



# STATE OF CONNECTICUT

## CONNECTICUT SITING COUNCIL

10 Franklin Square  
New Britain, Connecticut 06051  
Phone: (860) 827-2935  
Fax: (860) 827-2950

March 28, 2000

Kenneth C. Baldwin  
Robinson & Cole  
One Commercial Plaza  
280 Trumbull Street  
Hartford, CT 06103-3597

RE: EM-CROWN-064-000314 - Crown Atlantic Company LLC notice of intent to modify an existing telecommunications facility located at 439-455 Homestead Avenue in Hartford, Connecticut. (Docket No. 126)

Dear Mr. Baldwin:

At a public meeting held on March 22, 2000, the Connecticut Siting Council (Council) acknowledged your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies.

The proposed modifications are to be implemented as specified here and in your notice dated March 13, 2000, and additional information dated March 16, 2000. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

Mortimer A. Gelston  
Chairman

MAG/RKE/grg

c: Honorable Michael P. Peters, Mayor, City of Hartford  
Sandy M. Carter, Bell Atlantic Mobile  
J. Brendan Sharkey, VoiceStream Wireless  
Paul A. Spurlock, AT&T Wireless, Inc.

# ROBINSON & COLE LLP

HARTFORD • STAMFORD • GREENWICH • NEW YORK • BOSTON

LAW OFFICES

280 Trumbull Street  
Hartford, CT 06103-3597  
860-275-8200  
Fax 860-275-8299

Kenneth C. Baldwin  
860-275-8345  
Internet: kbaldwin@rc.com

March 16, 2000

*Via Hand Delivery*

Mr. Robert Erling  
Senior Siting Analyst  
Connecticut Siting Council  
10 Franklin Square  
New Britain, CT 06051

**RECEIVED**

MAR 16 2000

CONNECTICUT  
SITING COUNCIL

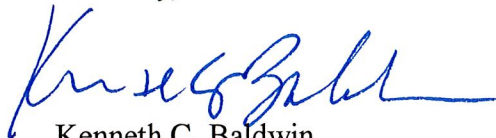
**Re: Hartford North Exempt Modification**

Dear Mr. Erling:

As you requested, I am enclosing 21 copies of the structural analysis verifying that the existing Hartford Northwest tower is capable of supporting the additional antennas proposed by Sprint Spectrum L.P.

Thank you for your assistance. Please contact me if you need any additional information.

Sincerely,



Kenneth C. Baldwin

KCB/kmd

Enclosures

cc: Tara K. Rand (w/o enc.)  
Julie M. Cashin, Esq. (w/o enc.)

H. Edmund Bergeron  
Civil Engineers

P.O. Box 4  
20 Swett Street  
North Conway, NH 03860  
(603) 356-6936  
(603) 356-7715 (fax)

65 W. Commercial Street  
Portland, ME 04101  
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HEB

**STRUCTURAL ANALYSIS REPORT  
of  
140' VALMONT MONOPOLE TOWER  
HARTFORD NW, CONNECTICUT**

Prepared for Crown Castle Atlantic

December 6, 1999



**Prepared by:**

H. Edmund Bergeron Civil Engineers, P.A.  
P.O. Box 440, 20 Swett Street  
North Conway, NH 03860  
HEB Project No. 99217

H. Edmund Bergeron  
Civil Engineers

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**STRUCTURAL ANALYSIS REPORT**  
of  
**140' VALMONT MONOPOLE**  
**HARTFORD NW, CONNECTICUT**  
prepared for  
**CROWN CASTLE ATLANTIC, LLC**

**EXECUTIVE SUMMARY:**

H. Edmund Bergeron Civil Engineers, P.A. (HEB) performed a structural analysis of this 140-foot Valmont monopole tower. The analysis was performed with the addition of a nine-panel antenna array mounted at a centerline elevation of 104-feet. The antenna array is to be installed on a 13.42-foot platform mount.

Our analysis indicates the tower and its foundation are capable of supporting the proposed antennas.

**INTRODUCTION:**

A structural analysis of this communications tower was performed by H. Edmund Bergeron Civil Engineers, P.A. (HEB) for Crown Castle Atlantic, LLC. HEB did not visit the tower site. This analysis was based on information provided by Crown Castle, which included Valmont erection drawings, and foundation drawings by SAC Engineering, Inc.

The structure is a 140-foot, galvanized steel monopole manufactured by Valmont. This analysis was conducted with the following antenna loads:

- (2) ALP9212 panel antennas on a 13.42' platform at 137'
- (6) APN199015 panel antennas on a 13.42' platform at 124'
- (9) DB980H90 panel antennas on a 13.42' platform at 114'
- (9) DB980H90 panel antennas on a 13.42' platform at 104' (Proposed)

For the purpose of the analysis, all waveguide cables were assumed to be 1-5/8" diameter, with all cables installed on the inside of the pole.

*Crown Castle Atlantic, LLC  
140' Valmont Monopole Tower  
Hartford NW, Connecticut*

*December 6, 1999  
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HEB Project #99217*

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## STRUCTURAL ANALYSIS:

### Methodology:

The structural analysis was done in accordance with TIA/EIA-222-F (EIA), Structural Standards for Steel Antenna Towers and Antenna Supporting Structures; and the American Institute of Steel Construction (AISC), Manual of Steel Construction, Allowable Stress Design, Ninth Edition.

The analysis was conducted using a wind speed of 80 miles per hour and one-half inch of radial ice over the entire structure and all appurtenances. The TIA/EIA Standard requires a minimum of 80-mph wind speed for Hartford County, Connecticut.

Two analytical methods were used to evaluate the structure: a two-dimensional linear model using spreadsheet programs developed by HEB, and a P-delta analysis using CSTRAAD finite element software distributed by ECOM Associates. The HEB 2-D model was used to generate dead loads of the tower and all of its appurtenances, radial ice loads and the resultant wind loading. The maximum bending moments and axial loads were used to calculate combined axial and bending stresses at intervals on the monopole, which were compared to allowable stresses according to AISC and TIA/EIA.

Loads generated in the 2-D model were input into the CSTRAAD program to evaluate secondary bending moments induced during deflection of the structure under load and to independently evaluate stresses. Evaluation of secondary bending moments is required by EIA paragraph 3.1.15.

Two loading conditions were evaluated in accordance with EIA to determine the tower's capacity. The higher stresses resulting from the two cases is used to calculate the tower capacity:

- Case 1 = Wind Load (without ice) + Tower Dead Load (controls)
- Case 2 = 0.75 Wind Load (with ice) + Ice Load + Tower Dead Load

EIA permits a one-third increase in allowable stresses for towers less than 700-feet tall. Allowable stresses of tower members were increased by one-third in computing the load capacity values indicated herein.

*Crown: Castle Atlantic, LLC  
140' Valmont Monopole Tower  
Hartford NW, Connecticut*

*December 6, 1999  
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#### ANALYSIS RESULTS:

Our analysis determined the tower will support the proposed antennae in addition to its current loading. Supporting calculations are provided in Appendix A.

The following table summarizes the capacity of the tower based on combined axial and bending stresses:

Elevation	Capacity
0'-14'	37%
14'-28'	34%
28'-42'	32%
42'-58'	37%
58'-74'	32%
74'-90'	26%
90'-107'	27%
107'-124'	16%
124'-140'	7%

The capability of the existing foundation to support the proposed loading was evaluated by comparing calculated values of shear, compression and overturning moment to design reactions provided on the Valmont record drawings. We found that the calculated reactions were less than the design values, indicating the tower's foundation is adequate to support the proposed loading, provided the foundations were designed and built to the requirements of the original design drawing.

#### CONCLUSIONS AND SUGGESTIONS:

As detailed above, our analysis indicates that the existing 140' Valmont monopole tower and foundation are capable of supporting the additional antenna loading proposed.

*Crown Castle Atlantic, LLC  
140' Valmont Monopole Tower  
Hartford NW, Connecticut*

*December 6, 1999  
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**LIMITATIONS:**

This report is based on the following:

1. Tower is properly installed and maintained.
2. All members are in new condition.
3. All required members are in place.
4. All bolts are in place and are properly tightened.
5. Tower is in plumb condition.
6. All members are galvanized.
7. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
8. Record drawings accurately reflect tower dimensions and height.

H. Edmund Bergeron Civil Engineers, P.A. (HEB) is not responsible for any modifications completed prior to or hereafter which HEB is not or was not directly involved. Modifications include but are not limited to:

1. Adding or relocating antennas.
2. Installing antenna mounting gates or side arms.
3. Extending tower.

HEB hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon the information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from original design, material, fabrication, or erection deficiencies, you should disregard this report and immediately contact HEB. HEB disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

# *Appendix A*

## *Calculations*



**H. EDMUND BERGERON CIVIL ENGINEERS, P.A.**

20 Swett Street, PO Box 440  
 North Conway, NH 03860  
 (603) 356-6936

Client: **Crown Castle**  
 Job: **Hartford N.W., CT.**

Job No.: **99**

Calculated By: **J. Greeley**  
 Checked By: *JG*

Date: **30-Nov-99**

Date: *12/6*

**General Information**

Tower Manufacturer	Valmont
Tower Type	Monopole
Total Height of Tower	140 ft.
Wind Speed	Hartford County 80 mph.
Radial Ice	0.5 in.
75% Reduction for ice	yes (yes or no)
1/3 increase for allowable loads	yes (yes or no)
Number of faces	12 faces

Calculations based on EIA/TIA-222-F, using the following formulas:

Force on discrete appurtenance:  $F=Qz*Gh*Ca*A$

Force on microwave antennae:  $F=Cr*A*Gh*Kz*V^2$ , where  $Cr=((Ca^2)+(Cs^2))^{(1/2)}$

Gh=1.69 for monopoles

Gh= 1.69

V as specified EIA-222-F

Fy	65 ksi
E (Modulus of Elasticity)	29000 ksi
Fb	0.6
K	1
Min. Width =	26.19 in
Max. Width =	59.05 in
Slope of Tower =	0.0196 in/in

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 Checked By: *JG*

Date: **30-Nov-99**  
 Date: *12/6*

**Tower Information**

Section	Length (ft.)	Midpt Elev.	Base Width (in.)	Top Width (in.)	Area (sf) w/o Ice	Area (sf) w/ Ice	Wall Thkns	Wt. (lbs) Tower	Wt. (lbs) Ice
10		0.00	0.00	0.00	0.00	0.00		0.00	0.00
9	17.00	131.50	30.18	26.19	39.93	41.35	0.313	2061.06	297.89
8	17.00	114.50	34.17	30.18	45.58	47.00	0.313	2084.26	339.32
7	16.00	98.00	37.93	34.17	48.06	49.40	0.313	2200.09	357.22
6	16.00	82.00	41.68	37.93	53.07	54.40	0.406	3146.27	393.92
5	16.00	66.00	45.44	41.68	58.08	59.41	0.406	3446.18	430.63
4	16.00	50.00	49.19	45.44	63.09	64.42	0.406	3746.09	467.33
3	14.00	35.00	52.48	49.19	59.31	60.47	0.500	4331.62	439.02
2	14.00	21.00	55.76	52.48	63.14	64.31	0.500	4614.40	467.13
1	14.00	7.00	59.05	55.76	66.97	68.14	0.500	4897.18	495.23
<b>Total</b>								<b>30527</b>	<b>3688</b>

**Section Properties**

Section	l in"	l mid	r in	S in°	Area in²	Area mid	L / side in
Top	2232.37				26.04		
10	0.00	0.0	#DIV/0!	#DIV/0!	0.00	0.0	0.00
9	3432.33	2832.3	10.69	227.46	30.06	28.1	8.09
8	4999.81	4216.1	12.11	292.64	34.07	32.1	9.16
7	6854.80	5927.3	13.46	361.49	37.85	36.0	10.16
6	11750.32	9302.6	14.77	563.82	53.88	45.9	11.17
5	15258.08	13504.2	16.11	671.62	58.79	56.3	12.17
4	19402.50	17330.3	17.45	788.85	63.69	61.2	13.18
3	28899.14	24150.8	18.60	1101.38	83.56	73.6	14.06
2	34733.50	31816.3	19.77	1245.73	88.85	86.2	14.94
1	41304.60	38019.1	20.95	1398.97	94.13	91.5	15.82

**Tower Dead Load Summary**

Elev.	Dead load Tower (lbs)	Dead load Ice (lbs)
140.0	0	0
123.0	2061	298
106.0	4145	637
90.0	6345	994
74.0	9492	1388
58.0	12938	1819
42.0	16684	2286
28.0	21016	2725
14.0	25630	3192
0.0	30527	3688

<b>Client:</b>	<b>Crown Castle</b>
<b>Project:</b>	<b>Hartford N.W., CT.</b>
<b>Prepared By:</b>	<b>J. Greeley</b>
<b>Checked By:</b>	<i>JG</i>
<b>Prepared:</b>	<b>30-Nov-99</b>

$K_z$  = Exposure coefficient =  $(z/33)^{2.7}$ ;  $1.00 \leq K_z \leq 2.58$

$Q_z$  = Velocity pressure =  $.00256 * K_z * V^2$

$G_h$  = Gust response factor = 1.69

$C_f$  = Structure force coefficient from Table 1 of TIA/EIA

$A_a$  and  $A_i$  = Areas of linear apputenances, w/o & with ice

$A_e$  = Effective area = Avg. width\*section length

Force =  $Q_z * G_h * (C_f * A_e + C_a * A_a)$

**Wind Load Summary**

Wind Velocity = 80 mph  
 Height of Tower = 140 feet

**Wind Load Without Ice**

Section	Midpoint Height	Areas		$K_z$	$Q_z$	$G_h$	$C_f$	Wind Load	Wind Load
		$A_e$	$A_a$						
10	0.00	0.0	0.00	1.00	16.38	1.69	1.03	0 lbs.	##### plf.
9	131.50	39.9	0.53	1.48	24.32	1.69	1.03	1717 lbs.	101 plf.
8	114.50	45.6	0.53	1.43	23.38	1.69	1.03	1880 lbs.	111 plf.
7	98.00	48.1	0.50	1.36	22.36	1.69	1.03	1893 lbs.	118 plf.
6	82.00	53.1	0.50	1.30	21.25	1.69	1.03	1985 lbs.	124 plf.
5	66.00	58.1	0.50	1.22	19.97	1.69	1.03	2039 lbs.	127 plf.
4	50.00	63.1	0.50	1.13	18.45	1.69	1.03	2045 lbs.	128 plf.
3	35.00	59.3	0.44	1.02	16.66	1.69	1.03	1735 lbs.	124 plf.
2	21.00	63.1	0.44	1.00	16.38	1.69	1.03	1815 lbs.	130 plf.
1	7.00	67.0	0.44	1.00	16.38	1.69	1.03	1925 lbs.	137 plf.

**Wind Load With Ice**

Section	Midpoint Height	Areas		$K_z$	$Q_z$	$G_h$	$C_f$	Wind Load	75% Wind Load
		$A_e$	$A_i$						
10	0.00	0.0	0.00	1.00	16.38	1.69	1.03	0 lbs.	##### plf.
9	131.50	41.3	1.95	1.48	24.32	1.69	1.03	1846 lbs.	81 plf.
8	114.50	47.0	1.95	1.43	23.38	1.69	1.03	2005 lbs.	88 plf.
7	98.00	49.4	1.83	1.36	22.36	1.69	1.03	2006 lbs.	94 plf.
6	82.00	54.4	1.83	1.30	21.25	1.69	1.03	2091 lbs.	98 plf.
5	66.00	59.4	1.83	1.22	19.97	1.69	1.03	2140 lbs.	100 plf.
4	50.00	64.4	1.83	1.13	18.45	1.69	1.03	2137 lbs.	100 plf.
3	35.00	60.5	1.60	1.02	16.66	1.69	1.03	1808 lbs.	97 plf.
2	21.00	64.3	1.60	1.00	16.38	1.69	1.03	1887 lbs.	101 plf.
1	7.00	68.1	1.60	1.00	16.38	1.69	1.03	1997 lbs.	107 plf.

Wind Loads

**H. EDMUND BERGERON CIVIL ENGINEERS, P.A.**

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Client: **Crown Castle**  
 Job: **Hartford N.W., CT.** Job No.: **99**  
 Calculated By: **J. Greeley** Date: **30-Nov-99**  
 Checked By: *[Signature]* Date: **12/6**

**Antennae Summary**

Input:  
 Wind Velocity= 80 mph  
 Tower Hgt= 140 ft.

<u>ANTENNAS</u>		<u>Elev. (z)</u>	<u>Coeff. (C)</u>	<u>Kz</u>	<u>Qz</u>	<u>Area (no ice)</u>	<u>Area (ice)</u>	<u>Force (no ice)</u>	<u>Force (ice)</u>	<u>Weight</u>	
(12) ALP 9212-N	137	1.4	1.50	24.61	46.8	49.2	2725	2864	360	9	14
13.42' Platform	137	2.0	1.50	24.61	11.1	14.1	927	1176	1000	9	14
(6) APN199015	124	1.4	1.46	23.92	12.6	15.2	713	862	102	8	18
13.42' Platform	124	2.0	1.46	23.92	11.1	14.1	901	1143	1000	8	18
(9) DB 980H90	114	1.4	1.43	23.35	22.5	27.0	1243	1518	225	8	8
13.42' Platform	114	2.0	1.43	23.35	11.1	14.1	880	795	1000	8	8
<u>Proposed</u>			1.00	16.38			0	0			
(9) DB 980H90	104	1.4	1.39	22.74	22.5	27.0	1211	1441	225	7	14
13.42' Platform	104	2.0	1.39	22.74	11.1	14.1	857	754	1000	7	14
			1.00	16.38			0	0			
<u>DISHES</u>			0.00000	1.00	16.38			0	0		
			0.00000	1.00	16.38			0	0		
			0.00000	1.00	16.38			0	0		
			0.00000	1.00	16.38			0	0		
			0.00000	1.00	16.38			0	0		

Orient

4912

**CABLES & LINEAR APPURT.**

<u>Section</u>	<u>Area w/o Ice</u>	<u>Area w/ Ice</u>	<u>Weight w/o Ice</u>	<u>Weight w/ Ice</u>
10				
9	0.53	1.95	318	780
8	0.53	1.95	477	1170
7	0.50	1.83	599	1469
6	0.50	1.83	599	1469
5	0.50	1.83	599	1469
4	0.50	1.83	599	1469
3	0.44	1.60	524	1285
2	0.44	1.60	524	1285
1	0.44	1.60	524	1285

Crown Castle  
Hartford NW, CT

December 6, 1999  
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✓ *RA* 12/6

NODE NO	REBAND NO	NODAL COORDINATES			BOUNDARY CONDITIONS					
		X	Y	Z	NODE TEMP	ALPHA	BETA	GAMMA	DIR	STIFFNESS
Units:		Ft	Ft	Ft	F	Deg	Deg	Deg		K /In /Deg
1	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00		FFFFFF
2	2	0.00	14.00	0.00	0.00	0.00	0.00	0.00		
3	3	0.00	28.00	0.00	0.00	0.00	0.00	0.00		
4	4	0.00	42.00	0.00	0.00	0.00	0.00	0.00		
5	5	0.00	56.00	0.00	0.00	0.00	0.00	0.00		
6	6	0.00	70.00	0.00	0.00	0.00	0.00	0.00		
7	7	0.00	84.00	0.00	0.00	0.00	0.00	0.00		
8	8	0.00	98.00	0.00	0.00	0.00	0.00	0.00		
9	9	0.00	112.00	0.00	0.00	0.00	0.00	0.00		
10	10	0.00	126.00	0.00	0.00	0.00	0.00	0.00		

TOTAL NUMBER OF ACTIVE NODES = 10  
TOTAL NUMBER OF EQUATIONS = 54

ELEM NO	NE NO	PE NO	PRISMATIC BEAM ELEMENT														
			ALPHA	BETA	GAMMA	LENGTH	MAT TYPE	PROP TYPE	RELEASE NE	RELEASE PE	REF TEMP	DIR	OFFSET NE	OFFSET PE	STIFFNESS NE	STIFFNESS PE	
Units:			Deg	Deg	Deg	Ft						F		Ft	Ft	K /In /Deg	K /In /Deg
1	1	2	90.00	-90.00	0.00	14.00	1	1									
2	2	3	90.00	-90.00	0.00	14.00	1	2									
3	3	4	90.00	-90.00	0.00	14.00	1	3									
4	4	5	90.00	-90.00	0.00	16.00	1	4									
5	5	6	90.00	-90.00	0.00	16.00	1	5									
6	6	7	90.00	-90.00	0.00	16.00	1	6									
7	7	8	90.00	-90.00	0.00	16.00	1	7									
8	8	9	90.00	-90.00	0.00	17.00	1	8									
9	9	10	90.00	-90.00	0.00	17.00	1	9									

TOTAL NUMBER OF ACTIVE PRISMATIC BEAM ELEMENTS = 9

MATL NO	DESIGNATION	MATERIAL PROPERTIES					WEIGHT DENSITY
		YOUNG'S MODULUS	POISSON'S RATIO	THERMAL COEFF	MASS DENSITY		
Units:		K /In <sup>2</sup>		F	Slug/Ft <sup>3</sup>	Lb/Ft <sup>3</sup>	
1	Steel	2.9e+004	0.250	6.5e-006	15.2	490	

PROP NO	DESIGNATION	PRISMATIC BEAM ELEMENT PROPERTIES								
		A	I <sub>XX</sub>	I <sub>YY</sub>	J	I <sub>XY</sub>	S <sub>XY</sub>	S <sub>FX</sub>	CW	
Units:		In <sup>2</sup>	In <sup>4</sup>	In <sup>4</sup>	In <sup>4</sup>	In <sup>4</sup>			In <sup>6</sup>	
1	Section 1	91.5	3.8e+004	3.8e+004	7.6e+004		0	1.000	1.000	0
2	Section 2	86.2	3.18e+004	3.18e+004	6.36e+004		0	1.000	1.000	0
3	Section 3	73.6	2.42e+004	2.42e+004	4.83e+004		0	1.000	1.000	0
4	Section 4	61.2	1.73e+004	1.73e+004	3.47e+004		0	1.000	1.000	0
5	Section 5	56.3	1.35e+004	1.35e+004	2.7e+004		0	1.000	1.000	0
6	Section 6	45.9	9.3e+003	9.3e+003	1.86e+004		0	1.000	1.000	0
7	Section 7	36.0	5.93e+003	5.93e+003	1.19e+004		0	1.000	1.000	0
8	Section 8	32.1	4.22e+003	4.22e+003	8.43e+003		0	1.000	1.000	0
9	Section 9	28.1	2.83e+003	2.83e+003	5.66e+003		0	1.000	1.000	0

REC NO	GRAVITY LOAD MULTIPLIERS		
	PX	PY	PZ
DESCRIPTION :	Tower Dead Load		
LOAD CASES :	1		
ELEMENT LIST :	1-9		
1	0.000	-1.300	0.000

Crown Castle  
Hartford NW, CT

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REC NO	LOAD TYPE	LOAD SYS	LOAD DIST SPEC	2 NODE	PRISMATIC	BEAM	ELEMENT	LOAD INFORMATION			
				DIST	PX	PY	PZ	MX	MY	MZ	
Units:				Ft	K	K	K	Ft-K	Ft-K	Ft-K	
DESCRIPTION : Sec 1 Wind											
LOAD CASES : 1											
ELEMENT LIST : 1											
1	UNIF	GLO	FRAC	B	0.003	0.137	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.137	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : Sec 2 Wind											
LOAD CASES : 1											
ELEMENT LIST : 2											
2	UNIF	GLO	FRAC	B	0.000	0.130	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.130	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : Sec 3 Wind											
LOAD CASES : 1											
ELEMENT LIST : 3											
3	UNIF	GLO	FRAC	B	0.000	0.124	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.124	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : Sec 4 Wind											
LOAD CASES : 1											
ELEMENT LIST : 4											
4	UNIF	GLO	FRAC	B	0.000	0.128	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.128	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : Sec 5 Wind											
LOAD CASES : 1											
ELEMENT LIST : 5											
5	UNIF	GLO	FRAC	B	0.000	0.127	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.127	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : Sec 6 Wind											
LOAD CASES : 1											
ELEMENT LIST : 6											
6	UNIF	GLO	FRAC	B	0.000	0.124	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.124	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : Sec 7 Wind											
LOAD CASES : 1											
ELEMENT LIST : 7											
7	UNIF	GLO	FRAC	B	0.000	0.118	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.118	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : Sec 8 Wind											
LOAD CASES : 1											
ELEMENT LIST : 8											
8	UNIF	GLO	FRAC	B	0.000	0.111	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.111	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : Sec 9 Wind											
LOAD CASES : 1											
ELEMENT LIST : 9											
9	UNIF	GLO	FRAC	B	0.000	0.101	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.101	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : (12) ALP9212 w/Platform @137'											
LOAD CASES : 1											
ELEMENT LIST : 9											
DISTANCES : 14											
11	CONC	GLO	DIST			3.652	-1.360	0.000	0.000	0.000	0.000
DESCRIPTION : (6) APN199015 w/Platform @124'											
LOAD CASES : 1											
ELEMENT LIST : 8											
DISTANCES : 18											
12	CONC	GLO	DIST			1.614	-1.102	0.000	0.000	0.000	0.000

Crown Castle  
Hartford NW, CT

December 6, 1999  
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DESCRIPTION : (9) DB980H90 with Platform @114'  
LOAD CASES : 1  
ELEMENT LIST : 8  
DISTANCES : 8

13 CONC GLO DIST 2.123 -1.225 0.000 0.000 0.000 0.000

DESCRIPTION : (9) DB930H90 w/Platform @104'  
LOAD CASES : 1  
ELEMENT LIST : 7  
DISTANCES : 14

14 CONC GLO DIST 2.068 -1.225 0.000 0.000 0.000 0.000

REC NO	ALPHA	BETA	GAMMA	PX	NODAL LOADS					
					PY	PZ	MX	MY	MZ	
Units:	Deg	Deg	Deg	K	K	K	Ft-K	Ft-K	Ft-K	
DESCRIPTION : Cable DL LOAD CASES : 1 NODE LIST : 2-4										
1	0.00	0.00	0.00	0.000	-0.524	0.000	0.000	0.000	0.000	
DESCRIPTION : Cable DL LOAD CASES : 1 NODE LIST : 5-8										
2	0.00	0.00	0.00	0.000	-0.599	0.000	0.000	0.000	0.000	
DESCRIPTION : Cable DL LOAD CASES : 1 NODE LIST : 9										
3	0.00	0.00	0.00	0.000	-0.477	0.000	0.000	0.000	0.000	
DESCRIPTION : Cable DL LOAD CASES : 1 NODE LIST : 10										
4	0.00	0.00	0.00	0.000	-0.318	0.000	0.000	0.000	0.000	

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LINEAR ANALYSIS RESULTS

NODE NO	LOAD CASE	NODAL DISPLACEMENTS (* Indicates Displacements Occur in Nodal Local System)					
		DX	DY	DZ	OX	OY	OZ
Units:		In	In	In	Deg	Deg	Deg
1	1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	1	0.3082	-0.0025	0.0000	0.0000	0.0000	-0.2018
3	1	1.2076	-0.0048	0.0000	0.0000	0.0000	-0.4027
4	1	2.7202	-0.0070	0.0000	0.0000	0.0000	-0.6135
5	1	5.2678	-0.0096	0.0000	0.0000	0.0000	-0.8862
6	1	8.6855	-0.0118	0.0000	0.0000	0.0000	-1.1361
7	1	12.9357	-0.0139	0.0000	0.0000	0.0000	-1.3789
8	1	17.9678	-0.0159	0.0000	0.0000	0.0000	-1.5960
9	1	23.9428	-0.0172	0.0000	0.0000	0.0000	-1.7344
10	1	30.2357	-0.0178	0.0000	0.0000	0.0000	-1.7787

ELEM NO	LOAD CASE	NODE NO	PRISMATIC BEAM ELEMENT -- SIGN CONVENTION : BEAM DESIGNERS			FORCES AND MOMENTS		
			AXIAL	SHEAR X	SHEAR Y	MOMENT X	MOMENT Y	TORSION
Units:			K	K	K	K -Ft	K -Ft	K -Ft
1	1	1	-42.7764	0.0000	24.8730	-2095.9950	0.0000	0.0000
		2	-37.1097	0.0000	22.9550	-1761.0990	0.0000	0.0000
2	1	2	-36.5857	0.0000	22.9550	-1761.0990	0.0000	0.0000
		3	-31.2473	0.0000	21.1350	-1452.4690	0.0000	0.0000
3	1	3	-30.7233	0.0000	21.1350	-1452.4690	0.0000	0.0000
		4	-26.1652	0.0000	19.3990	-1168.7310	0.0000	0.0000
4	1	4	-25.6412	0.0000	19.3990	-1168.7310	0.0000	0.0000
		5	-21.3096	0.0000	17.3510	-874.7310	0.0000	0.0000
5	1	5	-20.7106	0.0000	17.3510	-874.7310	0.0000	0.0000
		6	-16.7258	0.0000	15.3190	-613.3710	0.0000	0.0000
6	1	6	-16.1268	0.0000	15.3190	-613.3710	0.0000	0.0000
		7	-12.8781	0.0000	13.3350	-384.1390	0.0000	0.0000
7	1	7	-12.2791	0.0000	13.3350	-384.1390	0.0000	0.0000
		8	-8.5061	0.0000	9.3790	-190.0190	0.0000	0.0000
8	1	8	-7.9071	0.0000	9.3790	-190.0190	0.0000	0.0000
		9	-4.2682	0.0000	5.3690	-65.7225	0.0000	0.0000
9	1	9	-3.7912	0.0000	5.3690	-65.7225	0.0000	0.0000
		10	-0.3180	0.0000	0.0000	0.0000	0.0000	0.0000

NODE NO	LOAD CASE	R E A C T I O N S (* Indicates Reactions Occur in Nodal Local System)					
		PX	PY	PZ	MX	MY	MZ
Units:		K	K	K	K -Ft	K -Ft	K -Ft
1	1	-24.8730	42.7764	0.0000	0.0000	0.0000	2095.9950



Crown Castle  
Hartford NW, CT

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P-DELTA ANALYSIS RESULTS

NODE NO	LOAD COMB	NODAL DISPLACEMENTS (* Indicates Displacements Occur in Nodal Local System)					
		DX	DY	DZ	OX	OY	OZ
Units:		In	In	In	Deg	Deg	Deg
1	1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	1	0.3130	-0.0028	0.0000	0.0000	0.0000	-0.2051
3	1	1.2275	-0.0076	0.0000	0.0000	0.0000	-0.4056
4	1	2.7670	-0.0169	0.0000	0.0000	0.0000	-0.6293
5	1	5.3625	-0.0369	0.0000	0.0000	0.0000	-0.9032
6	1	8.8471	-0.0707	0.0000	0.0000	0.0000	-1.1587
7	1	13.1830	-0.1217	0.0000	0.0000	0.0000	-1.4071
8	1	18.3166	-0.1923	0.0000	0.0000	0.0000	-1.6292
9	1	24.4175	-0.2848	0.0000	0.0000	0.0000	-1.7767
10	1	30.8407	-0.3866	0.0000	0.0000	0.0000	-1.8153

ELEM NO	LOAD COMB	2 NODE NO	PRISMATIC BEAM ELEMENT -- SIGN CONVENTION : BEAM DESIGNERS			FORCES AND MOMENTS			
			AXIAL	SHEAR X	SHEAR Y	MOMENT X	MOMENT Y	TORSION	
Units:			K	K	K	K -Ft	K -Ft	K -Ft	
1	1	1	-42.7300	0.0000	24.9526	-2127.6648	0.0000	0.0000	
		2	-37.0669	0.0000	23.0241	-1791.8276	0.0000	0.0000	
2	1	2	-36.4602	0.0000	23.1538	-1791.8282	0.0000	0.0000	
		3	-31.1318	0.0000	21.3048	-1480.6178	0.0000	0.0000	
3	1	3	-30.5284	0.0000	21.4154	-1480.6171	0.0000	0.0000	
		4	-25.9864	0.0000	19.6377	-1193.2454	0.0000	0.0000	
4	1	4	-25.3767	0.0000	19.7437	-1193.2444	0.0000	0.0000	
		5	-21.0732	0.0000	17.6373	-894.1961	0.0000	0.0000	
5	1	5	-20.3923	0.0000	17.7241	-894.1965	0.0000	0.0000	
		6	-16.4451	0.0000	15.6201	-627.4433	0.0000	0.0000	
6	1	6	-15.7769	0.0000	15.6790	-627.4433	0.0000	0.0000	
		7	-12.5738	0.0000	13.6221	-393.0348	0.0000	0.0000	
7	1	7	-11.9181	0.0000	13.6588	-393.0348	0.0000	0.0000	
		8	-8.2522	0.0000	9.6033	-194.3386	0.0000	0.0000	
8	1	8	-7.6233	0.0000	9.6110	-194.3391	0.0000	0.0000	
		9	-4.1058	0.0000	5.4940	-67.0259	0.0000	0.0000	
9	1	9	-3.6202	0.0000	5.4858	-67.0257	0.0000	0.0000	
		10	-0.3178	0.0000	0.0101	0.0010	0.0000	0.0000	

NODE NO	LOAD COMB	R E A C T I O N S (* Indicates Reactions Occur in Nodal Local System)					
		PX	PY	PZ	MX	MY	MZ
Units:		K	K	K	K -Ft	K -Ft	K -Ft
1	1	-24.8730	42.7764	0.0000	0.0000	0.0000	2127.6648

**H. EDMUND BERGERON CIVIL ENGINEERS, P.A.**

20 Swett Street, PO Box 440  
 North Conway, NH 03860  
 (603) 356-6936

Client: **Crown Castle**  
 Job: **Hartford N.W., CT.**

Job No.: **99**

Calculated By: **J. Greeley**

Date: **30-Nov-99**

Checked By: *JCP*

Date: *12/6*

**Moments from Tower Without Ice @ Sections**

Tower Force w/o Ice	Elev. of Force	0	14	28	42	58	74	90	106	123	140
1925	7	13472	0	0	0	0	0	0	0	0	0
1815	21	38121	12707	0	0	0	0	0	0	0	0
1735	35	60721	36433	12144	0	0	0	0	0	0	0
2045	50	102234	73609	44983	16357	0	0	0	0	0	0
2039	66	134600	106049	77497	48946	16315	0	0	0	0	0
1985	82	162742	134957	107172	79387	47632	15877	0	0	0	0
1893	98	185559	159051	132542	106034	75738	45443	15148	0	0	0
1880	115	215261	188941	162621	136300	106220	76140	46060	15980	0	0
1717	132	225727	201695	177663	153631	126167	98702	71237	43772	14591	0
0	0	0	0	0	0	0	0	0	0	0	0
<b>Total (ft-kips)</b>		<b>1138</b>	<b>913</b>	<b>715</b>	<b>541</b>	<b>372</b>	<b>236</b>	<b>132</b>	<b>60</b>	<b>15</b>	<b>0</b>

**Moments from Tower With Ice @ Sections**

Tower Force w/ Ice	Elev. of Force	0	14	28	42	58	74	90	106	123	140
1997	7	13977	0	0	0	0	0	0	0	0	0
1887	21	39634	13211	0	0	0	0	0	0	0	0
1808	35	63285	37971	12657	0	0	0	0	0	0	0
2137	50	106869	76946	47023	17099	0	0	0	0	0	0
2140	66	141224	111267	81311	51354	17118	0	0	0	0	0
2091	82	171498	142218	112938	83658	50195	16732	0	0	0	0
2006	98	196570	168489	140407	112326	80233	48140	16047	0	0	0
2005	115	229551	201484	173417	145349	113272	81195	49118	17041	0	0
1846	132	242801	216952	191102	165253	135710	106168	76626	47083	15694	0
0	0	0	0	0	0	0	0	0	0	0	0
<b>Total (ft-kips)</b>		<b>1205</b>	<b>969</b>	<b>759</b>	<b>575</b>	<b>397</b>	<b>252</b>	<b>142</b>	<b>64</b>	<b>16</b>	<b>0</b>

**Total Moment (Tower & Antennas)**

**Axial Loads (kips)**

**Shear**

Elevation	Mom. w/o Ice	75% Mom w/ Ice	100% Mom w/ Ice	Secondary	D+A Force	D+A+I Force	Secondary	Tower (lbs.)	Antenna (lbs.)	Total (kips)	Secondary
0	2295.9	1874.5	2499.4	2127.7	36.0	40.4	42.7	17918	9456	27.37	25.0
14	1938.5	1586.1	2114.8	1791.8	31.1	35.5	36.5	15921	9456	25.38	23.2
28	1607.3	1318.0	1757.4	1480.6	26.5	30.4	30.5	14034	9456	23.49	21.4
42	1300.9	1069.4	1425.8	1193.2	22.2	25.8	25.4	12226	9456	21.68	19.7
58	981.1	808.9	1078.5	894.2	18.4	21.6	20.4	10088	9456	19.54	17.7
74	693.9	574.0	765.3	627.4	15.0	17.7	15.8	7948	9456	17.40	15.7
90	438.8	364.5	486.1	393.0	11.9	14.1	11.9	5857	9456	15.31	13.7
106	219.0	183.0	244.0	194.3	8.3	10.0	7.6	3851	7388	11.24	9.6
123	67.3	55.7	74.3	67.0	4.8	5.9	3.6	1846	5266	7.11	5.5
140	0.0	0.0	0.0		0.0	0.3		0	0	0.00	

**H. EDMUND BERGERON CIVIL ENGINEERS, P.A.**

20 Swett Street, PO Box 440  
 North Conway, NH 03860  
 (603) 356-6936

Client: **Crown Castle**  
 Job: **Hartford N.W., CT.**

Job No.: **99**

Calculated By: **J. Greeley**  
 Checked By: *[Signature]*

Date: **30-Nov-99**

Date: *12/16*

**Axial Force**

Elev.	Stress Ratio			
	w/o ice	Area	Fy	w/o ice
0	42.7	94.13	65	0.45
14	36.5	88.85	65	0.41
28	30.5	83.56	65	0.36
42	25.4	63.69	65	0.40
58	20.4	58.79	65	0.35
74	15.8	53.88	65	0.29
90	11.9	37.85	65	0.31
106	7.6	34.07	65	0.22
123	3.6	30.06	65	0.12
140	0.0	0.00	65	#DIV/0!

**Bending Force**

Elev.	fb= Moment/Section Modulus			Bending Stress		
	w/o ice	S	(FY)^.5 w/t	Allowable		Actual
				Fb	1.33 Fb	w/o ice
0	2127.7	1398.97	255.1	37.94	50.46	18.25
14.0	1791.8	1245.73	240.9	38.97	51.84	17.26
28.0	1480.6	1101.38	240.0	39.04	51.93	16.13
42.0	1193.2	788.85	261.7	37.46	49.82	18.15
58.0	894.2	671.62	241.8	38.91	51.75	15.98
74.0	627.4	563.82	240.0	39.04	51.93	13.35
90.0	393.0	361.49	261.8	37.45	49.82	13.05
106.0	194.3	292.64	240.0	39.04	51.93	7.97
123.0	67.0	227.46	240.0	39.04	51.93	3.53
140.0	0.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

**Combined Axial and Bending**

Elev.	Comb. Loads	Capacity
0	0.371	37%
14	0.341	34%
28	0.318	32%
42	0.372	37%
58	0.315	32%
74	0.263	26%
90	0.268	27%
106	0.158	16%
123	0.070	7%
140	#DIV/0!	#DIV/0!



STATE OF CONNECTICUT  
CONNECTICUT SITING COUNCIL

Ten Franklin Square  
New Britain, Connecticut 06051  
Phone: (860) 827-2935  
Fax: (860) 827-2950

March 16, 2000

Honorable Michael P. Peters  
Mayor  
City of Hartford  
Municipal Building  
550 Main Street  
Hartford, CT 06103

RE: EM-CROWN-064-000314 - Crown Atlantic Company LLC notice of intent to modify an existing telecommunications facility located at 439-455 Homestead Avenue in Hartford, Connecticut. (Docket No. 126)

Dear Mayor Peters:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

The Council will consider this item at the next meeting scheduled for Wednesday, March 22, 2000, at 1:30 p.m. in Hearing Room Two, Ten Franklin Square, New Britain, Connecticut.

Please call me or inform the Council if you have any questions or comments regarding this proposal.

Thank you for your cooperation and consideration.

Very truly yours,

A handwritten signature in black ink, appearing to read "Joel M. Rinebold".

Joel M. Rinebold  
Executive Director

JMR/jlh

Enclosure: Notice of Intent

c: Ms. Sandra Kee-Borges, City Manager

# HURWITZ & SAGARIN LLC

March 15, 2000

*Via Facsimile*

Robert Erling  
Staff Analyst  
Connecticut Siting Council  
10 Franklin Square  
New Britain, Connecticut 06051

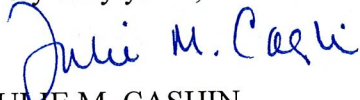
RE: Notice of Exempt Modification  
Siting Council Docket No. 126  
Hartford, Connecticut

Dear Bob:

Attached please find the individual radio frequency (RF) calculations for the proposed Sprint Spectrum, LP co-location on this existing telecommunications facility.

Please call me if you have any questions.

Very truly yours,



JULIE M. CASHIN

JMC/dsw

Enc.

cc: Ken Baldwin, Esq.

RECEIVED

MAR 16 2000

CONNECTICUT  
SITING COUNCIL

(MHz)	Trans.	Power (ERP) Per Transmitter (Watts)	(Watts)	(Feet)	at Tower (Feet)	(mW/cm <sup>2</sup> )	Exposure	
1962.5	11	609	6699	104	0	0.222970	1	22.2970%
1962.5	11	609	6699	104	50	0.181108	1	18.1108%
1962.5	11	609	6699	104	100	0.115855	1	11.5855%
1962.5	11	609	6699	104	150	0.072387	1	7.2387%
1962.5	11	609	6699	104	200	0.047458	1	4.7458%
1962.5	11	609	6699	104	250	0.032894	1	3.2894%
1962.5	11	609	6699	104	300	0.023921	1	2.3921%
1962.5	11	609	6699	104	350	0.018090	1	1.8090%
1962.5	11	609	6699	104	400	0.014118	1	1.4118%
1962.5	11	609	6699	104	450	0.011305	1	1.1305%
1962.5	11	609	6699	104	500	0.009247	1	0.9247%

\*Requirements set forth in OET Bulletin 65. Based on NCRP Report No. 86 and ANSI/IEEE C95.1-1992

**RECEIVED**

MAR 16 2000

CONNECTICUT  
SITING COUNCIL



**Crown; Homestead Ave. Hartford 3/15/00**

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March 13, 2000

*Via Federal Express*

Mr. Joel M. Rinebold  
Executive Director  
Connecticut Siting Council  
10 Franklin Square  
New Britain, CT 06051

**RECEIVED**

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**CONNECTICUT  
SITING COUNCIL**

**Re: Notice of Exempt Modification  
Siting Council Docket No. 126  
Hartford, Connecticut**

Dear Mr. Rinebold:

Crown Atlantic Company LLC ("Crown") holds the Siting Council certificate for the existing telecommunications tower and related facility in Hartford, Connecticut (Docket No. 126). Crown intends to allow Sprint Spectrum L.P. ("Sprint") to install nine panel-type antennas and related equipment at the existing facility in Hartford. Please accept this letter as notification, pursuant to R.C.S.A. § 16-50j-73, of construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the Mayor of Hartford, Michael P. Peters.

The existing Hartford facility consists of a 140-foot self-supporting monopole tower and related equipment located at 439-455 Homestead Avenue in Hartford. The Council approved the facility on April 9, 1990. The tower supports antennas of Bell Atlantic Mobile ("BAM"), Omnipoint Communications, Inc. ("OCI") and AT&T Wireless, Inc. ("AT&T").

Sprint plans to install nine panel-type antennas mounted on the tower at the 104 foot level and a global positioning antenna ("GPS") at the 50 foot level. Sprint will install an equipment cabinet on a steel platform near the base of the tower. (See attached site plans). The existing tower is structurally capable of supporting Sprint's use.

The planned modifications to the Hartford facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).



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1. The proposed modification will not increase the height of the tower. Sprint's antennas will be installed with a centerline at the 104 foot level. The enclosed tower drawing confirms that the proposed modifications will not increase the height of the tower.

2. The installation of Sprint's equipment near the base of the tower, as reflected on the attached site plan, will not require an extension of the site boundaries. Sprint's proposed equipment cabinet will be located entirely within the existing fenced area.

3. The proposed modification to the facility will not increase the noise levels at the existing facility by six decibels or more. Sprint's equipment is self-contained and requires no additional heating, ventilation or cooling equipment.

4. The operation of the additional antennas will not increase the total radio frequency (RF) power density, measured at the base of the tower, to a level at or above the applicable standard. The "worst-case" RF power density calculation for a point at the base of the tower for the existing operations of BAM, OCI and AT&T antennas would be 10.7% of the FCC Standard. Sprint's operations would add emissions of 0.22297 mW/cm<sup>2</sup> (22.3% of the FCC Standard). Therefore, the calculated "worst case" power density levels for the planned combined operation at the site, including Sprint's antennas, would be 33.0% of the FCC Standard as calculated for a mixed frequency site.

For the foregoing reasons, Crown respectfully submits that the proposed addition of antennas and equipment at the Hartford facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,



Kenneth C. Baldwin

KCB/kmd  
Enclosures

cc: Michael P. Peters, Mayor  
Dean Olsen, Crown Atlantic Company LLC  
Tara K. Rand, Crown Castle Atlantic LLC  
Julie M. Cashin, Esq.