STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

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

December 19, 2000

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

RE: **EM-XM-077-001129** - XM Satellite Radio notice of intent to modify an existing telecommunications facility located at 266 Center Street, Manchester, Connecticut. (Docket No. 129)

Dear Attorney Baldwin:

At a public meeting held on December 14, 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 notices dated November 28, 2000, and December 11, 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/FOC/laf

c: Honorable Stephen T. Cassano, Mayor, Town of Manchester
Richard J. Sartor, General Manager, Town of Manchester
Christine Belvin, LCC International, Inc.
Christopher Ciolfi, Crown Atlantic Company
Sandy M. Carter, Verizon Wireless

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ROBINSON & COLE LLP
HARTFORD • STAMFORD • GREENWICH • NEW YORK • BOSTON

LAW OFFICES

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Hartford, CT 06103-3597
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Kenneth C. Baldwin
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December 11, 2000

Fax and Regular Mail

Fred O. Cunliff
Siting Analyst
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Corrections to Exempt Modification Filings**

Dear Mr. Cunliff:

As a follow-up to our telephone conversation, I am writing to make the Council aware of certain corrections which need to be made to the Crown Atlantic Company LLC exempt modification notices for Manchester, East Hartford and Fairfield. Those corrections are as follows:

XM Radio/Manchester

Replace paragraph number 4 of Crown's November 28, 2000 filing with the following:

The operation of the additional antennas will not increase the total radio frequency (RF) power density, measured at the site boundary, to a level at or above the applicable standard. The "worst case" RF power density calculation for the closest point at the site boundary for the existing Cellco antennas on the tower, as described in the Council's Decision and Order dated March 12, 1990, would be 0.0737 mW/cm^2 or 2.92% of the FCC standard for uncontrolled environments. XM's operation at the Manchester site would add 0.144607 mW/cm^2 or 14.4607% of the FCC standard. (See attached RF power density calculations.) The calculated worst case power density for the combined operation at the site would therefore be 17.3807% of the FCC standard for uncontrolled environments as calculated for a mixed frequency site.

XM Radio/Fairfield

Replace paragraph number 4 of Crown's November 28, 2000 filing with the following:

The operation of the additional antennas will not increase the total radio frequency (RF) power density, measured at the site boundary, to a level at or above the applicable standard. The "worst case" RF power density calculation for the closest point at the site boundary for the existing providers on the tower, would be 14.66% of the FCC standard for uncontrolled environments. XM's operation at the Fairfield site would add 0.184215 mW/cm^2 or 18.4251% of the FCC standard. (See attached RF power density calculations.) The proposed Metricom installation would add 0.0002 mW/cm^2 (0.028% of the FCC standard). The calculated worst case power density for the combined operation at the site would therefore be 33.1131% of the FCC standard for uncontrolled environments as calculated for a mixed frequency site.

XM Radio/East Hartford

The third paragraph on the first page of the November 29, 2000 filing incorrectly references an antenna height for the XM Radio of 126 feet above ground level. As stated in paragraph number 1 of the filing the antenna height will not exceed 123 feet.

Metricom/XM Radio/Fairfield

Lastly, I have enclosed complete copies of the June 5, 2000 and September 13, 2000 structural analyses for the Fairfield tower. First and forward, these analyses conclude that the tower is structurally capable of supporting the addition of both Metricom and XM Radio antennas. The best way to explain the reduction in tower stresses referred to on page three of the June 5 and September 13 analyses is by referring you back to the antennae load listing on page one of each report.

In the June 5 analysis, the antenna load listing included 3-RR90-17 antennas for AT&T; 12-ALP 9212 antennas for Verizon Wireless; 12-ALP 11011A antennas for SNET; 6-ALP199015 antennas for Voicestream; 12-ALP 9212 antennas for a potential "**future carrier**"; 3 whip antennas for PageNet; 1-TA-2350-LCC whip antenna for XM Radio; and 1 TA2324-LHCP dish antenna.

The September 13 analysis includes the same antenna loading requirements for the AT&T, Verizon Wireless, SNET, Voicestream, PageNet and XM Radio antennas, adds 16 Larson panel antennas on side-arms for Metricom and removes the 12-ALP 9212 panel antennas listed for the "**future carrier**", and its associated antenna platform. The removal of the "**future carriers**" antennas and antenna platform from the 128 foot level , together with the addition of the Metricom antennas at the 100 foot level explains the reduction in tower stresses documented in the September 13 analysis.

If you have any additional questions or concerns regarding these filings please do not hesitate to contact me.

Sincerely,

Kenneth C. Baldwin

KCB/kmd
Enclosure
cc: Hal Giglio

ROBINSON & COLE LLP
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LAW OFFICES

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

November 29, 2000

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

Re: Exempt Modification Filings for XM Radio in Manchester and Fairfield, Connecticut

Dear Mr. Rinebold:

Enclosed please find two letters from H. E. Bergeron Engineers relating to the structural analysis completed for the Crown towers in Fairfield and Manchester, Connecticut. This information is intended to supplement Crown's recent filings on behalf of XM Radio.

Please contact me if you have any questions.

Sincerely,

Kenneth C. Baldwin

KCB/kmd
Enclosures
cc: John G. Metsopoulos, Fairfield First Selectman
Stephen T. Cassano, Manchester Mayor
Christine Belvin, LCC International, Inc.

H.E. Bergeron Engineers
• Civil • Structural • Land Surveying

P.O. Box 440
2605 White Mountain Highway
North Conway, NH 03860
(603) 356-6936
(603) 356-7715 (fax)

65 W. Commercial Street
Portland, ME 04101
(207) 780-1100
(207) 780-1101 (fax)
www.hebcivil.com

HEB

November 28, 2000

Crown Castle International
156 Old Chester Road
Haddam, Connecticut 06438

Attn: Hal Giglio
Re: Fairfield, Connecticut
XM Radio Antenna Change

Dear Hal,

H. E. Bergeron Engineers, P.A. (HEB) performed a structural analysis of Crown Castle's 171-foot Valmont monopole tower located in Fairfield, Connecticut.

HEB performed this analysis with XM Radio using a TA-2350-LCC omni-directional antenna mounted and a TA-2324-LHCP parabolic antenna mounted at 128-feet. You indicated that XM Radio is proposing to install the TA2324-LHCP parabolic antenna at 75-feet.

Because the parabolic antenna will be located at a lower elevation, stresses on the tower are reduced. Therefore the tower is capable of supporting the proposed antenna change.

Please feel free to contact me if you have any questions.

Sincerely,
H. E. Bergeron Engineers, P.A.

Robert E. Adair, P.E.
Senior Project Engineer

STATE OF CONNECTICUT
ROBERT E. ADAIR
No. 20278
LICENSED PROFESSIONAL ENGINEER

P: jobs\2000-085\Fairfield, CT ltr 11-28-00.doc

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☒ P.O. Box 440
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(207) 780-1100
(207) 780-1101 (fax)
www.hebcivil.com

HEB

November 28, 2000

Crown Castle International
156 Old Chester Road
Haddam, Connecticut 06438

Attn: Hal Giglio
Re: Manchester, Connecticut
XM Radio Antenna Change

Dear Hal,

H. E. Bergeron Engineers, P.A. (HEB) performed a structural analysis of Crown Castle's 115-foot Valmont monopole tower located in Manchester, Connecticut.

HEB performed this analysis with XM Radio using a TA-2350-LCC omnidirectional antenna mounted at a centerline elevation of 124-feet on a pipe extension, and a TA-2324-LHCP parabolic antenna mounted at 80-feet. You indicated that XM Radio is proposing to install the TA2324-LHCP parabolic antenna at 30-feet.

Because the parabolic antenna will be located at a lower elevation, stresses on the tower are reduced. Therefore the tower is capable of supporting the proposed antenna change.

Please feel free to contact me if you have any questions.

Sincerely,
H. E. Bergeron Engineers, P.A.

Robert E. Adair, P.E.
Senior Project Engineer

STATE OF CONNECTICUT
ROBERT E. ADAIR
No. 20278
LICENSED PROFESSIONAL ENGINEER

P: jobs\2000-084\Manchester, CT ltr 11-28-00.doc

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

EM-XM-077-001129

November 28, 2000

Via Federal Express

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

Re: Notice of Exempt Modification
Siting Council Docket No. 129
266 Center Street, Manchester, Connecticut

Dear Mr. Rinebold:

Crown Atlantic Company LLC ("Crown") holds the Siting Council certificate for the existing telecommunications tower and related facility in Manchester, Connecticut (Docket No. 129). Crown intends to allow XM Satellite Radio ("XM") to install antennas and related equipment at the existing facility in Manchester. Please accept this letter as notification, pursuant to R.C.S.A. § 16-50j-73, of construction which 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 Manchester Mayor, Stephen T. Cassano.

The existing facility consists of a self-supporting monopole tower and a single-story equipment building within a fenced compound, located off Center Street in Manchester. This facility was approved by the Connecticut Siting Council on March 12, 1990. The tower currently supports antennas of Cellco Partnership d/b/a Verizon Wireless ("Cellco").

XM proposes to install a single Til-Tek omnidirectional antenna on the top of the tower and a 25.25 inch diameter, received only, dish antenna at the 30-foot level on the tower. XM equipment will be located in a new 10-foot by 12-foot building located near the base of the tower within the existing site compound. (See attached plans.)

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

1. The proposed modification will not increase the overall height of the structure above that which was approved by the Council at this site. In its Docket No. 129 Decision and Order, the Council stated that "[t]he monopole tower including antennas and associated equipment shall not exceed a height of 128 feet above ground level, 324 feet AMSL". The XM

omnidirectional antenna will be mounted on the tower, with its center line at approximately the 125-foot level and its top at the 128-foot level, within the Council's height restriction. The XM dish antenna would be mounted at the 30-foot level on the tower. The enclosed tower drawings confirm that the planned modifications will not extend above the 128-foot height limitation for the tower including antennas approved by the Council in Docket No. 129.

2. The installation of the XM equipment shelter, as shown on the attached project plans, will not require an extension of the site boundaries.

3. The proposed modifications to the facility will not increase the noise levels at the existing facility by six decibels or more.

4. The operation of the additional antennas will not increase the total radio frequency (RF) power density, measured at the site boundary, to a level at or above the applicable standard. The "worst-case" RF power density calculation for the closest point at the site boundary for the existing Cellco antennas on the tower, as described in the Council's Decision and Order dated March 12, 1990, would be 0.0737 mW/cm^2 or 2.92% of the FCC standard for uncontrolled environments. XM's operations at the Manchester site would add 0.184520 mW/cm^2 or 18.452% of the FCC standard. (See attached RF Power Density Calculations.) The calculated "worst-case" power density for the combined operations at the site would therefore be 21.372% of the FCC standard for uncontrolled environments as calculated for a mixed frequency site.

Also attached is a copy of a structural analysis verifying that the tower can accommodate the XM antennas. Please note that the structural analysis contemplated the XM dish antenna being located at the 80-foot level on the tower rather than the 30-foot level as proposed. The structural analysis is therefore more conservative than necessary for the proposed antenna installation.

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

Sincerely,

Kenneth C. Baldwin

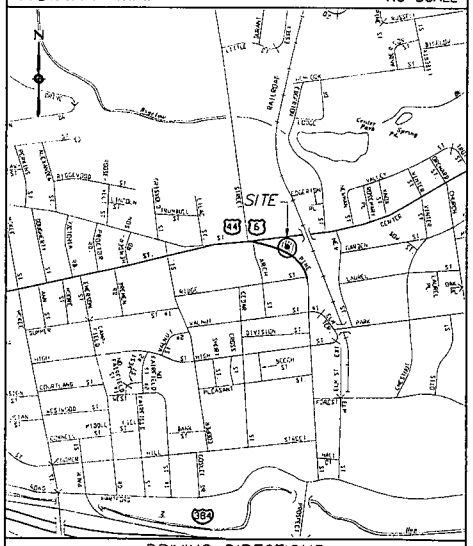
KCB/kmd
Attachments
cc: Stephen T. Cassano, Manchester Mayor
Tara K. Rand, Crown Atlantic Company, LLC
Christine Belvin, LCC International, Inc.

SATELLITE RADIO

CROWN-MANCHESTER HRT093
REAR 266 CENTER STREET
MANCHESTER, CONNECTICUT 06040
SITE ID: HAR011.A

VICINITY MAP

NO SCALE



DRIVING DIRECTIONS

FROM INTERSTATE 84, TAKE ROUTE 44 & 6 EXIT, EAST TOWARDS MANCHESTER. ABOUT 2 MILES ON 44 IN MANCHESTER, JUST BEFORE OVERHEAD R.R. BRIDGE, PINE STREET WILL FORK TO THE RIGHT. SITE IS ON LEFT JUST UP THE HILL ON PINE.

PROJECT DESCRIPTION

1. THE PROPOSED SITE IS AN EXISTING COMPOUND WITH GROUND SPACE, ANTENNAS MOUNTED ON MONOPOLE
2. THE PROPOSED INSTALLATION CONSISTS OF THE FOLLOWING:
   (1)-OMNI ANTENNA
   (1)-SATELLITE DISH
   (1)-XM RADIO EQUIPMENT
   (1)-10'-0" X 12'-0" EQUIPMENT SHELTER

ANTENNA DATA

TYPE:	AZIMUTH:	MODEL NO.:	TILT (E)	NUMBER
OMNI	0°	TA-2350-LCC-H	2°	1
DISH	198.4°	TA-2324-LHCP	0/UPTILT 40.1°	1

MANUFACTURER: TIL-TEK LTD.

	OMNI	DISH
TYPE:		
HEIGHT:	64"	-
DIAMETER:	8"	25.25"ø

APPROVALS

	BY	DATE
SITE ACQUISITION		
CONSTRUCTION		
R.F.		
ZONING		
OWNER		

SITE INFORMATION

CONTACT:	TARA RAND (781)-729-4001
LONGITUDE:	-72.53056
LATITUDE:	41.77139
SAR POWER TYPE:	LOW
SITE NAME:	CROWN-MANCHESTER
SITE ADDRESS:	REAR 266 CENTER STREET MANCHESTER, CONNECTICUT 06040
SITE NUMBER:	HAR011.A
CURRENT ZONING:	RR - (RURAL RESIDENTIAL)
JURISDICTION:	TOWN OF MANCHESTER, CONNECTICUT
PROPERTY OWNER:	CROWN CASTLE COMMUNICATIONS, INC 500 WEST CUMMINGS PARK SUITE 6500 WOBURN, MA 01801
APPLICANT:	XM SATELLITE RADIO
A/E:	URS CORPORATION A.E.S. 500 ENTERPRISE DRIVE ROCKY HILL, CT 06067

DRAWING LIST

SHT. NO.	DESCRIPTION
T-1	TITLE SHEET
A-1	COMPOUND PLAN, DETAILS AND ANTENNA SPECIFICATIONS
A-2	MONOPOLE ELEVATION AND DETAILS
A-3	TYPICAL EQUIPMENT RISER DIAGRAM
E-1	EQUIPMENT GROUNDING PLAN, DETAILS AND SYMBOL LIST
E-2	ELECTRICAL RISER DIAGRAM AND DETAILS
GN-1	GENERAL NOTES

MATERIAL LIST

ITEM NO.	DESCRIPTION	SIZE	QTY.	LENGTH	SUPPLIER/MODEL #	MANUFACTURER
1	DISH ANTENNA	25.25" DIAMETER	1	N/A	TA-2324-LHCP	TIL-TEK LTD
2	OMNI ANTENNA	64" H x 8" DIA.	1	N/A	TA-2350-LCC-H	TIL-TEK LTD
3	EQUIPMENT SHELTER	10'-0" X 12'-0"	1	N/A		N/A
4	COAX CABLE FOR DISH	7/8"	1	50'	VXLS-50A	ANDREW CORP.
5	COAX CABLE FOR OMNI	1 5/8"	1	160'	LDF7-50A	ANDREW CORP.
6	JUMPER FOR OMNI CABLE TOP/BOTTOM	7/8"	2	6'	TESSCO# 78061	ANDREW CORP.
7	JUMPER FOR DISH CABLE TOP	1/2"	1	6'	TESSCO# 82364	ANDREW CORP.
8	JUMPER FOR DISH CABLE BOTTOM	1/2"	1	3'	TESSCO# 82372	ANDREW CORP.
9	CONNECTOR FOR DISH BOTTOM JUMPER	1/2" N-MALE	1	N/A	L4PNM	ANDREW CORP.
10	CONNECTOR FOR DISH CABLE	7/16" DIN-FEMALE	2	N/A	TESSCO# 59568	ANDREW CORP.
11	CONNECTOR FOR OMNI CABLE	7/16" DIN-FEMALE	2	N/A	L7PDF	ANDREW CORP.
12	CONNECTOR FOR OMNI, BOTTOM AND TOP JUMPER	7/16" DIN-MALE	4	N/A	L5PDM	ANDREW CORP.
13	CONNECTOR FOR DISH, TOP JUMPER	7/16" D/N-MALE	2		L4PDM	ANDREW CORP.
14	CONNECTOR FOR DISH, BOTTOM JUMPER	7/16" D/N-MALE	1		L4PDM	ANDREW CORP.

LCC
1792 MAIN STREET
SUITE D
EAST HARTFORD, CT 06108
1-(860)-291-0627

SATELLITE RADIO
1250 23rd ST. NW, SUITE 57
WASHINGTON, DC, 20037
PHONE (202) 969-7000
FAX (202) 969-7000

URS
URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CT, 06067
(860)-529-8882

STATE OF CONNECTICUT
IGNACIO A. CRESPO
No. 8704
LICENSED ARCHITECT

PROJECT NO: 11143301960.09

DRAWN BY: DFG

CHECKED BY: ICA

ISSUED FOR	
10-13-00	REVIEW
11-13-00	PERMITTING

CROWN-MANCHESTER
SITE ID: HAR011.A

REAR 266 CENTER STREET
MANCHESTER, CONNECTICUT
06040

SCALE: AS NOTED

DATE: 11-07-00

TITLE SHEET

T-1

HIGH POWER OMNIDIRECTIONAL ANTENNA

TIL-TEK TA-2350-LCC-H ELECTRICAL SPECIFICATIONS

FREQUENCY RANGE:	2330-2345 MHz
GAIN:	10 dBi
VSWR:	1.3:1 MAXIMUM
POLARIZATION:	LINEAR VERTICAL
POWER RATING:	2000 watts AVERAGE 8000 watts PEAK
H-PLANE BEAMWIDTH(-3 dB):	360 DEGREES
E-PLANE BEAMWIDTH(-3 dB):	8 DEGREES
CROSS-POLARIZATION DISCRIMINATION:	15 dB
FRONT TO BACK RATIO:	N/A
ELECTRICAL DOWN-TILT:	2°
NULL FILL:	-20 dB (1st NULL)
IMPEDANCE:	50 ohms NOMINAL
TERMINATION:	7/8" EIA FLANGE

TIL-TEK TA-2350-LCC-H MECHANICAL SPECIFICATIONS

LENGTH:	64in.(1625.6 mm)
DIAMETER:	8 in(203mm)
WIDTH:	N/A
DEPTH:	N/A
WEIGHT INCLUDING CLAMPS:	40 lb.(18kg)
RATED WIND VELOCITY:	125 mph (200 km/hr)
HORIZONTAL THRUST AT RATED WIND:	148 lb.(67 kg)
MOUNTING:	MOUNTS TO A 1.75-4.0in.(44.5-102mm) O.D. PIPE

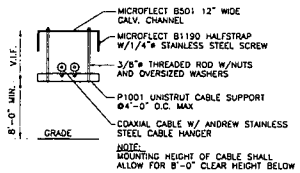
DISH SPECIFICATIONS

TIL-TEK TA-2324-LHCP ELECTRICAL SPECIFICATIONS

FREQUENCY RANGE:	2330-2345 MHz
GAIN:	21 dBi
VSWR:	1.3:1 MAXIMUM
POLARIZATION:	LEFT HAND CIRCULAR
POWER RATING:	2000 watts AVERAGE 6000 watts PEAK
H-PLANE BEAMWIDTH(-3 dB):	FIELD ADJUSTABLE 45°,60°,90°,120° OR 160°
E-PLANE BEAMWIDTH(-3 dB):	13.5 DEGREES
CROSS-POLARIZATION DISCRIMINATION:	2.5 dB
ELECTRICAL DOWN-TILT:	0°
NULL FILL:	NONE
IMPEDANCE:	50 ohms NOMINAL
TERMINATION:	7/16" DIN FEMALE

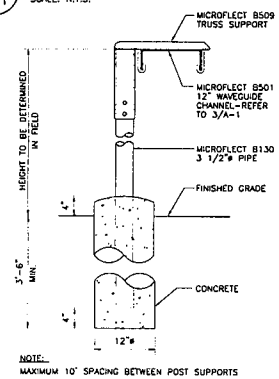
TIL-TEK TA-2324-LHCP MECHANICAL SPECIFICATIONS

LENGTH:	N/A
DIAMETER:	26in.(660mm)
WEIGHT INCLUDING CLAMPS:	28 lb.(12.7kg)
RATED WIND VELOCITY:	125 mph (200 km/hr)
HORIZONTAL THRUST AT RATED WIND:	127 lb.(57.6kg)
MOUNTING:	MOUNTS TO A 1.75-4.0in.(44.5-102mm) O.D. PIPE



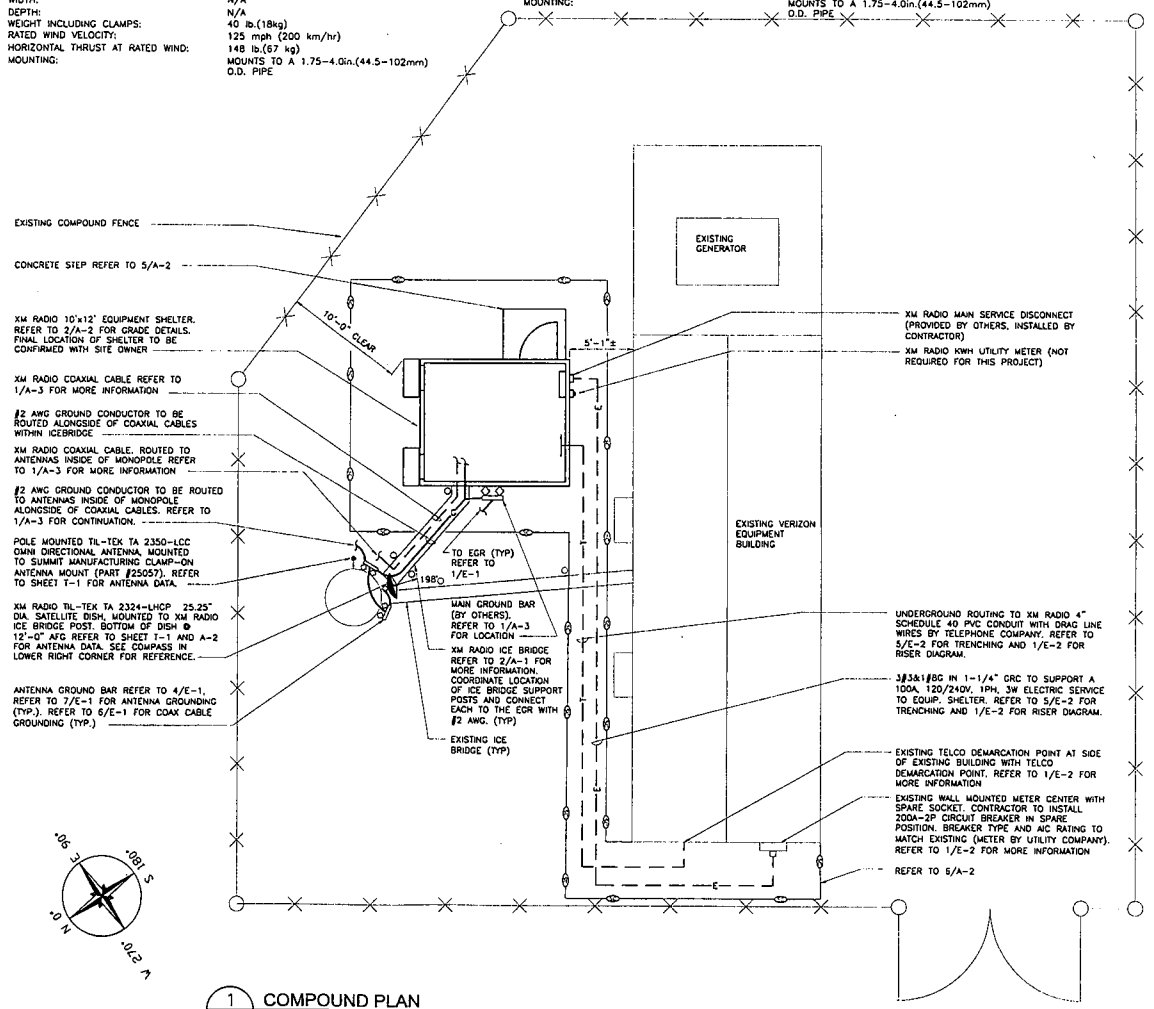
3 / A-1 CABLE SUPPORT DETAIL

SCALE: N.T.S.



2 / A-1 ICE BRIDGE DETAIL

SCALE: N.T.S.



1 / A-1 COMPOUND PLAN

SCALE: 1" = 10'-0"

LCC
1792 MAIN STREET
SUITE D
EAST HARTFORD, CT 06108
1-(860)-291-0627

SATELLITE RADIO
1250 23rd ST. NW., SUITE 57
WASHINGTON, DC, 20037
PHONE (202) 969-7700
FAX (202) 969-7030

URS
URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKYHILL, CT. 06067
1-(860)-529-8882

STATE OF CONNECTICUT
IGNACIO C. ARIAS
No. 870
LICENSED ARCHITECT

PROJECT NO. AP301980.09

DRAWN BY: DFG

CHECKED BY:

ISSUED FOR	
10-13-00	REVIEW
11-13-00	PERMITTING

CROWN-MANCHESTER
SITE ID: HAR011A

REAR 266 CENTER STREET
MANCHESTER, CONNECTICUT
06040

SCALE: AS NOTED

DATE: 11-07-00

COMPOUND PLAN, DETAILS AND ANTENNA SPECS.

A-1

CONCRETE AND REINFORCING STEEL NOTES

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318 AND THE SPECIFICATION CAST-IN-PLACE CONCRETE.
2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE.
3. REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE. SPLICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD, UNO.
4. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:

   CONCRETE CAST AGAINST EARTH.....3 IN.

   CONCRETE EXPOSED TO EARTH OR WEATHER:

   #6 AND LARGER .....2 IN.
   #5 AND SMALLER & WWF .....1 1/2 IN.

   CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:

   SLAB AND WALL .....3/4 IN.
   BEAMS AND COLUMNS .....1 1/2 IN.

5. A CHAMFER 3/4" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNO, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.
6. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR ENGINEERING APPROVAL WHEN DRILLING HOLES IN CONCRETE.

DESIGN LIVE LOADS

SNOW LOAD:
GROUND SNOW LOAD (Pg) 30 PSF
IMPORTANCE FACTOR (I) 1.15
EXPOSURE FACTOR (Ce) .7

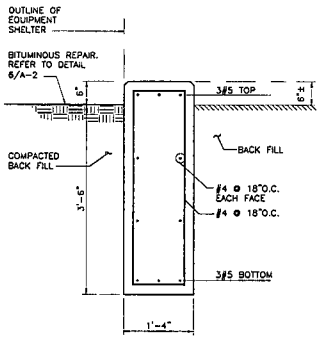
WIND LOAD:
BASIC WIND SPEED 80 MPH
BASE VELOCITY PRESSURE (Pv) 16.4 PSF
EXPOSURE GROUP B
IMPORTANCE FACTOR CATEGORY III (I) 1.17

FOUNDATION NOTES

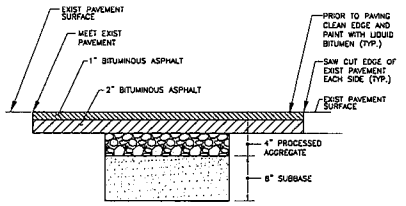
1. A PRESUMPTIVE SOIL BEARING CAPACITY OF 3000 PSF WAS USED FOR THE FOUNDATION DESIGN. THE GENERAL CONTRACTOR IS TO CONFIRM THE SPECIFIED SOIL BEARING PRESSURE.
2. ALL FOOTINGS SHALL BEAR ON EXISTING UNDISTURBED ORGANIC FREE SOIL. ALL UNSUITABLE SOIL SHALL BE REMOVED AS DIRECTED BY THE ENGINEER AND REPLACED WITH COMPACTED GRAVEL PLACED IN 8" LAYERS AND COMPACTED TO 95% OF MODIFIED OPTIMUM DENISTY. GRAVEL SHALL CONFORM TO STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FROM 814A, 1995, ARTICLE M.02.02, GRAVEL SUBBASE.

STRUCTURAL STEEL NOTES

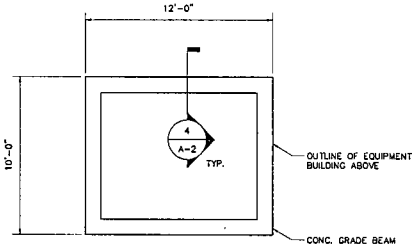
1. ALL WORK SHALL COMPLY WITH THE 1999 CONNECTICUT STATE BUILDING CODE.
2. ALL STEEL WORK SHALL BE GALVANIZED AND IN ACCORDANCE WITH THE SPECIFICATION ASTM A572 GRADE 50 UNLESS OTHERWISE NOTED. TOUCH-UP ALL DAMAGED GALVANIZED STEEL WITH LCC APPROVED COLD ZINC, "GALVANOX", "DRY GALV", "ZINC-IT", OR APPROVED EQUIVALENT, IN ACCORDANCE WITH MANUFACTURERS GUIDELINES. TOUCH-UP DAMAGED NON GALVANIZED STEEL WITH SAME PAINT APPLIED IN SHOP OR FIELD.
3. ALL WELDING SHALL BE DONE USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND AWS D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION", 9TH EDITION. AT THE COMPLETION ALL WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.
4. BOLTED CONNECTIONS SHALL USE BEARING TYPE GALVANIZED ASTM A325 BOLTS (3/4" DIA.) AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE.
5. CONTRACTOR TO INSTALL ACCA TO MOUNTING FRAME WITH (4) 1/2" DIA. BOLTS – ACCA TO BE PROVIDED BY LUCENT.



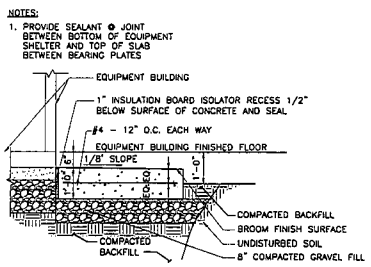
4 / A-2 SECTION - ALTERNATE #1
SCALE: 1/4" = 1'-0"



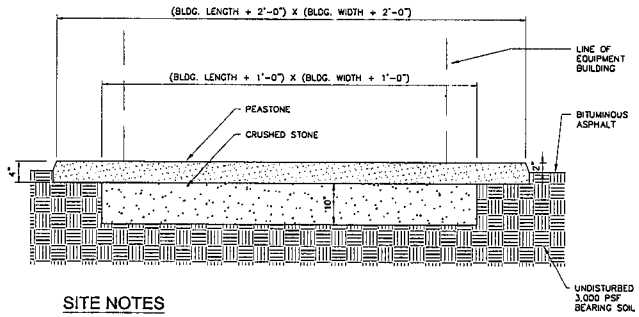
6 / A-2 BITUMINOUS REPAIR DETAIL
SCALE: NTS



3 / A-2 CONC. GRADE BEAM DETAIL - ALTERNATE #1
SCALE: 1/8" = 1'-0"



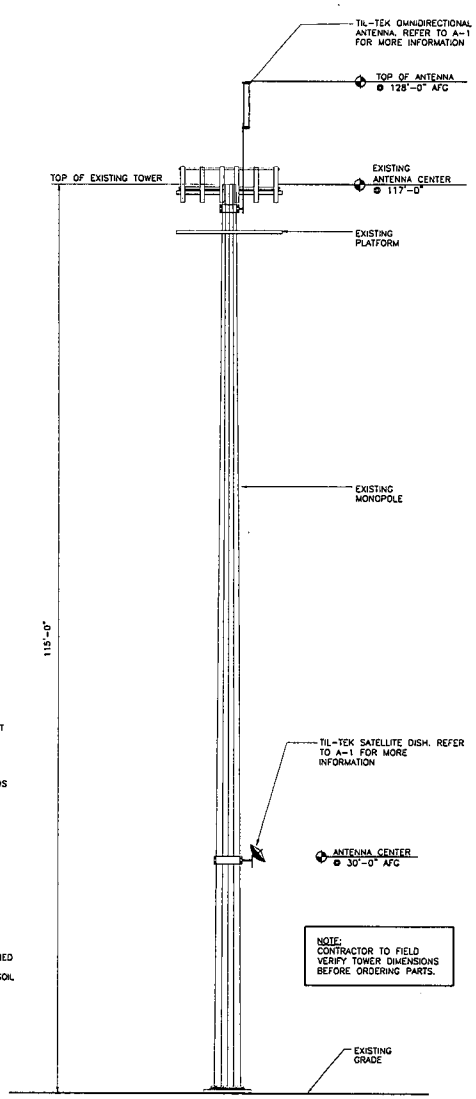
5 / A-2 CONCRETE STEP DETAIL
SCALE: N.T.S.



SITE NOTES

1. EXCAVATE TOP SOIL DOWN TO 3,000 PSF BEARING SOIL. INSTALL MIN. 10" OF CRUSHED STONE ON THE BEARING SOIL.
2. A FINAL SURFACE OF PEASTONE 4" TO 6" THICK SHALL BE APPLIED PERFECTLY LEVEL (A FEW INCHES HIGHER THAN THE FINISHED GRADE FOR SURFACE DRAINAGE)

2 / A-2 GRADE DETAIL
SCALE: 1/4" = 1'-0"



1 / A-2 MONOPOLE ELEVATION
SCALE: 1/16" = 1'-0"

LCC
1792 MAIN STREET
SUITE D
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1-(860)-291-0627

SATELLITE RADIO
1250 23rd ST. NW, SUITE 57
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FAX (202) 969-7050

URS
URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CT. 06067
PH (860) 529-8882

STATE OF CONNECTICUT
IGNACIO CRUZ ARTAZA
No. 8704
LICENSED ARCHITECT

PROJECT NO: 13301960.09

DRAWN BY: DFG

CHECKED BY:

ISSUED FOR

10-13-00	REVIEW
11-13-00	PERMITTING

CROWN-MANCHESTER
SITE ID: HAR011A

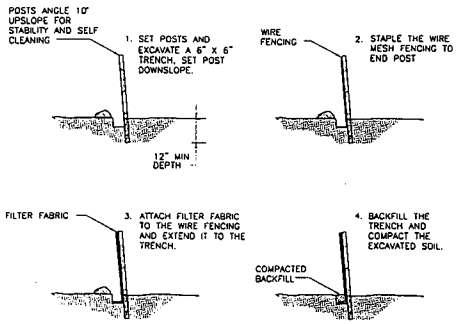
REAR 266 CENTER STREET
MANCHESTER, CONNECTICUT
06040

SCALE: AS NOTED

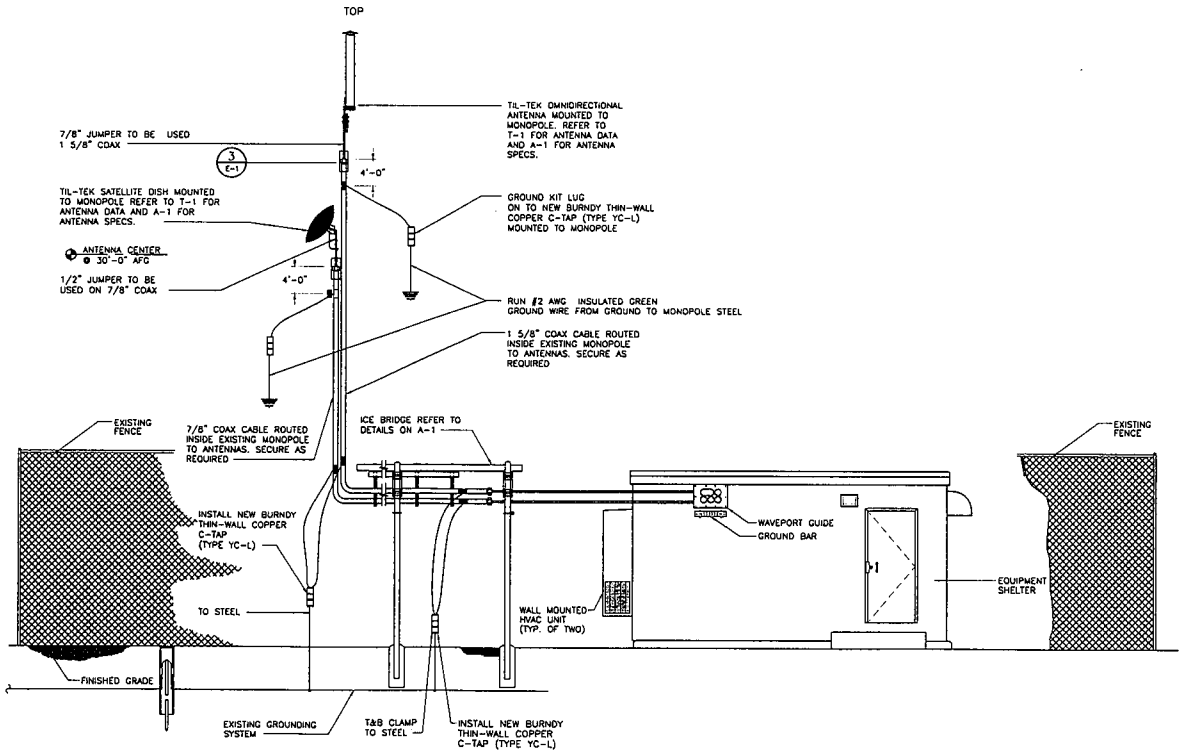
DATE: 11-07-00

MONOPOLE ELEVATION AND DETAILS

A-2



2 / A-3 SEDIMENTATION CONTROL BARRIER-SILT FENCE
SCALE: N.T.S.



1 / A-3 TYPICAL EQUIPMENT RISER DIAGRAM
SCALE: N.T.S.

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STATE OF CONNECTICUT
IGNACIO G. CESPEDES
No. 8707
LICENSED ARCHITECT

PROJECT NO: 11501960.09

DRAWN BY: DFG

CHECKED BY:

ISSUED FOR	
10-13-00	REVIEW
11-13-00	PERMITTING

CROWN-MANCHESTER
SITE ID: HAR011A

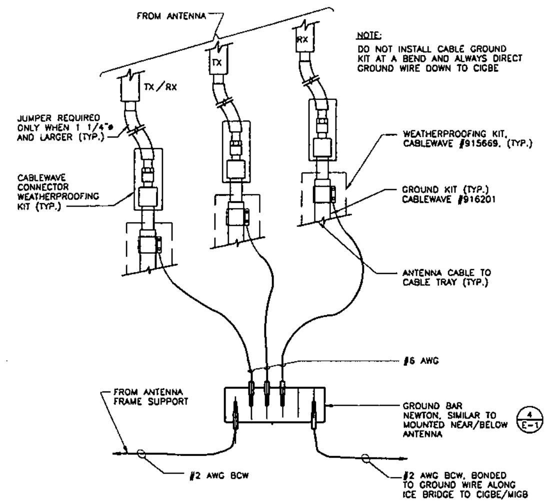
REAR 266 CENTER STREET
MANCHESTER, CONNECTICUT
06040

SCALE: AS NOTED

DATE: 11-07-00

TYPICAL EQUIPMENT RISER DIAGRAM

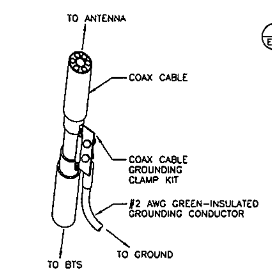
A-3


FROM ANTENNA
TX / RX
TX
RX
NOTE:
DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE
JUMPER REQUIRED ONLY WHEN 1 1/4" ø AND LARGER (TYP.)
WEATHERPROOFING KIT, CABLEWAVE #915669. (TYP.)
CABLEWAVE CONNECTOR WEATHERPROOFING KIT (TYP.)
GROUND KIT (TYP.) CABLEWAVE #916201
ANTENNA CABLE TO CABLE TRAY (TYP.)
#6 AWG
FROM ANTENNA FRAME SUPPORT
GROUND BAR NEWTON, SIMILAR TO MOUNTED NEAR/BELOW ANTENNA
#2 AWG BCW
#2 AWG BCW, BONDED TO GROUND WIRE ALONG ICE BRIDGE TO CIGBE/MIGB

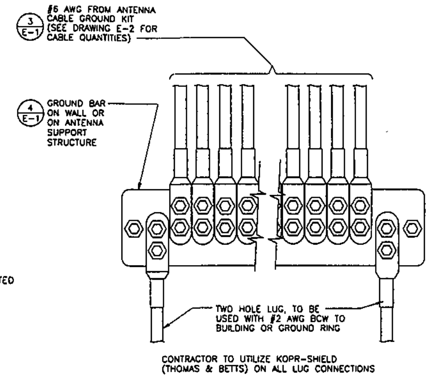
7 / E-1 **GROUNDING - CONNECTION OF GROUND WIRES TO GROUNDING BAR**
SCALE: NTS

SYMBOL LIST

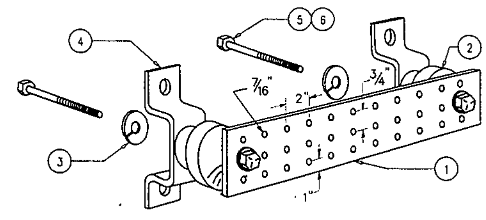
SYMBOL	DESCRIPTION
	DISCONNECT SWITCH, NON-FUSED, 600VAC (AMPERAGE AND POLES NOTED ON PLANS)
	DISCONNECT SWITCH, FUSED, 600VAC (AMPERAGE AND POLES NOTED ON PLANS)
—E—	ELECTRICAL CONDUIT AND CABLES
—G—	GROUND SYSTEM CONDUIT AND CABLE
— EGR —	EXTERIOR GROUND RING
MTS	MANUAL TRANSFER SWITCH
P	PULLBOX, 12" x 12" x 6", UNO
T	TRANSFORMER
	REVENUE METER AND BASE. COORDINATE WITH UTILITY COMPANY.
•	EXOTHERMIC WELD CONNECTION
	GROUND BAR
⊗	GROUNDING ELECTRODE
	EXOTHERMIC WELD 'T' OF THRU' CONDUCTOR AND TAP CONDUCTOR. 'CADWELD TYPE TA'
AWG	AMERICAN WIRE GAGE
BCW	BARE COPPER WIRE
C	CONDUIT
C/B	CIRCUIT BREAKER
GRC	GALVANIZED RIGID CONDUIT
KWH	KILO-WATT-HOUR
NF	NON-FUSED
SA	SURGE ARRESTOR
TBR	TO BE REMOVED
UNO	UNLESS NOTED OTHERWISE
WP	WEATHERPROOF
	CONNECTION POINT TO EXISTING SYSTEM



6 / E-1 **TYPICAL COAX CABLE GROUNDING DETAIL**
SCALE: NTS


#6 AWG FROM ANTENNA CABLE GROUND KIT (SEE DRAWING E-2 FOR CABLE QUANTITIES)
3 / E-1
GROUND BAR ON WALL OR ON ANTENNA SUPPORT STRUCTURE
4 / E-1
TWO HOLE LUG, TO BE USED WITH #2 AWG BCW TO BUILDING OR GROUND RING
CONTRACTOR TO UTILIZE KOPR-SHIELD (THOMAS & BETTS) ON ALL LUG CONNECTIONS

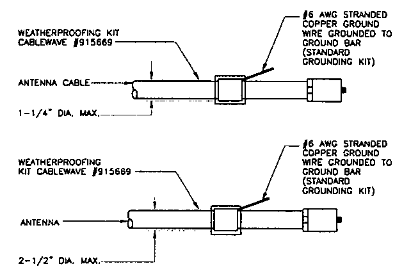
5 / E-1 **GROUNDING - INSTALLATION OF GROUND WIRE TO GROUND BAR**
SCALE: NTS



LEGEND

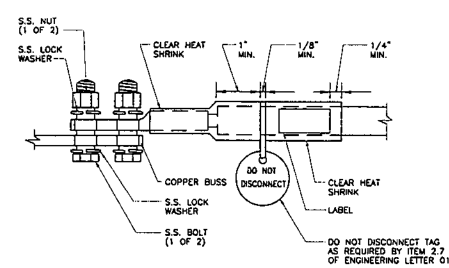
1- COPPER GROUND BAR, 1/4"X 4"X 20", NEWTON INSTRUMENT CO. CAT. NO. B-6142. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION
2- INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4
3- 5/8" LOCKWASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8
4- MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056. PROVIDE BAND CLAMP FOR FASTENING TO MONOPOLE
5- 5/8-11 X 1" H.H.C.S.BOLTS, NEWTON INSTRUMENT CO. CAT NO. 3012-1
6- WELDING OR DRILLING IS NOT PERMITTED ON TOWER.

4 / E-1 **GROUNDING - GROUND BAR DETAIL**
SCALE: NTS


WEATHERPROOFING KIT CABLEWAVE #915669
#6 AWG STRANDED COPPER GROUND WIRE GROUNDED TO GROUND BAR (STANDARD GROUNDING KIT)
ANTENNA CABLE
1-1/4" DIA. MAX.
WEATHERPROOFING KIT CABLEWAVE #915669
#6 AWG STRANDED COPPER GROUND WIRE GROUNDED TO GROUND BAR (STANDARD GROUNDING KIT)
ANTENNA
2-1/2" DIA. MAX.

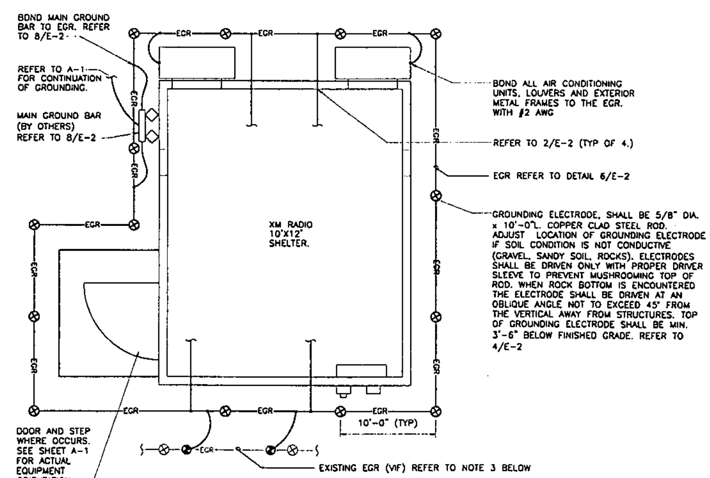
NOTE: DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT THE GROUND WIRE DOWN TO THE GROUND BAR.

3 / E-1 **CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE**
SCALE: NTS



NOTES:
1) ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING LOCK WASHERS. COAT ALL SURFACES WITH KOPR-SHEILD BEFORE MATING.
2) FOR GROUND BOND TO STEEL ONLY: INSERT A DRAGON TOOTH WASHER BETWEEN LUG AND STEEL. COAT ALL SURFACES WITH KOPR-SHEILD.

2 / E-1 **GENERAL LUG DETAIL**
SCALE: NTS


BOND MAIN GROUND BAR TO EGR. REFER TO 8/E-2
REFER TO A-1 FOR CONTINUATION OF GROUNDING.
MAIN GROUND BAR (BY OTHERS) REFER TO 8/E-2
EGR
XM RADIO 10'X12' SHELTER.
DOOR AND STEP WHERE OCCURS. SEE SHEET A-1 FOR ACTUAL EQUIPMENT ORIENTATION.
10'-0" (TYP)
BOND ALL AIR CONDITIONING UNITS, LOUVERS AND EXTERIOR METAL FRAMES TO THE EGR. WITH #2 AWG
REFER TO 2/E-2 (TYP OF 4.)
EGR REFER TO DETAIL 6/E-2
GROUNDING ELECTRODE, SHALL BE 5/8" DIA. x 10'-0"L. COPPER CLAD STEEL ROD. ADJUST LOCATION OF GROUNDING ELECTRODE IF SOIL CONDITION IS NOT CONDUCTIVE (GRAVEL, SANDY SOIL, ROCKS). ELECTRODES SHALL BE DRIVEN ONLY WITH PROPER DRIVER SLEEVE TO PREVENT MUSHROOMING TOP OF ROD. WHEN ROCK BOTTOM IS ENCOUNTERED THE ELECTRODE SHALL BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45° FROM THE VERTICAL AWAY FROM STRUCTURES. TOP OF GROUNDING ELECTRODE SHALL BE MIN. 3'-6" BELOW FINISHED GRADE. REFER TO 4/E-2
EXISTING EGR (VIF) REFER TO NOTE 3 BELOW

NOTE:
1. LOCATION OF THE MASTER GROUND BARS TO BE DETERMINED IN FIELD AND MAY BE LOCATED AND SUPPORTED AS CLOSE TO EQUIPMENT AS FEASIBLE AND PRACTICAL TO ACHIEVE THE DESIGNED CONFIGURATIONS.
2. SEE SHEET A-1 FOR ACTUAL EQUIPMENT ORIENTATION.
3. CONTRACTOR SHALL HAND DIG AND LOCATE EXISTING EGR. IF ANY DAMAGE IS CAUSED TO EXISTING EGR, CONTRACTOR SHALL REPAIR THE DAMAGE AT HIS OWN COST TO THE SATISFACTION OF RESPECTIVE CELL ENGINEERS.

1 / E-1 **BUILDING GROUNDING PLAN**
SCALE: 1" = 5'-0"

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URS
URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067

STATE OF CONNECTICUT · No. 14740 · LICENSED · PROFESSIONAL ENGINEER

PROJECT NO.: E301960.09

DRAWN BY: DFG

CHECKED BY:

ISSUED FOR	
10-13-00	REVIEW
11-13-00	PERMITTING

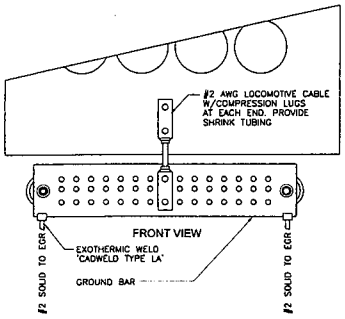
CROWN-MANCHESTER
SITE ID: HAR011.A
REAR 266 CENTER STREET
MANCHESTER, CONNECTICUT 06040

SCALE: AS NOTED

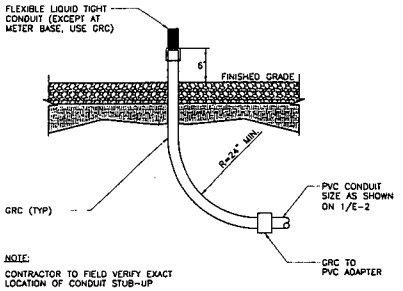
DATE: 11-07-00

EQUIPMENT GROUNDING PLAN, DETAILS AND SYMBOL LIST

E-1

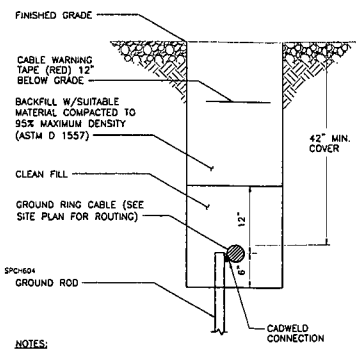


8 E-2 EXTERNAL GROUND BAR LUG CONNECTION
SCALE: N.T.S.



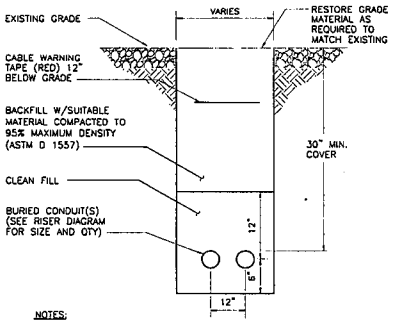
NOTE:
CONTRACTOR TO FIELD VERIFY EXACT LOCATION OF CONDUIT STUB-UP

7 E-2 UTILITY STUB UP DETAIL
SCALE: NTS



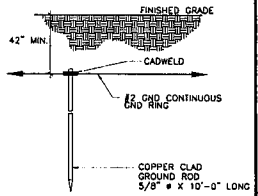
NOTES:
1. THE CLEAN FILL SHALL PASS THROUGH A 3/8" MESH SCREEN AND SHALL NOT CONTAIN SHARP STONES. OTHER BACKFILL SHALL NOT CONTAIN ASHES, CINDERS, SHELLS, FROZEN MATERIAL, LOOSE DEBRIS OR STONES LARGER THAN 2" IN MAXIMUM DIMENSION. THE TRENCH SHALL BE BACKFILLED IMMEDIATELY FOLLOWING PLACEMENT OF THE CONDUITS.
2. WHERE EXISTING UTILITIES ARE LIKELY TO BE ENCOUNTERED, CONTRACTOR SHALL HAND DIG AND PROTECT EXISTING UTILITIES.

6 E-2 EGR DETAIL
SCALE: N.T.S.

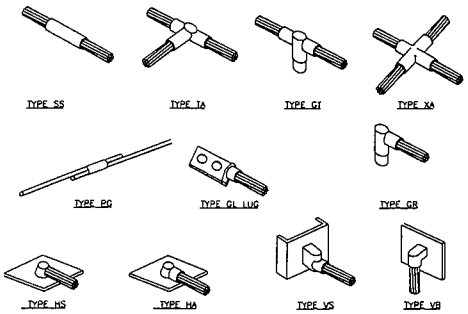


NOTES:
1. THE CLEAN FILL SHALL PASS THROUGH A 3/8" MESH SCREEN AND SHALL NOT CONTAIN SHARP STONES. OTHER BACKFILL SHALL NOT CONTAIN ASHES, CINDERS, SHELLS, FROZEN MATERIAL, LOOSE DEBRIS OR STONES LARGER THAN 2" IN MAXIMUM DIMENSION. THE TRENCH SHALL BE BACKFILLED IMMEDIATELY FOLLOWING PLACEMENT OF THE CONDUITS.
2. WHERE EXISTING UTILITIES ARE LIKELY TO BE ENCOUNTERED, CONTRACTOR SHALL HAND DIG AND PROTECT EXISTING UTILITIES.

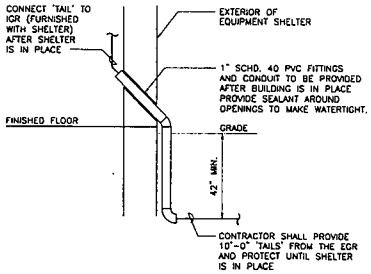
5 E-2 ELECTRICAL/TELCO TRENCH DETAIL
SCALE: N.T.S.



4 E-2 GROUND ROD DETAIL
SCALE: N.T.S.



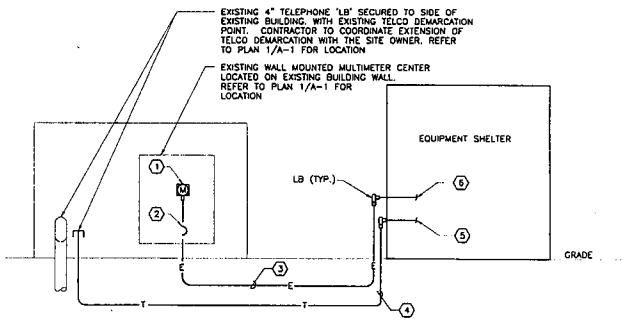
3 E-2 STANDARD CADWELD DETAILS
SCALE: NTS



2 E-2 TYPICAL EXT./INT. GROUNDING CONNECTION
SCALE: N.T.S.

RISER NOTES:

1. EXISTING SPARE METER SOCKET. METER SHALL BE INSTALLED BY UTILITY COMPANY. COORDINATE ACTIVATION OF METER WITH UTILITY COMPANY. VERIFY LOCATION OF METER WITH UTILITY COMPANY AND LOCAL ELECTRICAL ENGINEER.
2. PROVIDE 100AF/100AT 2 POLE BRANCH CIRCUIT BREAKER, MATCH EXISTING TYPE BREAKER AND AIC RATING.
3. PROVIDE 3#3 & 1#8 G IN 1-1/4" GRC TO SUPPORT A 100A, 120/240V, 1ø, 3 WIRE SERVICE TO THE EQUIPMENT SHELTER. SEE PLAN 1/A-1 FOR ROUTING.
4. PROVIDE 4" GRC WITH DRAG LINE. TELEPHONE COMPANY TO PROVIDE CABLES AND CONNECTIONS AT EXISTING DEMARCATION POINT. REFER TO PLAN 1/A-1 FOR ROUTING.
5. COORDINATE PENETRATION OF CONDUIT INTO EQUIP., SHELTER WITH TELCO BACKBOARD LOCATION INSIDE OF EQUIPMENT SHELTER.
6. COORDINATE PENETRATION OF CONDUIT INTO BUILDING WITH MAIN CIRCUIT BREAKER/DISCONNECT SWITCH LOCATION INSIDE EQUIPMENT SHELTER.



1 E-2 RISER DIAGRAM
SCALE: N.T.S.

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URS
URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKYHILL, CT. 06067
1-(860)-529-8882

STATE OF CONNECTICUT
No. 14749
LICENSED PROFESSIONAL ENGINEER

PROJECT NO: A1364960.09

DRAWN BY: DFG

CHECKED BY:

ISSUED FOR	
10-13-00	REVIEW
11-13-00	PERMITTING

CROWN-MANCHESTER
SITE ID: HAR011A

REAR 266 CENTER STREET
MANCHESTER, CONNECTICUT
06040

SCALE: AS NOTED

DATE: 11-07-00

ELETRICAL RISER DIAGRAM AND DETAILS

E-2

GENERAL CONSTRUCTION NOTES

1. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE LOCAL BUILDING CODE, THE LATEST EDITION AND ALL OTHER APPLICABLE CODES AND ORDINANCES.
2. CONTRACTOR SHALL VISIT THE JOB SITE AND SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK AND SHALL MAKE PROVISIONS AS TO THE COST THEREOF. CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.
3. PLANS ARE NOT TO BE SCALED. THESE PLANS ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE ONLY UNLESS OTHERWISE NOTED. THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT AND APPURTENANCES, AND LABOR NECESSARY TO EFFECT ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
4. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS OTHERWISE NOTED. SPACING BETWEEN EQUIPMENT IS REQUIRED CLEARANCE. THEREFORE, IT IS CRITICAL TO FIELD VERIFY DIMENSIONS. SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, EXISTING CONDITIONS AND/OR DESIGN INTENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM AUTHORIZED REPRESENTATIVE OF LCCI OR THE ENGINEER PRIOR TO PROCEEDING WITH THE WORK.
5. DETAILS ARE INTENDED TO SHOW END RESULT OF DESIGN. MINOR MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK.
6. CONTRACTOR SHALL RECEIVE CLARIFICATION IN WRITING, AND SHALL RECEIVE IN WRITING AUTHORIZATION TO PROCEED BEFORE STARTING WORK ON ANY ITEMS NOT CLEARLY DEFINED OR IDENTIFIED BY THE CONTRACT DOCUMENTS.
7. CONTRACTOR SHALL NOTIFY THE ENGINEER OF ALL PRODUCTS OR ITEMS NOTED AS "EXISTING" WHICH ARE NOT FOUND TO BE IN THE FIELD.
8. CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK USING THE BEST CONSTRUCTION SKILLS AND ATTENTION. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER CONTRACT, UNLESS OTHERWISE NOTED.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF THE WORK AREA, ADJACENT AREAS AND BUILDING OCCUPANTS THAT ARE LIKELY TO BE AFFECTED BY THE WORK UNDER THIS CONTRACT. WORK SHALL CONFORM TO ALL OSHA REQUIREMENTS.
10. CONTRACTOR SHALL COORDINATE HIS WORK WITH THE SUPERINTENDENT OF BUILDINGS & GROUNDS AND SCHEDULE HIS ACTIVITES AND WORKING HOURS IN ACCORDANCE WITH THE REQUIREMENTS.
11. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING HIS WORK WITH THE WORK OF OTHERS AS IT MAY RELATE TO RADIO EQUIPMENT, ANTENNAS AND ANY OTHER PORTIONS OF THE WORK.
12. CONTRACTOR SHALL PROVIDE ACCESS TO THE SITE AND ASSIST THE RADIO EQUIPMENT VENDOR AND THE ANTENNA INSTALLATION CONTRACTOR AS THEY MAY REQUIRE.
13. PROVIDE 48 HOURS WRITTEN NOTICE TO THE ENGINEER, LCCI & OWNER PRIOR TO COMMENCEMENT OF WORK.
14. CONTRACTOR SHALL MAINTAIN LIABILITY INSURANCE TO PROTECT THE OWNER, AGENT & LCCI
15. PROVIDE A PORTABLE FIRE EXTINGUISHER WITH A RATING OF NOT LESS THAN 2-A OR 2-A/10-BC WITHIN 75 FEET TRAVEL DISTANCE TO ALL PORTIONS OF THE WORK AREA DURING CONSTRUCTION.
16. INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS UNLESS SPECIFICALLY OTHERWISE INDICATED OR WHERE LOCAL CODES OR REGULATIONS TAKE PRECEDENCE.
17. VERIFY FINAL EQUIPMENT LOCATIONS WITH THE RADIO EQUIPMENT VENDOR.
18. MAKE NECESSARY PROVISIONS TO PROTECT EXISTING SURFACES, EQUIPMENT, IMPROVEMENTS, PIPING ETC. AND IMMEDIATELY REPAIR ANY DAMAGE THAT OCCURS DURING CONSTRUCTION.
19. IN DRILLING HOLES INTO CONCRETE WHETHER FOR FASTENING OR ANCHORING PURPOSES, OR PENETRATIONS THROUGH THE FLOOR FOR CONDUIT RUNS, PIPE RUNS, ETC., IT MUST BE CLEARLY UNDERSTOOD THAT REINFORCING STEEL SHALL NOT BE DRILLED INTO, CUT OR DAMAGED UNDER ANY CIRCUMSTANCES (UNLESS OTHERWISE NOTED). LOCATIONS OF REINFORCING STEEL ARE NOT DEFINITELY KNOWN AND THEREFORE MUST BE SEARCHED FOR BY APPROPRIATE METHODS AND EQUIPMENT.
20. REPAIR ALL EXISTING WALL SURFACES DAMAGED DURING CONSTRUCTION SUCH THAT THEY MATCH AND BLEND IN WITH ADJACENT SURFACES.
21. SEAL PENETRATIONS THROUGH FIRE RATED AREAS WITH U.L. LISTED AND FIRE CODE APPROVED MATERIALS.
22. KEEP CONTRACT AREA CLEAN, HAZARD FREE, AND DISPOSE OF ALL DIRT, DEBRIS, AND RUBBISH. EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY OF THE OWNER SHALL BE REMOVED. LEAVE PREMISES IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL ITEMS UNTIL COMPLETION OF CONSTRUCTION.
23. COMPLETE JOB SHALL BE GUARANTEED FOR A PERIOD OF ONE (1) YEAR AFTER THE DATE OF ACCEPTANCE BY LCCI. ANY WORK, MATERIALS, OR EQUIPMENT FOUND TO BE DEFECTIVE DURING THAT PERIOD SHALL BE CORRECTED IMMEDIATELY UPON WRITTEN NOTIFICATION AT NO ADDITIONAL COST TO LCCI.
24. MINIMUM BEND RADIUS OF ANTENNA CABLES SHALL BE IN ACCORDANCE WITH CABLE MANUFACTURERS RECOMMENDATIONS.

GENERAL CONCRETE NOTES

1. DESIGN AND CONSTRUCTION SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" ACI 318.
2. ULTIMATE COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS SHALL BE 3500 PSI.
3. CONCRETE WORK AND MATERIALS SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS", ACI 301.
4. CEMENT SHALL BE PORTLAND CEMENT CONFORMING TO ASTM C150 TYPE 1.
5. CONCRETE SLUMP SHALL NOT EXCEED 5 INCHES UNLESS SPECIFICALLY AUTHORIZED BY THE ENGINEER. SLUMP SHALL BE DETERMINED IN ACCORDANCE WITH ASTM C143.
6. READY MIX CONCRETE SHALL COMPLY WITH ACI-304 AND ASTM C-94 WITH A MAXIMUM WATER CEMENT RATIO OF 0.50. TIME BETWEEN INTRODUCTION OF WATER AND THE PLACEMENT OF CONCRETE SHALL NOT EXCEED 1-1/2 HOURS.
7. PROVIDE AIR ENTRAINMENT IN EXTERIOR EXPOSED CONCRETE TO OBTAIN TOTAL AIR CONTENT OF 5% ± 1% IN ACCORDANCE WITH ACI 301.
8. CONCRETE COVER FOR REINFORCING SHALL BE 3 INCHES FOR CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH. AT ALL OTHER CONCRETE SURFACES, MINIMUM COVER SHALL BE 2 INCHES FOR #6 AND LARGER BARS, AND 1 1/2 INCHES FOR #5 AND SMALLER BARS.
9. REMOVE ALL LOOSE MATERIAL AND DEBRIS FROM SURFACE PRIOR TO PLACING CONCRETE.
10. EXTERIOR WALKING SURFACES SHALL RECEIVE A BROOM FINISH.
11. THROUGHOUT CONSTRUCTION, THE CONCRETE WORK SHALL BE ADEQUATELY PROTECTED AGAINST DAMAGE DUE TO EXCESSIVE LOADING, CONSTRUCTION EQUIPMENT, MATERIALS OR METHODS, ICE, RAIN, SNOW, EXCESSIVE HEAT AND FREEZING.
12. DRYING OUT OF CONCRETE, ESPECIALLY DURING THE FIRST 24 HOURS, SHALL BE CAREFULLY GUARDED AGAINST, ALL SURFACES SHALL BE MOIST CURED OR PROTECTED USING A MEMBRANE CURING AGENT APPLIED AS SOON AS FORMS ARE REMOVED. IF MEMBRANE CURING AGENT IS USED, EXERCISE CARE NOT TO DAMAGE SURFACE.

11. SUBMIT SHOP DETAIL DRAWINGS OF ALL STRUCTURAL AND MISCELLANEOUS STEEL TO THE ENGINEER FOR APPROVAL, AND INCORPORATE ALL COMMENTS PRIOR TO FABRICATION.
12. GRATING SHALL BE GALVANIZED SERRATED WELDED STEEL BAR GRATING WITH 1"x3/16" BEARING BARS AT 1-3/16" OC. FASTEN TO SUPPORTING MEMBERS WITH SADDLE-TYPE CLIPS AND BAND ALL EXPOSED EDGES.
13. SLEEVE ANCHORS SHALL CONFORM TO FEDERAL SPECIFICATION FF-S-325, GROUP II, TYPE 3, CLASS 3, AS MANUFACTURED BY HILTI FASTENING SYSTEMS OR APPROVED EQUAL. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. MINIMUM EMBEDMENT SHALL BE THREE (3) INCHES.
14. EXPANSION BOLTS SHALL CONFORM TO FEDERAL SPECIFICATION FF-S-325, GROUP II, TYPE 4, CLASS 1, HILTI KWIK BOLT II OR APPROVED EQUAL. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. MINIMUM EMBEDMENT SHALL BE FOUR (4) INCHES.
15. EPOXY ANCHORING SYSTEM SHALL BE THE HILTI HIT HY20 FOR MASONRY CONSTRUCTION WITH HOLLOW BRICK OR BLOCK & THE HILTY HIT HY150 INJECTION ADHESIVE ANCHOR FOR GROUT FILLED CONCRETE MASONRY UNITS AND CONCRETE. EPOXY ANCHOR ASSEMBLY SHALL CONSIST OF 1/2"ø STAINLESS STEEL ANCHOR ROD W/NUTS & WASHERS, AN INTERNALLY THREADED INSERT(OPTIONAL), A SCREEN TUBE FOR THE HY20 ONLY & AN EPOXY ADHESIVE (8" MIN EMBEDMENT U.N.O). THE INSTALLATION PROCEDURE SHALL BE AS FOLLOWS
    - A. DRILL THE HOLE USING MANUFACTURER RECOMMENDED DRILL BIT UP TO SPECIFIED DEPTH. HAMMERING IS NOT PERMITTED.
    - B. CLEAN THE HOLE USING NYLON BRUSH AND/OR COMPRESSED AIR. THE HOLE SHOULD BE CLEAR OF ANY LOOSE MATERIAL. IF WET, THE MASONRY SHOULD BE ALLOWED TO DRY FULLY BEFORE ANCHOR INSTALLATION.
    - C. INSERT SPECIFIED SCREEN TUBE INTO THE HOLE.
    - D. FILL THE SCREEN TUBE COMPLETELY WITH ADHESIVE, BEGINNING AT THE BOTTOM END.
    - E. INSERT ANCHOR ROD OR INTERNALLY THREADED INSERT INTO THE ADHESIVE-FILLED SCREEN TUBE, TWISTING SLIGHTLY.
    - F. LOAD FASTENER ONLY AFTER MANUFACTURER SPECIFIED CURE TIME HAS ELAPSED.
16. INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NONCONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE ENGINEER PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER APPROVAL.

ANTENNA MOUNTING NOTES

1. DESIGN AND CONSTRUCTION OF ANTENNA SUPPORTS SHALL CONFORM TO ANSI/EIA/TIA- 222-F "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES" OR APPLICABLE LOCAL CODES. DESIGN WIND SPEED = 85 MPH. (85 MPH IN CONJUNCTION WITH 0.5 INCHES RADIAL ICE)
2. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS OTHERWISE NOTED.
3. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS OTHERWISE NOTED.
4. DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780.
5. ALL ANTENNA MOUNTS SHALL BE INSTALLED WITH DOUBLE NUTS AND SHALL BE INSTALLED SNUG TIGHT.

GENERAL ELECTRICAL NOTES

1. CONTRACTOR SHALL PERFORM ALL VERIFICATION OBSERVATION TESTS, AND EXAMINATION WORK PRIOR TO THE ORDERING OF THE ELECTRICAL EQUIPMENT AND THE ACTUAL CONSTRUCTION. CONTRACTOR SHALL ISSUE A WRITTEN NOTICE OF ALL FINDINGS TO THE ENGINEER LISTING ALL MALFUNCTIONS, FAULTY EQUIPMENT AND DISCREPANCIES.
2. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, INSURANCE, EQUIPMENT, INSTALLATION, CONSTRUCTION TOOLS, TRANSPORTATION, ETC., FOR A COMPLETE AND PROPERLY OPERATIVE SYSTEM ENERGIZED THROUGHOUT AND AS INDICATED ON DRAWINGS, AS SPECIFIED HEREIN AND/OR AS OTHERWISE REQUIRED.
3. ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND IN PERFECT CONDITION WHEN INSTALLED AND SHALL BE OF THE BEST GRADE AND OF THE SAME MANUFACTURER THROUGHOUT FOR EACH CLASS OR GROUP OF EQUIPMENT. MATERIALS SHALL BE LISTED AND APPROVED BY UNDERWRITER'S LABORATORIES (U.L.) AND SHALL BEAR THE INSPECTION LABEL "J" WHERE SUBJECT TO SUCH APPROVAL. MATERIALS SHALL MEET WITH APPROVAL OF ALL GOVERNING BODIES HAVING JURISDICTION. AND SHALL BE MANUFACTURED IN ACCORDANCE WITH APPLICABLE STANDARDS ESTABLISHED BY ANSI, NEMA AND NBFU.
4. CONTRACTOR TO COORDINATE WITH BUILDING OWNER FOR CONNECTION OF TEMPORARY AND PERMANENT POWER TO THE SITE. THE TEMPORARY POWER AND ALL HOOKUP COSTS TO BE PAID BY CONTRACTOR.
5. ALL ELECTRICAL EQUIPMENT SHALL BE LABELED WITH PERMANENT ENGRAVED PLASTIC LABELS.
6. ALL CIRCUIT BREAKERS, FUSES AND ELECTRICAL EQUIPMENT SHALL HAVE AN INTERRUPTING RATING NOT LESS THAN THE MAXIMUM SHORT CIRCUIT CURRENT TO WHICH THEY MAY BE SUBJECTED, AS INDICATED BY UTILITY COMPANY AND A MINIMUM OF 22,000 A.I.C.
7. METER SOCKET AMPERES, VOLTAGE, AND NUMBER OF PHASES SHALL BE AS NOTED AND SHALL BE MANUFACTURED BY SQUARE "D" COMPANY, SANGAMO, OR APPROVED EQUAL. METER SOCKET SHALL BE APPROVED BY UTILITY COMPANY PRIOR TO INSTALLATION.
8. WIRE AND CABLE CONDUCTORS SHALL BE COPPER #12 AWG MINIMUM WITH TYPE THWN INSULATION UNLESS SPECIFICALLY NOTED OTHERWISE.
9. EACH CONDUCTOR OF EVERY SYSTEM SHALL BE PERMANENTLY TAGGED IN EACH PANELBOARD, PULLBOX, J-BOX, SWITCH BOX, ETC., IN COMPLIANCE WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT (O.S.H.A.)
10. CONDUIT:
    - A. RIGID CONDUIT SHALL BE U.L. LABEL GALVANIZED ZINC COATED WITH ZINC INTERIOR AND SHALL BE USED WHEN INSTALLED IN OR UNDER CONCRETE SLABS, IN CONTACT WITH THE EARTH, UNDER PUBLIC ROADWAYS, IN MASONRY WALLS OR EXPOSED ON BUILDING EXTERIOR.
    - B. ELECTRICAL METALLIC TUBING (EMT) SHALL HAVE U.L. LABEL. FITTINGS SHALL BE GLAND RING COMPRESSION TYPE. EMT SHALL BE USED ONLY FOR INTERIOR RUNS. NO SET SCREW OR CRIMP TYPE FITTINGS SHALL BE USED.
    - C. FLEXIBLE METALLIC CONDUIT SHALL HAVE U.L. LABEL AND MAY BE USED WHERE PERMITTED BY CODE. FITTINGS SHALL BE "JAKE" OR "SQUEEZE" TYPE, SEAL TIGHT FLEXIBLE CONDUIT. ALL CONDUIT IN EXCESS OF SIX FEET IN LENGTH SHALL HAVE FULL SIZE GROUND WIRE.
    - D. PVC CONDUIT AND FITTINGS SHALL HAVE U.L. LABEL AND SHALL BE PVC SCHEDULE 40.
    - E. CONDUIT SHALL BE SIZED PER NEC OR ANY GOVERNING LOCAL CODE, AND AS SHOWN.
    - F. CONDUIT RUNS MAY BE SURFACE MOUNTED IN CEILINGS OR WALLS UNLESS INDICATED OTHERWISE. CONDUIT INDICATED SHALL RUN PARALLEL OR AT RIGHT ANGLES TO CEILING, FLOOR OR BEAMS. VERIFY EXACT ROUTING OF ALL EXPOSED CONDUIT WITH OWNER PRIOR TO INSTALLING.
    - G. ALL CONDUIT ONLY (C.O.) RUNS SHALL HAVE A PULL WIRE OR ROPE.
11. REFER TO MANUFACTURERS MANUAL FOR RECOMMENDED FUSE AND WIRE SIZES.
12. ALL FINAL CONNECTIONS TO THE EQUIPMENT ARE TO BE OF FLEXIBLE WEATHERPROOF CONDUIT TO MEET APPLICABLE CODES.
13. PROVIDE LCCI WITH ONE SET OF COMPLETE ELECTRICAL "AS INSTALLED" DRAWINGS AT THE COMPLETION OF THE JOB, SHOWING ACTUAL DIMENSIONS, ROUTINGS, AND CIRCUITS.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH, GAINING APPROVALS AND PAYING ALL FEES ASSESSED BY UTILITY COMPANY FOR ELECTRICAL SERVICE.
15. SEAL PENETRATIONS THROUGH FIRE RATED AREAS WITH UL LISTED AND CODE APPROVED MATERIALS.
16. TELCO CONDUIT RUN IN/ON BUILDINGS SHALL BE 2" DIA. AND HAVE MINIMUM 12" RADIUS BENDS & ELBOWS. CONDUIT RUNS SHALL HAVE ONE 18"x18"x8" PULL BOX AT DEMARC LOCATION. TWO (2) PULL ROPES SHALL BE INSTALLED IN TELCO CONDUIT.
17. CONTRACTOR TO INSTALL BRASS TAGS ON THE COAX CABLE AT THE ANTENNA END & AT THE EQUIPMENT END. THE TAGS MUST INCLUDE SECTOR NO.# AND CABLE LENGTH.

GENERAL GROUNDING NOTES

1. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE GROUNDED AS REQUIRED BY ALL APPLICABLE CODES.
2. ALL BUS CONNECTORS SHALL BE TWO-HOLE, LONG-BARREL TYPE COMPRESSION LUGS, T&B OR EQUAL, UNLESS OTHERWISE NOTED ON DRAWINGS. ALL LUGS SHALL BE ATTACHED TO BUSSES USING BOLTS, NUTS, AND LOCK WASHERS. NO WASHERS ARE ALLOWED BETWEEN THE ITEMS BEING GROUNDED.
3. ALL CONNECTORS SHALL BE CRIMPED USING HYDRAULIC CRIMPING TOOLS, T&B #TBM 8 OR EQUIVALENT.
4. ALL CONNECTIONS SHALL BE MADE TO BARE METAL. ALL PAINTED SURFACES SHALL BE FILED TO ENSURE PROPER CONTACT. NO WASHERS ARE ALLOWED BETWEEN THE ITEMS BEING GROUNDED. ALL CONNECTIONS ARE TO HAVE A NON-OXIDIZING AGENT APPLIED PRIOR TO INSTALLATION.
5. ALL COPPER BUSSES SHALL BE CLEANED, POLISHED, AND A NON-OXIDIZING AGENT APPLIED. NO FINGERPRINTS OR DISCOLORED COPPER WILL BE PERMITTED.
6. ALL BENDS SHALL BE AS SHALLOW AS POSSIBLE, WITH NO TURN SHORTER THAN AN 8-INCH NOMINAL RADIUS.
7. GROUNDING CONDUCTORS SHALL BE SOLID TINNED COPPER AND ANNEALED #2. ALL GROUNDING CONDUCTORS SHALL RUN THROUGH PVC SLEEVES WHEREVER CONDUCTORS RUN THROUGH WALLS, FLOORS, OR CEILINGS. IF CONDUCTORS MUST RUN THROUGH EMT, BOTH ENDS OF CONDUIT SHALL BE GROUNDED. SEAL BOTH ENDS OF CONDUIT WITH SILICONE CAULK.
8. GROUNDING SYSTEM RESISTANCE SHALL NOT EXCEED 10 OHMS. IF THE RESISTANCE VALUE IS EXCEEDED, NOTIFY THE PROJECT MANAGER FOR FURTHER INSTRUCTION ON METHODS FOR REDUCING THE RESISTANCE VALUE.
9. ALL ROOF TOP ANTENNA MOUNTS SHALL BE GROUNDED WITH A #2 GROUND WIRE CONNECTED TO THE NEAREST GROUND BUS. ALL CONNECTIONS ARE TO BE CAD-WELDED IF POSSIBLE.
10. UPON COMPLETION OF WORK, CONDUCT CONTINUITY, SHORT CIRCUIT, AND FALL OF POTENTIAL GROUNDING TESTS FOR APPROVAL. SUBMIT TEST REPORTS TO THE PROJECT MANAGER.
11. GROUNDING CONNECTION TO TRAVEL IN A DOWNWARD DIRECTION.
12. ALL EXPOSED #2 WIRE MUST BE TINN NOT BCW.
13. MASTER GROUND BAR IS TO BE 4" X 1'-8". ALL OTHER GROUND BARS ARE TO BE 4" X 1'-4".

GENERAL NOTES

1. THIS FACILITY IS UNMANED AND NOT FOR HUMAN OCCUPANCY.
2. ALL WORK SHALL CONFORM TO THE LOCAL BUILDING CODE.
3. RIGGING OPERATIONS SHALL BE DONE IN ACCORDANCE WITH LOCAL AND FEDERAL SAFETY REGULATIONS (OSHA). TECTONIC, AND THE LANDLORD SHALL BE HELD HARMLESS IN THE EVENT THE CONTRACTOR DOES NOT FOLLOW SUCH SAFETY REGULATIONS.

TENANT PROTECTION NOTES

SPECIAL PRECAUTION SHALL BE TAKEN BY THE CONTRACTOR SO THAT THE EQUIPMENT ON THIS APPLICATION AND IT'S INSTALLATION WILL NOT AFFECT THE FOLLOWING:

1. TENANT EGRESS TO AND FROM THE BUILDING/SITE.
2. FIRE SAFETY OR CREATE A FIRE HAZARD.
3. STRUCTURAL SAFETY OF THE ADJACENT STRUCTURES.
4. ACCUMULATION OF DUST: THE CONTRACTOR SHALL LEAVE THE WORKSITE BROOM CLEAN EACH DAY. IN THE EVENT THAT ASBESTOS IS FOUND ON THE JOBSITE, NOTIFY THE LCC CONSTRUCTION MANAGER IMMEDIATELY. ANY REMOVAL SHALL TAKE PLACE IN ACCORDANCE WITH ALL THE APPLICABLE REGULATIONS OF OSHA SECTION 1910.1 INCLUDING STATE AND FEDERAL DUMPING GROUNDS.
5. THERE SHALL BE NO CREATION OF NOISE OUTSIDE THE NORMAL HOURS OF BUILDING OPERATION.
6. BUILDING SECURITY SHALL BE MAINTAINED IN ORDER TO PREVENT UNAUTHORIZED PERSONS FROM ENTERING THE PREMISES.
7. ELECTRICITY, GAS, WATER AND ANY OTHER UTILITIES WILL NOT BE INTERRUPTED DURING CONSTRUCTION.

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1-(860)-[illegible]

STATE OF CONNECTICUT
IGNACIO C. ARTAZ
No. 8704
LICENSED ARCHITECT

PROJECT NO. [illegible]1960.09

DRAWN BY: DFG

CHECKED BY:

ISSUED FOR		
	10-13-00	REVIEW
	11-13-00	PERMITING

CROWN-MANCHESTER
SITE ID: HAR011.A

REAR 266 CENTER STREET
MANCHESTER, CONNECTICUT
06040

SCALE: AS NOTED

DATE: 11-07-00

GENERAL NOTES

GN-1

Power Density Calculation for XM Radio's proposed installation at 266 Center Street, Manchester, CT 06040

XM Radio Internal Site ID: **HAR-011A**

Power Density Calculation - Worst Case		
Base Station TX Output	1000 *watts*	60 *dBm*
Number of Tx Channels	2	
Antenna Model	TA-2350-DAB-H *Omni*	
Antenna Gain	10 *dBi*	
Cable Type/Size	LDF7-50A *1-5/8"*	
Cable Length	160 *ft*	
Jumper and Connector Loss	0.69 *dB*	
Cable Loss (per foot)	0.0137 *dB/ft*	
Total Cable Loss	2.19 *dB*	
Total Attenuation	2.88 *dB*	
EIRP Per Channel	67.12 *dBm*	5,152.05 *Watts*
Total EIRP	70.12 *dBm*	10,304.10 *Watts*
Ground Reflection	1.60	
Frequency	2337.49 *MHZ* 2340.02 *MHZ*	
Antenna Height	125 *ft*	3,810.00 *cm*
nsg	10.00	
Power Density (S)	0.144607 *mw/cm²*	
% MPE From XM Radio	**14.4607%**	
% MPE From Other Sources	0.00%	
Total % MPE From All Sources	**14.4607%**	

Equation Used:

Power Density (S) = (2.56*1000*EIRP)/4*(pi)*(R)²

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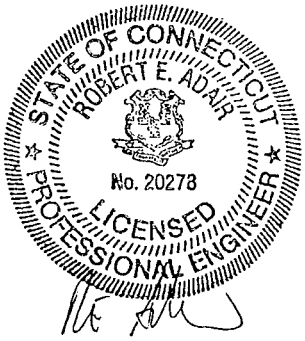
HEB

STRUCTURAL ANALYSIS REPORT
OF
115' VALMONT MONOPOLE
MANCHESTER, CONNECTICUT

Prepared for Crown Castle Atlantic, LLC

July 25, 2000



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STRUCTURAL ANALYSIS REPORT
of
115' VALMONT MONOPOLE
MANCHESTER, CONNECTICUT
prepared for
CROWN CASTLE ATLANTIC, LLC

EXECUTIVE SUMMARY:

H.E. Bergeron Engineers, P.A. (HEB) performed a structural analysis of this 115-foot Valmont monopole tower. The analysis was performed with the addition of a TA-2335-LCC panel antenna mounted at a centerline elevation of 124-feet on a pipe extension, and a TA-2324-LHCP parabolic antenna mounted at 80-feet.

Our analysis indicates the tower and its foundation are capable of supporting the proposed antennas. The pipe extension supporting the proposed panel antenna should consist of 3" X-Strong steel pipe, ASTM A-500 grade B. Should the extended height exceed 9', the pipe size should be increased to accommodate the additional length.

INTRODUCTION:

A structural analysis of this communications tower was performed by H.E. Bergeron 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 a Valmont design drawing, and TIL-TEK antenna catalog sheets.

The structure is a 115-foot, galvanized steel monopole manufactured by Valmont. This analysis was conducted with the following antenna loads:

- (12) ALP9212 panel antennas on 15' platform at 112'; 1-5/8" waveguide
- A vacant platform at 99'
- (1) TA-2335-LCC panel antenna at 124' on a 9' pipe extension; 1-5/8" waveguide
- (1) TA2324-LHCP solid parabolic antenna at 80'; 7/8" waveguide

HEB

For the purpose of the analysis, all cables were assumed to be installed on the inside of the pole.

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 85 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 load 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. Our analysis indicates that the secondary moments exceed those of the linear analysis, and therefore govern in determining the capacity of the structure.

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

HEB

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.

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'-10'	43%
10'-20'	40%
20'-29'	37%
29'-40'	44%
40'-51'	39%
51'-62'	34%
62'-72'	29%
72'-83'	40%
83'-94'	29%
94'-104'	19%
104'-115'	8%

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 reactions were less than the design values. Based on these figures, 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.

HEB

CONCLUSIONS AND SUGGESTIONS:

As detailed above, our analysis indicates that the existing 115' Valmont monopole tower and foundation are capable of supporting the additional antenna loading proposed.

The pipe extension supporting the proposed omnidirectional antenna should consist of 3" X-Strong ASTM A-500 grade B steel pipe. Should the extended height exceed 9', the pipe size should be increased to accommodate the additional length.

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.E. Bergeron 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. E. BERGERON ENGINEERS, P.A.
2605 White Mountain Highway, PO Box 440
North Conway, NH 03860
(603) 356-6936

Client: Crown Castle Atlantic
Job: Manchester, CT Job No.: 2000-084

Calculated By: J. Klementovich Date: 17-Jul-00
Checked By: Date: 7/24

General Information

Tower Manufacturer	Valmont	
Tower Type	Monopole	
Total Height of Tower	115	ft.
Wind Speed	85	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

E (Modulus of Elasticity)	29000	ksi
Fb	0.6	
K	1	
Min. Width =	21.91	in
Max. Width =	48.85	in
Slope of Tower =	0.0195	in/in

Tower Information

Section	Length (ft.)	Midpt Elev.	Base Width (in.)	Top Width (in.)	Area (sf) w/o Ice	Area (sf) w/ Ice	Wall Thknss	Wt. (lbs) Tower	Wt. (lbs) Ice
20		0.00	0.00	0.00	0.00	0.00		0.00	0.00
19		0.00	0.00	0.00	0.00	0.00		0.00	0.00
18		0.00	0.00	0.00	0.00	0.00		0.00	0.00
17		0.00	0.00	0.00	0.00	0.00		0.00	0.00
16		0.00	0.00	0.00	0.00	0.00		0.00	0.00
15		0.00	0.00	0.00	0.00	0.00		0.00	0.00
14		0.00	0.00	0.00	0.00	0.00		0.00	0.00
13		0.00	0.00	0.00	0.00	0.00		0.00	0.00
12		0.00	0.00	0.00	0.00	0.00		0.00	0.00
11	10.70	109.65	24.42	21.91	20.65	21.55	0.219	747.19	154.67
10	10.70	98.95	26.92	24.42	22.89	23.78	0.219	828.82	171.05
9	10.70	88.25	29.43	26.92	25.12	26.02	0.219	910.45	187.44
8	10.70	77.55	31.94	29.43	27.36	28.25	0.219	877.60	203.82
7	10.70	66.85	34.44	31.94	29.59	30.49	0.313	1351.48	220.20
6	10.70	56.15	36.95	34.44	31.83	32.72	0.313	1454.52	236.59
5	10.70	45.45	39.46	36.95	34.06	34.96	0.313	1557.56	252.97
4	10.70	34.75	41.96	39.46	36.30	37.19	0.313	1660.60	269.36
3	9.80	24.50	44.26	41.96	35.21	36.02	0.375	1930.77	261.07
2	9.80	14.70	46.55	44.26	37.08	37.90	0.375	2034.49	274.82
1	9.80	4.90	48.85	46.55	38.96	39.77	0.375	2138.21	288.56
	115.00						Total	15492	2521

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Client: Crown Castle Atlantic
Job: Manchester, CT Job No.: 2000-084

Calculated By: J. Klementovich Date: 17-Jul-00
Checked By: Date: 7/24

Section Properties

Section	I in^4	I mid	Area mid	Area in^2	L / side in	r in	S in^3
Top	919.91			15.27			
20	0.00	0.0	0.0	0.00	0.00	#DIV/0!	#DIV/0!
19	0.00	0.0	0.0	0.00	0.00	#DIV/0!	#DIV/0!
18	0.00	0.0	0.0	0.00	0.00	#DIV/0!	#DIV/0!
17	0.00	0.0	0.0	0.00	0.00	#DIV/0!	#DIV/0!
16	0.00	0.0	0.0	0.00	0.00	#DIV/0!	#DIV/0!
15	0.00	0.0	0.0	0.00	0.00	#DIV/0!	#DIV/0!
14	0.00	0.0	0.0	0.00	0.00	#DIV/0!	#DIV/0!
13	0.00	0.0	0.0	0.00	0.00	#DIV/0!	#DIV/0!
12	0.00	0.0	0.0	0.00	0.00	#DIV/0!	#DIV/0!
11	1277.06	1098.5	16.2	17.04	6.54	8.66	104.61
10	1716.43	1496.7	17.9	18.80	7.21	9.55	127.51
9	2246.54	1981.5	19.7	20.57	7.89	10.45	152.67
8	2875.89	2561.2	21.5	22.33	8.56	11.35	180.10
7	5113.62	3994.8	28.3	34.29	9.23	12.21	296.93
6	6324.98	5719.3	35.6	36.81	9.90	13.11	342.36
5	7713.96	7019.5	38.1	39.33	10.57	14.00	391.01
4	9292.72	8503.3	40.6	41.85	11.24	14.90	442.90
3	13043.15	11167.9	47.4	52.91	11.86	15.70	589.41
2	15199.05	14121.1	54.3	55.68	12.47	16.52	652.96
1	17580.32	16389.7	57.1	58.45	13.09	17.34	719.77

Tower Dead Load Summary

Elev.	Dead load Tower (lbs)	Dead load Ice (lbs)
115.0	0	0
115.0	0	0
115.0	0	0
115.0	0	0
115.0	0	0
115.0	0	0
115.0	0	0
115.0	0	0
115.0	0	0
115.0	0	0
115.0	0	0
104.3	747	155
93.6	1576	326
82.9	2486	513
72.2	3364	717
61.5	4716	937
50.8	6170	1174
40.1	7728	1427
29.4	9388	1696
19.6	11319	1957
9.8	13353	2232
0.0	15492	2521

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(603) 356-6936

Client: Crown Castle Atlantic
Job: Manchester, CT Job No.: 2000-084

Calculated By: J. Klementovich Date: 17-Jul-00
Checked By: Date: 7/24

Antennae Summary

Input:
Wind Velocity= 85 mph
Tower Hgt= 115 ft.

ANTENNAS Type	Elev. (z)	Coeff. (C)	Kz	Qz	Area (no ice)	Area (ice)	Force (no ice)	Force (ice)	Weight	
			1.00	18.50			0	0		
			1.00	18.50			0	0		
(12) ALP9212 & platform	112	1.4	1.42	26.22	56.2	63.2	3484	3920	1624	
			1.00	18.50			0	0		
TIL-TEK TA-2335-LCC-H	124	1.2	1.46	27.00	8.0	8.4	436	559	96	
			1.00	18.50			0	0		
Empty LP platform	99	1.2	1.37	25.32	9.4	11.6	480	678	1100	
			1.00	18.50			0	0		
			1.00	18.50			0	0		
			1.00	18.50			0	0		
DISHES										Orient
TIL-TEK TA-2324-LHCP	80	0.00426	1.29	23.82	3.5	3.8	233	252	125	50 0.0043
		0.00000	1.00	18.50			0	0		
		0.00000	1.00	18.50			0	0		
		0.00000	1.00	18.50			0	0		
		0.00000	1.00	18.50			0	0		
									2945	

CABLES & LINEAR APPURT.

Section	Area w/o Ice	Area w/ Ice	Weight w/o Ice	Weight w/ Ice
20	0.00	0.00	0	0
19	0.00	0.00	0	0
18	0.00	0.00	0	0
17	0.00	0.00	0	0
16	0.00	0.00	0	0
15	0.00	0.00	0	0
14	0.00	0.00	0	0
13	0.00	0.00	0	0
12	0.00	0.00	0	0
11	0.33	1.23	161	171
10	0.33	1.23	161	171
9	0.33	1.23	161	171
8	0.33	1.23	161	171
7	0.33	1.23	161	171
6	0.33	1.23	161	171
5	0.33	1.23	161	171
4	0.33	1.23	161	171
3	0.31	1.12	147	157
2	0.31	1.12	147	157
1	0.31	1.12	147	157

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(603) 356-6936

Client: **Crown Castle Atlantic**
Job: **Manchester, CT** Job No.: **2000-084**

Calculated By: **J. Klementovich** Date: **17-Jul-00**
Checked By: Date: 7/24

Kz = Exposure coefficient = $(z/33)^{2/7}$; 1.00<=Kz<=2.58
Qz = Velocity pressure = .00256*Kz*V^2
Gh = Gust response factor = 1.69
Cf = Structure force coefficient from Table 1 of TIA/EIA
Aa and Ai = Areas of linear apputenances, w/o & with ice
Ae = Effective area = Avg. width*section length
Force = Qz*Gh*(Cf*Ae+Ca*Aa)

Wind Load Summary

Wind Velocity = 85 mph
Height of Tower = 115 feet

Wind Load Without Ice

Section	Midpoint Height	Areas Ae	Areas Aa	Kz	Qz	Gh	Cf	Wind Load	Wind Load
20	0.00	0.0	0.00	1.00	18.50	1.69	1.03	0 lbs.	##### plf.
19	0.00	0.0	0.00	1.00	18.50	1.69	1.03	0 lbs.	##### plf.
18	0.00	0.0	0.00	1.00	18.50	1.69	1.03	0 lbs.	##### plf.
17	0.00	0.0	0.00	1.00	18.50	1.69	1.03	0 lbs.	##### plf.
16	0.00	0.0	0.00	1.00	18.50	1.69	1.03	0 lbs.	##### plf.
15	0.00	0.0	0.00	1.00	18.50	1.69	1.03	0 lbs.	##### plf.
14	0.00	0.0	0.00	1.00	18.50	1.69	1.03	0 lbs.	##### plf.
13	0.00	0.0	0.00	1.00	18.50	1.69	1.03	0 lbs.	##### plf.
12	0.00	0.0	0.00	1.00	18.50	1.69	1.03	0 lbs.	##### plf.
11	109.65	20.7	0.33	1.41	26.07	1.69	1.03	955 lbs.	89 plf.
10	98.95	22.9	0.33	1.37	25.31	1.69	1.03	1026 lbs.	96 plf.
9	88.25	25.1	0.33	1.32	24.50	1.69	1.03	1088 lbs.	102 plf.
8	77.55	27.4	0.33	1.28	23.61	1.69	1.03	1140 lbs.	107 plf.
7	66.85	29.6	0.33	1.22	22.63	1.69	1.03	1181 lbs.	110 plf.
6	56.15	31.8	0.33	1.16	21.53	1.69	1.03	1207 lbs.	113 plf.
5	45.45	34.1	0.33	1.10	20.27	1.69	1.03	1216 lbs.	114 plf.
4	34.75	36.3	0.33	1.01	18.77	1.69	1.03	1199 lbs.	112 plf.
3	24.50	35.2	0.31	1.00	18.50	1.69	1.03	1145 lbs.	117 plf.
2	14.70	37.1	0.31	1.00	18.50	1.69	1.03	1205 lbs.	123 plf.
1	4.90	39.0	0.31	1.00	18.50	1.69	1.03	1266 lbs.	129 plf.

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(603) 356-6936

Client: **Crown Castle Atlantic**
Job: **Manchester, CT** Job No.: **000-084**

Calculated By: **J. Klementovich** Date: **17-Jul-00**
Checked By: JSK Date: 7/14

Wind Load With Ice

Section	Midpoint Height	Areas Ae	Areas Ai	Kz	Qz	Gh	Cf	Wind Load	75% Wind Load
20	0.00	0.0	0.00	1.00	18.50	1.69	1.03	0 lbs.	##### plf.
19	0.00	0.0	0.00	1.00	18.50	1.69	1.03	0 lbs.	##### plf.
18	0.00	0.0	0.00	1.00	18.50	1.69	1.03	0 lbs.	##### plf.
17	0.00	0.0	0.00	1.00	18.50	1.69	1.03	0 lbs.	##### plf.
16	0.00	0.0	0.00	1.00	18.50	1.69	1.03	0 lbs.	##### plf.
15	0.00	0.0	0.00	1.00	18.50	1.69	1.03	0 lbs.	##### plf.
14	0.00	0.0	0.00	1.00	18.50	1.69	1.03	0 lbs.	##### plf.
13	0.00	0.0	0.00	1.00	18.50	1.69	1.03	0 lbs.	##### plf.
12	0.00	0.0	0.00	1.00	18.50	1.69	1.03	0 lbs.	##### plf.
11	109.65	21.5	1.23	1.41	26.07	1.69	1.03	1042 lbs.	73 plf.
10	98.95	23.8	1.23	1.37	25.31	1.69	1.03	1111 lbs.	78 plf.
9	88.25	26.0	1.23	1.32	24.50	1.69	1.03	1170 lbs.	82 plf.
8	77.55	28.3	1.23	1.28	23.61	1.69	1.03	1220 lbs.	85 plf.
7	66.85	30.5	1.23	1.22	22.63	1.69	1.03	1257 lbs.	88 plf.
6	56.15	32.7	1.23	1.16	21.53	1.69	1.03	1280 lbs.	90 plf.
5	45.45	35.0	1.23	1.10	20.27	1.69	1.03	1284 lbs.	90 plf.
4	34.75	37.2	1.23	1.01	18.77	1.69	1.03	1262 lbs.	88 plf.
3	24.50	36.0	1.12	1.00	18.50	1.69	1.03	1202 lbs.	92 plf.
2	14.70	37.9	1.12	1.00	18.50	1.69	1.03	1262 lbs.	97 plf.
1	4.90	39.8	1.12	1.00	18.50	1.69	1.03	1323 lbs.	101 plf.

7/14

N O D A L C O O R D I N A T E S

B O U N D A R Y C O N D I T I O N S
(F=FIX,S=SUP,M=MASTER/SLAVE)

NODE NO	REBAND NO	X	Y	Z	NODE TEMP	ALPHA	BETA	GAMMA	DIR	DDDOOO XYZXYZ	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	9.80	0.00	0.00	0.00	0.00	0.00			
3	3	0.00	19.60	0.00	0.00	0.00	0.00	0.00			
4	4	0.00	29.40	0.00	0.00	0.00	0.00	0.00			
5	5	0.00	40.10	0.00	0.00	0.00	0.00	0.00			
6	6	0.00	50.80	0.00	0.00	0.00	0.00	0.00			
7	7	0.00	61.50	0.00	0.00	0.00	0.00	0.00			
8	8	0.00	72.20	0.00	0.00	0.00	0.00	0.00			
9	9	0.00	82.90	0.00	0.00	0.00	0.00	0.00			
10	10	0.00	93.60	0.00	0.00	0.00	0.00	0.00			
11	11	0.00	104.30	0.00	0.00	0.00	0.00	0.00			
12	12	0.00	115.00	0.00	0.00	0.00	0.00	0.00			

TOTAL NUMBER OF ACTIVE NODES = 12
TOTAL NUMBER OF EQUATIONS = 66

2 N O D E P R I S M A T I C B E A M E L E M E N T

ELEM NO	NE NO	PE NO	ALPHA	BETA	GAMMA	LENGTH	MAT TYPE	PROP TYPE	RELEASE NE	RELEASE PE	REF TEMP	OFFSET 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	9.80	1	1								
2	2	3	90.00	-90.00	0.00	9.80	1	2								
3	3	4	90.00	-90.00	0.00	9.80	1	3								
4	4	5	90.00	-90.00	0.00	10.70	1	4								
5	5	6	90.00	-90.00	0.00	10.70	1	5								
6	6	7	90.00	-90.00	0.00	10.70	1	6								
7	7	8	90.00	-90.00	0.00	10.70	1	7								
8	8	9	90.00	-90.00	0.00	10.70	1	8								
9	9	10	90.00	-90.00	0.00	10.70	1	9								
10	10	11	90.00	-90.00	0.00	10.70	1	10								
11	11	12	90.00	-90.00	0.00	10.70	1	11								

TOTAL NUMBER OF ACTIVE PRISMATIC BEAM ELEMENTS = 11

M A T E R I A L P R O P E R T I E S

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

2 N O D E P R I S M A T I C B E A M E L E M E N T P R O P E R T I E S

PROP	DESIGNATION	A	IXX	IYY	J	IXY	SFY	SFX	CW
Units:		In^2	In^4	In^4	In^4	In^4			In^6
1	Section 1	57.1	1.64e+004	1.64e+004	3.28e+004	0	1.000	1.000	0
2	2	54.3	1.41e+004	1.41e+004	2.82e+004	0	1.000	1.000	0
3	3	47.4	1.12e+004	1.12e+004	2.23e+004	0	1.000	1.000	0
4	4	40.6	8.5e+003	8.5e+003	1.7e+004	0	1.000	1.000	0
5	5	38.1	7.02e+003	7.02e+003	1.4e+004	0	1.000	1.000	0
6	6	35.6	5.72e+003	5.72e+003	1.14e+004	0	1.000	1.000	0
7	7	28.3	4e+003	4e+003	7.99e+003	0	1.000	1.000	0
8	8	21.5	2.56e+003	2.56e+003	5.12e+003	0	1.000	1.000	0
9	9	19.7	1.98e+003	1.98e+003	3.96e+003	0	1.000	1.000	0
10	10	17.9	1.5e+003	1.5e+003	2.99e+003	0	1.000	1.000	0
11	11	16.2	1.1e+003	1.1e+003	2.2e+003	0	1.000	1.000	0

G R A V I T Y L O A D M U L T I P L I E R S

REC NO	PX	PY	PZ
DESCRIPTION : Dead load of pole			
LOAD CASES : 1			
ELEMENT LIST : 1-11			
1	0.000	-1.300	0.000

2 NODE PRISMATIC BEAM ELEMENT LOAD INFORMATION

REC NO	LOAD TYPE	LOAD SYS	DIST SPEC		DIST	PX	PY	PZ	MX	MY	MZ
Units:					Ft	K	K	K	Ft-K	Ft-K	Ft-K
DESCRIPTION : Wind on section 1 LOAD CASES : 1 ELEMENT LIST : 1											
1	UNIF	GLO	FRAC	B	0.000	0.129	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.129	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : 2 LOAD CASES : 1 ELEMENT LIST : 2											
2	UNIF	GLO	FRAC	B	0.000	0.123	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.123	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : 3 LOAD CASES : 1 ELEMENT LIST : 3											
3	UNIF	GLO	FRAC	B	0.000	0.117	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.117	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : 4 LOAD CASES : 1 ELEMENT LIST : 4											
4	UNIF	GLO	FRAC	B	0.000	0.112	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.112	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : 5 LOAD CASES : 1 ELEMENT LIST : 5											
5	UNIF	GLO	FRAC	B	0.000	0.114	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.114	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : 6 LOAD CASES : 1 ELEMENT LIST : 6											
6	UNIF	GLO	FRAC	B	0.000	0.113	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.113	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : 7 LOAD CASES : 1 ELEMENT LIST : 7											
7	UNIF	GLO	FRAC	B	0.000	0.110	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.110	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : 8 LOAD CASES : 1 ELEMENT LIST : 8											
8	UNIF	GLO	FRAC	B	0.000	0.107	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.107	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : 9 LOAD CASES : 1 ELEMENT LIST : 9											
9	UNIF	GLO	FRAC	B	0.000	0.102	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.102	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : 10 LOAD CASES : 1 ELEMENT LIST : 10											
10	UNIF	GLO	FRAC	B	0.000	0.096	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.096	0.000	0.000	0.000	0.000	0.000
DESCRIPTION : 11 LOAD CASES : 1 ELEMENT LIST : 11											
11	UNIF	GLO	FRAC	B	0.000	0.089	0.000	0.000	0.000	0.000	0.000
				E	1.000	0.089	0.000	0.000	0.000	0.000	0.000

```
DESCRIPTION  : (12) ALP9212 & platform @ 112'
LOAD CASES   : 1
ELEMENT LIST : 11
DISTANCES    : 7.7

 101   CONC  GLO  DIST                        3.484        -1.624        0.000        0.000        0.000        0.000

DESCRIPTION  : TIL-TEK TA2335 @ 124' on pipe mount
LOAD CASES   : 1
ELEMENT LIST : 11
DISTANCES    : 10.7

 102   CONC  GLO  DIST                        0.436        -0.096        0.000        0.000        0.000        3.924

DESCRIPTION  : TIL-TEK TA2324 dish @ 80'
LOAD CASES   : 1
ELEMENT LIST : 8
DISTANCES    : 7.8

 103   CONC  GLO  DIST                        0.233        -0.125        0.000        0.000        0.000        0.000

DESCRIPTION  : Empty platform at 99'
LOAD CASES   : 1
ELEMENT LIST : 10
DISTANCES    : 5.4

 104   CONC  GLO  DIST                        0.480        -1.100        0.000        0.000        0.000        0.000

================================================================================================================================
REC                                                          N O D A L   L O A D S
 NO      ALPHA     BETA      GAMMA        PX                 PY                 PZ                 MX                 MY                 MZ
================================================================================================================================
Units:     Deg       Deg       Deg         K                  K                  K                Ft-K               Ft-K               Ft-K

DESCRIPTION  : Waveguide dead loads
LOAD CASES   : 1
NODE LIST    : 2-4

   1      0.00      0.00      0.00          0.000             -0.147              0.000              0.000              0.000              0.000

DESCRIPTION  : WG d.l.
LOAD CASES   : 1
NODE LIST    : 5-12

   2      0.00      0.00      0.00          0.000             -0.161              0.000              0.000              0.000              0.000

================================================================================================================================
                                                S T R U C T U R E   L O A D   C O M B I N A T I O N S
COMB   LIST OF FACTORS * CASES
================================================================================================================================

DESCRIPTION : Wind + dead loads
   1   1*1
```

L I N E A R A N A L Y S I S R E S U L T S

N O D A L D I S P L A C E M E N T S

(* Indicates Displacements Occur in Nodal Local System)

NODE NO	LOAD COMB	DX	DY	DZ	OX	OY	OZ
Units:		In	In	In	Deg	Deg	Deg
2	1	0.2009	-0.0015	0.0000	0.0000	0.0000	-0.1883
3	1	0.7878	-0.0028	0.0000	0.0000	0.0000	-0.3758
4	1	1.7745	-0.0042	0.0000	0.0000	0.0000	-0.5768
5	1	3.3467	-0.0056	0.0000	0.0000	0.0000	-0.8149
6	1	5.4450	-0.0070	0.0000	0.0000	0.0000	-1.0455
7	1	8.0481	-0.0082	0.0000	0.0000	0.0000	-1.2646
8	1	11.1600	-0.0094	0.0000	0.0000	0.0000	-1.4965
9	1	14.8167	-0.0108	0.0000	0.0000	0.0000	-1.7457
10	1	18.9760	-0.0120	0.0000	0.0000	0.0000	-1.9438
11	1	23.4979	-0.0129	0.0000	0.0000	0.0000	-2.0683
12	1	28.1862	-0.0134	0.0000	0.0000	0.0000	-2.0953

2 N O D E P R I S M A T I C B E A M E L E M E N T -- F O R C E S A N D M O M E N T S

SIGN CONVENTION : BEAM DESIGNERS

ELEM NO	LOAD COMB	NODE NO	AXIAL	SHEAR X	SHEAR Y	MOMENT X	MOMENT Y	TORSION
Units:			K	K	K	K -Ft	K -Ft	K -Ft
1	1	1	-21.8720	0.0000	17.2693	-1189.4116	0.0000	0.0000
		2	-19.3966	0.0000	16.0051	-1026.3670	0.0000	0.0000
2	1	2	-19.2496	0.0000	16.0051	-1026.3670	0.0000	0.0000
		3	-16.8956	0.0000	14.7997	-875.4235	0.0000	0.0000
3	1	3	-16.7486	0.0000	14.7997	-875.4235	0.0000	0.0000
		4	-14.6938	0.0000	13.6531	-736.0048	0.0000	0.0000
4	1	4	-14.5468	0.0000	13.6531	-736.0048	0.0000	0.0000
		5	-12.6251	0.0000	12.4547	-596.3280	0.0000	0.0000
5	1	5	-12.4641	0.0000	12.4547	-596.3280	0.0000	0.0000
		6	-10.6607	0.0000	11.2349	-469.5887	0.0000	0.0000
6	1	6	-10.4997	0.0000	11.2349	-469.5887	0.0000	0.0000
		7	-8.8147	0.0000	10.0258	-355.8439	0.0000	0.0000
7	1	7	-8.6537	0.0000	10.0258	-355.8439	0.0000	0.0000
		8	-7.3141	0.0000	8.8488	-254.8648	0.0000	0.0000
8	1	8	-7.1531	0.0000	8.8488	-254.8648	0.0000	0.0000
		9	-6.0105	0.0000	7.4709	-166.9836	0.0000	0.0000
9	1	9	-5.8495	0.0000	7.4709	-166.9836	0.0000	0.0000
		10	-4.9170	0.0000	6.3795	-92.8839	0.0000	0.0000
10	1	10	-4.7560	0.0000	6.3795	-92.8839	0.0000	0.0000
		11	-2.8088	0.0000	4.8723	-32.6628	0.0000	0.0000
11	1	11	-2.6478	0.0000	4.8723	-32.6628	0.0000	0.0000
		12	-0.2570	0.0000	0.4360	3.9240	0.0000	0.0000

R E A C T I O N S

(* Indicates Reactions Occur in Nodal Local System)

NODE NO	LOAD COMB	PX	PY	PZ	MX	MY	MZ
Units:		K	K	K	K -Ft	K -Ft	K -Ft
1	1	-17.2693	21.8720	0.0000	0.0000	0.0000	1189.4116

P-D E L T A A N A L Y S I S R E S U L T S

N O D A L D I S P L A C E M E N T S

(* Indicates Displacements Occur in Nodal Local System)

NODE NO	LOAD COMB	DX	DY	DZ	OX	OY	OZ
Units:		In	In	In	Deg	Deg	Deg
2	1	0.2038	-0.0016	0.0000	0.0000	0.0000	-0.1911
3	1	0.7997	-0.0045	0.0000	0.0000	0.0000	-0.3817
4	1	1.8022	-0.0101	0.0000	0.0000	0.0000	-0.5863
5	1	3.4012	-0.0215	0.0000	0.0000	0.0000	-0.8291
6	1	5.5370	-0.0406	0.0000	0.0000	0.0000	-1.0646
7	1	8.1884	-0.0692	0.0000	0.0000	0.0000	-1.2886
8	1	11.3600	-0.1095	0.0000	0.0000	0.0000	-1.5258
9	1	15.0889	-0.1650	0.0000	0.0000	0.0000	-1.7809
10	1	19.3320	-0.2363	0.0000	0.0000	0.0000	-1.9836
11	1	23.9457	-0.3201	0.0000	0.0000	0.0000	-2.1108
12	1	28.7293	-0.4097	0.0000	0.0000	0.0000	-2.1385

2 N O D E P R I S M A T I C B E A M E L E M E N T -- F O R C E S A N D M O M E N T S

SIGN CONVENTION : BEAM DESIGNERS

ELEM NO	LOAD COMB	NODE NO	AXIAL	SHEAR X	SHEAR Y	MOMENT X	MOMENT Y	TORSION
Units:			K	K	K	K -Ft	K -Ft	K -Ft
1	1	1	-21.8420	0.0000	17.3072	-1205.9820	0.0000	0.0000
		2	-19.3689	0.0000	16.0387	-1042.5874	0.0000	0.0000
2	1	2	-19.1683	0.0000	16.1025	-1042.5878	0.0000	0.0000
		3	-16.8204	0.0000	14.8852	-890.7483	0.0000	0.0000
3	1	3	-16.6219	0.0000	14.9420	-890.7490	0.0000	0.0000
		4	-14.5769	0.0000	13.7779	-750.0214	0.0000	0.0000
4	1	4	-14.3757	0.0000	13.8330	-750.0213	0.0000	0.0000
		5	-12.4691	0.0000	12.6108	-608.5467	0.0000	0.0000
5	1	5	-12.2552	0.0000	12.6603	-608.5465	0.0000	0.0000
		6	-10.4724	0.0000	11.4107	-479.7670	0.0000	0.0000
6	1	6	-10.2654	0.0000	11.4494	-479.7681	0.0000	0.0000
		7	-8.6057	0.0000	10.2058	-363.9125	0.0000	0.0000
7	1	7	-8.4035	0.0000	10.2361	-363.9119	0.0000	0.0000
		8	-7.0935	0.0000	9.0264	-260.8574	0.0000	0.0000
8	1	8	-6.8932	0.0000	9.0527	-260.8555	0.0000	0.0000
		9	-5.7910	0.0000	7.6422	-170.9585	0.0000	0.0000
9	1	9	-5.5994	0.0000	7.6604	-170.9599	0.0000	0.0000
		10	-4.7035	0.0000	6.5388	-94.9945	0.0000	0.0000
10	1	10	-4.5239	0.0000	6.5461	-94.9957	0.0000	0.0000
		11	-2.6321	0.0000	4.9699	-33.3590	0.0000	0.0000
11	1	11	-2.4644	0.0000	4.9675	-33.3581	0.0000	0.0000
		12	-0.2569	0.0000	0.4419	3.9238	0.0000	0.0000

R E A C T I O N S

(* Indicates Reactions Occur in Nodal Local System)

NODE NO	LOAD COMB	PX	PY	PZ	MX	MY	MZ
Units:		K	K	K	K -Ft	K -Ft	K -Ft
1	1	-17.2693	21.8720	0.0000	0.0000	0.0000	1205.9820

H. E. BERGERON ENGINEERS, P.A.
2605 White Mountain Highway, PO Box 440
North Conway, NH 03860
(603) 356-6936

Client: Crown Castle Atlantic
Job: Manchester, CT — Job No.: 2000-084

Calculated By: J. Klementovich — Date: 17-Jul-00
Checked By: [handwritten initials] — Date: 7/24

	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	1196.8	997.7	1330.3	1206	18.5	21.0	21.8	13413	4634	18.05	17.3
10	1033.8	864.3	1152.4	1043	16.3	18.6	19.2	12090	4634	16.72	16.1
20	883.0	740.3	987.0	891	14.3	16.3	16.6	10828	4634	15.46	14.9
29	743.6	625.4	833.8	750	12.4	14.1	14.4	9626	4634	14.26	13.8
40	604.0	509.8	679.7	609	10.7	12.2	12.3	8364	4634	13.00	12.7
51	477.4	404.4	539.2	480	9.2	10.4	10.3	7080	4634	11.71	11.4
62	363.6	309.3	412.4	364	7.7	8.7	8.4	5800	4634	10.43	10.2
72	262.7	224.4	299.2	261	6.4	7.1	6.9	4543	4634	9.18	9.1
83	174.9	150.0	199.9	171	5.4	5.9	5.6	3323	4401	7.72	7.7
94	100.8	86.6	115.5	95	4.5	4.8	4.5	2153	4401	6.55	6.5
104	40.5	35.1	46.8	33	2.6	2.8	2.5	1042	3920	4.96	5.0
115	3.9	3.8	5.0		0.1	0.1		0	436	0.00	
115	3.9	3.8	5.0		0.1	0.1		0	436	0.00	
115	3.9	3.8	5.0		0.1	0.1		0	436	0.00	
115	3.9	3.8	5.0		0.1	0.1		0	436	0.00	
115	3.9	3.8	5.0		0.1	0.1		0	436	0.00	
115	3.9	3.8	5.0		0.1	0.1		0	436	0.00	
115	3.9	3.8	5.0		0.1	0.1		0	436	0.00	
115	3.9	3.8	5.0		0.1	0.1		0	436	0.00	
115	3.9	3.8	5.0		0.1	0.1		0	436	0.00	

H. E. BERGERON ENGINEERS, P.A.
2605 White Mountain Highway, PO Box 440
North Conway, NH 03860
(603) 356-6936

Client: Crown Castle Atlantic
Job: Manchester, CT Job No.: 2000-084

Calculated By: J. Klementovich Date: 17-Jul-00
Checked By: [illegible] Date: 7/24

Axial Force

				Stress Ratio
Elev.	w/o ice	Area	Fy	w/o ice
0	21.8	58.45	65	0.37
10	19.2	55.68	65	0.34
20	16.6	52.91	65	0.31
29	14.4	41.85	65	0.34
40	12.3	39.33	65	0.31
51	10.3	36.81	65	0.28
62	8.4	34.29	65	0.24
72	6.9	22.33	65	0.31
83	5.6	20.57	65	0.27
94	4.5	18.80	65	0.24
104	2.5	17.04	65	0.15
115	0.0	0.00		#DIV/0!
115	0.0	0.00		#DIV/0!
115	0.0	0.00		#DIV/0!
115	0.0	0.00		#DIV/0!
115	0.0	0.00		#DIV/0!
115	0.0	0.00		#DIV/0!
115	0.0	0.00		#DIV/0!
115	0.0	0.00		#DIV/0!
115	0.0	0.00		#DIV/0!

Bending Force

fb= Moment/Section Modulus

				Bending Stress		
				Allowable		Actual
Elev.	w/o ice	S	(FY)^.5 w/t	Fb	1.33 Fb	w/o ice
0	1206.0	719.77	281.4	36.02	47.91	20.11
10	1043.0	652.96	268.2	36.99	49.19	19.17
20	891.0	589.41	255.0	37.95	50.47	18.14
29	750.0	442.90	290.1	35.39	47.07	20.32
40	609.0	391.01	272.8	36.65	48.75	18.69
51	480.0	342.36	255.4	37.92	50.43	16.82
62	364.0	296.93	240.0	39.04	51.93	14.71
72	261.0	180.10	315.0	33.57	44.65	17.39
83	171.0	152.67	290.3	35.37	47.05	13.44
94	95.0	127.51	265.6	37.18	49.44	8.94
104	33.0	104.61	240.9	38.98	51.84	3.79
115	0.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
115	0.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
115	0.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
115	0.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
115	0.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
115	0.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
115	0.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
115	0.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
115	0.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

H. E. BERGERON ENGINEERS, P.A.
2605 White Mountain Highway, PO Box 440
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(603) 356-6936

Client:	Crown Castle Atlantic		
Job:	Manchester, CT	Job No.:	2000-084
Calculated By:	J. Klementovich	Date:	17-Jul-00
Checked By:		Date:	7/24

Combined Axial and Bending

Elev.	Comb. Loads	Capacity
0	0.427	43%
10	0.397	40%
20	0.366	37%
29	0.439	44%
40	0.390	39%
51	0.339	34%
62	0.288	29%
72	0.396	40%
83	0.291	29%
94	0.186	19%
104	0.076	8%
115	#DIV/0!	#DIV/0!
115	#DIV/0!	#DIV/0!
115	#DIV/0!	#DIV/0!
115	#DIV/0!	#DIV/0!
115	#DIV/0!	#DIV/0!
115	#DIV/0!	#DIV/0!
115	#DIV/0!	#DIV/0!
115	#DIV/0!	#DIV/0!
115	#DIV/0!	#DIV/0!
115	#DIV/0!	#DIV/0!