional safety concerns:*

*Since wireless attachments usually involve placing facilities above the power area of the pole, special attention must be given to safety because such facilities could fall over onto power lines in high wind conditions or in heavy wet snow conditions resulting in power outages. While National Grid allows wireless attachments, it has comprehensive safety standards and requirements for such attachments and reserves the right to refuse to put wireless attachments on its poles or increase the height of poles to accommodate wireless attachments*



Wireless requires more careful analysis:

*Installing wireless antennas on pole tops above energized electric facilities raises a host of safety, reliability and engineering concerns and requires much more careful analysis than placing wireline attachments in the designated communications space. Pole top attachments require workers to pass through and work above energized lines. During installation and afterward, the antennas and other equipment could fall onto energized electric facilities.*

Distributed Antennas and environmental concerns:

*Distributed antenna companies sometimes find themselves delayed in obtaining permits to use municipal rights-of-way because they seek to place their not-so-attractive antennas with unknown radiofrequency emissions in close proximity to residences and the general public. Such routine municipal reviews and permitting processes render any imposed utility make-ready*



*schedules meaningless in the context of wireless attachments.*

Wireless installations are non-standard:

*Wireless antenna installations are anything but standard and must be assessed on a case by-case basis. Utility pole owners in general do not yet have enough experience with wireless attachments to satisfy their own questions as to safety, reliability and overall impact on the electric distribution system.*

The consistent theme that emerges from this filing is that wireless attachments are different from wireline telecom attachments in the areas of safety, equipment, space and environmental concerns. The Coalition's filing also highlighted that wireless systems have alternatives to attachment to utility poles, and that they tend to be non-standard and require more analysis, compared to conventional attachments.

#### **Practical Examples of Outdoor DAS Deployments.**

The figure above shows a typical attachment for ODAS on a utility pole. The amount of space required is significantly more than merely attaching a CATV or Telco Strand of wire. Specifically, these illustrations show an antenna structure and an equipment box containing wireless equipment which is specific to an Outdoor DAS installation, and quite unlike the conventional facilities that are attached to Utility Poles.

## 10. Practical Considerations and Concerns for the Attachment of Outdoor DAS on Utility Poles

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These descriptions show that an outdoor DAS is a nascent technology for deployment on utility poles. Thus, there are several practical considerations that such a new technology poses. These considerations demonstrate that using legacy methods for engineering, space allocation, cost and price of attachment cannot be arbitrarily applied to a novel solution.

- a) Do the rules and guidelines for attachment (location on the “Spaces” on a utility pole, power requirements for the equipment, location of an antenna on the pole, different requirements for maintenance of active electronics versus a piece of cable or optical fiber etc.) apply to a device containing active electronics, power and antennas, rather than other communications attachments such as telephone lines, fiber or cable?
- b) Should the pricing of attachment rights be the same as that of other legacy technologies (the pricing method for current attachments is well established, as opposed to the methodology to be used for a solution that has yet to be widely deployed, and its associated costs to the utility are unknown)?
- c) What are the implications of giving attachment rights to one entity, and if that right either restricts or prevents other entities from gaining similar rights, what are the implications for access to the DAS systems for a future wireless communications provider who wants to use DAS as one of the various technologies (macro cells, micro cells, indoor DAS, ODAS and pico cells) to provide capacity and coverage for high speed Internet or video services?
- d) What other new services may be deployed on utility poles, and what demands may be made on these services: for example, public safety (i.e. emergency alert and first-responder communications services), or the increasing pressure from regulators as a result of natural and man-made disasters for continuity of communications in a disaster scenario?
- e) What other new services may be deployed on utility poles: for example, with the increasing focus on smartgrid technologies for meter reading, management of power distribution and generation, and integration of home security into the smartgrid networks, what are the implications on space and engineering requirements for utility poles for these solutions?
- f) What is the competitive implication of the “Neutral Host” capability of a DAS system, which may give a “first-mover” advantage to the DAS operator, to the exclusion of other competitive solutions, and in particular how should that be factored into the pricing model for attachment to a utility pole?

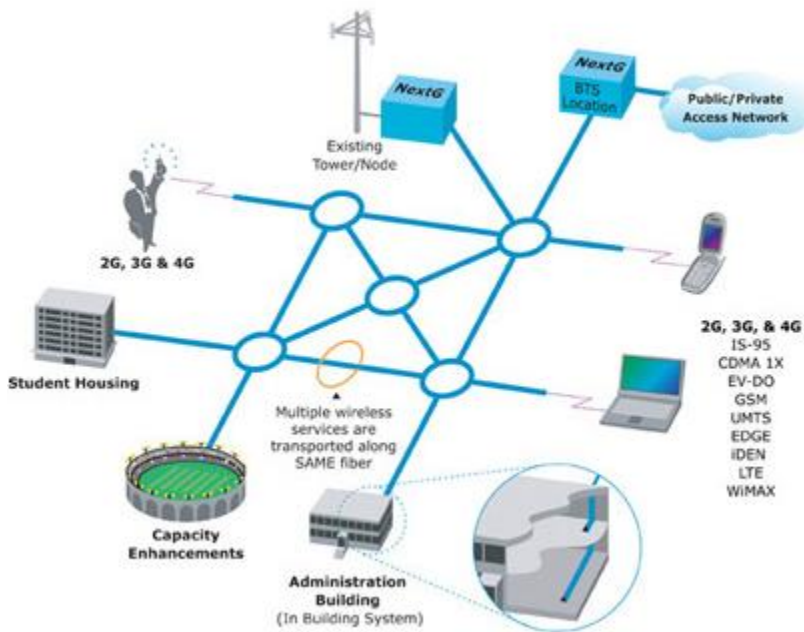


## 11. Outdoor DAS Case Study: San Diego State University

In this section we describe the outdoor DAS network that has been put in place at San Diego State University. ODAS transmits a wireless signal the same way as an in-building system. The DAS includes nodes that are strategically placed on existing utility poles, street lights, traffic signals and other structures every half mile within the coverage area.

The nodes connect to a hub via fiber optic cable. The hub contains American Tower's head-end equipment and the service provider's Base Transceiver Station (BTS)."

NextG Networks' DAS-Network solution was chosen to provide improved cellular coverage and capacity for San Diego State University. Instead of using additional cell towers, NextG is using unobtrusive equipment using DAS to meet the needs of the University and cellular carriers. NextG strategically places small, low power antennas on approved buildings and lampposts in such a manner as to make them virtually unnoticeable.



## 12. Outdoor DAS Case Study: Use of purpose-built Cactus structures

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DAS systems have been deployed in many different locations . Wireless network deployment companies have used their imagination and been sensitive to environmental and aesthetic considerations.

One illustration is the case of Paradise Valley, Arizona, where ODAS was approved for installation and the vast majority of the DAS equipment was deployed on purpose-built structures, which were disguised as cactus for aesthetic reasons. This is one of several installations where a commercial deployment found a way to deploy DAS without the use of utility pole attachments.





### 13. Outdoor DAS Case Study: Use of structures other than Utility Pole Attachments

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LCC builds and assists its clients in building wireless infrastructure around the world, including ODAS, and has direct experience with designing wireless equipment to be attached to numerous and varied locations other than utility poles. Below we have included some pictorial representations of these other alternatives with which we are familiar. Simply put, while utility poles may be one potential avenue for deployment of these types of systems (including ODAS), they are not essential to a successful deployment.

Buildings, in many circumstances, represent an ideal attachment location given quick access to power and adequate space for the placement of supporting hardware. Further, buildings of any size in metropolitan areas are often pre-lit with fiber optic cables which can provide necessary backhaul services. Even when fiber isn't available, many newer technologies can rely upon a more standardized broadband connection for that purpose. The picture to the left below represents the installation of an ADC Systems wireless antenna and supporting equipment on the side of a commercial building. The picture to the right represents similar equipment attached to the structure of a sports stadium.





In some circumstances, no building is even required. ADC, the same manufacturer represented in the picture above, produces a terrestrial antenna that can be placed at ground level in some circumstances. That technology is demonstrated in the following picture:



Stand alone structures such as sole purpose poles and other street furniture are also used regularly to place (and often "hide") necessary antenna and radio equipment. The pictures below are taken from Extenet's own website related to its deployment of ODAS in Las Vegas, Nevada.





#### **14. Alternative Antenna Site Deployments:**

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The number of alternative site locations is constrained only by the creativity of the designer and the willingness of the market to allow for wireless attachments. Below we identify numerous antenna locations that rely neither on buildings, utility poles or street furniture, but instead, use existing or replacement commercial signage:





Likewise, it is important to note that buildings provide numerous ways to hide wireless antenna equipment that could never be accomplished via attachments on utility poles. For example, see the antenna attachments in the pictures which follow that have been effectively hidden by creative architecture:







Flagpole acts as antenna location



Fake tree in center acts as location for antennas



*Photo above: Sequoyah Community Church, with four cell-phone antenna panels*

A number of churches have opted to host cell antennas. Churches often provide some distance from concerned neighbors. They have high roofs, crosses or bell towers where antennas can be hidden inside on an upper facade.

Communities that staunchly oppose the development of cellular communication sites often petition their zoning board of appeal to force carriers to propose and build cellphone towers that blend into their surroundings or are virtually undetectable. Carriers could save a lot of money on zoning legal expenses by proposing camouflage cellular sites. Concealed cell towers when deployed and integrated properly blend in with their surroundings and are often difficult or impossible to detect. The photo to the right provides a great example of a camouflaged cell site.



The photo to the right is a great application of a cellular antenna concealment on a typical building that can usually be found on a Municipal Building, Library, or Courthouse. The cellular antennas are concealed within the cupola facade, and are completely undetectable. The use of an existing high-elevation structure reduces the need to build an additional tower in the coverage area. When cellular antennas are deployed on municipal property, the revenue generated can provide decades of revenue for community initiatives.

Municipalities who require the use of disguised cell towers by the carriers in return for a streamlined zoning review process can ultimately save huge costs involved with fighting carriers in the courts and prevent wireless sprawl in their communities, allowing for proper wireless expansion.



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There is no way to know that this church steeple is a cellphone antenna location. As more cellular sites will be constructed throughout the US, municipalities that have created wireless ordinances favoring the use of concealed antenna cellular technology can prevent the obstruction of their view-sheds with a camouflage cell tower solution such as this cellular steeple replacement.

Cost of construction is paid by the carrier, not the property owner. Carriers can justify the expense of a customized concealed antenna deployment by the time and money saved in zoning and fighting the municipality in court.



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A hidden cell tower such as this disguised church bell tower are a win/win solution for any community concerned with the aesthetics of having a traditional cell tower built in or near their community. The problem that many municipalities have is that their municipal cell tower ordinances are non-specific, non-existent or poorly written.

Towns and cities that embrace wireless technologies and are willing to work with the cellular carriers instead of constantly fighting them will find that the carriers are willing to incur the additional cost of concealing a cellular tower.



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Images courtesy of **STEALTH® Concealment Solutions, Inc.**, a leading designer and fabricator of Cellular Antenna Concealment Systems custom engineered for Municipal and Church Wireless Communication Sites.

See also:

<http://weburbanist.com/2010/03/26/faux-ny-towers-cleverly-concealed-cellular-sites/?ref=search>

## 15. Conclusion

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At the core of this report is the difference between wireline attachments and wireless attachments to “Joint Utility Poles” i.e. poles that are installed by a utility, but attachment rights are also offered to other entities (i.e. telecom and cable companies). This report has shown not only that there are fundamental differences, but also that there are numerous alternatives for the deployment of ODAS systems, illustrated by practical examples, than the use of attachment rights to utility poles.

As is evidenced from the examples detailed throughout this report, DAS is only one of many technology alternatives to alleviate the increase in consumer demand for mobile data. As the wireless industry matures with more sophisticated roaming support for carriers, the need for ODAS as it exists today, becomes less important. Joe Madden, principal analyst at Mobile Experts L.L.C., said, “Without a doubt outdoor DAS solutions are more expensive to deploy than a traditional rollout.” If a carrier is looking at option A as a DAS deployment or option B as something akin to a remote antenna or traditional cell site, option A will cost more.

In summary, we demonstrate that:

1. ODAS is but one of many technologies that is (and will) be used by wireless providers as they add capacity to existing networks.
2. It is highly unlikely that ODAS will evolve as a substitute to traditional transmission engineering found today in the form of macro and multiple micro-site technologies. Instead, ODAS and multiple other technologies (e.g., Wi-Fi, pico-, femto-) will be used to “fill in” in areas of high demand and/or unique terrain characteristics.
3. Wireless providers and network builders have multiple attachment alternatives when designing wireless networks, including those relying primarily upon ODAS. Manufacturers are aware of, and build to, the need for substantial flexibility in placing today's wireless hardware. Buildings, street furniture, stand-alone poles and other aesthetically designed apparatus exist, and are currently in use, to support ODAS and other wireless hardware.
4. It is not essential that utility poles be available as attachment options in the design and construction of wireless networks, including those that rely upon ODAS.

## 16. About the Authors

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**DR. NITIN J. SHAH**

7791 Orion Place, Cupertino, CA 95014 USA +1-408-859-4392 nitinjshah@ymail.com

### **Executive Summary**

Leadership roles in product management, business development, marketing and technology innovation. Recognized for skills in strategic planning, technology & product roadmaps: analysis of ecosystems, competitive threats and economics. Experience in start-ups, multi-national corporations and strategic consulting. Track record of innovation and commercialization of communications and software products.

- Successful management of business and technical organizations, with versatility and resilience to learn, adapt and react in a dynamic environment while focused on defined goals.
- Record of anticipating market and technology trends and threats, and reacting with innovations and building personal and organizational competence to meet customer requirements.
- Record of taking concepts through all phases of market requirements to prototype to commercial introduction including partnerships and customer contracts in mobile and digital advertising.
- Strong focus on learning about industry and ecosystems to perform risk assessment, identification of gaps, making resource allocations to ensure efficient and realistic product and project delivery.
- Clear and articulate in both business and technology communications which was instrumental in closing executive-level contracts with major service providers.

Product Management - Business Development - Strategic Planning  
Product and Technology Roadmaps - Consumer Privacy - Intellectual Property  
Broadband Wireless – Digital Advertising – Mobile Advertising

### **Significant Accomplishments**

- Innovative privacy-compliant platform to deliver hyper-local targeting and audience intelligence and metrics to ad networks and publishers, and new online ad revenues to service providers: attracted word-class advisors and commercial partners (Cisco and Juniper, ISPs and advertisers).
- Career record of critical decisions in the mobile products and services industry to improve competitiveness, cost and performance, using market requirements, product management, strategic planning, technical analyses and triage on priorities.

### **Professional Experience**

#### **Broadband Mobile Wireless Innovations**

**2004 to 2007 and 2010 to present**

*Solo consulting and decision services to executives responsible for strategy in major service providers and vendors with a target of \$ Bn+ new revenues in business opportunities*

#### **Founder:**

- Identified suitable partner with network & spectrum for a mobile operator's entry into North America, analyzed service and network economics and led RFQ for network deployment.
- Developed network, value-added service and product roadmap for spectrum holders in US and Europe: comparative analysis of WiFi, WiMAX, 3G, LTE for video and advertising.

- Delivered revenue risk/opportunity analysis of licensed and unlicensed spectrum and accurate cost estimate of upcoming 700 MHz spectrum auctions for a broadband service provider.

**Feeva Technology, Inc.****2007 to 2010**

*Software start-up with a privacy-compliant platform for hyper-local targeted advertising, generating new revenues from existing assets for mobile and broadband service providers.*

**Founder and CEO:**

Invited to become co-founder by original founders and angel to lead and grow the start-up company.

- Closed investment of \$ 10M, built the organization (from 3 to 20+ people), and attracted three world-class Strategic Advisors in the area of telecoms, privacy and advertising.
- Developed the architecture and IP (20+ patent applications), revenues of over \$ 2M, won support of major ISPs in US and Europe, contracts with leading ad networks and exchanges.
- Led strategy, product management and business development resulting in partnerships with Cisco Systems, Juniper Networks and Microsoft, and acceptance by privacy bodies (FTC), and development of a cloud-based platform for real-time metrics and targeting.

**RHK, Inc.****2003 to 2004**

*Leading strategy and technology consulting, and telecommunications market research firm.*

**Group Head, Wireless Advisory Services:**

Recruited by executive founder to jump-start a new wireless consulting and market research practice.

- Consulted on wireless strategy, risks, opportunities, spectrum for WiFi, WiMAX, and 3G.
- Clients included US, Asian and European telecoms carriers, network infrastructure, technology and IC manufacturers, content and applications providers, and financial investors.
- Market analysis of wireless alternatives (WiFi, 3G, LTE, WiMAX etc) for major network operators

**ArrayComm, Inc.****2000 to 2003**

*Industry leader in “smart antenna” technology for wireless networks.*

**Chief Strategy Officer and General Manager:**

Recruited from Bell Labs by the founders to establish a new division for iBURST: industry's first commercial all-IP mobile broadband system manufactured by Kyocera for emerging markets.

- Led product management, marketing, partnerships (Sony, Kyocera, and Mitsubishi) and IP portfolio (from 12 to over 100 patents) and standardization in IEEE 802.20/ATIS.
- Purchased nationwide 1.9 GHz 3G spectrum and founded Personal Broadband Australia a wholesale broadband wireless network with Vodafone and Ozemail, and led a similar business partnership for nationwide licensed spectrum from FCC Auction 46 in the US.

**Bell Labs/Lucent Technologies****1990 to 2000**

*Leading manufacturer of network infrastructure for 2G, 3G and 4G mobile networks.*

**Vice President, Wireless Internet:**

Held progressive leadership roles from Supervisor to Director of Wireless Core Technology to Vice President of Wireless Data Networking and Chief Wireless Architect in the Office of the CTO.

- Responsible for strategy, technology and product roadmaps, R&D and product team of over 350 staff in six global locations and budget of \$ 35M, generating over 360 patents in 6 years.
- Managed portfolio of technology development in software architecture, digital speech coding, software radio, CDMA baseband IC, GSM base station, 3G core and radio access standards.
- Resulted in cost reduction and performance enhancement and were the launch-pad for the first 3G networks, an open applications platform for mobile Internet.
- Deployed in-building and distributed antenna systems and fiber-connected base stations
- Sponsored for an Executive MBA Program, Leadership Continuity Program, promoted as one of the youngest Vice Presidents at Lucent Technologies to lead mobile Internet initiatives.

### **Prior experience**

Quantum-engineering of compound semiconductors for US Air Force, US Army and DARPA funded R&D (Program budgets over \$ 20M): as lead scientist and program manager, achieved the goal of building the fastest transistors and optoelectronic switches in the world.

### **Education**

University of Pittsburgh Executive MBA Joseph M. Katz Graduate School of Business (incomplete)  
University of Cambridge PhD, Microelectronics and Physics  
University of Cambridge BA, MA, Natural Sciences: Materials Science, Physics, and Mathematics

### **Industry**

Named Wireless Week's Top 50 Newsmakers (2000)  
Served as one of the 30 industry experts on the FCC's Technological Advisory Council (2001 to 2003)  
Featured as "The Thinker" in Wireless Review (2004)

### **Products and Platforms**

Bell Labs/Lucent Technologies:

Wireless Data Server (software platform for mobile Internet services) for US carrier trials.  
WaveAccess/XWD (fixed broadband wireless for Internet access) first deployed in Argentina.  
PlanR (distributed objected-oriented software platform for mobility management and IP services).  
CDMA network trials with Cox, Sprint PCS and KDDI (first CDMA trials).  
W-CDMA network product and trials with NTT DoCoMo (first 3G RAN and core networks).  
GSM BTS ("cube"), fiber microcell, CDMA algorithms and baseband IC, EVRC speech coder.

### **Press and Media**

Feeva:

Partnerships with Cisco Systems, Juniper Networks and Microsoft.  
Marketing video <http://www.youtube.com/watch?v=IPXCNE5QBE>.  
Microsoft BizSpark *One* Start-up of the Day interview; AdExchanger interview.

RHK:

Analysis on broadband wireless in leading news, financial & trade publications.

ArrayComm:

iBURST product, Personal Broadband services and DEMOgod Award.  
Partnerships with Sony, Vodafone Australia, Kyocera, Hanaro, LGE, TSMC.  
FCC Auction 46 nationwide spectrum license.

Bell Labs:

Responsible for the Global Wireless Conference series for Bell Labs/Lucent's customers.  
Mobile Communications and Mobile Data Services in the Bell Labs Technical Journal.  
Over 100 publications and presentations in technical and trade journals and conferences.

### **Patents**

Twelve issued patents and over ten patent applications in process. Most recent issued patents: "Directed Media Based On User Preferences" for digital media and audience intelligence (2009) and "Method and apparatus for disabling the RF functionality of a multi-function wireless communication device while maintaining local functionality" (2007)

**E.J. von Schaumburg**  
**4800 Westfields Blvd**  
**Chantilly Va**

### **Professional Experience**

#### ***LCC International***

***2011- Present***

##### ***Vice President, Enterprise Mobility Solutions***

Responsible for leading the Enterprise Mobility Solutions Business Unit. Enterprise Mobility Solutions provides operators and enterprise clients solutions to address the skyrocketing mobile data demands. Services include the design and deployment of Distributed Antenna Systems (DAS); data off-loading and mobility services using both licensed radio (Cellular) and unlicensed (Wi-Fi) technologies. In addition, LCC's Land Mobile Radio Group provides in depth engineering, network, and project management services to support Public Safety and Land Mobile Radio (LMR) solutions.

#### ***Edgecon Consulting***

***2010 - 2011***

##### ***Managing Partner***

Business Development support several clients with respect to Wireless In-Building technologies – Wi-Fi, DAS and LMR. business development strategy as it relates to the wireless and telecom industries. Led team to prepare and submit, and subsequent award of \$17M NTIA BTOP grant for client.

#### ***Feeva Technology, Inc.***

***2008 – 2010***

##### ***Vice President, Strategic Alliances and Partnerships***

Feeva Technology specializes in cutting-edge online advertising solutions for marketers and publishers. Feeva has created a patented software platform to allow advertisers to more accurately target online audiences based geo-demographics.

- Defined, negotiated and closed deals with business partners essential to Feeva's ecosystem
  - Service providers (Fixed and Mobile/domestic and international)
  - Media companies
  - Network Equipment Vendors
  - Data providers.
- Led Sales partnership program with Network Equipment Vendors
- Created, and executed the Go-to- Market Strategy for Feeva Inc.
- "Evangelize" Feeva solution across industry segments with Senior Level Executives.
- Responsible for driving ad strategy/execution and all publisher/agency/ad network relationships
- Acquired strong knowledge of interworkings of the digital marketing (display) industry
- Member of IAB Sales Executive Council



***Integral Wireless Solutions, Inc. Charlotte, NC***  
***Executive Vice President Business Development***

**2004 – 2008**

IWS provided system integration, design, and commissioning of wireless applications and networks.

- Negotiated master service partnership agreements with Motorola, Verizon, AT&T, Cincinnati Bell and Avaya
- Subject matter expert in Wireless technologies including Wi-Fi, WiMAX, In-Door & Outdoor DAS systems, Public Safety, and Mobile applications
- Created and Delivered New Service Offerings
  - Mobile Applications, Location Tracking, In-Building System Design
- Responsible for Investor Relations including the preparation and presentation of road show materials and the Company's private placement memorandum for prospective investors
- Direct report to CEO

***WPCS International, Inc Denville, NJ***  
***President, InvisiNet Subsidiary***

**2002–2004**

***Executive Vice President Business Development & Investor Relations***

WPCS International Incorporated provides design-build engineering services for specialty communication systems and wireless infrastructure. This included site design, structured cabling, product integration, network security, technical support, product integration and project management. The company has a diverse customer base that includes corporations, government entities and educational institutions. WPCS was created through a "roll-up" acquisition strategy in which InvisiNet was the first company acquired.

- Led the InvisiNet subsidiary, which included full P&L responsibility
- Merger and Acquisitions experience
  - Responsible for strategic direction and identification of acquisition candidates
  - Led due diligence efforts on numerous M&A targets
  - Led the deployment of hundreds of wireless network deployments for enterprise and government customers. Outdoor DAS, Wi-Fi

***InvisiNet, Inc. Morristown, NJ (acquired by WPCS, Int'l)***  
***Founder/ CEO***

**2000–2002**

InvisiNet Inc. was a project engineering company that focused on the implementation of Wi-Fi networks and fixed wireless deployment. InvisiNet provided a wide range of wireless communications services including project management, site design, product integration, infrastructure deployment, wireless network security and technical support.

- Created Business Plan, Secured angel financing to create InvisiNet
- Developed vision and go-to market strategy
- Hired key executives to management team
- Recalibrated the company's market penetration post 9/11.
  - opened new markets, including homeland security/public safety

- Negotiated and completed the sale of the Company to WPCS
- Return on investment was over 300% in 2 years

**AT&T / Lucent Technologies Whippany, NJ**  
**Director WaveLAN (Wireless LAN) Business Unit**  
**North America**

**1989–2000**

**Parsippany, NJ**

- Grew revenue from \$16M to over \$120M in 5 years
- Complete P&L responsibility for business unit
- Manage all aspects for Wireless LAN business unit
- Managed team of 35
- Created indirect channel program including recruiting, training and supporting of over 250 Value-Add Resellers
- Negotiated key distribution agreements
- Negotiated all major sales contract
- Provided strategic direction for product development
- Represented Lucent on WECA committee to name “Wi-Fi™”

**CFO, Wireless Communications Division      Utrecht, The Netherlands      1994–1996**

- CFO responsibility for wholly own International subsidiary
- Implemented proper internal controls and financial discipline
- Managed all reporting and forecasting for Wireless LAN business unit
- Managed team of 15 Dutch nationals
- Supported Negotiations for all major sales and supplier contracts worldwide

Various positions within AT&T’s CFO and Product Management organizations.

### **Education**

St. Bonaventure University, Olean, NY - BA, Finance, 1989

Fairleigh Dickinson University, Madison, NJ - MBA, Finance, 1992



TAB 11



65 of 87 DOCUMENTS

Proceeding on Motion of the Commission Concerning Wireless Facility Attachments to  
Utility Distribution Poles

CASE 07-M-0741

New York Public Service Commission

2007 N.Y. PUC LEXIS 235

June 27, 2007, Issued and Effective

**DISPOSITION:** [\*1] ORDER INSTITUTING PROCEEDING

**PANEL:** COMMISSIONERS PRESENT: Patricia L. Acampora, Chairwoman; Maureen F. Harris; Robert E. Curry, Jr.; Cheryl A. Buley

**OPINION:** At a session of the Public Service Commission held in the City of Albany on June 20, 2007

BY THE COMMISSION:

#### BACKGROUND

On August 6, 2004, an Order and Policy Statement n1 governing wire attachments to utility poles was issued. On February 12, 2007, Omnipoint Communications Inc. d/b/a T-Mobile USA (T-Mobile) petitioned to apply the August 6, 2004 pole attachment Order, Policy Statement, and rates under PSL § 119-a to wireless attachments.

n1 Case 03-M-0432, Proceeding on Motion of the Commission Concerning Certain Pole Attachment Issues, Order Adopting Policy Statement on Pole Attachments, (issued August 6, 2004).

#### THE PETITION

In its petition, T-Mobile requests that our wire pole attachment policies and rates under PSL § 119-a be applied to wireless attachments. T-Mobile notes that [\*2] we approved a joint proposal n2 by Niagara Mohawk Power Corporation d/b/a National Grid (National Grid) and its affiliate, National Grid Communications (Grid Com), for wireless attachments to National Grid's distribution poles and the attachment rates proposed by the companies. We also clarified that National Grid's wireless attachment rates applied to attachments by Commercial Mobile Radio Service (CMRS) providers as well as competitive local exchange companies (CLECs).

n2 Case 03-E-1578, Joint Petition of Niagara Mohawk Power Corporation and National Grid Communications Inc. for Approval of a Pole Attachment Rate for Certain Wireless Attachments to Niagara Mohawk's Distribution Poles, Order Approving Petition with Modifications (issued April 7, 2004).

T-Mobile argues that application of our wire pole attachment rates and policies to wireless attachments is required by law because the language of PSL § 119-a is "attachments," not "wire attachments." It continues that [\*3] attachments to utility poles are often the only option available for extending service coverage because permission to build towers is difficult to obtain from local governments. T-Mobile asserts that our action is needed because many pole owners treat wireless attachments differently from wire attachments. T-Mobile asks for an order:

1. stating that pole attachment policies, time frames, and procedures in the Commission's August 2004 Order and rates under PSL § 119-a shall apply to wireless attachments;
2. clarifying that pole owners must provide wireless carriers with reasonable attachment agreements;
3. stating that our finding in Case 03-E-1578, that Grid Com's proposed pole top mounted antennas do not compromise pole safety, creates a presumption in New York that pole top-mounted antennas are allowed;
4. clarifying that pole owners must provide pole change outs and other alterations to accommodate wireless attachments as required of National Grid in Case 06-E-0082.

#### COMMENTS

A Notice of Proposed Rulemaking, pursuant to the State Administrative Procedures Act (SAPA), seeking comments on T-Mobile's petition was published on [\*4] December 27, 2006. Comments were filed by: Sprint Spectrum, L.P. and Nextel of New York, Inc., jointly (Sprint Nextel) and AT&T. Joint comments were filed by: Central Hudson Gas & Electric Corporation, Consolidated Edison Company of New York, Inc., Frontier Communications, New York State Electric & Gas Corporation, National Grid, Orange & Rockland Utilities, Inc., Rochester Gas and Electric Corporation, Verizon New York, Inc. and The New York State Telecommunications Association, (Pole Owners). T-Mobile also filed comments in response to the SAPA.

AT&T supports T-Mobile's petition and the elimination of barriers and cost impediments to wireless deployment on utility poles.

Sprint Nextel also supports the petition, asserting that we should encourage collocation of wireless attachments on existing utility poles, which is beneficial to customers, carriers and local residents in hard-to-serve areas. It continues that in some residential neighborhoods and in areas with special-use restrictions, utility poles are the only viable option for attachments. Sprint Nextel argues that local governments often require cellular companies to blend antennas and facilities into existing facilities and [\*5] that utility poles satisfy this requirement. Sprint Nextel argues that using utility poles for wireless attachments is beneficial because fewer new facilities will need to be constructed, something favored by local governments.

Sprint Nextel notes it has experienced delays and higher rates than those set under PSL § 119-a in negotiating wireless attachment agreements with pole owners. It asserts that, without our action, pole owners can "...exert monopoly power over the rates, terms and conditions of getting access to structures." n3 It cites a Massachusetts law n4 that requires utility owners to treat wireless attachments in a non-discriminatory way and requires utilities to expand the capacity of poles at the expense of the wireless attacher, if it can reasonably be done to accommodate wireless attachments. Sprint Nextel also supports a model agreement for wireless attachments and the rate structure approved for National Grid in Case 03-E-1578. Finally, Sprint Nextel supports the presumption that pole top-mounted antennas do

not compromise pole safety.

n3 Sprint Nextel comments at p 3.  
[\*6]

n4 Massachusetts Pole Attachment Law of 2006, MGL, c. 166 section 25A (amended 2006).

The Pole Owners oppose T-Mobile's petition arguing that under Opinion 97-10, n5 wireless attachments should be treated differently than traditional wire attachments and arranged by private negotiations between the attacher and pole owner. The Pole Owners state that there are other locations for wireless attachments such as street lights, buildings, towers etc. They contend that since not all pole infrastructure is the same, we should not make a finding that a certain structure is safe on all poles based on National Grid's specifications. The Pole Owners argue that T-Mobile should not raise the issue of wireless attachments in a proceeding that only encompassed wire attachments.

n5 Case 95-C-0341, In the Matter of Certain Pole Attachment Issues which Arose in Case 94-C-0095, Opinion No. 97-10 (issued June 17, 1997).

In response to the SAPA [\*7] notice and in further support of its petition, T-Mobile argues that application of our pole attachment rates and policies to wireless attachments, including rates for make-ready work, pole replacements, work schedules, and agreements, would be beneficial. T-Mobile asserts that such application will further the competitive telecommunications environment in the State, economic investment in advanced communications service facilities, and assist in the development of the public safety network and Enhanced 911. T-Mobile reiterates that PSL § 119-a applies to "attachments" and there is no legal basis to exclude wireless attachments from the coverage of the statute. T-Mobile also points out that wireless attachments are in the National Electric Safety Code as an acceptable attachment, which, it argues, supports a finding that they are safe.

#### DISCUSSION

The wireless attachers have made important points about the benefits of allowing attachment of their facilities to utility poles quickly and at reasonable rates. The Pole Owners, on the other hand, resist a one size fits all approach to wireless facility attachments. They claim that what we approved [\*8] for National Grid is not necessarily appropriate for all poles. The Pole Owners want to keep the status quo of negotiated agreements and rates for wireless attachments as set out in Opinion 97-10.

National Grid petitioned in November 2003 to allow wireless attachments, which included antennas on top of its poles and other facilities attached, to its poles under tariffed rates. In its most recent semi-annual report to the Commission, dated April 2, 2007, National Grid reported that no wireless attachments had been made to its distribution poles and no applications for attachments were under review. National Grid did not request that all wire pole attachment policies, including schedules, make ready work, etc. be applied to its wireless attachment process. In fact, it joined the other pole owners in opposing the application of our wire pole attachment policies and rates to wireless attachments.

Unlike telephone, cable and power facilities, which may only be attached to utility poles, wireless attachers have other options for attaching their facilities, such as buildings, existing towers, and newly constructed towers. Although attachers argue that it is sometimes difficult to get permission [\*9] from local governments to erect new towers, it is appropriate for local governments and community residents to be involved in considering whether tall antenna

structures should be placed in their communities. If wireless attachers were given unrestricted access to all utility poles, local governments might be excluded from the decision-making process.

Wireless attachments occupy a much larger portion of a pole than the 12 inches used by a standard wire attachment. The wireless attachment contemplated by National Grid would use as much as 7 feet of pole space and include an antenna on top of the pole up to 9 feet tall. n6 Wireless attachment designs vary, which makes advance evaluation of their safety difficult. We are not applying pole attachment policies and rates to wireless attachments at this time. Because of the variation in wireless configurations, the status quo of a negotiated rate and process is more appropriate until more information is developed about wireless attachments generally on utility poles.

n6 National Grid Standard GS 1169 details practices and procedures for a 35kV Maximum Distribution Wood Pole Mounted Meter Power Supply and Antenna Installations (Fall 2003). The National Grid Standard for the installation of wireless antennas demonstrates the uniqueness of these attachments and provides specific guidelines for the antenna and its associated equipment. Figure 4 titled Wireless Communication Installation Details shows a communications antenna with a height of 9 feet at the top of a utility pole that is connected with communication cables that run from the antenna through the electric supply space to equipment enclosures, power supply and electrical meter that can be mounted at a minimum of 8 feet above grade. That installation demonstrates that the space used for such installations requires almost 100% of a utility pole if the antenna and all associated equipment and interconnecting cables are considered.

[\*10]

Since wireless attachments usually involve placing facilities above the power area of the pole, special attention must be given to safety because such facilities could fall over onto power lines in high wind conditions or in heavy wet snow conditions resulting in power outages. While National Grid allows wireless attachments, it has comprehensive safety standards and requirements for such attachments and reserves the right to refuse to put wireless attachments on its poles or increase the height of poles to accommodate wireless attachments.

## CONCLUSION

Until more information about wireless attachments to utility distribution poles is developed, we will not apply the Pole Attachment Order and Policy Statement to wireless attachments. Opinion 97-10 remains in effect as to non-standard attachments: they are subject to negotiation. National Grid's tariff and procedures also remain in effect. We will not decide the T-Mobile petition at this time but will institute a new proceeding and issue a Notice requesting comments in order to develop more information about wireless attachments to utility distribution poles, including: safety concerns; whether wire attachment time frames and other [\*11] policies are appropriate for wireless attachments; standards for rates, terms and conditions; SEQRA issues; examples from attachers of inability to gain reasonable access to poles; as well as any other concerns of attachers, pole owners, local governments, and residents.

The Commission orders:

1. A proceeding is instituted to examine issues related to wireless attachments to utility poles.
2. A notice requesting comments shall be issued.
3. This proceeding is continued.

By the Commission

**Legal Topics:**

2007 N.Y. PUC LEXIS 235, \*11

For related research and practice materials, see the following legal topics:

Communications LawCable SystemsPole AttachmentsCommunications LawTelephone ServicesCellular  
ServicesCommunications LawTelephone ServicesWireless Services

TAB 12

**UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION  
Washington, D.C. 20549**

**FORM 10-K**

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2010

or

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15 (d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from \_\_\_\_\_ to \_\_\_\_\_

Commission File Number 001-16441

**CROWN CASTLE INTERNATIONAL CORP.**  
(Exact name of registrant as specified in its charter)

Delaware  
(State or other jurisdiction  
of incorporation or organization)

76-0470458  
(I.R.S. Employer  
Identification No.)

1220 Augusta Drive, Suite 500, Houston Texas 77057-2261

(Address of principal executive offices) (Zip Code)

(713) 570-3000

(Registrant's telephone number, including area code)

Securities Registered Pursuant to  
Section 12(b) of the Act

Common Stock, \$.01 par value

Rights to Purchase Series A Participating  
Cumulative Preferred Stock

Name of Each Exchange  
on Which Registered

New York Stock Exchange

New York Stock Exchange

Securities Registered Pursuant to Section 12(g) of the Act: NONE.

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

Indicated by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes ☐ No ☒

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Website, if any, every Interactive DataFile required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes ☒ No ☐

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☒

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a small reporting company. See definitions of a "large accelerated filer," "accelerated filer" and "smaller reporting company" in rule 12B-2 of the Exchange Act. Large accelerated filer ☒ Accelerated filer ☐ Non-accelerated filer ☐ Smaller reporting company ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes ☐ No ☒

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the registrant was approximately \$10.4 billion as of June 30, 2010, the last business day of the registrant's most recently completed second fiscal quarter, based on the New York Stock Exchange closing price on



that day of \$37.26 per share.

**Applicable Only to Corporate Registrants**

As of February 5, 2011, there were 290,888,523 shares of Common Stock outstanding.

**Documents Incorporated by Reference**

The information required to be furnished pursuant to Part III of this Form 10-K will be set forth in, and incorporated by reference from, the registrant's definitive proxy statement for the annual meeting of stockholders (the "2011 Proxy Statement"), which will be filed with the Securities and Exchange Commission not later than 120 days after the end of the fiscal year ended December 31, 2010.

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## CROWN CASTLE INTERNATIONAL CORP.

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### Cautionary Language Regarding Forward-Looking Statements

This Annual Report on Form 10-K contains forward-looking statements that are based on our management's expectations as of the filing date of this report with the Securities and Exchange Commission ("SEC"). Statements that are not historical facts are hereby identified as forward-looking statements. In addition, words such as "estimate," "anticipate," "project," "plan," "intend," "believe," "expect," "likely," "predicted," and similar expressions are intended to identify forward-looking statements. Such statements include plans, projections and estimates contained in *"Item 1. Business," "Item 3. Legal Proceedings," "Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations"* ("MD&A") and *"Item 7A. Quantitative and Qualitative Disclosures About Market Risk"* herein. Such forward-looking statements include (1) expectations regarding anticipated growth in the wireless communication industry, carriers' investments in their networks, new tenant additions and demand for our towers, (2) availability of cash flows for, and plans regarding, future discretionary investments including capital expenditures, (3) anticipated growth in future revenues, margins, and operating cash flows, and (4) expectations regarding the credit markets, our availability and cost of capital, and our ability to service our debt and comply with debt covenants.

Such forward-looking statements are subject to certain risks, uncertainties and assumptions, including prevailing market conditions, the risk factors described under *"Item 1A. Risk Factors"* herein and other factors. Should one or more of these risks or uncertainties materialize, or should underlying assumptions prove incorrect, actual results may vary materially from those expected.

Unless this Form 10-K indicates otherwise or the context otherwise requires, the terms, "we," "our," "our company," "the company" or "us" as used in this Form 10-K refer to Crown Castle International Corp. ("CCIC"), a Delaware corporation organized on April 20, 1995, and its subsidiaries. Unless this Form 10-K indicates otherwise or the context otherwise requires, the terms "CCUSA" and "in the U.S." refer to our CCUSA segment while the terms "CCAL" and "in Australia" refer to our CCAL segment.

## PART I

### Item 1. *Business*

#### Overview

We own, operate and lease towers and other wireless infrastructure, including distributed antenna system ("DAS") networks in the U.S. and rooftop installations (unless the context otherwise suggests or requires, references herein to "towers" include such other wireless infrastructure). Our core business is renting space on our towers via long-term contracts in various forms, including license, sublease and lease agreements (collectively, "contracts"). Our towers can accommodate multiple customers ("co-location") for antennas and other equipment necessary for the transmission of signals for wireless communication devices. We seek to increase our site rental revenues by adding more tenants on our towers, which we expect to result in significant incremental cash flows due to our relatively fixed tower operating costs.

Information concerning our towers as of December 31, 2010 is as follows:

- We owned, leased or managed approximately 23,900 towers, inclusive of 43 completed DAS networks with a varying number of discrete antenna locations ("nodes").
- We have approximately 22,300 towers in the United States, including Puerto Rico ("U.S."), and approximately 1,600 towers in Australia.
- Approximately 54% and 71% of our towers in the U.S. are located in the 50 and 100 largest U.S. basic trading areas ("BTAs"), respectively. Our towers have a significant presence in 92 of the top 100 BTAs in the U.S. In Australia, 57% of our towers are located in the six major metropolitan areas.
- We owned in fee or had perpetual or long-term easements in the land and other property interests (collectively, "land") on which approximately 34% of our site rental gross margin is derived, and we leased, subleased or licensed (collectively "leased") the land on which approximately 65% of our site rental gross margin is derived. In addition, we managed approximately 600 towers owned by third parties. The leases for the land under our towers had an average remaining life of approximately 31 years, weighted based on site rental gross margin.

Information concerning our customers and site rental contracts as of December 31, 2010 is as follows:

- Our customers include many of the world's major wireless communications companies. In the U.S., Verizon Wireless, AT&T, Sprint Nextel ("Sprint") and T-Mobile accounted for a combined 77% and 73% of our 2010 CCUSA and consolidated revenues, respectively. In Australia, our customers include Telstra, Optus and a joint venture between Vodafone and Hutchison ("VHA").
- Revenues derived from our site rental business represented 91% of our 2010 consolidated revenues.
- Our site rental revenues are of a recurring nature, and typically in excess of 90% have been contracted for in a prior year.
- Our site rental revenues typically result from long-term contracts with (1) initial terms of five to 15 years, (2) multiple renewal periods at the option of the tenant of five to ten years each, (3) limited termination rights for our customers, and (4) contractual escalations of the rental price.
- Our customer contracts have a weighted-average remaining life of approximately eight years, exclusive of renewals at the customers' option, and represent \$15.3 billion of expected future cash inflows.

To a lesser extent, we also provide certain network services relating to our towers, primarily consisting of antenna installations and subsequent augmentations, as well as the following additional services: site acquisition, architectural and engineering, zoning and permitting, other construction and other services related to network development.

#### Strategy

Our strategy is to increase long-term stockholder value by translating anticipated future growth in our core site rental business into growth of our results of operations on a per share basis. We believe our strategy is consistent with our mission to deliver the highest level of service to our customers at all times – striving to be their critical partner as we assist them in growing efficient, ubiquitous wireless networks. The key elements of our strategy are to:

- *Organically grow the revenues and cash flows from our towers.* We seek to maximize the site rental revenues derived

from our towers by co-locating additional tenants on our towers through long-term contracts as our customers deploy and improve their wireless networks. We seek to maximize additional new tenant additions or modifications of existing installations (collectively, "new tenant additions") through our focus on customer service and deployment speed and by leveraging our web-based proprietary tools. Due to the relatively fixed nature of the costs to operate our towers (which tend to increase at approximately the rate of inflation), we expect the increased revenues from rent received from additional co-locations and the related subsequent impact from contracted escalations to result in incremental site rental gross margin and growth in our operating cash flows. We believe there is considerable additional future demand for our existing towers based on their location and the anticipated growth in the wireless communications industry.

- *Allocate capital efficiently.* We seek to allocate our available capital, including the cash produced by our operations, in a manner that will enhance per share operating results. During 2010, we increased our discretionary investments from 2009 levels, as a result of the financial flexibility afforded by financing activities completed during 2009 and 2010 that extended our debt maturities. Our discretionary investments have historically included those shown below (in no particular order):
  - purchase shares of our common stock ("common stock") from time to time;
  - acquire towers;
  - acquire land under towers;
  - selectively construct towers;
  - make improvements and structural enhancements to our existing towers; and
  - purchase or redeem our debt or preferred stock.

Our long-term strategy is based on our belief that additional demand for our towers will be created by the expected continued growth in the wireless communications industry, which is predominately driven by the demand for wireless voice and data services by consumers. We believe that additional demand for wireless infrastructure will create future growth opportunities for us. We believe that such demand for our towers will continue, will result in organic growth of our revenues due to the co-location of additional tenants on our existing towers and will create other growth opportunities for us such as demand for new towers. However, our results of operations may not always be indicative of the extent of changing demand for our towers in any given period as a result of the application of straight-line accounting.

During 2010, consumer demand for wireless data services continued to grow, driven by user-friendly wireless devices, such as smartphones, high speed networks and a robust offering of software applications. This growth in data services is in contrast to the slowing growth rate in voice services as the role of wireless devices expands. The following is a discussion of the recent growth and our expectations for growth trends in the U.S. wireless communications industry:

- We expect that consumers' growing demands for network speed and quality will likely result in wireless carriers continuing their focus on improving network quality and expanding capacity by adding additional antennas and other equipment for the transmission of their services in an effort to improve customer retention and satisfaction.
- Our customers have introduced, and we believe they plan to continue to deploy, next generation wireless technologies, including 3G and 4G, in response to consumer demand for high speed networks. We expect these next generation technologies and others, including LTE, HSPA+ and WiMAX, to translate into additional demand for tower space, although the timing and rate of this growth is difficult to predict.
- We have seen, and anticipate there could be other, new entrants into the wireless communications industry that should deploy regional or national wireless networks for voice and data services.
- Spectrum licensed by the Federal Communications Commission ("FCC") in 2006 and 2008 has enabled next generation networks, and we expect these and future auctions should continue to enable next generation networks in the U.S.
- Consumers are increasing their use of wireless voice and data services according to recent U.S. wireless industry reports.
  - Wireless data services grew in 2010 as consumers increased their wireless use of e-mail, internet, social networking, music and video sharing. Wireless data service revenues for the first half of 2010 were nearly \$25 billion, which represents a 27% increase over the first half of 2009 and accounted for more than 25% of all wireless services revenues.<sup>(a)</sup>
  - Wireless connections were nearly 293 million as of June 30, 2010, which represents a year-over-year increase of over 16 million subscribers, or 6%.<sup>(a)</sup>
  - Wireless data consumption per line increased by 450% between the first quarter of 2009 and the second quarter of 2010.<sup>(b)</sup>
  - Wireless devices are trending toward more bandwidth intensive devices such as smartphones, laptops, netbooks, tablets and other emerging and embedded devices. In particular smartphone shipments are expected to grow by 55% in 2010 from 2009.<sup>(c)</sup> Despite the growth in smartphones, market penetration for smartphones was approximately 30% at the end of 2010 and is expected to surpass 50% by the end of 2011.<sup>(d)</sup>
  - Access to the internet by mobile devices has continued to grow during 2010 with 59% of the U.S. population

accessing the internet on their phones in 2010, up from 25% in 2009.<sup>(e)</sup>

- (a) Source: Cellular Telecommunications & Internet Association ("CTIA")
- (b) Source: Federal Communications Commission
- (c) Source: International Data Corporation ("IDC")
- (d) Source: Morgan Stanley Research
- (e) Source: Pew Research Center

## 2010 Highlights and Recent Developments

See "Item 7. MD&A" and our consolidated financial statements for a discussion of developments and activities occurring in 2010, including the refinancing of \$3.5 billion face value of debt and the settlement of all remaining forward-starting interest rate swaps.

### The Company

Virtually all of our operations are located in the U.S. and Australia. We conduct our operations principally through subsidiaries of Crown Castle Operating Company ("CCOC"), including (1) certain subsidiaries which operate our tower portfolios in the U.S. and (2) a 77.6% owned subsidiary that operates our Australia tower portfolio. For more information about our operating segments, as well as financial information about the geographic areas in which we operate, see note 16 to our consolidated financial statements and "Item 7. MD&A."

#### CCUSA

*Site Rental.* The core business of CCUSA is the renting of antenna space on our towers, including co-locating tenants on our indoor and outdoor DAS networks, which are located in areas in which zoning restrictions or other barriers may prevent or delay the deployment of a tower and often are attached to public right-of-way infrastructure such as utility poles and street lights. We predominately rent space to wireless carriers under long-term contracts for their antennas which transmit a variety of signals related to wireless voice and data. As a result, we believe our towers are integral to our customers' network and their ability to serve their customers.

Most of our CCUSA towers were acquired from the four largest wireless carriers (or their predecessors) through transactions consummated during the last decade, including (1) approximately 10,700 towers from Global Signal Inc. ("Global Signal") in 2007, of which approximately 6,600 were originally acquired from Sprint, (2) approximately 4,800 towers during 1999 to 2000 from companies now part of Verizon Wireless, (3) approximately 2,700 towers during 1999 to 2000 from companies now part of AT&T, as well as (4) other smaller acquisitions from companies now part of T-Mobile and other independent tower operators.

We generally receive monthly rental payments from tenants, payable under long-term contracts. We have existing master lease agreements with most wireless carriers, including Verizon Wireless, AT&T, Sprint, T-Mobile and Clearwire, which provide certain terms (including economic terms) that govern contracts on our towers entered into by such parties during the term of their master lease agreements. Over the last several years, we have negotiated 15-year terms for both initial and renewal periods for certain of our customers, which often included fixed escalations. We continue to endeavor to negotiate with our existing customer base for longer contractual terms, which often may contain fixed escalation rates.

Our customer contracts have a high renewal rate because of (1) the integral nature of our towers within our customers' networks, (2) customers' cost associated with relocation of their antennas and other equipment to another tower, and (3) zoning and other barriers associated with the construction of new towers. With limited exceptions, the customer contracts may not be terminated. In general, each customer contract which is renewable will automatically renew at the end of its term unless the customer provides prior notice of its intent not to renew.

See note 15 to our consolidated financial statements for a tabular presentation of the minimum rental cash payments due to us by tenants pursuant to contract agreements without consideration of tenant renewal options.

The average monthly rental payment of a new tenant added to a tower varies based on (1) the different regions in the U.S., (2) aggregate customer volume, and (3) the type of signal transmitted by the tenant, primarily as a result of the physical size of the antenna installation and related equipment. We also routinely receive rental payment increases in connection with contract amendments, pursuant to which our customers add additional antennas or other equipment to towers on which they already have equipment pursuant to pre-existing contract agreements.

Approximately two-thirds of our direct site operating expenses consist of ground lease expenses and the remainder includes property taxes, repairs and maintenance, employee compensation and related benefit costs, and utilities. Our cash operating expenses tend to escalate at approximately the rate of inflation, partially offset by reductions in cash ground lease expenses from our purchases of land. As a result of the relatively fixed nature of these expenditures, the co-location of additional tenants is

achieved at a low incremental operating cost, resulting in high incremental operating cash flows. Our tower portfolio requires minimal sustaining capital expenditures, including tower maintenance and other non-discretionary capital expenditures, and are typically less than 2% of site rental revenues.

We have an agreement to provide certain management, construction and acquisition services for a third party as to certain tower opportunities in the U.S. with an initial period through March 2011. The arrangement was entered into to permit us to maintain our construction and acquisition capabilities and expertise and further our good relationships with certain major customers with limited capital commitments and expenditures as to such towers.

*Network Services.* To a lesser extent, we also offer wireless communication companies and their agents certain network services relating to our towers. For 2010, approximately 71% of network services and other revenues related to antenna installations and subsequent augmentation (collectively, "installation services"), and the remainder related to the following additional services: site acquisition, architectural and engineering, zoning and permitting, other construction and other services related to network development. We do not always provide the installation services on our towers as the customer may obtain a third party to complete these services, as reflected in our quarterly market share for installation services on our towers, which has ranged between one-quarter to two-thirds over the last two years (see also "*Competition*" below). We have grown our network services business over the last several years as a result of our focus on customer service and increasing our market share for installation services on our towers. We have the capability and expertise to install, with the assistance of our network of subcontractors, equipment and antenna systems for our customers. These activities are typically non-recurring and highly competitive, with a number of local competitors in most markets. Nearly all of our antenna installation services are billed on a cost-plus profit basis.

*Customers.* We work extensively with large national wireless carriers, and in general, our customers are primarily comprised of providers of wireless voice and data services who operate national or regional networks. The following table summarizes the net revenues from our four largest customers expressed as a percentage of CCUSA's and our consolidated revenues for 2010. See "*Item 1A. Risk Factors.*"

| <u>Customer</u>  | <u>% of 2010<br/>CCUSA<br/>Net Revenues</u> | <u>% of 2010<br/>Consolidated<br/>Net Revenues</u> |
|------------------|---------------------------------------------|----------------------------------------------------|
| AT&T             | 22%                                         | 21%                                                |
| Verizon Wireless | 22%                                         | 21%                                                |
| Sprint           | 21%                                         | 20%                                                |
| T-Mobile         | 12%                                         | 11%                                                |
| Total            | 77%                                         | 73%                                                |

In addition to our four largest customers, new tenant additions for 2010 were derived from customers offering emerging wireless technologies, such as those offering wireless data only technologies and, to a lesser extent, national wireless carriers other than those mentioned in the table above, such as those offering flat rate calling plans. New entrants in the wireless industry are emerging as new technologies become available, including Clearwire, a provider of WiMAX wireless mobile data services.

*Sales and Marketing.* The CCUSA sales organization markets our towers within the wireless communications industry with the objectives of renting space on existing towers and on new towers prior to construction as well as obtaining network services related to our towers. We seek to become the critical partner and preferred independent tower provider for our customers and increase customer satisfaction relative to our peers by leveraging our (1) technological tools, (2) process centric approach, and (3) customer relationships.

We use public and proprietary databases to develop targeted marketing programs focused on carrier network expansions, including DAS networks, and any related network services. We attempt to match specific towers in our portfolio with potential new site demand by obtaining and analyzing information, including our customers' existing antenna locations, tenant contracts, marketing strategies, capital spend plans, deployment status, and actual wireless carrier signal strength measurements taken in the field. We have developed a web-based tool that stores key tower information above and beyond normal property management information, including data on actual customer signal strength, demographics, site readiness and competitive structures. In addition, the web-based tool assists us in estimating potential demand for our towers with greater speed and accuracy. We believe these and other tools we have developed assist our customers in their site selection and deployment of their wireless networks and provide us with an opportunity to have proactive discussions with them regarding their wireless infrastructure deployment plans and the timing and location of their demand for our towers. A key aspect to our sales and marketing strategy is a continued emphasis on our process-centric approach to reduce cycle time related to new leasing and amendments, which helps provide our customers with faster deployment of their networks.

A team of national account directors maintains our relationships with our largest customers. These directors work to develop

tower leasing and network service opportunities, as well as to ensure that customers' tower needs are efficiently translated into new leases on our towers. Sales personnel in our area offices develop and maintain local relationships with our customers that are expanding their networks, entering new markets, bringing new technologies to market or requiring maintenance or add-on business. In addition to our full-time sales and marketing staff, a number of senior managers and officers spend a significant portion of their time on sales and marketing activities and call on existing and prospective customers.

*Competition.* CCUSA competes with (1) other independent tower owners which also provide site rental and network services, (2) wireless carriers which build, own and operate their own tower networks and lease space to other wireless communication companies, and (3) owners of alternative facilities, including rooftops, water towers, broadcast towers, DAS networks, and utility poles. Some of the larger independent tower companies with which CCUSA competes in the U.S. include American Tower Corporation, SBA Communications Corporation, Global Tower Partners and TowerCo. Wireless carriers that own and operate their own tower networks generally are substantially larger and have greater financial resources than we have. We believe that tower location and capacity, deployment speed, quality of service and price have been and will continue to be the most significant competitive factors affecting the leasing of a tower.

Competitors in the network services business include site acquisition consultants, zoning consultants, real estate firms, right-of-way consulting firms, construction companies, tower owners and managers, radio frequency engineering consultants, telecommunications equipment vendors who can provide turnkey site development services through multiple subcontractors, and our customers' internal staffs. We believe that our customers base their decisions on the outsourcing of network services on criteria such as a company's experience, track record, local reputation, price and time for completion of a project.

#### *CCAL*

Our primary business in Australia is the renting of antenna space on towers to our customers. CCAL is owned 77.6% by us and 22.4% by Permanent Nominees (Aust) Ltd, acting on behalf of a group of professional and private investors led by Todd Capital Limited. CCAL is the largest independent tower operator in Australia. As of December 31, 2010, CCAL had approximately 1,600 towers with 57% of such towers located in the six major metropolitan areas, including Sydney, Melbourne, Brisbane, Perth, Adelaide and the Australian Capital Territory. The majority of CCAL's towers were acquired from Optus (in 2000) and Vodafone (in 2001). CCAL also provides a range of services including site maintenance and property management services for towers owned by third parties.

For 2010, CCAL comprised 5% of our consolidated net revenues. CCAL's principal customers are Telstra, Optus and VHA, which collectively accounted for approximately 93% of CCAL's 2010 revenues. In June 2009, Vodafone and Hutchison merged their Australian operations in a joint venture named VHA Pty Ltd., with the intention to market primarily under the name Vodafone.

In Australia, CCAL competes with wireless carriers, which own and operate their own tower networks; service companies that provide site maintenance and property management services; and other site owners, such as broadcasters and building owners. The other significant tower owners in Australia are Broadcast Australia, an independent operator of broadcast towers, and Telstra and Optus, wireless carriers. We believe that tower location, capacity, quality of service, deployment speed and price within a geographic market are the most significant competitive factors affecting the leasing of a tower.

#### **Employees**

At January 31, 2011, we employed approximately 1,200 people worldwide, including approximately 1,100 in the U.S. We are not a party to any collective bargaining agreements. We have not experienced any strikes or work stoppages, and management believes that our employee relations are satisfactory.

#### **Regulatory and Environmental Matters**

To date, we have not incurred any material fines or penalties or experienced any material adverse effects to our business as a result of any domestic or international regulations. The summary below is based on regulations currently in effect, and such regulations are subject to review and modification by the applicable governmental authority from time to time. If we fail to comply with applicable laws and regulations, we may be fined or even lose our rights to conduct some of our business.

##### *United States*

We are required to comply with a variety of federal, state and local regulations and laws in the U.S., including the FCC and Federal Aviation Administration ("FAA") regulations and those discussed under "*Environmental*" below.

*Federal Regulations.* Both the FCC and the FAA regulate towers used for wireless communications, radio and television broadcasting. Such regulations control the siting, lighting and marking of towers and may, depending on the characteristics of particular towers, require the registration of tower facilities with the FCC and the issuance of determinations confirming no hazard

to air traffic. Wireless communications devices operating on towers are separately regulated and independently licensed based upon the particular frequency used. In addition, the FCC and the FAA have developed standards to consider proposals for new or modified tower and antenna structures based upon the height and location, including proximity to airports. Proposals to construct or to modify existing tower and antenna structures above certain heights are reviewed by the FAA to ensure the structure will not present a hazard to aviation, which determination may be conditioned upon compliance with lighting and marking requirements. The FCC requires its licensees to operate communications devices only on towers that comply with FAA rules and are registered with the FCC, if required by its regulations. Where tower lighting is required by FAA regulation, tower owners bear the responsibility of notifying the FAA of any tower lighting outage and ensuring the timely restoration of such outages. Failure to comply with the applicable requirements may lead to civil penalties.

*Local Regulations.* The U.S. Telecommunications Act of 1996 amended the Communications Act of 1934 to preserve state and local zoning authorities' jurisdiction over the siting of communications towers. The law, however, limits local zoning authority by prohibiting actions by local authorities that discriminate between different service providers of wireless services or ban altogether the provision of wireless services. Additionally, the law prohibits state and local restrictions based on the environmental effects of radio frequency emissions to the extent the facilities comply with FCC regulations.

Local regulations include city and other local ordinances (including subdivision and zoning ordinances), approvals for construction, modification and removal of towers, and restrictive covenants imposed by community developers. These regulations vary greatly, but typically require us to obtain approval from local officials prior to tower construction. Local zoning authorities may render decisions that prevent the construction or modification of towers or place conditions on such construction or modifications that are responsive to community residents' concerns regarding the height, visibility and other characteristics of the towers. To expedite the deployment of wireless networks, the FCC issued a declaratory ruling in November 2009 establishing timeframes for the review of applications by local and state governments of 90 days for co-locations and 150 days for new tower construction. If a jurisdiction fails to act within these timeframes, the applicant may file a claim for relief in court. Notwithstanding this declaratory ruling, decisions of local zoning authorities may also adversely affect the timing and cost of tower construction and modification.

*Environmental.* We are required to comply with a variety of federal, state and local environmental laws and regulations protecting environmental quality, including air and water quality and wildlife protection. To date, we have not incurred any material fines or penalties or experienced any material adverse effects to our business as a result of any domestic or international environmental regulations or matters. See "Item 1A. Risk Factors."

The construction of new towers and, in some cases, the modification of existing towers in the U.S. may be subject to environmental review under the National Environmental Policy Act of 1969, as amended ("NEPA"), which requires federal agencies to evaluate the environmental impact of major federal actions. The FCC has promulgated regulations implementing NEPA which require applicants to investigate the potential environmental impact of the proposed tower construction. Should the proposed tower construction present a significant environmental impact, the FCC must prepare an environmental impact statement, subject to public comment. If the proposed construction or modification of a tower may have a significant impact on the environment, the FCC's approval of the construction or modification could be significantly delayed.

Our operations are subject to federal, state and local laws and regulations relating to the management, use, storage, disposal, emission, and remediation of, and exposure to, hazardous and non-hazardous substances, materials and wastes. As an owner, lessee or operator of real property, we are subject to certain environmental laws that impose strict, joint-and-several liability for the cleanup of on-site or off-site contamination relating to existing or historical operations; and we could also be subject to personal injury or property damage claims relating to such contamination. In general, our customer contracts prohibit our customers from using or storing any hazardous substances on our tower sites in violation of applicable environmental laws and require our customers to provide notice of certain environmental conditions caused by them.

As licensees and tower owners, we are also subject to regulations and guidelines that impose a variety of operational requirements relating to radio frequency emissions. As employers, we are subject to Occupational Safety and Health Administration (and similar occupational health and safety legislation in Australia) and similar guidelines regarding employee protection from radio frequency exposure. The potential connection between radio frequency emissions and certain negative health effects, including some forms of cancer, has been the subject of substantial study by the scientific community in recent years.

We have compliance programs and monitoring projects to help assure that we are in substantial compliance with applicable environmental laws. Nevertheless, there can be no assurance that the costs of compliance with existing or future environmental laws will not have a material adverse effect on us.

*Other Regulations.* We hold, through certain of our subsidiaries, certain licenses for radio transmission facilities granted by the FCC, including licenses for common carrier microwave service, commercial and private mobile radio service, specialized mobile radio and paging service, which are subject to additional regulation by the FCC. Our FCC license relating to our 1670-1675



MHz U.S. nationwide spectrum license ("Spectrum") contains certain conditions related to the services that may be provided thereunder, the technical equipment used in connection therewith and the circumstances under which it may be renewed. In 2007, after receiving FCC approval, we entered into a long-term lease of the Spectrum with an initial term through 2013.

#### *Australia*

*Federal Regulations.* Carrier licenses and nominated carrier declarations issued under the Australian Telecommunications Act 1997 authorize the use of network units for the supply of telecommunications services to the public. The definition of "network units" includes line links and base stations used for wireless voice services but does not include tower infrastructure. Accordingly, CCAL as a tower owner and operator does not require a carrier license under the Australian Telecommunications Act 1997. Similarly, because CCAL does not own any transmitters or spectrum, it does not currently require any apparatus or spectrum licenses issued under the Australian Radiocommunications Act 1992.

Carriers have a statutory obligation to provide other carriers with access to towers, and if there is a dispute (including a pricing dispute), the matter may be referred to the Australian Competition and Consumer Commission for resolution. As a non-carrier, CCAL is not subject to this requirement, and our customers negotiate site access on a commercial basis.

While the Australian Telecommunications Act 1997 grants certain exemptions from planning laws for the installation of "low impact facilities," newly constructed towers are expressly excluded from the definition of "low impact facilities." Accordingly, in connection with the construction of towers, CCAL is subject to state and local planning laws that vary on a site by site basis, typically requiring us to obtain approval from local offices prior to tower construction, subject to certain exceptions. Structural enhancements may be undertaken on behalf of a carrier without state and local planning approval under the general "maintenance power" under the Australian Telecommunications Act 1997, although these enhancements may be subject to state and local planning laws if CCAL is unable to obtain carrier cooperation to use such power. For a limited number of towers, CCAL is also required to install aircraft warning lighting in compliance with federal aviation regulations. In Australia, a carrier may arguably be able to utilize the "maintenance power" under the Australian Telecommunications Act 1997 to remain as a tenant on a tower after the expiration of a site license or sublease; however, CCAL's customer access agreements generally limit the ability of customers to do this, and, even if a carrier did utilize this power, the carrier would be required to pay for CCAL's financial loss, which would roughly equal the site rental revenues that would have otherwise been payable.

*Local Regulations.* In Australia there are various local, state and territory laws and regulations which relate to, among other things, town planning and zoning restrictions, standards and approvals for the design, construction or alteration of a structure or facility, and environmental regulations. As in the U.S., these laws vary greatly, but typically require tower owners to obtain approval from governmental bodies prior to tower construction and to comply with environmental laws on an ongoing basis.

#### **Item 1A. Risk Factors**

You should carefully consider all of the risks described below, as well as the other information contained in this document, when evaluating your investment in our securities.

***Our business depends on the demand for wireless communications and towers, and we may be adversely affected by any slowdown in such demand.***

Demand for our towers depends on the demand for antenna space from our customers, which, in turn, depends on the demand for wireless voice and data services by their customers. The willingness of our customers to utilize our infrastructure, or renew or extend existing contracts on our towers, is affected by numerous factors, including:

- consumer demand for wireless services;
- availability and capacity of our towers and the land under those towers;
- location of our towers;
- financial condition of our customers, including their availability and cost of capital;
- willingness of our customers to maintain or increase their capital expenditures;
- increased use of network sharing, roaming, joint development, or resale agreements by our customers;
- mergers or consolidations among our customers;
- changes in, or success of, our customers' business models;
- governmental regulations, including local and state restrictions on the proliferation of towers;
- cost of constructing towers;
- technological changes, including those affecting (1) the number or type of towers or other communications sites needed to provide wireless communications services to a given geographic area and (2) the obsolescence of certain existing wireless networks; and

**UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION  
Washington, D.C. 20549**

**FORM 10-K**

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2010

or

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15 (d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from \_\_\_\_\_ to \_\_\_\_\_

Commission File Number 001-16441

**CROWN CASTLE INTERNATIONAL CORP.**  
(Exact name of registrant as specified in its charter)

Delaware  
(State or other jurisdiction  
of incorporation or organization)

76-0470458  
(I.R.S. Employer  
Identification No.)

1220 Augusta Drive, Suite 500, Houston Texas 77057-2261

(Address of principal executive offices) (Zip Code)

(713) 570-3000

(Registrant's telephone number, including area code)

| Securities Registered Pursuant to<br>Section 12(b) of the Act           | Name of Each Exchange<br>on Which Registered |
|-------------------------------------------------------------------------|----------------------------------------------|
| Common Stock, \$.01 par value                                           | New York Stock Exchange                      |
| Rights to Purchase Series A Participating<br>Cumulative Preferred Stock | New York Stock Exchange                      |

Securities Registered Pursuant to Section 12(g) of the Act: NONE.

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

Indicated by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes ☐ No ☒

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Website, if any, every Interactive DataFile required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes ☒ No ☐

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☒

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a small reporting company. See definitions of a "large accelerated filer," "accelerated filer" and "smaller reporting company" in rule 12B-2 of the Exchange Act. Large accelerated filer ☒ Accelerated filer ☐ Non-accelerated filer ☐ Smaller reporting company ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes ☐ No ☒

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the registrant was approximately \$10.4 billion as of June 30, 2010, the last business day of the registrant's most recently completed second fiscal quarter, based on the New York Stock Exchange closing price on

that day of \$37.26 per share.

**Applicable Only to Corporate Registrants**

As of February 5, 2011, there were 290,888,523 shares of Common Stock outstanding.

**Documents Incorporated by Reference**

The information required to be furnished pursuant to Part III of this Form 10-K will be set forth in, and incorporated by reference from, the registrant's definitive proxy statement for the annual meeting of stockholders (the "2011 Proxy Statement"), which will be filed with the Securities and Exchange Commission not later than 120 days after the end of the fiscal year ended December 31, 2010.

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### Cautionary Language Regarding Forward-Looking Statements

This Annual Report on Form 10-K contains forward-looking statements that are based on our management's expectations as of the filing date of this report with the Securities and Exchange Commission ("SEC"). Statements that are not historical facts are hereby identified as forward-looking statements. In addition, words such as "estimate," "anticipate," "project," "plan," "intend," "believe," "expect," "likely," "predicted," and similar expressions are intended to identify forward-looking statements. Such statements include plans, projections and estimates contained in *"Item 1. Business," "Item 3. Legal Proceedings," "Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations"* ("MD&A") and *"Item 7A. Quantitative and Qualitative Disclosures About Market Risk"* herein. Such forward-looking statements include (1) expectations regarding anticipated growth in the wireless communication industry, carriers' investments in their networks, new tenant additions and demand for our towers, (2) availability of cash flows for, and plans regarding, future discretionary investments including capital expenditures, (3) anticipated growth in future revenues, margins, and operating cash flows, and (4) expectations regarding the credit markets, our availability and cost of capital, and our ability to service our debt and comply with debt covenants.

Such forward-looking statements are subject to certain risks, uncertainties and assumptions, including prevailing market conditions, the risk factors described under *"Item 1A. Risk Factors"* herein and other factors. Should one or more of these risks or uncertainties materialize, or should underlying assumptions prove incorrect, actual results may vary materially from those expected.

Unless this Form 10-K indicates otherwise or the context otherwise requires, the terms, "we," "our," "our company," "the company" or "us" as used in this Form 10-K refer to Crown Castle International Corp. ("CCIC"), a Delaware corporation organized on April 20, 1995, and its subsidiaries. Unless this Form 10-K indicates otherwise or the context otherwise requires, the terms "CCUSA" and "in the U.S." refer to our CCUSA segment while the terms "CCAL" and "in Australia" refer to our CCAL segment.

## PART I

### Item 1. *Business*

#### Overview

We own, operate and lease towers and other wireless infrastructure, including distributed antenna system ("DAS") networks in the U.S. and rooftop installations (unless the context otherwise suggests or requires, references herein to "towers" include such other wireless infrastructure). Our core business is renting space on our towers via long-term contracts in various forms, including license, sublease and lease agreements (collectively, "contracts"). Our towers can accommodate multiple customers ("co-location") for antennas and other equipment necessary for the transmission of signals for wireless communication devices. We seek to increase our site rental revenues by adding more tenants on our towers, which we expect to result in significant incremental cash flows due to our relatively fixed tower operating costs.

Information concerning our towers as of December 31, 2010 is as follows:

- We owned, leased or managed approximately 23,900 towers, inclusive of 43 completed DAS networks with a varying number of discrete antenna locations ("nodes").
- We have approximately 22,300 towers in the United States, including Puerto Rico ("U.S."), and approximately 1,600 towers in Australia.
- Approximately 54% and 71% of our towers in the U.S. are located in the 50 and 100 largest U.S. basic trading areas ("BTAs"), respectively. Our towers have a significant presence in 92 of the top 100 BTAs in the U.S. In Australia, 57% of our towers are located in the six major metropolitan areas.
- We owned in fee or had perpetual or long-term easements in the land and other property interests (collectively, "land") on which approximately 34% of our site rental gross margin is derived, and we leased, subleased or licensed (collectively "leased") the land on which approximately 65% of our site rental gross margin is derived. In addition, we managed approximately 600 towers owned by third parties. The leases for the land under our towers had an average remaining life of approximately 31 years, weighted based on site rental gross margin.

Information concerning our customers and site rental contracts as of December 31, 2010 is as follows:

- Our customers include many of the world's major wireless communications companies. In the U.S., Verizon Wireless, AT&T, Sprint Nextel ("Sprint") and T-Mobile accounted for a combined 77% and 73% of our 2010 CCUSA and consolidated revenues, respectively. In Australia, our customers include Telstra, Optus and a joint venture between Vodafone and Hutchison ("VHA").
- Revenues derived from our site rental business represented 91% of our 2010 consolidated revenues.
- Our site rental revenues are of a recurring nature, and typically in excess of 90% have been contracted for in a prior year.
- Our site rental revenues typically result from long-term contracts with (1) initial terms of five to 15 years, (2) multiple renewal periods at the option of the tenant of five to ten years each, (3) limited termination rights for our customers, and (4) contractual escalations of the rental price.
- Our customer contracts have a weighted-average remaining life of approximately eight years, exclusive of renewals at the customers' option, and represent \$15.3 billion of expected future cash inflows.

To a lesser extent, we also provide certain network services relating to our towers, primarily consisting of antenna installations and subsequent augmentations, as well as the following additional services: site acquisition, architectural and engineering, zoning and permitting, other construction and other services related to network development.

#### Strategy

Our strategy is to increase long-term stockholder value by translating anticipated future growth in our core site rental business into growth of our results of operations on a per share basis. We believe our strategy is consistent with our mission to deliver the highest level of service to our customers at all times – striving to be their critical partner as we assist them in growing efficient, ubiquitous wireless networks. The key elements of our strategy are to:

- *Organically grow the revenues and cash flows from our towers.* We seek to maximize the site rental revenues derived

from our towers by co-locating additional tenants on our towers through long-term contracts as our customers deploy and improve their wireless networks. We seek to maximize additional new tenant additions or modifications of existing installations (collectively, "new tenant additions") through our focus on customer service and deployment speed and by leveraging our web-based proprietary tools. Due to the relatively fixed nature of the costs to operate our towers (which tend to increase at approximately the rate of inflation), we expect the increased revenues from rent received from additional co-locations and the related subsequent impact from contracted escalations to result in incremental site rental gross margin and growth in our operating cash flows. We believe there is considerable additional future demand for our existing towers based on their location and the anticipated growth in the wireless communications industry.

- *Allocate capital efficiently.* We seek to allocate our available capital, including the cash produced by our operations, in a manner that will enhance per share operating results. During 2010, we increased our discretionary investments from 2009 levels, as a result of the financial flexibility afforded by financing activities completed during 2009 and 2010 that extended our debt maturities. Our discretionary investments have historically included those shown below (in no particular order):
  - purchase shares of our common stock ("common stock") from time to time;
  - acquire towers;
  - acquire land under towers;
  - selectively construct towers;
  - make improvements and structural enhancements to our existing towers; and
  - purchase or redeem our debt or preferred stock.

Our long-term strategy is based on our belief that additional demand for our towers will be created by the expected continued growth in the wireless communications industry, which is predominately driven by the demand for wireless voice and data services by consumers. We believe that additional demand for wireless infrastructure will create future growth opportunities for us. We believe that such demand for our towers will continue, will result in organic growth of our revenues due to the co-location of additional tenants on our existing towers and will create other growth opportunities for us such as demand for new towers. However, our results of operations may not always be indicative of the extent of changing demand for our towers in any given period as a result of the application of straight-line accounting.

During 2010, consumer demand for wireless data services continued to grow, driven by user-friendly wireless devices, such as smartphones, high speed networks and a robust offering of software applications. This growth in data services is in contrast to the slowing growth rate in voice services as the role of wireless devices expands. The following is a discussion of the recent growth and our expectations for growth trends in the U.S. wireless communications industry:

- We expect that consumers' growing demands for network speed and quality will likely result in wireless carriers continuing their focus on improving network quality and expanding capacity by adding additional antennas and other equipment for the transmission of their services in an effort to improve customer retention and satisfaction.
- Our customers have introduced, and we believe they plan to continue to deploy, next generation wireless technologies, including 3G and 4G, in response to consumer demand for high speed networks. We expect these next generation technologies and others, including LTE, HSPA+ and WiMAX, to translate into additional demand for tower space, although the timing and rate of this growth is difficult to predict.
- We have seen, and anticipate there could be other, new entrants into the wireless communications industry that should deploy regional or national wireless networks for voice and data services.
- Spectrum licensed by the Federal Communications Commission ("FCC") in 2006 and 2008 has enabled next generation networks, and we expect these and future auctions should continue to enable next generation networks in the U.S.
- Consumers are increasing their use of wireless voice and data services according to recent U.S. wireless industry reports.
  - Wireless data services grew in 2010 as consumers increased their wireless use of e-mail, internet, social networking, music and video sharing. Wireless data service revenues for the first half of 2010 were nearly \$25 billion, which represents a 27% increase over the first half of 2009 and accounted for more than 25% of all wireless services revenues.<sup>(a)</sup>
  - Wireless connections were nearly 293 million as of June 30, 2010, which represents a year-over-year increase of over 16 million subscribers, or 6%.<sup>(a)</sup>
  - Wireless data consumption per line increased by 450% between the first quarter of 2009 and the second quarter of 2010.<sup>(b)</sup>
  - Wireless devices are trending toward more bandwidth intensive devices such as smartphones, laptops, netbooks, tablets and other emerging and embedded devices. In particular smartphone shipments are expected to grow by 55% in 2010 from 2009.<sup>(c)</sup> Despite the growth in smartphones, market penetration for smartphones was approximately 30% at the end of 2010 and is expected to surpass 50% by the end of 2011.<sup>(d)</sup>
  - Access to the internet by mobile devices has continued to grow during 2010 with 59% of the U.S. population

accessing the internet on their phones in 2010, up from 25% in 2009.<sup>(e)</sup>

- (a) Source: Cellular Telecommunications & Internet Association ("CTIA")
- (b) Source: Federal Communications Commission
- (c) Source: International Data Corporation ("IDC")
- (d) Source: Morgan Stanley Research
- (e) Source: Pew Research Center

## 2010 Highlights and Recent Developments

See "Item 7. MD&A" and our consolidated financial statements for a discussion of developments and activities occurring in 2010, including the refinancing of \$3.5 billion face value of debt and the settlement of all remaining forward-starting interest rate swaps.

### The Company

Virtually all of our operations are located in the U.S. and Australia. We conduct our operations principally through subsidiaries of Crown Castle Operating Company ("CCOC"), including (1) certain subsidiaries which operate our tower portfolios in the U.S. and (2) a 77.6% owned subsidiary that operates our Australia tower portfolio. For more information about our operating segments, as well as financial information about the geographic areas in which we operate, see note 16 to our consolidated financial statements and "Item 7. MD&A."

#### CCUSA

*Site Rental.* The core business of CCUSA is the renting of antenna space on our towers, including co-locating tenants on our indoor and outdoor DAS networks, which are located in areas in which zoning restrictions or other barriers may prevent or delay the deployment of a tower and often are attached to public right-of-way infrastructure such as utility poles and street lights. We predominately rent space to wireless carriers under long-term contracts for their antennas which transmit a variety of signals related to wireless voice and data. As a result, we believe our towers are integral to our customers' network and their ability to serve their customers.

Most of our CCUSA towers were acquired from the four largest wireless carriers (or their predecessors) through transactions consummated during the last decade, including (1) approximately 10,700 towers from Global Signal Inc. ("Global Signal") in 2007, of which approximately 6,600 were originally acquired from Sprint, (2) approximately 4,800 towers during 1999 to 2000 from companies now part of Verizon Wireless, (3) approximately 2,700 towers during 1999 to 2000 from companies now part of AT&T, as well as (4) other smaller acquisitions from companies now part of T-Mobile and other independent tower operators.

We generally receive monthly rental payments from tenants, payable under long-term contracts. We have existing master lease agreements with most wireless carriers, including Verizon Wireless, AT&T, Sprint, T-Mobile and Clearwire, which provide certain terms (including economic terms) that govern contracts on our towers entered into by such parties during the term of their master lease agreements. Over the last several years, we have negotiated 15-year terms for both initial and renewal periods for certain of our customers, which often included fixed escalations. We continue to endeavor to negotiate with our existing customer base for longer contractual terms, which often may contain fixed escalation rates.

Our customer contracts have a high renewal rate because of (1) the integral nature of our towers within our customers' networks, (2) customers' cost associated with relocation of their antennas and other equipment to another tower, and (3) zoning and other barriers associated with the construction of new towers. With limited exceptions, the customer contracts may not be terminated. In general, each customer contract which is renewable will automatically renew at the end of its term unless the customer provides prior notice of its intent not to renew.

See note 15 to our consolidated financial statements for a tabular presentation of the minimum rental cash payments due to us by tenants pursuant to contract agreements without consideration of tenant renewal options.

The average monthly rental payment of a new tenant added to a tower varies based on (1) the different regions in the U.S., (2) aggregate customer volume, and (3) the type of signal transmitted by the tenant, primarily as a result of the physical size of the antenna installation and related equipment. We also routinely receive rental payment increases in connection with contract amendments, pursuant to which our customers add additional antennas or other equipment to towers on which they already have equipment pursuant to pre-existing contract agreements.

Approximately two-thirds of our direct site operating expenses consist of ground lease expenses and the remainder includes property taxes, repairs and maintenance, employee compensation and related benefit costs, and utilities. Our cash operating expenses tend to escalate at approximately the rate of inflation, partially offset by reductions in cash ground lease expenses from our purchases of land. As a result of the relatively fixed nature of these expenditures, the co-location of additional tenants is

achieved at a low incremental operating cost, resulting in high incremental operating cash flows. Our tower portfolio requires minimal sustaining capital expenditures, including tower maintenance and other non-discretionary capital expenditures, and are typically less than 2% of site rental revenues.

We have an agreement to provide certain management, construction and acquisition services for a third party as to certain tower opportunities in the U.S. with an initial period through March 2011. The arrangement was entered into to permit us to maintain our construction and acquisition capabilities and expertise and further our good relationships with certain major customers with limited capital commitments and expenditures as to such towers.

*Network Services.* To a lesser extent, we also offer wireless communication companies and their agents certain network services relating to our towers. For 2010, approximately 71% of network services and other revenues related to antenna installations and subsequent augmentation (collectively, "installation services"), and the remainder related to the following additional services: site acquisition, architectural and engineering, zoning and permitting, other construction and other services related to network development. We do not always provide the installation services on our towers as the customer may obtain a third party to complete these services, as reflected in our quarterly market share for installation services on our towers, which has ranged between one-quarter to two-thirds over the last two years (see also "*Competition*" below). We have grown our network services business over the last several years as a result of our focus on customer service and increasing our market share for installation services on our towers. We have the capability and expertise to install, with the assistance of our network of subcontractors, equipment and antenna systems for our customers. These activities are typically non-recurring and highly competitive, with a number of local competitors in most markets. Nearly all of our antenna installation services are billed on a cost-plus profit basis.

*Customers.* We work extensively with large national wireless carriers, and in general, our customers are primarily comprised of providers of wireless voice and data services who operate national or regional networks. The following table summarizes the net revenues from our four largest customers expressed as a percentage of CCUSA's and our consolidated revenues for 2010. See "Item 1A. Risk Factors."

| <u>Customer</u>  | <u>% of 2010<br/>CCUSA<br/>Net Revenues</u> | <u>% of 2010<br/>Consolidated<br/>Net Revenues</u> |
|------------------|---------------------------------------------|----------------------------------------------------|
| AT&T             | 22%                                         | 21%                                                |
| Verizon Wireless | 22%                                         | 21%                                                |
| Sprint           | 21%                                         | 20%                                                |
| T-Mobile         | 12%                                         | 11%                                                |
| Total            | 77%                                         | 73%                                                |

In addition to our four largest customers, new tenant additions for 2010 were derived from customers offering emerging wireless technologies, such as those offering wireless data only technologies and, to a lesser extent, national wireless carriers other than those mentioned in the table above, such as those offering flat rate calling plans. New entrants in the wireless industry are emerging as new technologies become available, including Clearwire, a provider of WiMAX wireless mobile data services.

*Sales and Marketing.* The CCUSA sales organization markets our towers within the wireless communications industry with the objectives of renting space on existing towers and on new towers prior to construction as well as obtaining network services related to our towers. We seek to become the critical partner and preferred independent tower provider for our customers and increase customer satisfaction relative to our peers by leveraging our (1) technological tools, (2) process centric approach, and (3) customer relationships.

We use public and proprietary databases to develop targeted marketing programs focused on carrier network expansions, including DAS networks, and any related network services. We attempt to match specific towers in our portfolio with potential new site demand by obtaining and analyzing information, including our customers' existing antenna locations, tenant contracts, marketing strategies, capital spend plans, deployment status, and actual wireless carrier signal strength measurements taken in the field. We have developed a web-based tool that stores key tower information above and beyond normal property management information, including data on actual customer signal strength, demographics, site readiness and competitive structures. In addition, the web-based tool assists us in estimating potential demand for our towers with greater speed and accuracy. We believe these and other tools we have developed assist our customers in their site selection and deployment of their wireless networks and provide us with an opportunity to have proactive discussions with them regarding their wireless infrastructure deployment plans and the timing and location of their demand for our towers. A key aspect to our sales and marketing strategy is a continued emphasis on our process-centric approach to reduce cycle time related to new leasing and amendments, which helps provide our customers with faster deployment of their networks.

A team of national account directors maintains our relationships with our largest customers. These directors work to develop



tower leasing and network service opportunities, as well as to ensure that customers' tower needs are efficiently translated into new leases on our towers. Sales personnel in our area offices develop and maintain local relationships with our customers that are expanding their networks, entering new markets, bringing new technologies to market or requiring maintenance or add-on business. In addition to our full-time sales and marketing staff, a number of senior managers and officers spend a significant portion of their time on sales and marketing activities and call on existing and prospective customers.

*Competition.* CCUSA competes with (1) other independent tower owners which also provide site rental and network services, (2) wireless carriers which build, own and operate their own tower networks and lease space to other wireless communication companies, and (3) owners of alternative facilities, including rooftops, water towers, broadcast towers, DAS networks, and utility poles. Some of the larger independent tower companies with which CCUSA competes in the U.S. include American Tower Corporation, SBA Communications Corporation, Global Tower Partners and TowerCo. Wireless carriers that own and operate their own tower networks generally are substantially larger and have greater financial resources than we have. We believe that tower location and capacity, deployment speed, quality of service and price have been and will continue to be the most significant competitive factors affecting the leasing of a tower.

Competitors in the network services business include site acquisition consultants, zoning consultants, real estate firms, right-of-way consulting firms, construction companies, tower owners and managers, radio frequency engineering consultants, telecommunications equipment vendors who can provide turnkey site development services through multiple subcontractors, and our customers' internal staffs. We believe that our customers base their decisions on the outsourcing of network services on criteria such as a company's experience, track record, local reputation, price and time for completion of a project.

#### *CCAL*

Our primary business in Australia is the renting of antenna space on towers to our customers. CCAL is owned 77.6% by us and 22.4% by Permanent Nominees (Aust) Ltd, acting on behalf of a group of professional and private investors led by Todd Capital Limited. CCAL is the largest independent tower operator in Australia. As of December 31, 2010, CCAL had approximately 1,600 towers with 57% of such towers located in the six major metropolitan areas, including Sydney, Melbourne, Brisbane, Perth, Adelaide and the Australian Capital Territory. The majority of CCAL's towers were acquired from Optus (in 2000) and Vodafone (in 2001). CCAL also provides a range of services including site maintenance and property management services for towers owned by third parties.

For 2010, CCAL comprised 5% of our consolidated net revenues. CCAL's principal customers are Telstra, Optus and VHA, which collectively accounted for approximately 93% of CCAL's 2010 revenues. In June 2009, Vodafone and Hutchison merged their Australian operations in a joint venture named VHA Pty Ltd., with the intention to market primarily under the name Vodafone.

In Australia, CCAL competes with wireless carriers, which own and operate their own tower networks; service companies that provide site maintenance and property management services; and other site owners, such as broadcasters and building owners. The other significant tower owners in Australia are Broadcast Australia, an independent operator of broadcast towers, and Telstra and Optus, wireless carriers. We believe that tower location, capacity, quality of service, deployment speed and price within a geographic market are the most significant competitive factors affecting the leasing of a tower.

#### **Employees**

At January 31, 2011, we employed approximately 1,200 people worldwide, including approximately 1,100 in the U.S. We are not a party to any collective bargaining agreements. We have not experienced any strikes or work stoppages, and management believes that our employee relations are satisfactory.

#### **Regulatory and Environmental Matters**

To date, we have not incurred any material fines or penalties or experienced any material adverse effects to our business as a result of any domestic or international regulations. The summary below is based on regulations currently in effect, and such regulations are subject to review and modification by the applicable governmental authority from time to time. If we fail to comply with applicable laws and regulations, we may be fined or even lose our rights to conduct some of our business.

##### *United States*

We are required to comply with a variety of federal, state and local regulations and laws in the U.S., including the FCC and Federal Aviation Administration ("FAA") regulations and those discussed under "*Environmental*" below.

*Federal Regulations.* Both the FCC and the FAA regulate towers used for wireless communications, radio and television broadcasting. Such regulations control the siting, lighting and marking of towers and may, depending on the characteristics of particular towers, require the registration of tower facilities with the FCC and the issuance of determinations confirming no hazard

to air traffic. Wireless communications devices operating on towers are separately regulated and independently licensed based upon the particular frequency used. In addition, the FCC and the FAA have developed standards to consider proposals for new or modified tower and antenna structures based upon the height and location, including proximity to airports. Proposals to construct or to modify existing tower and antenna structures above certain heights are reviewed by the FAA to ensure the structure will not present a hazard to aviation, which determination may be conditioned upon compliance with lighting and marking requirements. The FCC requires its licensees to operate communications devices only on towers that comply with FAA rules and are registered with the FCC, if required by its regulations. Where tower lighting is required by FAA regulation, tower owners bear the responsibility of notifying the FAA of any tower lighting outage and ensuring the timely restoration of such outages. Failure to comply with the applicable requirements may lead to civil penalties.

*Local Regulations.* The U.S. Telecommunications Act of 1996 amended the Communications Act of 1934 to preserve state and local zoning authorities' jurisdiction over the siting of communications towers. The law, however, limits local zoning authority by prohibiting actions by local authorities that discriminate between different service providers of wireless services or ban altogether the provision of wireless services. Additionally, the law prohibits state and local restrictions based on the environmental effects of radio frequency emissions to the extent the facilities comply with FCC regulations.

Local regulations include city and other local ordinances (including subdivision and zoning ordinances), approvals for construction, modification and removal of towers, and restrictive covenants imposed by community developers. These regulations vary greatly, but typically require us to obtain approval from local officials prior to tower construction. Local zoning authorities may render decisions that prevent the construction or modification of towers or place conditions on such construction or modifications that are responsive to community residents' concerns regarding the height, visibility and other characteristics of the towers. To expedite the deployment of wireless networks, the FCC issued a declaratory ruling in November 2009 establishing timeframes for the review of applications by local and state governments of 90 days for co-locations and 150 days for new tower construction. If a jurisdiction fails to act within these timeframes, the applicant may file a claim for relief in court. Notwithstanding this declaratory ruling, decisions of local zoning authorities may also adversely affect the timing and cost of tower construction and modification.

*Environmental.* We are required to comply with a variety of federal, state and local environmental laws and regulations protecting environmental quality, including air and water quality and wildlife protection. To date, we have not incurred any material fines or penalties or experienced any material adverse effects to our business as a result of any domestic or international environmental regulations or matters. See "*Item 1A. Risk Factors.*"

The construction of new towers and, in some cases, the modification of existing towers in the U.S. may be subject to environmental review under the National Environmental Policy Act of 1969, as amended ("NEPA"), which requires federal agencies to evaluate the environmental impact of major federal actions. The FCC has promulgated regulations implementing NEPA which require applicants to investigate the potential environmental impact of the proposed tower construction. Should the proposed tower construction present a significant environmental impact, the FCC must prepare an environmental impact statement, subject to public comment. If the proposed construction or modification of a tower may have a significant impact on the environment, the FCC's approval of the construction or modification could be significantly delayed.

Our operations are subject to federal, state and local laws and regulations relating to the management, use, storage, disposal, emission, and remediation of, and exposure to, hazardous and non-hazardous substances, materials and wastes. As an owner, lessee or operator of real property, we are subject to certain environmental laws that impose strict, joint-and-several liability for the cleanup of on-site or off-site contamination relating to existing or historical operations; and we could also be subject to personal injury or property damage claims relating to such contamination. In general, our customer contracts prohibit our customers from using or storing any hazardous substances on our tower sites in violation of applicable environmental laws and require our customers to provide notice of certain environmental conditions caused by them.

As licensees and tower owners, we are also subject to regulations and guidelines that impose a variety of operational requirements relating to radio frequency emissions. As employers, we are subject to Occupational Safety and Health Administration (and similar occupational health and safety legislation in Australia) and similar guidelines regarding employee protection from radio frequency exposure. The potential connection between radio frequency emissions and certain negative health effects, including some forms of cancer, has been the subject of substantial study by the scientific community in recent years.

We have compliance programs and monitoring projects to help assure that we are in substantial compliance with applicable environmental laws. Nevertheless, there can be no assurance that the costs of compliance with existing or future environmental laws will not have a material adverse effect on us.

*Other Regulations.* We hold, through certain of our subsidiaries, certain licenses for radio transmission facilities granted by the FCC, including licenses for common carrier microwave service, commercial and private mobile radio service, specialized mobile radio and paging service, which are subject to additional regulation by the FCC. Our FCC license relating to our 1670-1675

MHz U.S. nationwide spectrum license ("Spectrum") contains certain conditions related to the services that may be provided thereunder, the technical equipment used in connection therewith and the circumstances under which it may be renewed. In 2007, after receiving FCC approval, we entered into a long-term lease of the Spectrum with an initial term through 2013.

#### *Australia*

*Federal Regulations.* Carrier licenses and nominated carrier declarations issued under the Australian Telecommunications Act 1997 authorize the use of network units for the supply of telecommunications services to the public. The definition of "network units" includes line links and base stations used for wireless voice services but does not include tower infrastructure. Accordingly, CCAL as a tower owner and operator does not require a carrier license under the Australian Telecommunications Act 1997. Similarly, because CCAL does not own any transmitters or spectrum, it does not currently require any apparatus or spectrum licenses issued under the Australian Radiocommunications Act 1992.

Carriers have a statutory obligation to provide other carriers with access to towers, and if there is a dispute (including a pricing dispute), the matter may be referred to the Australian Competition and Consumer Commission for resolution. As a non-carrier, CCAL is not subject to this requirement, and our customers negotiate site access on a commercial basis.

While the Australian Telecommunications Act 1997 grants certain exemptions from planning laws for the installation of "low impact facilities," newly constructed towers are expressly excluded from the definition of "low impact facilities." Accordingly, in connection with the construction of towers, CCAL is subject to state and local planning laws that vary on a site by site basis, typically requiring us to obtain approval from local offices prior to tower construction, subject to certain exceptions. Structural enhancements may be undertaken on behalf of a carrier without state and local planning approval under the general "maintenance power" under the Australian Telecommunications Act 1997, although these enhancements may be subject to state and local planning laws if CCAL is unable to obtain carrier cooperation to use such power. For a limited number of towers, CCAL is also required to install aircraft warning lighting in compliance with federal aviation regulations. In Australia, a carrier may arguably be able to utilize the "maintenance power" under the Australian Telecommunications Act 1997 to remain as a tenant on a tower after the expiration of a site license or sublease; however, CCAL's customer access agreements generally limit the ability of customers to do this, and, even if a carrier did utilize this power, the carrier would be required to pay for CCAL's financial loss, which would roughly equal the site rental revenues that would have otherwise been payable.

*Local Regulations.* In Australia there are various local, state and territory laws and regulations which relate to, among other things, town planning and zoning restrictions, standards and approvals for the design, construction or alteration of a structure or facility, and environmental regulations. As in the U.S., these laws vary greatly, but typically require tower owners to obtain approval from governmental bodies prior to tower construction and to comply with environmental laws on an ongoing basis.

#### **Item 1A. Risk Factors**

You should carefully consider all of the risks described below, as well as the other information contained in this document, when evaluating your investment in our securities.

***Our business depends on the demand for wireless communications and towers, and we may be adversely affected by any slowdown in such demand.***

Demand for our towers depends on the demand for antenna space from our customers, which, in turn, depends on the demand for wireless voice and data services by their customers. The willingness of our customers to utilize our infrastructure, or renew or extend existing contracts on our towers, is affected by numerous factors, including:

- consumer demand for wireless services;
- availability and capacity of our towers and the land under those towers;
- location of our towers;
- financial condition of our customers, including their availability and cost of capital;
- willingness of our customers to maintain or increase their capital expenditures;
- increased use of network sharing, roaming, joint development, or resale agreements by our customers;
- mergers or consolidations among our customers;
- changes in, or success of, our customers' business models;
- governmental regulations, including local and state restrictions on the proliferation of towers;
- cost of constructing towers;
- technological changes, including those affecting (1) the number or type of towers or other communications sites needed to provide wireless communications services to a given geographic area and (2) the obsolescence of certain existing wireless networks; and

## Exhibit 8

Excerpts of American Tower Corporation  
2010 Annual Report



20  
10



ANNUAL  
REPORT



**AMERICAN TOWER®**  
CORPORATION



## Corporate Profile

Founded in 1995, American Tower is a leading wireless and broadcast communications infrastructure company with a portfolio of over 35,000 communications sites, including wireless communications towers, broadcast communications towers and distributed antenna system (DAS) networks. Our portfolio of wireless and broadcast towers consists of towers that we own and towers that we operate pursuant to long-term lease arrangements, including, as of December 31, 2010, approximately 20,900 towers in the United States and approximately 13,900 towers internationally in Brazil, Chile, Colombia, India, Mexico and Peru. Our portfolio also includes approximately 200 in-building DAS

networks that we operate in malls, casinos and other in-building applications, and select outdoor environments. In addition to the communications sites in our portfolio, we manage rooftop and tower sites for property owners. Our primary business is leasing antenna space on multi-tenant communications sites to wireless service providers and radio and television broadcast companies. We also offer tower-related services domestically, including site acquisition, zoning and permitting services and structural analysis services, which primarily support our site leasing business and the addition of new tenants and equipment on our sites.



# To Our Shareholders

APRIL 7, 2011

As a result of our employees' continued commitment and effort in both the U.S. and around the world, 2010 was truly a breakout year for American Tower. We added approximately 7,800 communications sites to our infrastructure portfolio through our acquisition and construction programs. At the same time, we delivered one of the highest rates of growth in total rental and management revenue and Adjusted EBITDA<sup>(1)</sup> in the Company's history. We also further strengthened our financial position to support our growth strategy.



## Global Tower Count Expanded by 29%

In the U.S., we exceeded the 21,000 site count level, which includes approximately 20,900 towers and approximately 200 distributed antenna system (DAS) networks. Of these sites, we acquired 548 towers and constructed approximately 370 towers and 30 DAS networks for our customers during the year. Our teams also brought many years of business development efforts to completion in our international operations. Through the acquisition of 6,225 towers and the construction of 640 towers, we nearly doubled our international portfolio to almost 14,000 sites. Moreover, we extended the commercial collocation business model from our original four markets to a total of nine markets.

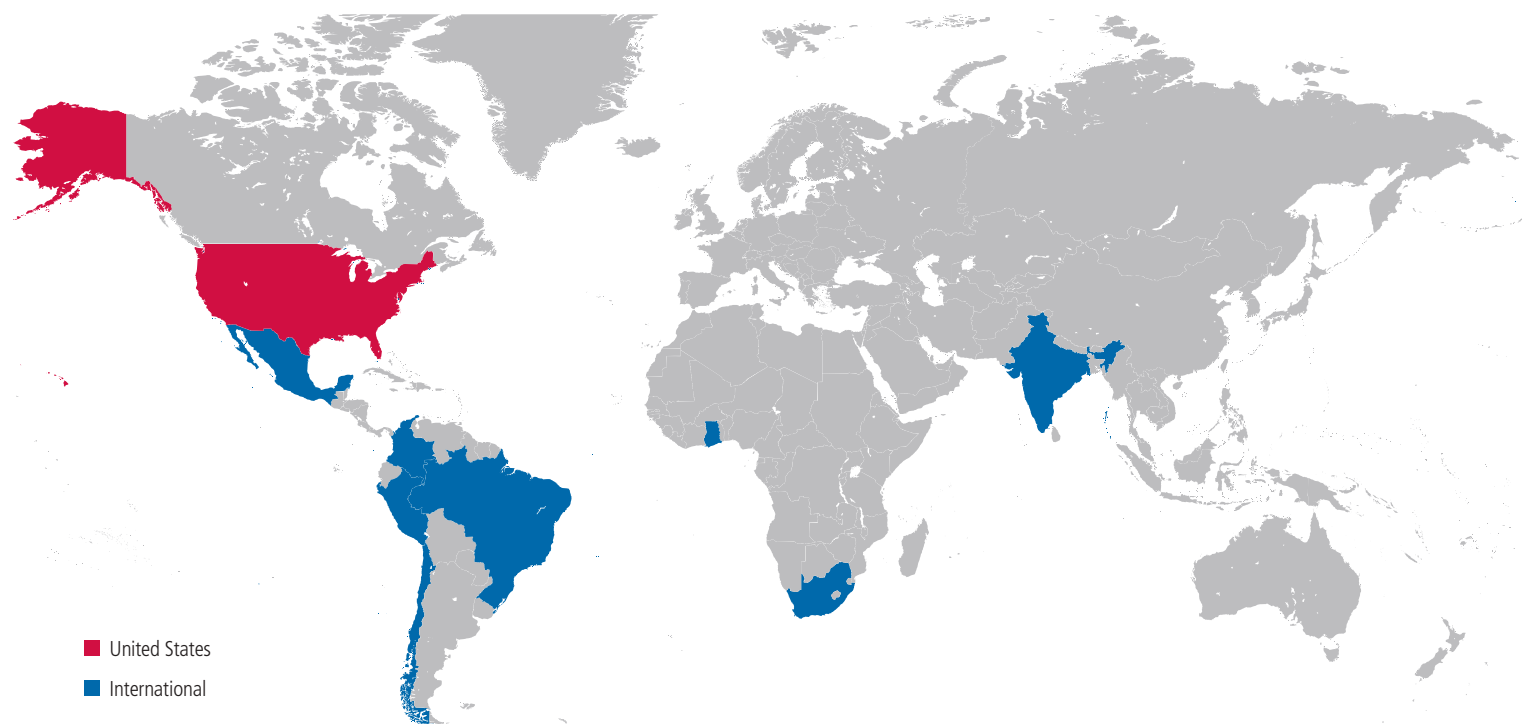
Three of these new markets complement our long-standing and high-performing Latin American operations in Mexico and Brazil. Each of our new businesses in Colombia, Chile and Peru will extend our service offerings to existing customers, including Telefónica, America Móvil and NII Holdings, while providing our service offerings to new customers in each area.

Two of our new markets, South Africa and Ghana, mark our entry into the Europe, Middle East, Africa (EMEA) region. After four years of extensive research and business development efforts in the region, we concluded that select markets in

Sub-Saharan Africa offer the right environment and growth potential for the introduction of the commercial collocation business model. We have formal agreements with two of the region's leading wireless service providers as our launch customers in these countries — Cell-C in South Africa and MTN in Ghana. We completed the closing of our first tranche of towers in South Africa during the first quarter of 2011 and expect to complete most of the announced tower acquisitions for these two markets during the course of 2011.

While we have added to our U.S. asset base and announced expansion into five new countries, we have also made major strides in growing our presence in two of our key existing international markets. First, we completed the acquisition of over 4,600 towers from Essar Telecom Infrastructure in India. This transaction was critical in achieving the desired level of scale for our India business, while providing a solid platform for further organic growth and potential follow-on asset acquisitions on a measured basis over time. Moreover, we acquired approximately 565 towers from an independent tower company in Brazil in March 2011. The addition of these assets increased our sites in Brazil by over 30%, to approximately 2,300 towers, in advance of planned 3G deployments by NII Holdings and others in that country.





Even in the midst of such vigorous asset expansion initiatives, our managers and employees in our legacy markets delivered superior operational and financial results. We elevated our status as a key supplier and extended the term of our existing contracts with two major wireless carriers in the U.S. and with one of our largest customers in Latin America. We also made progress in developing

and deploying extensions on our leasing offerings to our tenants that are complementary to our towers, such as our shared generator program and in-building and outdoor DAS networks. In addition, we implemented advanced web-based site selection and lease processing systems to enhance customer access to critical information and further improve the process of doing business with us.

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## Organic Growth Plus New Assets Drive Financial Performance

As a consequence of our efforts to expand our asset base in a disciplined fashion, drive new business through our existing sites through contractual, product and systems improvements and maintain our operational focus on efficiency, we delivered strong growth in total rental and management revenue, Adjusted EBITDA<sup>(1)</sup> and Recurring Free Cash Flow<sup>(1)</sup> (RFCF) per share (Figures 1, 2 and 3).

Our most important goals are to sustain robust cash flow growth from our ongoing business operations, prudently augment this cash through consistent access to the capital markets and make optimal capital allocation decisions for the benefit of our shareholders. In 2010, we grew cash from operating activities by more than 20% to over \$1 billion.

During the course of the year, we accessed the investment grade bond market for two financings totaling \$1.7 billion at a weighted average cost of approximately 4.7% and a weighted average term of approximately 8 years.

Our capital allocation priorities remain consistent, with our first priority being our capital expenditure program. This program funds our discretionary growth projects, primarily new site construction and land purchases, and our non-discretionary projects, such as tower maintenance and redevelopment. In 2010, we devoted \$278 million to discretionary projects including the construction of over 1,000 tower sites, the installation of approximately 30 DAS networks and the purchase



FIGURE 1

**Total Rental & Management Revenue**

(\$ IN MILLIONS)

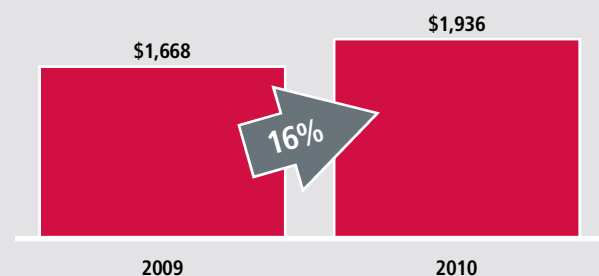


FIGURE 2

**Adjusted EBITDA**

(\$ IN MILLIONS)

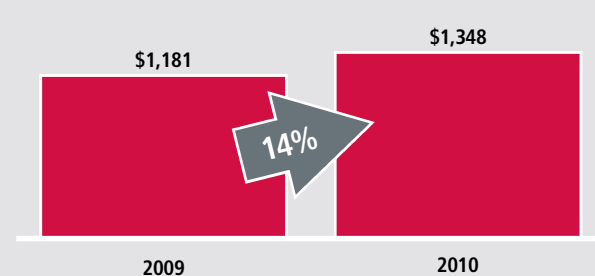


FIGURE 3

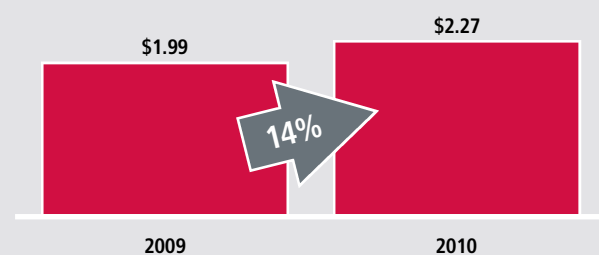
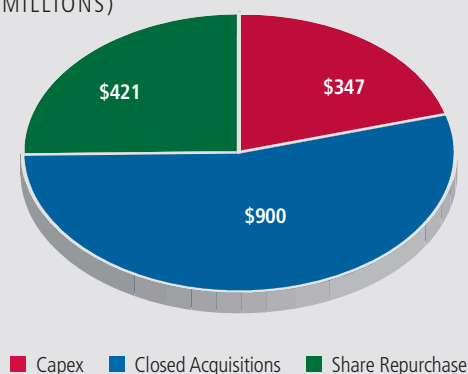
**Recurring Free Cash Flow (RFCF) Per Share**

FIGURE 4

**2010 Investments of \$1.7 Billion**

(\$ IN MILLIONS)



of land under approximately 460 of our towers. Non-discretionary capital expenditures were \$69 million, or approximately 20% of total capital expenditures.

Our second priority for capital allocation is our mergers and acquisitions efforts, in both existing and new geographies. Given the success of our domestic and international business development initiatives, during 2010 we signed and/or closed approximately \$2.1 billion in asset investments. Of this, \$900 million was spent during 2010, with the remaining \$1.2 billion expected to be spent thereafter pursuant to definitive purchase agreements entered into during the year. In addition, our business development teams are

continuing to evaluate and pursue attractive investment opportunities, primarily within our existing geographic scope.

Once we are confident that we can fully fund our anticipated capital expenditures and acquisition pipeline, we remain committed to returning capital to shareholders. During 2010, we utilized our share repurchase program to buy back 9.3 million shares of American Tower stock for a total of approximately \$421 million. We plan to continue to utilize share repurchases to return capital to shareholders and may also consider implementing a dividend program to the extent we determine it necessary or appropriate (Figure 4).





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## Our Strategy is Designed to Take Full Advantage of the Mobile Broadband Phenomenon

In last year's letter to shareholders, I described our view of the "Decade of Wireless," during which we anticipate that broadband mobile data services in the U.S. will reach nearly ubiquitous levels of penetration as voice service did during the previous decade. Given recent trends and developments in the U.S. telecom market, we consider the Decade of Wireless to be in full swing.

U.S. consumers are eagerly migrating to mobile broadband service in increasing numbers and are willing to pay for advanced services and devices. This level of excitement about mobile data services in the subscriber base is, in turn, driving robust revenue and operating growth for U.S. wireless carriers. Consequently, these carriers, including large national service providers, suppliers of pre-paid services and emerging "wholesale" service providers, have been investing in their networks to deliver ever-faster data services. Of course, wireless network development leads to continued demand for more tower space as additional antennae and equipment are deployed to deliver these high-speed services.

At American Tower, we believe that the notion of the Decade of Wireless will also apply outside the U.S. The benefits of mobile broadband services are recognized by people around the world, especially in developing countries where there is very little "wired" infrastructure for telephony, data and media delivery. Deploying wireless broadband can enable

these countries to bypass the lengthy, expensive and disruptive process of deploying cable, DSL or fiber connections to residences and businesses, making the benefits of broadband communications available to citizens more quickly.

In our served markets outside of the U.S., the deployment of mobile broadband is at a much earlier stage or, in some cases, has not even begun. To facilitate this deployment, India and several countries in Latin America have recently concluded spectrum auctions, in which many of our customers have acquired the spectrum necessary to begin deploying mobile broadband. As a result, we expect that the demand for tower space in these markets will, on balance, be longer in duration and at a faster rate than in the United States. Thus, we view our international business operations as a "turbocharger" to our U.S. growth engine. We anticipate that in 2011 approximately 26% of our total rental and management revenue will be generated from our international operations as the overseas transactions that we have announced are completed during the course of the year. By the end of 2011, we expect that on a pro forma basis, approximately 28% of our total rental and management revenue will be from our international operations. Coupled with our growing U.S. business, our asset and revenue expansion in Latin America, Asia and Africa places American Tower distinctly on the map as a global communications infrastructure company.



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## We Remain Focused on Delivering Strong Results in 2011 and Beyond

Our teams of hard working, dedicated employees delivered solid operational performance in 2010, as demonstrated by the growth in both our site portfolio and cash flows. Throughout this expansion period we have remained committed to enhancing shareholder returns through our disciplined approach to capital allocation. We continue to execute our growth strategy in an industry environment

marked by the increased levels of subscriber demand we expect to see in the U.S. through this Decade of Wireless, the growing need for wireless infrastructure in our international markets and the continued strength in our current operations. As a result, we have high confidence in our ability to deliver strong results for shareholders in 2011 and beyond.



A handwritten signature in black ink that reads "James D. Taiclet".

**James D. Taiclet, Jr.**  
Chairman, President &  
Chief Executive Officer

(1) See Appendix I at the end of this Annual Report for notes to this letter to shareholders, which provides definitions of Adjusted EBITDA and Recurring Free Cash Flow per share, including associated calculations and reconciliations to measures under generally accepted accounting principles.



## Corporate Responsibility

Our business strategy at American Tower is based on maintaining and growing our asset base in our served markets, delivering operational excellence and maintaining a strong financial position. A key component to successfully accomplishing our business strategy is our continued commitment to corporate responsibility.



Corporate Responsibility at American Tower is comprised of four core elements:

Ethics  
Environmental Awareness  
Corporate Philanthropy  
Employees

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### Ethics

The most important aspect of our business model is upholding the highest standard of ethics in all that we do. From the highest levels of executive management, we have consistently communicated that the establishment of a company culture founded on ethical behavior throughout the entire organization is the Company's highest priority. Our global Excellence through Ethics program is devoted to helping employees understand our ethical culture and how to apply it in everyday business situations. The program also espouses our philosophy of creating an environment in which employees can report suspected unethical behavior without fear of retaliation.

In addition, our Code of Conduct, which is signed annually by each employee, upholds our ethical standards. In signing the Code of Conduct, our employees agree to embody the Company's fundamental values of ethical business practice. The combination of our Code of Conduct and our Excellence through Ethics program supports our strong commitment to doing business with the highest level of integrity.



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## Environmental Awareness

We are committed to environmental awareness. Our business model is fundamentally green in that we provide shared infrastructure for wireless communications services, thereby minimizing land use and visual impact in the communities that we serve. We also strive to reduce energy use and related emissions at our communications sites and, as part of this effort, began participating in the annual Carbon Disclosure Project (CDP) Report in 2008. The CDP Report measures our carbon emissions and energy consumption, and the details regarding our CDP Report can be found on the CDP website.

We are also focused on reducing environmental risks and employ a dedicated team of professionals to ensure that our sites are fully compliant with environmental regulations and guidelines with respect to issues including the protection of migratory birds and endangered species and the preservation of historical and tribal sites.

Internally, we encourage our teams to recommend actions that we can take to reduce, reuse and recycle through our Green@American Tower initiative. We also encourage our customers to reduce their impact on the environment through our shared generator program, which decreases the amount of waste created by and fuel needed for multiple generators at a site. These programs, in conjunction with the ongoing efforts of our environmental team and continued CDP reporting, ensure that we are respectful of our environment in our offices and in our field operations.



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## Corporate Philanthropy

We have several programs designed to promote employee support of charitable organizations through individual giving and organized events. We offer a Volunteer Day Off program and a Matching Gift program as ways of encouraging employees to give back to their communities and preferred charities. Each employee receives eight paid hours per year to volunteer. In 2010, employees volunteered for a total of 1,325 hours through this program. Our Matching Gift program encourages employee giving by matching dollar-for-dollar gifts between \$25 and \$1,000. Last year, over \$50,000 in employee donations were matched by the Company.

American Tower also offers employees organized opportunities to get involved in their communities. Each of our U.S. major offices (Boston, MA, Atlanta, GA and Cary, NC) hosts two Volunteer Days per year. In 2010, 130 employees spent time volunteering at local public schools and non-profit organizations. By encouraging our employees to get involved in philanthropy, whether through volunteering or charitable giving, we are helping to improve the communities where we live and work.





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## Employees

At American Tower, we strive to hire talented people and empower them, as they are the most valuable investment we make. In an effort to help employees develop their professional skills, we encourage them to take advantage of training opportunities at our online Development Center. The Development Center has approximately 200 courses and 450 hours of online learning available to employees in a variety of subjects including: training specific to American Tower's business, professional skill development, health and safety courses and soft skills training.

Furthermore, we recognize that what makes each of us different also makes us stronger. It is therefore critical to our success that we continue to have a diverse workforce that not only reflects the communities where we do business, but also brings to us different thoughts, opinions and ideas. Diversity at American Tower is truly about respect and inclusion, emphasizing what each employee brings to the Company.



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## Our Commitment to Corporate Responsibility

In addition to continuing the programs and projects listed above, American Tower will introduce a global philanthropic signature program centered on education, by helping students and teachers in need. This new program will launch in all of our global markets and be led by teams of employees working in partnership with local schools and organizations dedicated to education.

Our corporate responsibility efforts will continue to evolve as we grow, but our core values will always remain the same: doing business ethically and with integrity, being respectful of our environment, supporting the communities where we live and work and hiring good people and positioning them for professional success. Employees have embraced our corporate responsibility programs, and we look forward to seeing this important initiative continue to grow.

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**UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION**  
Washington, D.C. 20549

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**FORM 10-K**

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(Mark One):

☒ **Annual report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934.**

**For the fiscal year ended December 31, 2010**

☐ **Transition report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934.**

**For the transition period from                      to**

**Commission File Number: 001-14195**

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**American Tower Corporation**

(Exact name of registrant as specified in its charter)

**Delaware**  
(State or other jurisdiction of  
Incorporation or Organization)

**65-0723837**  
(I.R.S. Employer  
Identification No.)

**116 Huntington Avenue  
Boston, Massachusetts 02116**  
(Address of principal executive offices)

**Telephone Number (617) 375-7500**  
(Registrant's telephone number, including area code)

**Securities registered pursuant to Section 12(b) of the Act:**

| <u>Title of each Class</u>             | <u>Name of exchange on which registered</u> |
|----------------------------------------|---------------------------------------------|
| Class A Common Stock, \$0.01 par value | New York Stock Exchange                     |

**Securities registered pursuant to Section 12(g) of the Act:**

None

Indicate by check mark if the registrant is a well known seasoned issuer, as defined in Rule 405 of the Securities Act: Yes ☒ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act: Yes ☐ No ☒

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days: Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes ☒ No ☐

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of the Form 10-K or any amendment to this Form 10-K. ☒

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See definition of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act. (Check One):

Large accelerated filer ☒ Accelerated filer ☐ Non-accelerated filer ☐ Smaller reporting company ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act): Yes ☐ No ☒

The aggregate market value of the voting and non-voting common stock held by non-affiliates of the registrant as of June 30, 2010 was approximately \$17.7 billion, based on the closing price of the registrant's Class A Common Stock as reported on the New York Stock Exchange as of the last business day of the registrant's most recently completed second quarter.

As of February 11, 2011, there were 397,612,895 shares of Class A Common Stock outstanding.

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**DOCUMENTS INCORPORATED BY REFERENCE**

Portions of the definitive proxy statement (the "Definitive Proxy Statement") to be filed with the Securities and Exchange Commission relative to the Company's 2011 Annual Meeting of Stockholders are incorporated by reference into Part III of this Report.

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**SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS**

This Annual Report contains statements about future events and expectations, or forward-looking statements, all of which are inherently uncertain. We have based those forward-looking statements on our current expectations and projections about future results. When we use words such as “anticipates,” “intends,” “plans,” “believes,” “estimates,” “expects,” or similar expressions, we do so to identify forward-looking statements. Examples of forward-looking statements include statements we make regarding future prospects of growth in the communications site leasing industry, the level of future expenditures by companies in this industry and other trends in this industry, the effects of consolidation among companies in our industry and among our tenants, our ability to maintain or increase our market share, our future operating results, our consideration to elect real estate investment trust status, our future purchases under our stock repurchase program, our future capital expenditure levels, our future financing transactions and our plans to fund our future liquidity needs. These statements are based on our management’s beliefs and assumptions, which in turn are based on currently available information. These assumptions could prove inaccurate. These forward-looking statements may be found under the captions “Business” and “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” as well as in this Annual Report generally.

You should keep in mind that any forward-looking statement we make in this Annual Report or elsewhere speaks only as of the date on which we make it. New risks and uncertainties arise from time to time, and it is impossible for us to predict these events or how they may affect us. In any event, these and other important factors, including those set forth in Item 1A of this Annual Report under the caption “Risk Factors,” may cause actual results to differ materially from those indicated by our forward-looking statements. We have no duty to, and do not intend to, update or revise the forward-looking statements we make in this Annual Report, except as may be required by law. In light of these risks and uncertainties, you should keep in mind that the future events or circumstances described in any forward-looking statement we make in this Annual Report or elsewhere might not occur.

## **PART I**

### **ITEM 1. BUSINESS**

#### **Overview**

We are a leading wireless and broadcast communications infrastructure company that owns, operates and develops communications sites. Our primary business is leasing antenna space on multi-tenant communications sites to wireless service providers and radio and television broadcast companies. We refer to this business as our rental and management operations, which accounted for approximately 98% of our total revenues for the year ended December 31, 2010. We also offer tower-related services domestically, including site acquisition, zoning and permitting services and structural analysis services, which primarily support our site leasing business and the addition of new tenants and equipment on our sites.

Our communications site portfolio includes wireless communications towers, broadcast communications towers and distributed antenna system (“DAS”) networks, which are collocation solutions to support seamless in-building and outdoor wireless coverage. Our portfolio consists of towers that we own and towers that we operate pursuant to long-term lease arrangements, including, as of December 31, 2010, approximately 20,900 towers domestically and approximately 13,900 towers internationally. Our portfolio also includes approximately 200 in-building and outdoor DAS networks that we operate in malls, casinos and other in-building applications, and select outdoor environments. In addition to the communications sites in our portfolio, we manage rooftop and tower sites for property owners.

American Tower Corporation was created as a subsidiary of American Radio Systems Corporation in 1995 and was spun off into a free-standing public company in 1998. Since inception, we have grown our communications site portfolio through acquisitions, long-term lease arrangements, development and construction of sites, and through mergers with and acquisitions of other tower operators.

American Tower Corporation is a holding company, and we conduct our operations through our directly and indirectly owned subsidiaries. Our principal domestic operating subsidiaries are American Towers, Inc. (“ATT”) and SpectraSite Communications, LLC (“SpectraSite”). We conduct our international operations through our subsidiary, American Tower International, Inc., which in turn conducts operations through its various international operating subsidiaries. Our international operations consist primarily of our operations in Brazil, Chile, Colombia, India, Mexico and Peru. In addition, as previously disclosed, we have entered into definitive agreements to acquire communications sites in South Africa and Ghana, and subject to customary closing conditions, we expect to close on initial tranches of communications sites during the first half of 2011.

Increased expansion activity in international markets and changes to our organizational structure have led us to separately disclose our rental and management operations in two reportable segments: domestic rental and management and international rental and management. Through our network development services segment, we also offer tower-related services domestically. Accordingly, our continuing operations are reported in three segments, domestic rental and management, international rental and management and network development services. For more information about our business segments, as well as financial information about the geographic areas in which we operate, see Item 7 of this Annual Report under the caption “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and note 18 to our consolidated financial statements included in this Annual Report.

#### **Products and Services**

##### ***Rental and Management Operations***

Our rental and management operations accounted for approximately 98%, 97% and 97% of our total revenues for the years ended December 31, 2010, 2009 and 2008, respectively. Our tenants lease space on our

communications site infrastructure, where they install and maintain their individual communications network equipment. Our revenue is primarily generated from tenant leases, and the annual rental payments vary considerably depending upon various factors, including but not limited to, tower location, amount of tenant equipment on the tower, ground space required by the tenant, and remaining tower capacity. Our tenant leases are typically non-cancellable and have annual rent escalations. Our primary costs typically include ground rent, property taxes and repairs and maintenance, which are primarily fixed, with annual cost escalations. In our international markets, a portion of our operating costs is passed through to our tenants, such as ground rent and fuel costs. Our rental and management operations have generated consistent incremental growth in revenue and have low cash flow volatility due to the following characteristics:

- **Consistent demand for our sites.** We have the ability to add new tenants and new equipment for existing tenants on our sites. Our legacy site portfolio and our established tenant base provide us with a diverse source of new business opportunities, which has historically resulted in consistent and predictable organic revenue growth.
- **Long-term tenant leases with contractual rent escalations.** In general, a tenant lease has an initial non-cancellable term of five to ten years with multiple five-year renewal terms thereafter, and lease payments that typically increase 3% to 5% per year. As a result, as of December 31, 2010, we had approximately \$13.5 billion of non-cancellable tenant lease revenue, absent the impact of straight-line lease accounting.
- **High lease renewal rates.** Our tenants tend to renew leases because suitable alternative sites may not exist or be available and repositioning a site in their network may be expensive and may adversely affect the quality of their network. Historical churn has been approximately 2% of total rental and management revenue per year.
- **High operating leverage.** Incremental operating costs associated with adding new tenants to an existing communications site are minimal. Therefore, as additional tenants are added, the substantial majority of incremental revenue flows through to operating profit.
- **Low maintenance capital expenditures.** On average, we require low amounts of annual capital expenditures to maintain our communications sites.

Our domestic rental and management segment is comprised of our nationwide network of communications sites that enable us to address the needs of national, regional, local and emerging communications service providers. Our domestic rental and management segment accounted for approximately 79%, 82% and 83% of our total revenues for the years ended December 31, 2010, 2009 and 2008, respectively.

Our international rental and management segment, which is comprised primarily of communications sites in Brazil, Chile, Colombia, India, Mexico and Peru, provides a source of diversification and growth. Our international rental and management segment accounted for approximately 19%, 15% and 14% of our total revenues for the years ended December 31, 2010, 2009 and 2008, respectively.

Our rental and management operations include the operation of wireless communications towers, broadcast communications towers and DAS networks, as well as rooftop management.

*Wireless Communications Towers.* We own and operate wireless communications towers in the United States, Brazil, Chile, Colombia, India, Mexico and Peru. Approximately 93%, 94% and 92% of revenue in our rental and management segments was attributable to our wireless towers for the years ended December 31, 2010, 2009 and 2008, respectively.

We lease space on our wireless communications towers to tenants in a diverse range of wireless services, including personal communications services, cellular, enhanced specialized mobile radio, WiMAX, paging and fixed microwave. Our four largest domestic and international tenants by revenue are as follows:

- **Domestic:** AT&T Mobility, Sprint Nextel, Verizon Wireless and T-Mobile USA accounted for approximately 74% of domestic rental and management segment revenue for the year ended December 31, 2010;
- **International:** Iusacell (Mexico), Idea Cellular (India), Nextel International (primarily through its operating subsidiaries in Brazil and Mexico) and Telefonica (through its various operating subsidiaries in Brazil, Chile, Colombia, Mexico, and Peru) accounted for approximately 58% of international rental and management segment revenue for the year ended December 31, 2010.

Accordingly, we are subject to certain risks, as set forth in Item 1A of this Annual Report under the caption “Risk Factors—Due to the long-term expectations of revenue growth from tenant leases, we are sensitive to changes in the creditworthiness and financial strength of our tenants” and “A substantial portion of our revenue is derived from a small number of customers.” In addition, we are subject to risks related to our international operations, as set forth under the caption “Risk Factors—Our foreign operations are subject to economic, political and other risks that could materially and adversely affect our revenues or financial position, including risks associated with fluctuations in foreign currency exchange rates.”

*Broadcast Communications Towers, DAS Networks and Rooftop Management.* In addition to our wireless communications towers, we also own and operate broadcast towers and DAS networks, and provide communications site management services to third parties.

- **Broadcast Communications Towers.** We are one of the largest independent owners and operators of broadcast towers in the United States and Mexico. We own approximately 200 broadcast towers in the United States and have exclusive rights to approximately 200 broadcast towers in Mexico. Broadcast towers generally are taller and structurally more complex than typical wireless communications towers, require unique engineering skills and are more costly to build. We lease space on our broadcast towers to a variety of tenants including wireless service providers, but the higher elevations on these towers are primarily leased to radio and television broadcast companies.
- **DAS Networks.** We own and operate approximately 200 DAS networks in malls, casinos and other in-building applications in the United States, Mexico and Brazil. We obtain rights from property owners to install and operate in-building DAS networks, and we grant rights to wireless service providers to attach their equipment to our installations. We also offer outdoor DAS networks as a complementary shared infrastructure solution for our tenants, and currently operate such networks in the United States. Typically, we design, build and operate our DAS networks in areas in which zoning restrictions or other barriers may prevent or delay deployment of more traditional wireless infrastructures.
- **Rooftop Management.** We provide management services to property owners in the United States who own rooftops that are capable of hosting wireless communications equipment. We obtain rights to manage a rooftop by entering into contracts with property owners pursuant to which we receive a percentage of occupancy or license fees paid by the wireless carriers and other tenants.

#### *Network Development Services*

Through our network development services segment, we offer tower-related services domestically, including site acquisition, zoning and permitting services and structural analysis services, which primarily support our site leasing business and the addition of new tenants and equipment on our sites. This segment accounted for approximately 2%, 3% and 3% of our total revenues for the years ended December 31, 2010, 2009 and 2008, respectively.

*Site Acquisition, Zoning and Permitting.* We engage in site acquisition services on our own behalf in connection with our tower development projects, as well as on behalf of our tenants. We typically work with our

tenants' engineers to determine the geographic areas where new tower sites will best address the tenants' needs and meet their coverage objectives. Once a new site is identified, we acquire the rights to the land or structure on which the site will be constructed, and we manage the permitting process to ensure all necessary approvals are obtained to construct and operate the communications site under applicable law.

*Structural Analysis.* We offer structural analysis services to wireless carriers in connection with the installation of their communications equipment on our towers. Our team of engineers can evaluate whether a tower can support the additional burden of the new equipment or if an upgrade is needed, which enables our tenants to better assess potential sites before making an installation decision. Our structural analysis capabilities enable us to provide higher quality service to our existing tenants by, among other things, reducing cycle times, as well as provide opportunities to offer structural analysis services to third parties.

## Strategy

### *Operational Strategy*

Our operational strategy is to capitalize on the growth in the use of wireless communications services and the evolution of advanced wireless handsets, as well as the expanding infrastructure required to deploy current and future generations of wireless communications technologies. To achieve this, our primary focus is to increase the leasing of our existing communications site portfolio, invest in and selectively grow our communications site portfolio, further improve upon our operational performance and maintain a strong balance sheet. We believe these efforts will further support and maximize our ability to capitalize on the growth in demand for wireless infrastructure.

- **Increase the leasing of our existing communications site portfolio.** We believe that our highest returns will be achieved by leasing additional space on our existing communications sites. As a result of wireless industry capital spending trends in the markets we serve, we anticipate consistent demand for our communications sites because they are attractively located for wireless service providers and have capacity available for additional tenants. As of December 31, 2010, we had an average of approximately 2.3 average tenants per tower. We believe that of our towers that are currently at or near full structural capacity, the vast majority can be upgraded or augmented to meet future tenant demand, with relatively modest capital investment. Therefore, we will continue to target our sales and marketing activities to increase the utilization, and return on investment of, our existing communications sites.
- **Invest in and selectively grow our communications site portfolio.** We seek opportunities to invest and grow our operations through our capital programs and acquisitions. We believe we can achieve attractive risk adjusted returns by pursuing such investments. This includes pursuing opportunities to invest through new site construction and acquisitions in our domestic and in select international markets which we believe have a high-growth wireless industry and are attractive from a macroeconomic standpoint.
- **Further improve on our operational performance.** We will continue to seek opportunities to improve our operational performance throughout the organization. This includes investing in our systems and people as we strive to improve our efficiencies and provide best in class service to our customers. To achieve this, we intend to continue to focus on customer service, such as reducing cycle times for key functions, including lease processing and tower structural analysis.
- **Maintain a strong balance sheet.** We will continue to maintain our disciplined approach to managing our balance sheet. This includes maintaining a target net leverage ratio and ensuring ample liquidity is available to pursue our strategy. As of December 31, 2010, we had approximately \$1.8 billion of available liquidity. We believe that our investment grade ratings and our current level of net leverage make us an attractive service provider partner for our tenants, and provide us with consistent access to the capital markets.



### ***Capital Allocation Strategy***

The objective of our capital allocation strategy is to simultaneously increase recurring free cash flow per share growth and our return on invested capital. To achieve this, we expect we will continue to deploy our capital through our annual capital expenditure program and acquisitions, while continuing our stock repurchase program or implementing a dividend program to the extent we determine it necessary or appropriate. During 2010, we generated approximately \$1.0 billion of cash provided by operating activities, which along with incremental debt, was used to fund nearly \$1.7 billion of investments, which included approximately \$346.7 million of capital expenditures, \$899.6 million of acquisitions and \$420.8 million of stock repurchases, including commissions and fees.

- **Annual capital expenditure program.** We will continue to reinvest in our existing assets and expand our existing communications site portfolio through our annual capital expenditure program. This includes capital expenditures associated with maintenance, increasing the capacity of our existing sites, and projects such as new site construction, land acquisitions, and shared generator installations. We believe we can achieve the highest incremental recurring free cash flow per share and returns on our invested capital through our annual capital expenditure program.
- **Acquisitions.** We will seek to pursue acquisitions of communications sites. This includes acquisitions in our existing or new markets where we can meet our return on investment criteria. When evaluating international investments, our return on investment criteria reflects the additional risks inherent to the particular geographic area.
- **Stock repurchase program.** If we have sufficient capital available to fund our capital expenditures and other acquisition opportunities, and we have access to capital available for anticipated future investment, we will seek to return that capital to shareholders. We currently utilize a stock repurchase program to facilitate this return and we may provide return to shareholders in the future through the payment of dividends should we elect real estate investment trust (“REIT”) status.

### ***International Expansion Strategy***

We believe that in certain international markets, we can create substantial value by establishing an independent wireless infrastructure leasing business. Therefore, we expect we will continue to seek international expansion opportunities, where our risk adjusted return objectives can be achieved. Our international expansion strategy includes a disciplined, individualized market evaluation, whereby we conduct the following analyses:

- **Country analysis.** Prior to pursuing a new geographical area, we review the country’s political stability, historical and projected macro-economic fundamentals and the general business environment, including property rights and regulatory environment.
- **Wireless industry analysis.** To ensure sufficient demand for an independent tower company, we analyze the competitiveness of the country’s wireless industry and the stage of its wireless network deployment. Characteristics that result in an attractive investment opportunity include a country that has multiple competitive wireless service providers who are actively seeking to invest in deploying voice and data networks, as well as spectrum auctions that have or that are anticipated to occur.
- **Opportunity and counterparty analysis.** Finally, once an investment opportunity is identified within a geographical area with a competitive wireless industry, we conduct a multifaceted opportunity and counterparty analysis. This includes evaluating the type of transaction, its ability to meet our risk adjusted return criteria for the country and the counterparties involved, as well as how the transaction fits within our long-term strategic objectives, including future potential investment and expansion within the region.

### ***Demand Drivers***

Our strategy is predicated on our belief that wireless service providers will continue to invest in their networks in both our domestic and international markets, driving demand for our communications sites:

- **Domestic wireless network investments.** Historically, according to industry data, aggregate annual wireless capital spending in the United States has typically been approximately \$20 to \$25 billion. As a result of this level of capital spending, demand for our site has remained consistent. Accordingly, demand for our domestic communications sites is driven by:
  - Wireless service provider focus on network quality and coverage as a competitive advantage;
  - Rapid subscriber adoption of third generation (“3G”) wireless data applications, such as email, internet access and video;
  - Pursuit of new avenues for growth by wireless service providers, such as deploying fourth generation (“4G”) technology based wireless networks to provide higher speed data services and enable fixed broadband substitution; and
  - Deployment of wireless networks by new market entrants.

As these factors continue to grow as a competitive necessity in the United States on a widespread basis, wireless service providers may be compelled to deploy new technology and equipment, further increase the cell density of their existing networks and expand their network coverage.

- **International wireless network investments.** The wireless networks in our served international markets are less advanced than those in our domestic market, with respect to the density of voice networks and the current technologies generally deployed for wireless services. Accordingly, demand for our international communications sites is primarily driven by:
  - Incumbent wireless service providers investing in existing voice networks to improve or expand their coverage and increase capacity;
  - In certain of our international markets, subscriber adoption of 3G wireless data applications, such as email, internet access and video; and
  - Spectrum auctions, which result in new market entrants, as well as initial data network deployments.

We believe demand for our communications sites will continue as wireless service providers seek to increase the quality and coverage of their networks, while also investing in next generation data networks. To meet this demand, we believe wireless carriers will continue to outsource their communications site infrastructure needs as a means to accelerate access to their markets and more efficiently use their capital, rather than construct and operate their own communications sites and maintain their own communications site service and development capabilities.

### **Recent Developments**

#### ***Growth and Expansion***

In 2010, we continued to focus on growing our operations using selective criteria for acquisitions and new site development, including expansion into new and existing international geographic areas. During the year ended December 31, 2010, we grew our communications site portfolio through acquisitions and construction activities, including the acquisition and construction of approximately 7,800 towers and the installation of approximately 30 in-building and outdoor DAS networks. In addition, we continue to evaluate complementary product lines such as shared generators to supplement our tower site growth and expansion strategy. We also continue to evaluate opportunities to acquire larger communications site portfolios that we believe we can effectively integrate into our portfolio.



*United States.* During 2010, in response to the needs of our tenants, we pursued the acquisition and construction of communications sites in select locations throughout the United States. Our expansion in the United States during 2010 included the acquisition and construction of approximately 900 towers and the installation of approximately 30 in-building and outdoor DAS networks.

*International.* During 2010, we increased our footprint in Latin America primarily through the acquisition and construction of approximately 1,700 towers in Brazil, Chile, Colombia, Mexico and Peru. During 2010, we also expanded our presence in India through the acquisition of Essar Telecom Infrastructure Private Limited (“ETIPL”), adding over 4,600 towers to our communications site portfolio. We also constructed approximately 500 towers in India. As previously disclosed, in 2010 we entered into definitive agreements to acquire communications sites in Brazil, Chile, Colombia, Ghana and South Africa, subject to customary closing conditions.

### ***Financing Transactions***

In 2010, we continued to raise capital to refinance our outstanding indebtedness and fund acquisitions. In August and December of 2010, we completed registered public offerings of \$700.0 million aggregate principal amount of our 5.05% senior notes due 2020 (“5.05% Notes”) and \$1.0 billion aggregate principal amount of our 4.50% senior notes due 2018 (“4.50% Notes”).

For more information about our financing transactions, see Item 7 of this Annual Report under the caption “Management’s Discussion and Analysis of Financial Condition and Results of Operations—Liquidity and Capital Resources” and notes 6 and 13 to our consolidated financial statements included in this Annual Report.

### **Regulatory Matters**

*Towers and Antennas.* Our domestic and international tower operations are subject to national, state and local regulatory requirements with respect to the registration, siting, lighting, marking and maintenance of our towers. In the United States, which accounted for approximately 81% of our total rental and management revenue for the year ended December 31, 2010, depending on factors such as tower height and proximity to public airfields, the construction of new towers or modifications to existing towers may require pre-approval by the Federal Communications Commission (“FCC”) and the Federal Aviation Administration (“FAA”). Towers requiring pre-approval must be registered with the FCC and painted, lighted and maintained in accordance with FAA standards. Similar requirements regarding pre-approval of the construction and modification of towers are imposed by regulators in other countries, such as the Ministry of Civil Aviation in India and the Ministry of Transportation and Telecommunications in Chile. Non-compliance with applicable tower-related requirements may lead to monetary penalties.

Furthermore, in India, each of our subsidiaries holds an Infrastructure Provider Category-I license (“IP-I”) issued by the Indian Ministry of Communications and Information Technology, which permits us to provide tower space to companies licensed as telecommunications service providers under the Indian Telegraph Act of 1885. While we are required to provide tower space on a non-discriminatory basis, we may negotiate mutually agreeable terms and conditions with such service providers. As a condition to the IP-I, the Indian government has the right to take over our infrastructure in the case of emergency or war.

In all countries where we operate, we are subject to zoning restrictions and restrictive covenants imposed by local authorities or community developers. These regulations vary greatly, but typically require tower owners and/or our tenants to obtain approval from local authorities or community standards organizations prior to tower construction or the addition of a new antenna to an existing tower. Local zoning authorities and community residents often oppose construction in their communities, which can delay or prevent new tower construction, new antenna installation or site upgrade projects, thereby limiting our ability to respond to customer demand. In addition, zoning regulations can increase costs associated with new tower construction and the addition of new

antennas to a site. Existing regulatory policies may adversely affect the associated timing or cost of such projects and additional regulations may be adopted that cause delays or result in additional costs to us. These factors could materially and adversely affect our construction activities and operations. In the United States, the Telecommunications Act of 1996 limits state and local zoning authorities by prohibiting any action that would discriminate between different providers of wireless services or ban altogether the construction, modification or placement of communications towers. It also prohibits state or local restrictions based on the environmental effects of radio frequency emissions to the extent the facilities comply with FCC regulations.

In addition, our tenants, both domestic and international, may be subject to new regulatory policies from time to time that may materially and adversely affect the demand for communications sites.

*Environmental Matters.* Our domestic and international operations, like those of other companies engaged in similar businesses, are subject to various national, state and local environmental laws and regulations, including those relating to the management, use, storage, disposal, emission and remediation of, and exposure to, hazardous and non-hazardous substances, materials, and wastes, and the siting of our towers. As an owner, lessee and/or operator of real property and facilities, we may have liability under environmental laws for the costs of investigation, removal or remediation of soil and groundwater contaminated by hazardous substances or waste. Certain of these laws impose cleanup responsibility and liability without regard to whether we, as the owner, lessee or operator, knew of, or were responsible for, the contamination, and whether or not we have discontinued operations or sold the property. We may also be subject to common law claims by third parties based on damages and costs resulting from off-site migration of contamination. We, and our customers, may be required to obtain permits, pay additional property taxes, comply with regulatory requirements, and make certain informational filings related to hazardous substances and devices used to provide power such as batteries, generators and fuel at our sites. Violations of these types of regulations could subject us to fines or criminal sanctions.

Additionally, in the United States, before constructing a new tower or adding a new antenna to an existing site, we must review and evaluate the impact of the action to determine whether it may significantly affect the environment and we must disclose any significant impacts in an environmental assessment. If a tower or new antenna might have a material adverse impact on the environment, FCC approval of the tower or antenna could be significantly delayed.

*Health and Safety.* In the United States and in other countries where we operate, we are subject to various national, state and local laws regarding employee health and safety, including protection from radio frequency exposure.

## **Competition and Customer Demand**

### ***Rental and Management Segments***

Our rental and management segments compete with other international, national and regional tower companies, primarily Crown Castle International Corp. and SBA Communications Corporation in the United States and Indus Towers in India, as well as wireless carriers and broadcasters that own and operate their own communications site networks and lease space to third parties, numerous independent tower owners and the owners of non-communications sites, including rooftops, utility towers, water towers and other alternative structures. We believe that site location and capacity, network density, price and quality of service have been and will continue to be significant competitive factors affecting owners, operators and managers of communications sites.

Customer demand is also affected by the emergence and growth of new technologies. Technologies that make it possible for wireless carriers to increase the capacity and efficiency of their existing networks could reduce customer demand for our communications sites. The increased use of spectrally efficient air access technologies, which potentially can relieve some network capacity problems, could reduce the demand for tower-based antenna space. Additionally, certain complementary network technologies, such as femtocells, could offload a portion of network traffic away from the traditional tower-based networks, which could reduce the need for carriers to add more equipment at certain communications sites.

In addition, any increase in the use of network sharing, roaming or resale arrangements by wireless service providers also could adversely affect customer demand for leasing tower space. These arrangements, which are essentially extensions of traditional roaming agreements, enable a provider to adequately serve its tenants outside its license area, to give licensed providers the right to enter into arrangements to serve overlapping license areas, and to permit non-licensed providers to enter the wireless marketplace. Consolidation among wireless carriers could similarly impact customer demand for our communications sites, because the existing networks of wireless carriers often overlap. In addition, if wireless carriers share their sites or swap their sites with other carriers to a significant degree, it could reduce demand for our communications sites.

### ***Network Development Services Segment***

Our network development services segment competes with a variety of companies offering individual, or combinations of, competing services. The field of competitors includes site acquisition consultants, zoning consultants, real estate firms, right-of-way consulting firms, structural engineering firms, tower owners/managers, telecommunications equipment vendors who can provide turnkey site development services through multiple subcontractors, and our customers' internal staffs. We believe that our customers base their decisions for network development services on various criteria, including a company's experience, local reputation, price, and time for completion of a project.

We believe that we compete favorably as to the key competitive factors relating to our domestic and international rental and management and network development services segments.

### **Employees**

As of December 31, 2010, we employed 1,729 full-time individuals and consider our employee relations to be satisfactory.

### **Available Information**

Our Internet website address is [www.americantower.com](http://www.americantower.com). Information contained on our website is not incorporated by reference into this Annual Report, and you should not consider information contained on our website as part of this Annual Report. You may access, free of charge, our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, and Current Reports on Form 8-K, plus amendments to such reports as filed or furnished pursuant to Sections 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended ("Exchange Act"), through the Investors portion of our website as soon as reasonably practicable after we electronically file such material with, or furnish it to, the Securities and Exchange Commission ("SEC").

We have adopted a written Code of Conduct that applies to all of our employees and directors, including, but not limited to, our principal executive officer, principal financial officer, and principal accounting officer or controller, or persons performing similar functions. The Code of Conduct, our corporate governance guidelines, and the charters of the audit, compensation, and nominating and corporate governance committees of our Board of Directors are available at the "Investors" portion of our website. In the event we amend the provisions of our Code of Conduct, or provide any waivers under the Code of Conduct for our directors or executive officers, we intend to disclose these events on our website as required by the regulations of the New York Stock Exchange and applicable law.

In addition, paper copies of these documents may be obtained free of charge by writing us at the following address: 116 Huntington Avenue, Boston, Massachusetts 02116, Attention: Investor Relations; or by calling us at (617) 375-7500.

TAB 13 A

Toronto Hydro-Electric System Limited Telephone: 416-542-2517  
14 Carlton Street Facsimile: 416-542-3024  
Toronto, Ontario M5B 1K5 [gwinn@torontohydro.com](mailto:gwinn@torontohydro.com)



September 22, 2011

***via RESS e-filing – signed original to follow by courier***

Ms. Kirsten Walli  
Board Secretary  
Ontario Energy Board  
PO Box 2319  
2300 Yonge Street, 27<sup>th</sup> floor  
Toronto, ON M4P 1E4

Dear Ms. Walli:

**Re: Toronto Hydro-Electric System Limited's ("THESL")  
Interrogatory Responses  
OEB File No. EB-2011-0120**

Please find attached THESL's responses to selected interrogatories in the above-noted proceeding. The accompanying Index lists the schedule numbers of the responses that have been filed to date. We continue to work diligently to complete the responses and will provide those as soon as possible.

Yours truly,

*[original signed by]*

Amanda Klein  
Senior Regulatory Counsel

:AA/acc

cc: J. Mark Rodger, Counsel for THESL, by electronic mail only  
Applicant and Intervenors of Record for EB-2011-0120, by electronic mail only

## **RESPONSES TO ONTARIO ENERGY BOARD STAFF INTERROGATORIES**

1 **INTERROGATORY 14:**

2 **Reference(s):** Vol1/Exh 2: Affidavit of Adonis Yatchew  
3 **Section C.4., pages 18 and 19**  
4

5 Please clarify whether to your knowledge Crown Castle or American Tower, or any  
6 company offering similar services with respect to wireless antenna siting services is  
7 operating anywhere in Ontario.  
8

9 **RESPONSE:**

10 Given the dominance of Crown Castle and American Tower in the market for wireless  
11 antenna siting services in the U.S., there is no reason to believe that a similar market for  
12 siting wireless antenna services could not develop in Ontario. Indeed, it is my  
13 understanding that Antenna Management Corporation offers sites in Toronto (See:  
14 <http://www.antennamgt.com/potential-sites>). SBA offers sites in Toronto and across  
15 Ontario (<http://map.sbasite.com/>). Please see the Affidavit of Mr. Starkey, page 32, lines  
16 1-3.  
17  
18

TAB 13 B

Toronto Hydro-Electric System Limited Telephone: 416-542-2517  
14 Carlton Street Facsimile: 416-542-3024  
Toronto, Ontario M5B 1K5 [gwinn@torontohydro.com](mailto:gwinn@torontohydro.com)



October 3, 2011

***via RESS e-filing – signed original to follow by courier***

Ms. Kirsten Walli  
Board Secretary  
Ontario Energy Board  
PO Box 2319  
2300 Yonge Street, 27<sup>th</sup> floor  
Toronto, ON M4P 1E4

Dear Ms. Walli:

**Re: Toronto Hydro-Electric System Limited's ("THESL")  
Interrogatory Responses  
OEB File No. EB-2011-0120**

Please find attached THESL's responses to selected interrogatories in the above-noted proceeding. The accompanying Index lists the schedule numbers of the responses that have been filed to date.

Also attached are corrections to the following responses that were previously filed:

Tab 1, Schedule 30  
Tab 1, Schedule 31

THESL has now responded to all interrogatories from Parties in this phase of the proceeding.



Should you have any questions, please feel free to contact me at 416-542-2729 or at [aklein@torontohydro.com](mailto:aklein@torontohydro.com)

Yours truly,

*[original signed by]*

Amanda Klein  
Senior Regulatory Counsel

:AA/acc

cc: J. Mark Rodger, Counsel for THESL, by electronic mail only  
Applicant and Intervenors of Record for EB-2011-0120, by electronic mail only

## **RESPONSES TO CONSUMERS COUNCIL OF CANADA INTERROGATORIES**

**INTERROGATORY 15:**

**Reference(s):**        **Affidavit of Mary Byrne**

THESL's current charge for wireline attachers is \$22.35/pole/per year. In addition, THESL has historically charged prospective telecom attachers a \$95 application charge to recover the costs of processing those applications.

a) Do these charges fully recover the costs associated with the attachments? If not, please explain the extent to which other customers subsidize the attachments.

b) For 2008, 2009, and 2010 please list the number of wireline and wireless attachments on THESL's system and the associated revenue received for each type for each year. What was the estimated annual cost for each type of attachment in each of those years?

**RESPONSE:**

a) The hosting costs driven by wireless attachments can be divided into two categories: non-incremental asset carrying and maintenance costs related to existing poles, and incremental administrative, application processing, and make ready costs. These costs can also be further divided into two categories depending on whether they are one-time costs or ongoing.

In the CCTA Decision, the formula used to derive the charge of \$22.35 per pole per year predominantly reflected non-incremental costs, or what the Board termed Indirect Costs. Indirect or non-incremental costs are those which do not (materially) vary with the presence of wireless attachments. These were the asset carrying costs including depreciation, return, and taxes, as well as pole maintenance

## **RESPONSES TO CONSUMERS COUNCIL OF CANADA INTERROGATORIES**

costs. 'Indirect Costs' constituted \$20.43 out of a total of \$22.35, or more than 91% of the total. Of the indirect costs, asset carrying costs were \$18.76, and maintenance costs were \$1.67. 'Direct Costs' or incremental costs were set at \$1.92.

### **INDIRECT (NON-INCREMENTAL) COSTS**

The principle underlying the predominant portion of the \$22.35 rate was that of the sharing of non-incremental costs among pole occupants, rather than recovery of the incremental costs of hosting attachments. The sharing of these costs was based on the proportions of pole occupancy.

**Asset Carrying Costs:** Although the component parts of the asset carrying costs have varied in different directions since the CCTA Decision, THESL believes that the \$18.76 figure significantly understates the proportion of asset carrying costs that should be borne by wireless attachments, both because: (a) the asset carrying costs for utilities are higher than those represented by the proxy for provincial average costs employed at the time; and (b) the pole occupancy assumed in the formula understates that of wireless attachments. In particular, due to the much greater size and (non-uniform) configuration of wireless ancillary equipment attachments compared to wireline attachments, the assumption of approximately 2.5 attachments per pole is not realistic or appropriate.

If necessary and at the appropriate time, THESL will bring evidence as to its carrying costs and the occupancy factor that it believes should apply to wireless attachments.

## **RESPONSES TO CONSUMERS COUNCIL OF CANADA INTERROGATORIES**

**Pole Maintenance Costs:** These costs (including tree trimming) may to some degree be affected by the presence of wireless attachments. However, even if it is assumed there are no incremental pole maintenance costs due to wireless attachments, they should nevertheless be shared based on proportions of pole occupancy. While this general principle was reflected in the CCTA Decision, THESL believes that the proxy figure incorporated in the formula understates the share of costs that should be borne by wireless attachments due to the understatement of their pole occupancy. Further, pole maintenance costs themselves may also be higher than those reflected in the proxy figure used in the CCTA Decision. In particular, because wireless attachments were not contemplated in the CCTA Decision or CCTA proceeding, the \$1.67 figure did not take account of the additional complexities posed by the presence of wireless attachments on utility poles, and in particular, the way in which those attachments can lengthen and complicate maintenance work in the ordinary course (see affidavit of Ms. Byrne at paragraphs 40-50).

### **DIRECT (INCREMENTAL) COSTS**

Incremental costs of hosting attachments include items such as application processing, records management, billing and payment processing, and ongoing asset administration costs related to pole management (i.e., relocation of poles etc). In addition, circumstances at individual poles may dictate that make ready work is necessary, ranging from the relocation of existing attachments to pole replacement.

## RESPONSES TO CONSUMERS COUNCIL OF CANADA INTERROGATORIES

Incremental costs (excluding make ready work) are reflected to an inadequate extent in the CCTA Decision. That formula reflected a total of \$1.92 per pole per year for 'Administration Costs' and 'Loss in Productivity'. THESL's position is that, *de facto*, this portion of the rate clearly excludes the considerable costs incurred by THESL to process wireless attachment applications.

A categorical breakdown of these attachment hosting costs is given in the table below.

| <b>Cost Type/<br/>Category</b> | <b>INCREMENTAL</b>                                                  | <b>NON-<br/>INCREMENTAL</b>                |
|--------------------------------|---------------------------------------------------------------------|--------------------------------------------|
| <b>ONGOING</b>                 | Record Keeping,<br>Billing & Payment Processing,<br>Pole Management | Pole Maintenance*,<br>Asset Carrying Costs |
| <b>ONE-TIME</b>                | Application Processing,<br>Make-Ready Costs                         |                                            |

*\* assumes that incremental pole maintenance costs are not material*

Of the One-Time costs, make-ready costs are charged directly to attachers on a cost-recovery basis in the same manner as other demand-billable work. With respect to application processing costs, THESL sets out below the shortfalls it has experienced between the revenues generated (and credited to customers through revenue offsets) by the \$95 application charge.

|               | <b>2008</b> | <b>2009</b> | <b>2010</b> |
|---------------|-------------|-------------|-------------|
| <b>Permit</b> | \$39, 710   | \$107,825   | \$95,755    |

## RESPONSES TO CONSUMERS COUNCIL OF CANADA INTERROGATORIES

|                                                     |              |              |              |
|-----------------------------------------------------|--------------|--------------|--------------|
| <b>administration<br/>charge (\$95)<br/>revenue</b> |              |              |              |
| Staff costs to<br>process permits                   | \$160,781.84 | \$114,595.84 | \$695,798.80 |

### SUMMARY

THESL believes incremental, ongoing costs exceed the \$1.92 per pole per year provided for in the current rate. Similarly, the actual non-incremental, ongoing asset carrying and pole maintenance costs exceed the amounts of \$18.76 and \$1.67 per pole per month respectively as currently set.

- b) The table below provides information on the number of permits processed, revenue from permit administration, and associated staff costs of the permitting function. It also provides the number of invoiced attachments and the corresponding revenue from the attachment rate. However, THESL has not completed, and cannot complete within the timeline for this proceeding, an exhaustive analysis of the categorical costs set out in a) above that correspond to the attachment revenue. Further, any such cost analysis would be dependant on future contingent factors, such as the Board's decision in this proceeding.

## RESPONSES TO CONSUMERS COUNCIL OF CANADA INTERROGATORIES

| <b>Wireless and Wireline Attachments</b>                |             |             |             |
|---------------------------------------------------------|-------------|-------------|-------------|
|                                                         | <b>2008</b> | <b>2009</b> | <b>2010</b> |
| <b>Number of permits</b>                                | 418         | 1,135       | 1,029       |
| <b>Number of attachments invoiced</b>                   | 75,462      | 77,550      | 79,590      |
| <b>Total revenue from invoices (taxes not included)</b> | \$1,686,576 | \$1,733,243 | \$1,778,837 |

TAB 14 A





**Fraser Milner Casgrain LLP**

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**FILED ELECTRONICALLY AND VIA COURIER**

**Helen T Newland**

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DIRECT 416-863-4471

November 16, 2011

Ms. Kirsten Walli  
Board Secretary  
Ontario Energy Board  
2300 Yonge Street  
PO Box 2319, 27th Floor  
Toronto, ON  
M4P 1E4

Dear Ms. Walli:

**RE:           Application by Canadian Distributed  
              Antenna Systems Coalition ("CANDAS");  
              Board File No.: EB-2011-0120**

We represent CANDAS in connection with its application to the Board regarding access to the power poles of licensed electricity distributors for the purpose of attaching wireless telecommunications equipment ("**Application**").

CANDAS is filing the Responses to Undertakings given at the Technical Conference held on November 4, 2011. In the Response to Undertaking JTC1.3, where we have provided a reference to CANDAS' prior responses to interrogatories, we have used the following protocol, consistent with the protocol established in our October 26, 2011 filing: *e.g.*, CANDAS (THESL) 1 would be a reference to CANDAS' response to THESL interrogatory number 1 on CANDAS' Application and Written Evidence.

CANDAS will file two paper copies of the above-noted evidence as soon as possible.

Yours very truly,

***(signed) H.T. Newland***

HTN/ko

Encls.

cc:       All Intervenors

## I. Application<sup>1</sup>

### Questions:

1. *Reference: p. 4 and 21, paras. 2.8, 2.9 and 7.10*

At p. 2.8, CANDAS states that: “Moreover, Canadian carriers who require access to power poles to enable their wireless networks are now effectively precluded from entering the market. This is either because they are unable to obtain pole access at all, or because the terms and conditions of such access are completely indeterminate or subject to such uncertainties as to preclude the requisite capital investments. If left unchecked, the ability of electricity distributors to use their monopoly power to unduly discriminate among Canadian carriers by unilaterally deciding who may have access to regulated assets and who may not, will materially and adversely affect the development of a competitive wireless industry in Ontario.” (emphasis added)

Later, paragraph 7.10, CANDAS states that “As a result of the continuing delays in permit processing and the uncertainty as to when the Toronto DAS Network would be 100 percent completed, Public Mobile decided to launch its new Toronto service using “temporary” Macro Cell Sites. Accordingly, Public Mobile, ExteNet and DAScom agreed to terminate arrangements for the committed use of the Toronto DAS Network by Public Mobile. Although Public Mobile is still interested in utilizing DAS technology for portions of its network in Toronto, it will not commit to do so unless and until it receives credible assurances, including assurances that THESL will grant timely and long-term pole access for node and fibre attachments.”

- (a) Please describe in greater detail all of the other alternatives available to Canadian carriers - such as Public Mobile - to the Toronto DAS Network solution proposed by ExteNet and DAScom.
- (b) From the evidence of CANDAS, it appears that Public Mobile is currently using a “Macro Cell Site” alternative to the Toronto DAS Network. Please provide particulars on how a Macro Cell Site approach can be used to provide service to Canadian carriers.
- (c) Who are the vendors from whom Canadian carriers - such as Public Mobile - that can purchase “Macro Cell Site” service? Rogers? Bell? Telus? American Tower? Crown Castle? Please identify any others.

---

<sup>1</sup> As filed April 21, 2011.

- (d) What is the total cost being paid by Public Mobile for use of the Macro Cell Site alternative for coverage in the exact service area that is proposed to be covered by the Toronto DAS Network?
- (e) What is the difference in total cost between Public Mobile's "Macro Cell Site" alternative currently being used by Public Mobile and the forecasted costs of the Toronto DAS Network proposed by ExteNet and DAScom?
- (f) Please specify and provide the relevant particulars regarding Public Mobile's likely use of a DAS network, how many nodes it would require within its current business planning period, where those nodes would be located, and what proportion of its traffic volumes would be handled through such a network.

**Responses:**

- (a) The Application and the written evidence in the record contain sufficient detail as to the limited alternatives available to wireless carriers and demonstrate that such alternatives are not the equivalent of a DAS network solution. To the extent that this Interrogatory seeks greater detail about a specific network project or a particular carrier network, the information requested is not relevant to the issues raised by the Application. Moreover, production of this information would be unduly onerous relative to its probative value, if any.
- (b) See response to THESL 1(a).
- (c) See response to THESL 1(a).
- (d) The information requested is not relevant to the issues raised by the Application.
- (e) The information requested is not relevant to the issues raised by the Application.
- (f) ~~The information requested is not relevant to the issues raised by the Application.~~ Public Mobile does not have the information required to answer this interrogatory in relation to the City of Toronto. As a result of DAScom's inability to attach the wireline cabling required to provide network connectivity to the installed wireless nodes on THESL's poles, the contract between Public Mobile and ExteNet Canada was terminated. DAScom's inability to attach the wireline cabling required to provide wireline connectivity to and from the installed wireless nodes was the direct result of THESL's failure to process Cogeco's wireline attachment applications in a timely fashion.

As a further consequence and as stated in the evidence of Mr. Brian O'Shaughnessy at p.8, Q.12, Public Mobile abandoned its plans to use distributed antenna system (DAS) technology and redesigned its network based on macrocell technology. The ability of Public Mobile or of any other mobile wireless carrier to rely on innovative, smaller-cell, mobile wireless deployment technologies of their choosing in Toronto to achieve blanket outdoor coverage, will depend on the outcome of this proceeding.

TAB 14 B



**Fraser Milner Casgrain LLP**

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**FILED ELECTRONICALLY AND VIA COURIER**

**Helen T Newland**

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DIRECT 416-863-4471

August 16, 2011

Ms. Kirsten Walli  
Board Secretary  
Ontario Energy Board  
2300 Yonge Street  
PO Box 2319, 27th Floor  
Toronto, ON  
M4P 1E4

Dear Ms. Walli:

**RE:           Application by Canadian Distributed  
              Antenna Systems Coalition ("CANDAS");  
              Board File No.: EB-2011-0120**

We represent CANDAS in connection with its application to the Board regarding access to the power poles of licensed electricity distributors for the purpose of attaching wireless telecommunications equipment ("**Application**").

In accordance with Procedural Order No. 1, CANDAS is filing the Responses to Interrogatories of Toronto Hydro-Electric System Limited.

CANDAS will file two paper copies of the above-noted evidence tomorrow.

Yours very truly,

***(signed) H.T. Newland***

HTN/ko

cc:       Mr. George Vinyard  
          ExteNet Systems, Inc.  
          Mr. Mark Rodger  
          Borden Ladner Gervais  
          All Intervenors

**IN THE MATTER OF** the *Ontario Energy Board Act, 1998*, S.O. 1998, c. 15, (Schedule B);

**AND IN THE MATTER OF** an Application by the **Canadian Distributed Antenna Systems Coalition** for certain orders under the *Ontario Energy Board Act, 1998*.

**RESPONSES TO INTERROGATORIES OF  
TORONTO HYDRO-ELECTRIC SYSTEM LIMITED  
(on the evidence of the Applicant, CANDAS)**

**August 16, 2011**

**Questions:**

**2.**     *Reference: p. 9, para. 3.11*

CANDAS states “That the parties’ settlement on this issue was reached after “considerable discussion” and resulted in universal access by all Canadian carriers (with only the Bell Canada carve out) is significant. As appears from the THESL Letter, THESL now takes the position that the CCTA Order does not apply to wireless attachments because there was no discussion about such attachments during the CCTA Proceeding and the Board never “turned its mind” to this issue. To suggest that wireless attachments are not within the scope of the CCTA Order because the issue was not debated in the CCTA Proceeding ignores the fact that the parties in that proceeding had already agreed, as part of the settlement, that access should be given to all Canadian carriers and not just to wireline carriers. Accordingly, there was no need for further discussion of this issue during the CCTA Proceeding. Moreover, to now suggest that the Board never turned its mind to the issue is to suggest that the Board and Board counsel did not apprehend that the definition of “Canadian carrier” included wireless carriers. Such a suggestion would be quite remarkable.”

- (a)     Are wireless attachments explicitly discussed anywhere in the CCTA Decision?
- (b)     In the CCTA Decision, the Board was focused specifically on attachments made within the 2ft communications space on distribution poles. Please confirm whether all of the proposed Toronto DAS Network distribution pole attachments fit strictly within the 2ft communications space. Alternatively, please identify those components associated with the Toronto DAS Network that require attachment to the utility pole outside of the 2ft communications space.
- (c)     In the CCTA Decision, the Board determined that 2.5 attachments per pole was reasonable in the context of its Decision. In respect of the Toronto DAS Network, could 2.5 wireless distribution pole attachments be made to each distribution pole within the 2ft communications space? Please provide the relevant particulars regarding the response.
- (d)     At paragraph 3.15, CANDAS notes that “The Board ultimately decided the pole charge issue in a way that did not distinguish among various types of attachments.” Are there any notable differences between wireline and wireless attachments? Did the Board explore these differences in the CCTA Decision? If so, please provide the relevant particulars, including specific references to the CCTA Decision.



**Responses:**

- (a) See response to CCC 1.
- (b) CANDAS does not understand the communications space on a pole to invariably be 2 feet. Rather, the communications space is the standard clearance between the power and neutral zones above, and the required clearance above grade for cable spans below. Components of the Toronto DAS Network that attach outside (below) the allocated communications space on node site poles include remote radio units, power supplies and related elements such as cables, connectors and switches, as described in the Written Evidence of Tormod Larsen (Exhibit D, sheets 3 and 4 of 4).
- (c) In the CCTA Order, the Board adopted an assumption regarding the number of attachers, not the number of separate attachments, in respect of its determination of rates. CANDAS does not understand the Board to have made a determination regarding a reasonable number of attachments to a node site pole or the location thereof.

Depending on the nature and arrangement of the components attached to the pole and the size of the communications space on the pole, CANDAS believes that more than 2.5 attachments can appropriately be affixed to the communications space.

CANDAS has never suggested that a particular number of wireless attachments should be made "to each distribution pole" and, in fact, has noted that the numbers of poles to which wireless equipment may be attached are small in relation to the total number of distribution poles.

Wireline and wireless attachments include components that are not designed to, and do not need to fit within the communication space.

- (d) CANDAS does not believe there are any differences between wireline and wireless attachments that are of significance for purposes of this proceeding.

TAB 14 C



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**Helen T Newland**

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August 16, 2011

Ms. Kirsten Walli  
Board Secretary  
Ontario Energy Board  
2300 Yonge Street  
PO Box 2319, 27th Floor  
Toronto, ON  
M4P 1E4

Dear Ms. Walli:

**RE:           Application by Canadian Distributed  
              Antenna Systems Coalition ("CANDAS");  
              Board File No.: EB-2011-0120**

We represent CANDAS in connection with its application to the Board regarding access to the power poles of licensed electricity distributors for the purpose of attaching wireless telecommunications equipment ("**Application**").

In accordance with Procedural Order No. 1, CANDAS is filing the Responses to Interrogatories of Toronto Hydro-Electric System Limited.

CANDAS will file two paper copies of the above-noted evidence tomorrow.

Yours very truly,

***(signed) H.T. Newland***

HTN/ko

cc:       Mr. George Vinyard  
          ExteNet Systems, Inc.  
          Mr. Mark Rodger  
          Borden Ladner Gervais  
          All Intervenors

**IN THE MATTER OF** the *Ontario Energy Board Act, 1998*, S.O. 1998, c. 15, (Schedule B);

**AND IN THE MATTER OF** an Application by the **Canadian Distributed Antenna Systems Coalition** for certain orders under the *Ontario Energy Board Act, 1998*.

**RESPONSES TO INTERROGATORIES OF  
TORONTO HYDRO-ELECTRIC SYSTEM LIMITED  
(on the evidence of the Applicant, CANDAS)**

**August 16, 2011**

**Questions:**

**3.**     *Reference: p. 12 and 14, paras. 4.1 and 5.9*

CANDAS states at paragraph 4.1 that “CANDAS was formed for the purpose of promoting the ongoing improvement of wireless communications services in Canada, by creating an environment conducive to the rapid deployment of DAS networks in those areas where DAS technology offers technical, economic and environmental advantages that cannot be realized through traditional macro cell site infrastructure.”

CANDAS states at paragraph 5.9 that “In the United States, DAS networks have been successfully deployed in most major cities. Such networks typically utilize hydro and telephone poles.” (emphasis added)

- (a)     Has ExteNet, Public Mobile, or DAScom considered, either together or individually, any other alternatives to siting, and deployed its proposed Toronto DAS Network other than using distribution utility poles?
- (b)     If the answer to (a) is yes, please describe each of the other alternatives that have been considered and please provide all attachment agreements in the possession of any of the CANDAS group of companies relating to each of these alternatives.
- (c)     If the answer to (a) is no - why hasn't CANDAS explored other alternatives? Please provide the relevant particulars.
- (d)     Is CANDAS aware of outdoor DAS networks in the United States that have been deployed using assets other than distribution utility poles? Please elaborate on the specific examples of which CANDAS is aware, including providing details on what asset the wireless antenna is attached to.

**Responses:**

- (a)     Yes.     -
- (b)     ExteNet and DAScom have considered the following alternatives to electric distribution utility poles:
  - 1.     Streetlight poles owned by THESI.
  - 2.     Bell Canada poles.
  - 3.     Various methods of installing fibre optic cabling in new underground conduits (as an alternative to new aerial fibre deployments by Cogeco).

4. Traffic light standards and other municipal "street furniture".
5. Installation of new node poles in the public rights of way.

Except for the pole access agreement with THESI, there are no attachment agreements with respect to any of the foregoing alternatives because with the exception of the THESI streetlight poles none of the foregoing alternatives was deemed to be a viable alternative means of providing effective DAS network services to meet the needs of Public Mobile and possibly other wireless carriers in Toronto.

- (c) Not applicable.
- (d) CANDAS is aware of a limited number of instances in which DAS networks have been deployed in the United States using assets other than electric distribution poles. These instances generally fall into two categories:
  1. Areas in which all electric distribution lines have been placed underground so that there are no distribution poles. These are primarily city centers, but also include some (usually newer) residential areas and institutional campuses. For example, in Las Vegas, fibre optic cabling was deployed in underground and newly installed conduits owned by the local electric utility. New poles were constructed in the public rights of way for mounting communications nodes. In Chicago, fibre optic cabling was deployed in existing conduits. Nodes were mounted on streetlight poles pursuant to a City Ordinance dealing specifically with attachments to city-owned structures.
  2. Areas in which other utility poles or similar structures (e.g., telephone company poles that are not also used for electric distribution under a joint use agreement or municipal streetlight poles) are available and better located for the purposes of DAS network deployment.

TAB 14 D



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August 19, 2011

Ms. Kirsten Walli  
Board Secretary  
Ontario Energy Board  
2300 Yonge Street  
PO Box 2319, 27th Floor  
Toronto, ON  
M4P 1E4

Dear Ms. Walli:

**RE:           Application by Canadian Distributed  
              Antenna Systems Coalition ("CANDAS");  
              Board File No.: EB-2011-0120**

We represent CANDAS in connection with its application to the Board regarding access to the power poles of licensed electricity distributors for the purpose of attaching wireless telecommunications equipment ("**Application**").

In accordance with Procedural Order No. 1, CANDAS is filing the Responses to Interrogatories of Canadian Electricity Association.

CANDAS will file two paper copies of the above-noted evidence as soon as possible.

Yours very truly,

***(signed) H.T. Newland***

HTN/ko

cc:       Mr. George Vinyard  
          ExteNet Systems, Inc.  
          Mr. Mark Rodger  
          Borden Ladner Gervais  
          All Intervenors



**IN THE MATTER OF** the *Ontario Energy Board Act, 1998*, S.O. 1998, c. 15, (Schedule B);

**AND IN THE MATTER OF** an Application by the **Canadian Distributed Antenna Systems Coalition** for certain orders under the *Ontario Energy Board Act, 1998*.

**RESPONSES TO INTERROGATORIES OF  
CANADIAN ELECTRICITY ASSOCIATION  
(on the evidence of the Applicant, CANDAS)**

**August 19, 2011**

**Questions:**

28. At question 6, page 5 of Vinyard's evidence, Vinyard states that "[w]ithout such provisions, DAS technology cannot be made available in a given market and any policy mandating access to electricity distribution poles is likely to be severely undermined, if not rendered entirely illusory."
- (a) The claim that "without such provisions, DAS technology cannot be made available" suggests that it will not be available in wholly underground areas that have been the norm since the mid-1970's. Is this what CANDAS believes?
  - (b) If DAS technology is not made available, what services will not be provided in areas with electric utility poles? In areas without electric utility poles?
  - (c) In 2004 during the CCTA application to the OEB about access to power poles, the OEB reviewed the negotiated agreement terms and conditions and did not apply regulatory oversight to the agreement but only determined an annual attachment rate. What has changed for the OEB to now consider CANDAS's application for oversight on the agreement terms and conditions?

**Responses:**

- (a) No. The quoted statement was made in the context of a discussion of the terms and conditions that should apply with respect to areas in which there are, in fact, above-ground utility poles. While it is possible that DAS network deployments may not be permitted or economically feasible in some areas where utilities are "wholly underground", CANDAS believes that in many such areas, the availability of underground ducts and other factors (such as greater willingness of local authorities to allow installation of DAS nodes on existing or new street lamp posts or other poles in the public rights-of-way) may enable successful DAS deployments. See responses to THESL 3(d).1, 37(c) and EDA 7.
- (b) See Application, section 5, Written Evidence of George Vinyard, and Written Evidence of Tormod Larsen (Q. 6).
- (c) The question misrepresents the facts. In the CCTA Proceeding, the Board did exercise regulatory oversight over conditions of pole access in the CCTA Order. The CCTA Order states as follows: "Under the Settlement Agreement, the parties agreed to negotiate the terms and conditions once the Board has made its determination as to the rate. The parties agreed to report back to the Board in four months as to the progress of these negotiations. The Board accepts this

approach". See also Application, Section 10, as to the reasons why the determination of terms and conditions of access cannot be left to negotiations between utilities and attachers.

TAB 14 E



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August 22, 2011

Ms. Kirsten Walli  
Board Secretary  
Ontario Energy Board  
2300 Yonge Street  
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Toronto, ON  
M4P 1E4

Dear Ms. Walli:

**RE:           Application by Canadian Distributed  
              Antenna Systems Coalition ("CANDAS");  
              Board File No.: EB-2011-0120**

We represent CANDAS in connection with its application to the Board regarding access to the power poles of licensed electricity distributors for the purpose of attaching wireless telecommunications equipment ("**Application**").

In accordance with Procedural Order No. 1, CANDAS is filing the Responses to Interrogatories of Energy Probe.

CANDAS will file two paper copies of the above-noted evidence as soon as possible.

Yours very truly,

***(signed) H.T. Newland***

HTN/ko

cc:       Mr. George Vinyard  
          ExteNet Systems, Inc.  
          Mr. Mark Rodger  
          Borden Ladner Gervais  
          All Intervenors

**IN THE MATTER OF** the *Ontario Energy Board Act, 1998*, S.O. 1998, c. 15, (Schedule B);

**AND IN THE MATTER OF** an Application by the **Canadian Distributed Antenna Systems Coalition** for certain orders under the *Ontario Energy Board Act, 1998*.

**RESPONSES TO INTERROGATORIES OF**  
**ENERGY PROBE RESEARCH FOUNDATION**  
**("ENERGY PROBE")**  
**(on the evidence of the Applicant, CANDAS)**

**August 22, 2011**

**Interrogatory #7**

**Ref: Exh. C, Written Evidence of Tormod Larsen, July 26, 2011**

**Issue: Las Vegas – DAS Nodes**

**Question:**

It appears that the DAS equipment deployed in Las Vegas is installed on a pole adjacent to a local hydro pole providing street lighting.

Did ExteNet deploy its own poles in Las Vegas or did it use poles owned by the local electric distribution company? If the former, what were the circumstances?

**Response:**

ExteNet Systems deployed its own poles in Las Vegas at considerable cost in order to honour a commitment to its wireless carrier customer regarding time to market. See also Response to THESL 37(c).

TAB 15



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July 12, 2012 (**Revised**)

**Delivered by Email, RESS & Delivered**

Ms. Kirsten Walli, Board Secretary  
Ontario Energy Board  
2300 Yonge Street, Ste. 2701  
Toronto ON M4P 1E4

Dear Ms. Walli:

**Re: Toronto-Hydro Electric System Limited (“THESL”)  
CANDAS Proceeding (EB-2011-0120)  
Amendments to the Evidentiary Record and New Information  
Confidential Filings**

Pursuant to Rule 11.02 of the Board’s *Rules of Practice and Procedure*, and as set out and explained below, THESL writes to notify the Board of new information constituting a material change to the evidence already before the Board that is directly relevant to the Board’s determination in this proceeding and seeks an amendment to the evidentiary record regarding the same.

In CANDAS IR#5(e), CANDAS asked THESL:

*“Do any third parties currently have any wireless attachments on THESL owned or controlled poles? If yes, provide all applicable agreements regarding these attachments and describe, for each third party,*

*(i) What type of wireless attachment is located on the poles*

*(ii) The total number of each type of wireless attachment located on the poles*

*(iii) The attachment rate, and all other applicable fees, paid by such third party*

*(iv) The permitted term of each wireless attachment*

*(v) Whether there are also wireline attachments associated with any of the wireless attachments*

*(vi) The number of associated wireline attachments”*

THESL takes note of the Board’s Decision at page 8 of its December 9, 2011 Decision and Order that:

“The Board finds that certain information and materials sought in these IRs are relevant to the issues in this proceeding. The Board will be determining whether to mandate access for wireless attachments to distributor poles. The Board finds that information as to the other attachments THESL is making (t ) and under what arrangements those attachments are being made (price and terms and conditions) is relevant to the issues in this proceeding. The Board also recognizes that these various other attachments may or may not be comparable to the wireless attachments sought by CANDAS. The Board will be able to assess that comparability better if it understands more fully the circumstances that surround these other attachments. THESL has provided evidence related to the potential alternative sites for wireless attachments. Similarly, the Board finds it relevant to understand the other types of attachments on distributor poles for comparison purposes.

[...]

The Board concludes that information relating to all attachments which facilitate wireless communications in any form is relevant to the proceeding.

The Board will order THESL to:

- a) identify the parties (including the TTC and One Zone and any other parties with attachments which facilitate wireless communications) that currently have wireless attachments on THESL’s poles;
- b) provide THESL’s master agreement with each party;
- c) identify the price for the wireless attachments (if not covered in b);
- d) identify the approximate number of attachments for each party; and
- e) identify whether there are associated wireline attachments for the wireless attachments.”

THESL further takes note of the Board’s determination on page 5 of the January 20, 2012 Decision on Motion and Procedural Order No. 8, where the Board reiterated its finding from the December 9, 2011 Decision and Order in this proceeding that “the price THESL charges for other wireless attachments is directly relevant to the issues before the Board.”

THESL therefore writes to notify the Board, pursuant to Rule 11.02 of the Board’s *Rules of Practice and Procedure*, of new information constituting a material change to evidence already before the Board that is directly relevant to the Board’s determination in this proceeding particularly in light of the aforementioned findings of the Board.

Pursuant to Rule 11, THESL seeks an amendment to the evidentiary record to include the enclosed term sheet and agreement regarding wireless attachments on THESL poles, which THESL refers to as Term Sheet A and Agreement A (collectively the “New Confidential

Information”). As explained below, THESL is filing this New Confidential Information with the Board, in its entirety, pursuant to the Board’s *Practice Direction On Confidential Filings*.

The New Confidential Information involves a new agreement for wireless attachments which THESL has very recently negotiated with an arm’s-length commercial party within the City of Toronto. The arrangements involve wireless attachments on THESL’s distribution poles.

The Board will note that the wireless attachment rate negotiated and agreed to by the arm’s length third party is significantly higher than the Board’s regulated rate for wireline attachments. The net income derived from THESL’s negotiated wireless attachment rates ultimately benefit its customers as a set-off against THESL’s distribution revenue requirement.

The New Confidential Information is directly relevant to the issues before the Board and directly responsive to the interrogatory of CANDAS as referenced above. The agreement illustrates that a market for wireless attachments exists within the City of Toronto and that THESL has been successful in negotiating acceptable commercial terms and conditions, including market-based wireless attachment rates, with other (non-CANDAS) telecommunications providers. THESL is currently in negotiations with another prospective wireless attacher and will file any resulting agreement promptly with the Board in a similar manner. The Board may also find it of note that THESL’s affiliate THESI has entered into an agreement for wireless attachments on THESI’s street-lighting poles with an arm’s-length third party within a similar attachment price range and similar terms and conditions to those contained within Agreement A.

As the Board will note from the effective date of the agreement that is the subject of the New Confidential Information, Agreement A has only very recently been entered into.

Pursuant to the Practice Direction of Confidential Filings, THESL attaches un-redacted copies of the New Confidential Information for the Board’s review.

THESL seeks an order from the Board that the New Confidential Information in its entirety be held in confidence. As an arm’s-length negotiated agreement, concluded in a market context, the terms, conditions and pricing is highly commercially sensitive information. If this information were made public it would directly prejudice THESL’s ability to negotiate appropriate agreements with commercially acceptable terms, as well as that of the counterparty to Agreement A. Similarly for the wireless attachers, disclosure of the New Confidential Information would compromise their competitive position in the Ontario market by disclosing sensitive information about how these companies operate, how they deploy and utilize their particular wireless technologies, and the competitive prices they are paying for wireless attachments.

THESL requests the Board further order that disclosure of the un-redacted New Confidential Information be restricted to external counsel and CANDAS’ external consultants only who execute the Board’s form of Declaration and Undertaking. Specifically, THESL submits that all CANDAS member’s internal counsel and employees, such as Mr. Vinyard, should be prohibited from having access to the New Confidential Information given the obvious competitive advantage it would give to CANDAS members for the Toronto and other Ontario markets. Such disclosure would prejudice THESL (and potentially other utilities and the wireless attacher who is the counterparty to Agreement A) in achieving commercially acceptable wireless attachment

agreements with CANDAS in the future. Such disclosure would also prejudice the third party attacher by disclosing sensitive commercial information directly to a potential competitor.

Yours very truly,

**BORDEN LADNER GERVAIS LLP**

*Original Signed by John Vellone*

**John A.D. Vellone**

Encl.

copy to: CANDAS, all Parties, Board Staff  
J. Mark Rodger