



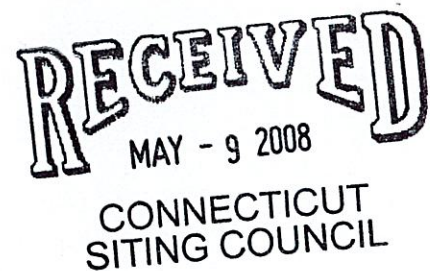
New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, Connecticut 06067-3900
Phone: (860) 513-7636
Fax: (860) 513-7190

EM-CING-055-080509

Steven L. Levine
Real Estate Consultant

ORIGINAL

May 9, 2008



Honorable Daniel F. Caruso, Chairman,
and Members of the Connecticut Siting Council
Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

**Re: Notice of Exempt Modification – Existing Bay Communications Tower Facility at
113 Brush Hill Road, Goshen, Connecticut**

Dear Chairman Caruso and Members of the Council:

New Cingular Wireless PCS, LLC (“Cingular” or “AT&T”) intends to install telecommunications antennas and associated equipment at an existing multicarrier telecommunications tower at 113 Brush Hill Road in Goshen, Connecticut. Cingular operates under licenses issued by the Federal Communications Commission (“FCC”) to provide cellular and PCS mobile telephone service in Litchfield County, which includes the area to be served by Cingular’s proposed installation.

Please accept this letter as notification to the Council, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter is being sent to the 1st Selectman of Goshen.

Existing / Approved Facility

The Goshen facility is located approximately ½ mile west of CT Rt 63, near it’s intersection with Brush Hill Road. Site coordinates (NAD83) are N41° 47’ 49.8” and W73° 13’ 18”.

The facility is owned and operated by Bay Communications, LLC, 16 East Washington Street, Suite 207, North Attleborough, MA 02760.

The Goshen facility was initially approved by the Council in Docket 250. It consists of a 195-foot monopole within a 41’ x 54’ compound surrounded by a chain link fence. Sprint and Verizon Wireless currently operate wireless communications equipment at the facility.

Proposed Modifications

As shown on the attached drawings and as further described below, Cingular proposes to install up to six Powerwave 7770-panel antennas, or their functional equivalents, at a centerline height of 175 feet above ground level. Cingular also proposes to place a 12 x 20 ft prefabricated concrete equipment shelter, as well as a 50 KW diesel-powered electric generator for emergency use, at the base of the tower. The shelter will be located within the existing compound, while the generator will occupy an 8 x 12 ft extension of the fenced compound.

The proposed electric generator will occupy an 8 x 11 ft concrete pad. For environmental safety, the generator has a double-walled fuel tank with overflow containment and a containment tank alarm. It also has a Level IIA sound-attenuating enclosure for quiet operation. (See attachments.)

Attached to this Notice are a location map; site plans and tower profiles; diesel generator information materials; and a structural analysis report that shows the tower will be structurally capable of supporting the proposed Cingular telecommunications equipment at 175 feet above ground level.

Statutory Considerations

The changes to the Goshen tower facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed or altered. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2) because they will not result in any substantial adverse environmental effect.

1. The height of the overall structure will be unaffected.
2. The proposed changes will not affect the property boundaries. All new construction will take place either within the existing fence or the existing lease area.
3. The proposed additions will not increase the noise level at the existing facility by six decibels or more.
4. Operation of Cingular's antennas will not increase the total radio frequency electromagnetic radiation power density, measured at the tower base, to or above the standard adopted by the State of Connecticut and the FCC. The before and after "worst-case" exposure calculations in accordance with FCC OET Bulletin No. 65 (1997) for a point of interest at the base of the tower in relation to the operation of the proposed antenna array are as follows:

| Company | Centerline Height (feet) | Frequency (MHz) | Number of Channels | Power Per Channel (Watts) | Power Density [†] (mW/cm ²) | Standard Limits (mW/cm ²) | Percent of Limit |
|---------------|--------------------------|------------------------|--------------------|---------------------------|--|---------------------------------------|------------------|
| Sprint * | 195 | 1962.5 | 11 | 213 | 0.0222 | 1.0000 | 2.22 |
| Verizon * | 185 | 1970 | 9 | 485 | 0.0459 | 1.0000 | 4.59 |
| Verizon * | 185 | 875 | 9 | 200 | 0.0189 | 0.5833 | 3.24 |
| Cingular GSM | 175 | 1930-1935 1965-1970 | 2 | 427 | 0.0100 | 1.0000 | 1.00 |
| Cingular GSM | 175 | 880-894 | 4 | 296 | 0.0139 | 0.5867 | 2.37 |
| Cingular UITS | 175 | 880-894 | 1 | 296 | 0.0035 | 0.5867 | 0.59 |
| | | | | | | | |
| TOTAL | | | | | | | 14.0% |

* Power density parameters from Council records.

† Please note that the standard power density equation provided by the Council in its memo of January 22, 2001 incorporates a ground reflection factor of 2.56 (i.e., the square of 1.6) as described in FCC OET Bulletin No. 65.

As the tables demonstrate, the cumulative "worst-case" power density would be 14 % of the ANSI/IEEE standard, as calculated for mixed frequency sites. Total power density levels resulting from Cingular's use of the tower facility would thus be within applicable standards.

For the foregoing reasons, Cingular respectfully submits that proposed changes at the Goshen facility constitute an exempt modification under R.C.S.A. Section 16-50j-72(b)(2).

Please feel free to call me with questions any concerning this notice. Thank you for your consideration in this matter.

Respectfully yours,

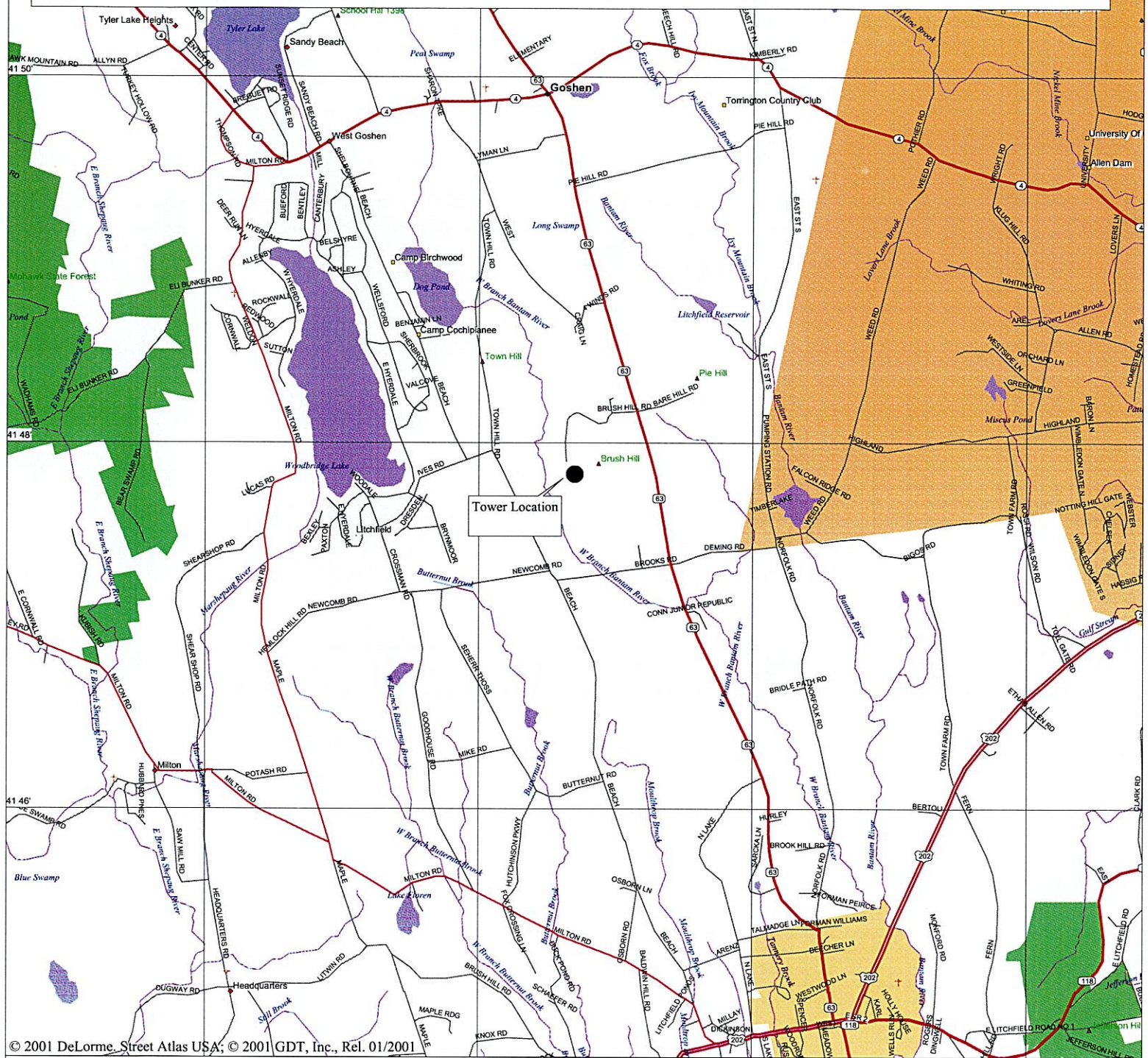


Steve Levine
Real Estate Consultant

Enclosures

cc: Honorable Robert P. Valentine, 1st Selectman, Town of Goshen
Michele G. Briggs, Manager of Real Estate
Christopher B. Fisher, Esq.

Brush Hill Road, Goshen



Mag 14.00

Fri May 09 10:00 2008

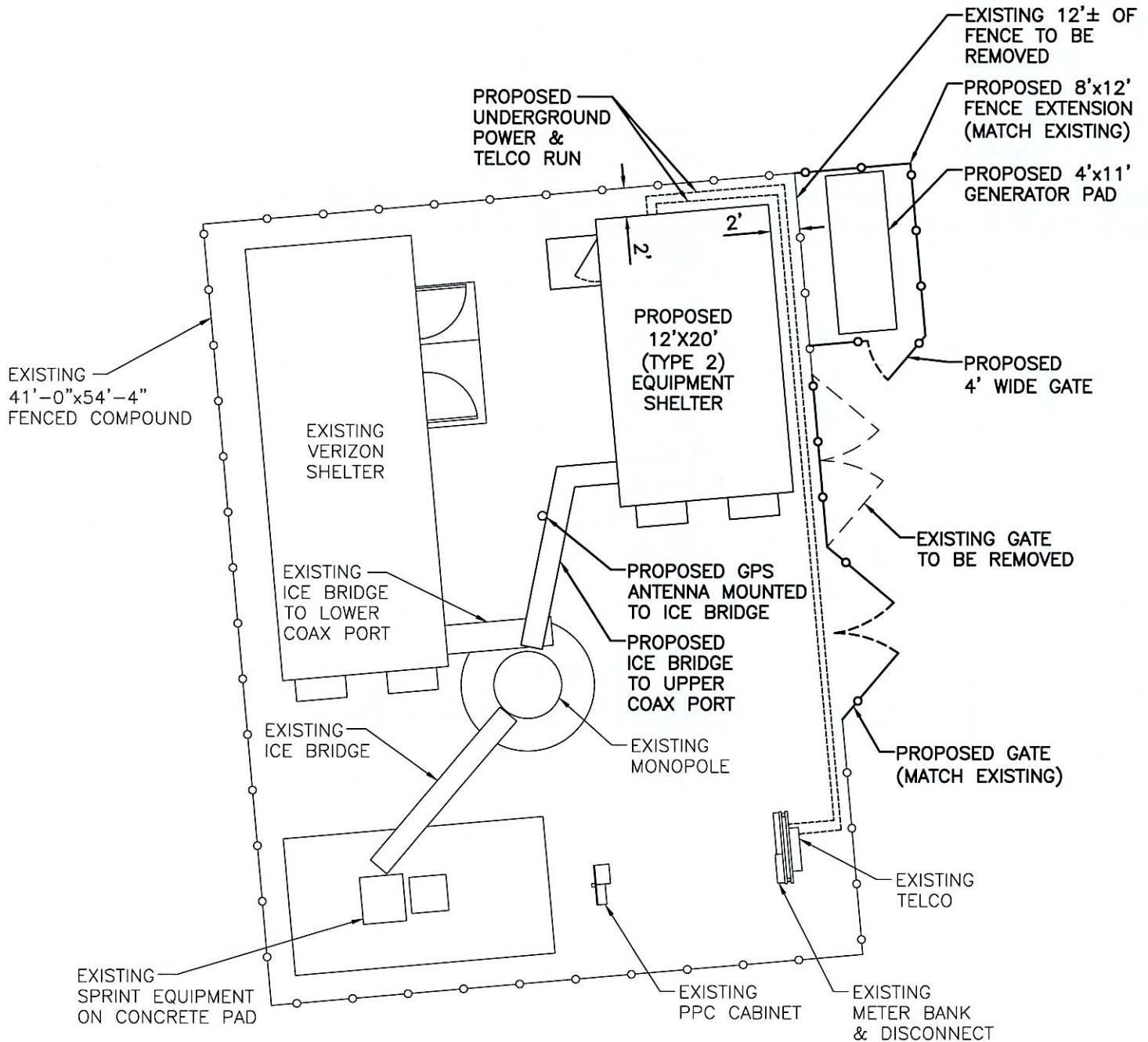
Scale 1:56,250 (at center)

5000 Feet

2000 Meters

*EQUIPMENT SPECIFICATIONS AND UTILITY
EASEMENTS AS REQUIRED BY TELCO AND POWER
COMPANY.

ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE
SUBJECT TO APPROVAL BY LESSEE/LICENSEE
STRUCTURAL & RF ENGINEERS. LOCATIONS OF POWER
& TELEPHONE FACILITIES ARE SUBJECT TO APPROVAL BY
UTILITY COMPANIES.



COMPOUND LAYOUT

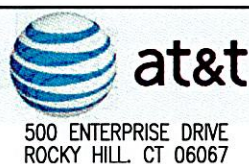
SCALE: $3/32" = 1'-0"$



RF APPROVED: _____

REV 2: 05/06/08

SITE NO: 1447
SITE NAME: GOSHEN
ADDRESS: 113 BRUSH HILL ROAD
GOSHEN, CT 06756

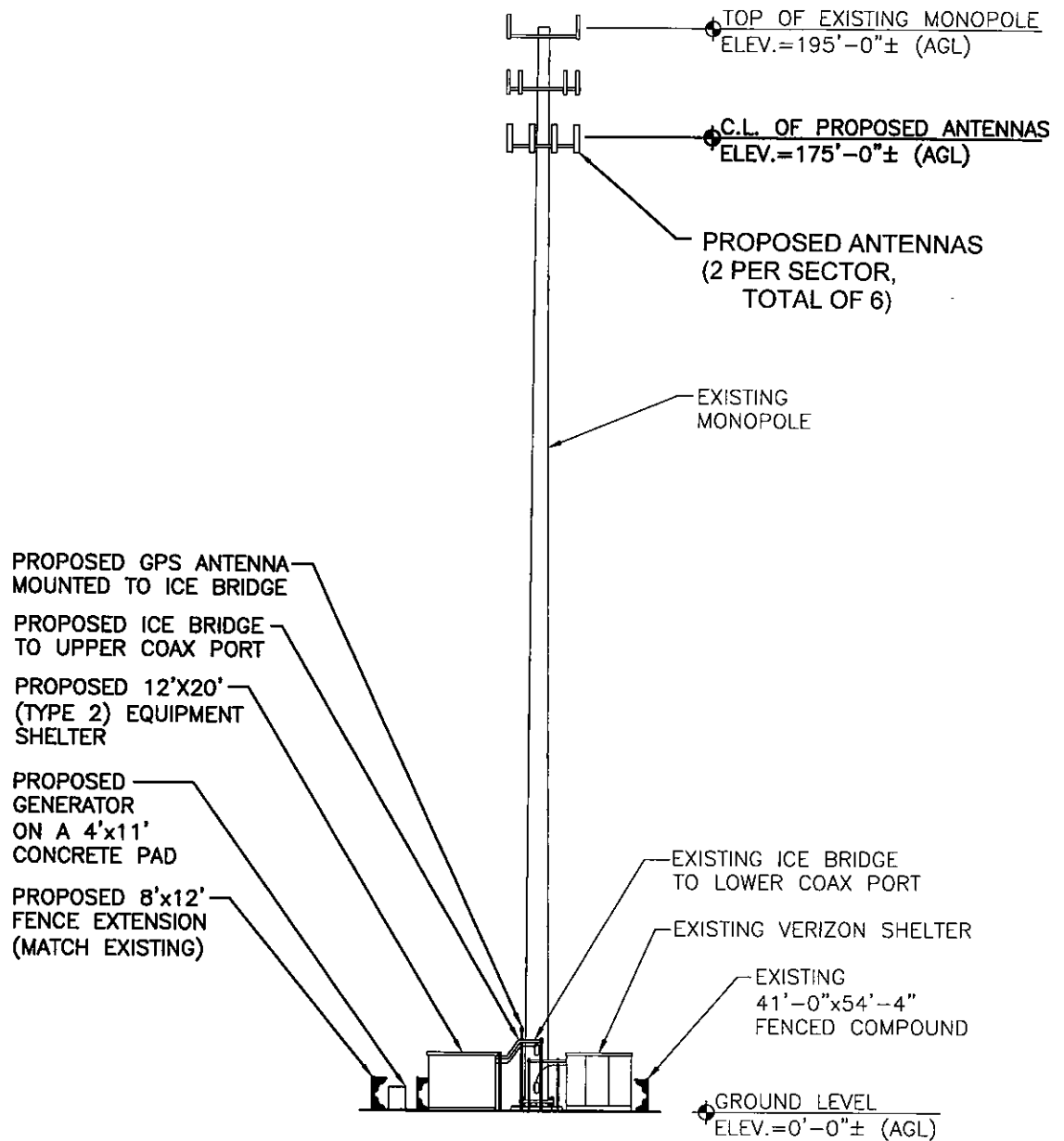


SITE TYPE: MONOPOLE

DATE:
04/18/08

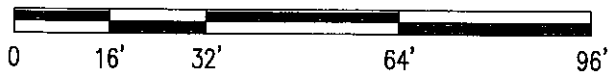
DRAWN BY: BR

SCALE: NTS



WEST ELEVATION

SCALE: 1/32" = 1'-0"



RF APPROVED: _____

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& TELEPHONE FACILITIES ARE SUBJECT TO APPROVAL BY
UTILITY COMPANIES.

REV 2: 05/06/08

SITE NO: 1447
SITE NAME: GOSHEN
ADDRESS: 113 BRUSH HILL ROAD
GOSHEN, CT 06756

 **at&t**
500 ENTERPRISE DRIVE
ROCKY HILL, CT 06067

SITE TYPE: MONOPOLE

DATE:
04/18/08

DRAWN BY: BR

SCALE: NTS



cingular
raising the bar™

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500 Enterprise Drive
Rocky Hill, Connecticut 06067-3900
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Fax: (860) 513-7190

Steven L. Levine
Real Estate Consultant

May 9, 2008

Honorable Robert P. Valentine
1st Selectman, Town of Goshen
Town Office Bldg. 42 North Street
Goshen, CT 06756

**Re: Notice of Exempt Modification – Existing Bay Communications Tower Facility at
113 Brush Hill Road, Goshen, Connecticut**

Dear Mr. Valentine:

New Cingular Wireless PCS, LLC (“Cingular”) intends to install telecommunications antennas and associated equipment at an existing multicarrier telecommunications tower at 113 Brush Hill Road in Goshen.

The facility is owned and operated by Bay Communications, LLC, 16 East Washington Street, Suite 207, North Attleborough, MA 02760.

A Notice of Exempt Modification has been filed with the Connecticut Siting Council as required by Regulations of Connecticut State Agencies (“R.C.S.A.”) Section 16-50j-73. Please accept this letter as notification to the Town of Goshen under Section 16-50j-73 of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2).

The attached letter fully sets forth the Cingular proposal. However, if you have any questions or require any further information on the plans for the site or the Siting Council’s procedures, please contact the undersigned or Mr. Derek Phelps, Executive Director of the Connecticut Siting Council, at (860) 827-2935.

Sincerely,

Steve Levine
Real Estate Consultant

Enclosure

Levine, Steven

From: Paul Breece [PBreece@generac.com]
Sent: Tuesday, May 06, 2008 2:51 PM
To: Levine, Steven
Cc: Randy Berry
Subject: 50kW Generac Generator Info
Follow Up Flag: Follow up
Flag Status: Red
Attachments: 2.4LSound.pdf; 50kW.Install drawing.0G8480-1.pdf; SD50 2.4 PADLAYOUT.pdf; SD50.2.4Lcutsheet.0176480SBY.pdf

Steve. Randy Berry requested that I follow-up with you on some of these requested drawings. Please see the attachments. The install drawing details the fuel/fill containment box and the emergency venting for the fuel tank. Below is a brief description of the fuel tank:

Factory, preassembled tank is a U.L. 142 listed double-wall diesel, sub-base fuel tank with a fuel level indicating gauge; containment tank alarm; low-fuel switch w/alarm; exterior emergency vent; 5-gallon overflow spill containment and alarm (high fuel level); flex fuel-line connections to/from tank. The total tank capacity is a minimum of 189 useable gallon capacity (210 actual -Expansion room is designed in). Fuel Consumption is as follows: At 75% load = 3.3 gal/hr (57 hrs)

Don't hesitate to ask if you need anything else.

Respectfully,

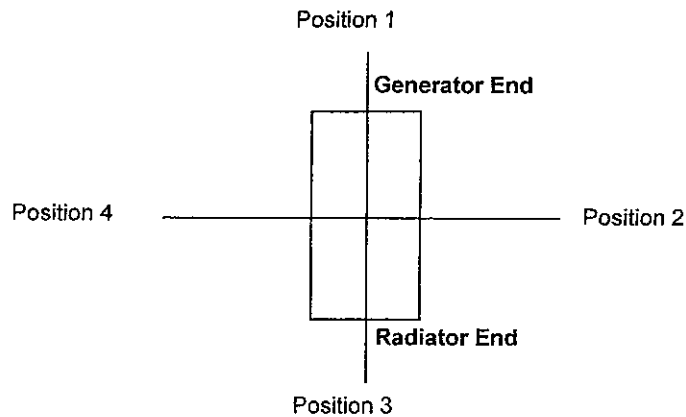
Paul Breece, Jr.
Generac Power Systems, Inc
AT&T National Accounts Manager
(414) 339-3483

5/8/2008

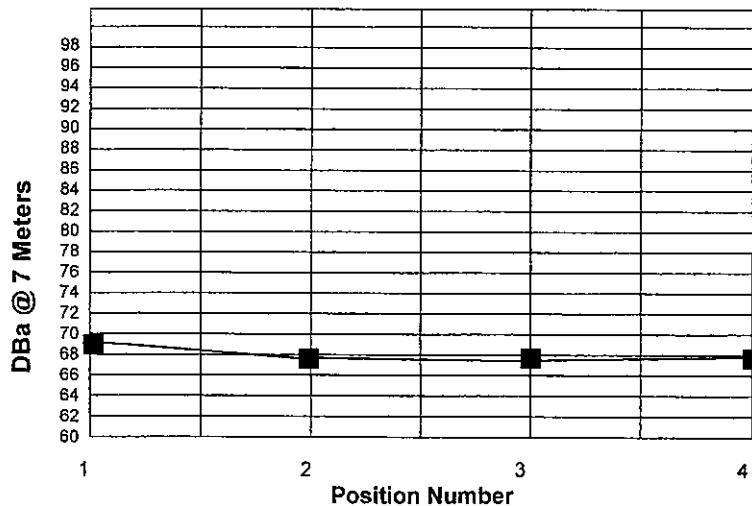
GENERAC®

POWER SYSTEMS, INC.

Measured Sound Performance 2.4 Liter Diesel Engine. SD50 with Level IIA Enclosure Full Load Data



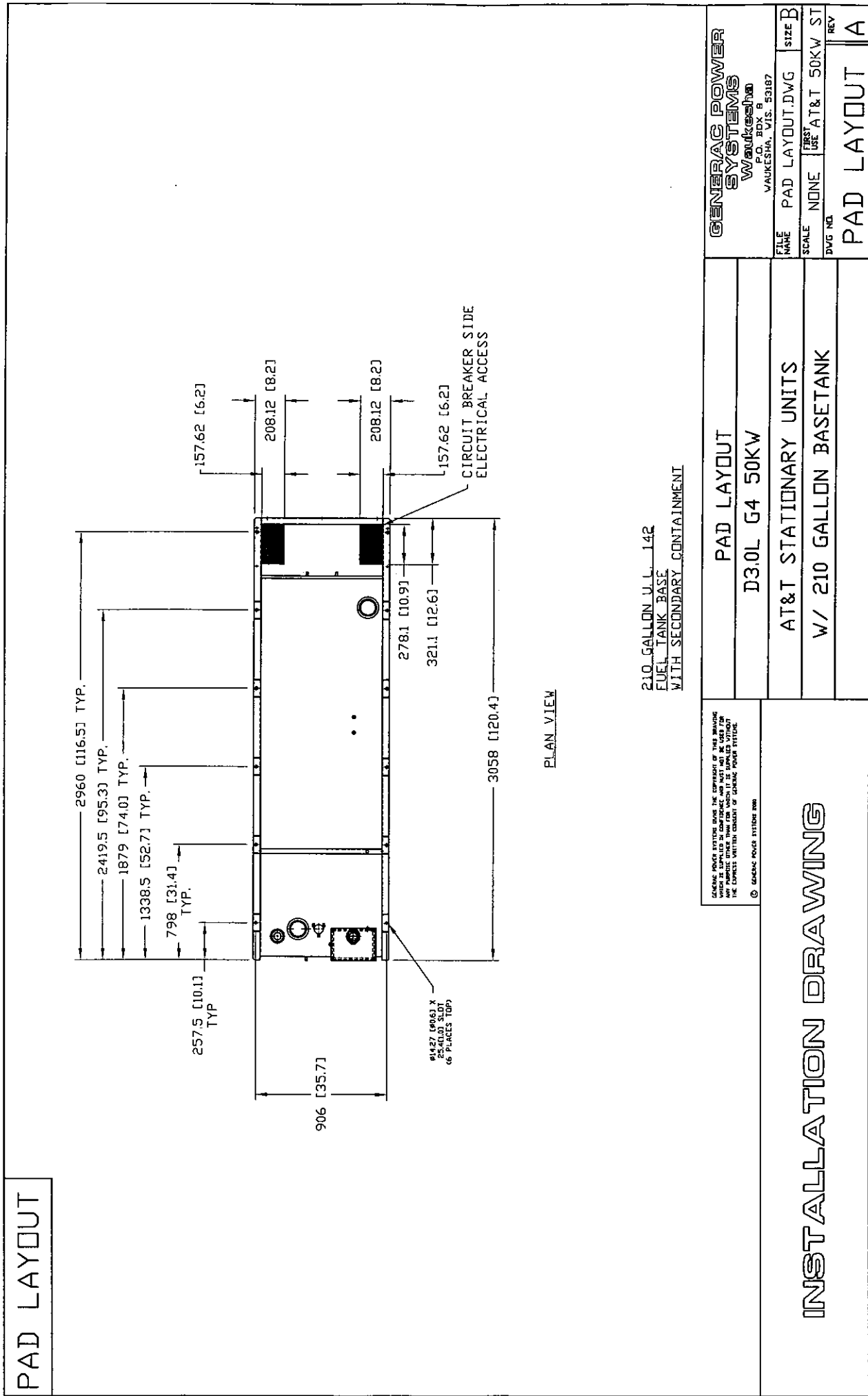
Measured Sound Levels – 60 Hertz Full Load



| Data Table | |
|------------|------|
| Pos # | DBa |
| 1 | 68.9 |
| 2 | 66.4 |
| 3 | 66.7 |
| 4 | 66.6 |

Notes:

1. All positions 23 ft. (7 meters) from center of generator
2. Generator operating at **Rated Load**
3. Test conducted on a 100 foot diameter Blacktop Surface
4. Ambient Temperature 22° F 38% Rel Hum.
5. Ref Test No. B4168-T123

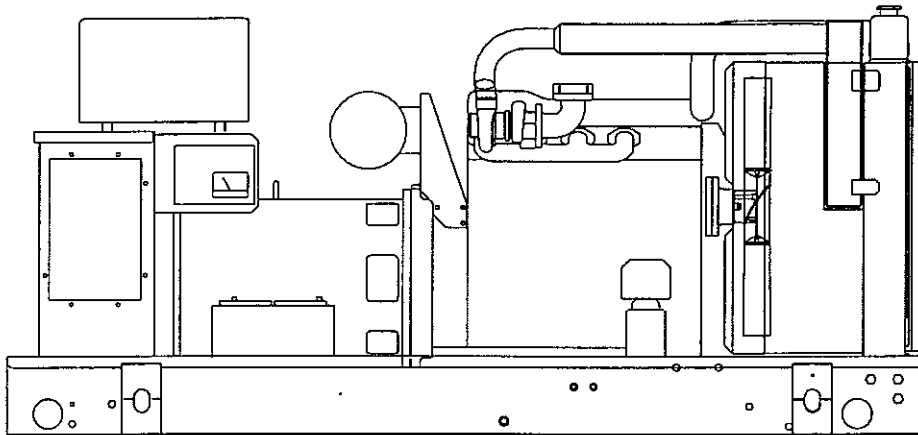
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SD050

Liquid Cooled Diesel Engine Generator Sets

Standby Power Rating
50KW 60 Hz / 50KVA 50 Hz

Prime Power Rating
44KW 60 Hz / 44KVA 50 Hz



Power Matched
GENERAC 2.4DTA ENGINE
Turbocharged/Aftercooled
Tier III Compliant

FEATURES

- **INNOVATIVE DESIGN & PROTOTYPE TESTING** are key components of GENERAC'S success in "IMPROVING POWER BY DESIGN." But it doesn't stop there. Total commitment to component testing, reliability testing, environmental testing, destruction and life testing, plus testing to applicable CSA, NEMA, EGSA, and other standards, allows you to choose GENERAC POWER SYSTEMS with the confidence that these systems will provide superior performance.
- **TEST CRITERIA:**
 - ✓ PROTOTYPE TESTED
 - ✓ SYSTEM TORSIONAL TESTED
 - ✓ ELECTRO-MAGNETIC INTERFERENCE
 - ✓ NEMA MG1 EVALUATION
 - ✓ MOTOR STARTING ABILITY
 - ✓ SHORT CIRCUIT TESTING
 - ✓ UL COMPLIANCE AVAILABLE
- **SOLID-STATE, FREQUENCY COMPENSATED DIGITAL VOLTAGE REGULATION.** This state-of-the-art power maximizing regulation system is standard on all Generac models. It provides

optimized FAST RESPONSE to changing load conditions and MAXIMUM MOTOR STARTING CAPABILITY by electronically torque-matching the surge loads to the engine.

- **SINGLE SOURCE SERVICE RESPONSE** from Generac's dealer network provides parts and service know-how for the entire unit, from the engine to the smallest electronic component. You are never on your own when you own a GENERAC POWER SYSTEM.
- **ECONOMICAL DIESEL POWER.** Low cost operation due to modern diesel engine technology. Better fuel utilization plus lower cost per gallon provide real savings.
- **LONGER ENGINE LIFE.** Generac heavy-duty diesels provide long and reliable operating life.
- **GENERAC TRANSFER SWITCHES, SWITCHGEAR AND ACCESSORIES.** Long life and reliability is synonymous with GENERAC POWER SYSTEMS. One reason for this confidence is that the GENERAC product line includes its own transfer systems, accessories, switchgear and controls for total system compatibility.

GENERAC®

POWER SYSTEMS, INC.

APPLICATION & ENGINEERING DATA

SD050

GENERATOR SPECIFICATIONS

| | |
|---|--------------------------------|
| TYPE | Four-pole, revolving field |
| ROTOR INSULATION | Class H |
| STATOR INSULATION | Class H |
| TOTAL HARMONIC DISTORTION | <3% |
| TELEPHONE INTERFERENCE FACTOR (TIF) | <50 |
| ALTERNATOR | Self-ventilated and drip-proof |
| BEARINGS (PRE-LUBED & SEALED) | 1 |
| COUPLING | Direct, Flexible Disc |
| LOAD CAPACITY (STANDBY) | 100% |
| LOAD CAPACITY (PRIME) | 110% |

NOTE: Emergency loading in compliance with NFPA 99, NFPA 110. Generator rating and performance in accordance with ISO8528-5, BS5514, SAE J1349, ISO3046 and DIN6271 standards.

VOLTAGE REGULATOR

| | |
|------------------|---|
| TYPE | Full Digital |
| SENSING | 3 Phase |
| REGULATION | ± 1/4% |
| FEATURES | Built into H-100 Control Panel, V/F Adjustable Adjustable Voltage and Gain |

GENERATOR FEATURES

- Revolving field heavy duty generator
- Quiet drive coupling
- Operating temperature rise 120°C above a 40°C ambient
- Insulation is Class H rated at 150°C rise
- All prototype models have passed three phase short circuit testing

CONTROL PANEL FEATURES

- TWO FOUR LINE LCD DISPLAYS READ:
 - Voltage (all phases)
 - Power factor
 - kVAR
 - Engine speed
 - Run hours
 - Fault history
 - Coolant temperature
 - Low oil pressure shutdown
 - Overvoltage
 - Low coolant level
 - Exercise speed
 - Not in auto position (flashing light)
 - Current (all phases)
 - kW
 - Transfer switch status
 - Low fuel pressure
 - Service reminders
 - Oil pressure
 - Time and date
 - High coolant temp shutdown
 - Overspeed
 - Low coolant level
 - ATS selection
- INTERNAL FUNCTIONS:
 - I²T function for alternator protection from line to neutral and line to line short circuits
 - Emergency stop
 - Programmable auto crank function
 - 2 wire start for any transfer switch
 - Communicates with the Generac HTS transfer switch
 - Built-in 7 day exerciser
 - Adjustable engine speed at exerciser
 - RS232 port for GenLink® control
 - RS485 port remote communication
 - Canbus addressable
 - Governor controller and voltage regulator are built into the master control board
 - Temperature range -40°C to 70°C

ENGINE SPECIFICATIONS

| | |
|-------------------------------|--------------------------------------|
| MAKE | GENERAC/DEERE |
| MODEL | 4024HF285B |
| ENGINE FAMILY | 8JDXL03.0113 |
| CYLINDERS | 4 |
| DISPLACEMENT | 2.4 Liter (149 cu.in.) |
| BORE | 86 mm (3.4 in.) |
| STROKE | 105 mm (4.1 in.) |
| COMPRESSION RATIO | 18:1 |
| INTAKE AIR | Turbocharged/Aftercooled |
| NUMBER OF MAIN BEARINGS | 5 |
| CONNECTING RODS | 4-Drop Forged Steel |
| CYLINDER HEAD | Cast Iron |
| PISTONS | 4-Aluminum Alloy |
| CRANKSHAFT | Die Forged, Induction Hardened Steel |

VALVE TRAIN

| | |
|------------------------------|----------------------|
| LIFTER TYPE | Solid |
| INTAKE VALVE MATERIAL | Heat Resistant Steel |
| EXHAUST VALVE MATERIAL | Heat Resistant Steel |
| HARDENED VALVE SEATS | Replaceable |

ENGINE GOVERNOR

| | |
|--|-------------|
| <input type="checkbox"/> ELECTRONIC | Standard |
| FREQUENCY REGULATION, NO-LOAD TO FULL LOAD | Isochronous |
| STEADY STATE REGULATION | ±0.25% |

LUBRICATION SYSTEM

| | |
|--------------------------|----------------------|
| TYPE OF OIL PUMP | Gear |
| OIL FILTER | Full flow, Cartridge |
| CRANKCASE CAPACITY | 7.5 qts. |

COOLING SYSTEM

| | |
|----------------------------|------------------------------|
| TYPE OF SYSTEM | Pressurized, Closed Recovery |
| WATER PUMP | Pre-Lubed, Self-Sealing |
| TYPE OF FAN | Pusher |
| NUMBER OF FAN BLADES | 6 |
| DIAMETER OF FAN | 560 mm (22 in.) |
| COOLANT HEATER | 120V, 1000 W |

FUEL SYSTEM

| | |
|---------------------------|--|
| FUEL | #2D Fuel (Min Cetane #40) (Fuel should conform to ASTM Spec.) |
| FUEL FILTER | 5 Micron |
| FUEL INJECTION PUMP | Bosch |
| FUEL PUMP | Mechanical |
| INJECTORS | Unit Type Multi-Hole, Nozzle |
| ENGINE TYPE | Pre-combustion |
| FUEL LINE (Supply) | 6.35 mm (0.25 in.) |
| FUEL RETURN LINE | 6.35 mm (0.25 in.) |

ELECTRICAL SYSTEM

| | |
|---------------------------------|-----------------------|
| BATTERY CHARGE ALTERNATOR | 20 Amps at 12 V |
| STARTER MOTOR | 12 V |
| RECOMMENDED BATTERY | 12 Volt, 90 A.H., 27F |
| GROUND POLARITY | Negative |

Rating definitions - Standby: Applicable for supplying emergency power for the duration of the utility power outage. No overload capability is available for this rating. (All ratings in accordance with BS5514, ISO3046 and DIN6271). Prime (Unlimited Running Time): Applicable for supplying electric power in lieu of commercially purchased power. Prime power is the maximum power available at variable load. A 10% overload capacity is available for 1 hour in 12 hours. (All ratings in accordance with BS5514, ISO3046, ISO8528 and DIN6271).

SD050

OPERATING DATA

| | STANDBY | | | | PRIME | | | | |
|---|-------------------------------------|-----------------|-------------|-------|---------------------|-------------------|-------------|-------|-------|
| | SD050 | | | | SD050 | | | | |
| GENERATOR OUTPUT VOLTAGE/KW-60Hz | Rated AMP | | | | Rated AMP | | | | |
| 120/240V, 1-phase, 1.0 pf | 50 | | | 208 | 44 | | | 183 | |
| 120/208V, 3-phase, 0.8 pf | 50 | | | 173 | 44 | | | 153 | |
| 120/240V, 3-phase, 0.8 pf | 50 | | | 150 | 44 | | | 133 | |
| 277/480V, 3-phase, 0.8 pf | 50 | | | 75 | 44 | | | 66 | |
| 600V, 3-phase, 0.8 pf | 50 | | | 60 | 44 | | | 53 | |
| NOTE: Consult your Generac dealer for additional voltages. | | | | | | | | | |
| GENERATOR OUTPUT VOLTAGE/KVA-50Hz | Rated AMP | | | | Rated AMP | | | | |
| 110/220V, 1-phase, 1.0 pf | 40 | | | 182 | 35 | | | 159 | |
| 115/200V, 3-phase, 0.8 pf | 50 | | | 144 | 44 | | | 127 | |
| 100/200V, 3-phase, 0.8 pf | 50 | | | 144 | 44 | | | 127 | |
| 231/400V, 3-phase, 0.8 pf | 50 | | | 72 | 44 | | | 63 | |
| NOTE: Consult your Generac dealer for additional voltage | | | | | | | | | |
| MOTOR STARTING KVA | | | | | | | | | |
| Maximum at 35% instantaneous voltage dip with standard alternator; 50/60 Hz | 208/240/416V | | 480V | | 208/240/416V | | 480V | | |
| | 82/100 | | 93/113 | | 82/100 | | 93/113 | | |
| FUEL | | | | | | | | | |
| Fuel consumption—60 Hz | Load | 25% | 50% | 75% | 100% | 25% | 50% | 75% | 100% |
| | gal./hr. | 1.12 | 2.19 | 3.21 | 4.16 | 0.99 | 1.93 | 2.82 | 3.66 |
| | liters/hr. | 4.25 | 8.3 | 12.13 | 15.76 | 3.74 | 7.3 | 10.68 | 13.87 |
| | gal./hr. | 0.9 | 1.75 | 2.56 | 3.33 | 0.79 | 1.54 | 2.26 | 2.93 |
| Fuel consumption—50 Hz | liters/hr. | 3.4 | 6.64 | 9.71 | 12.61 | 2.99 | 5.84 | 8.54 | 11.1 |
| Fuel pump lift | | 40" | | | | 40" | | | |
| COOLING | | | | | | | | | |
| Coolant capacity | System - US gal. (lit.) | 4.5 (17.0) | | | | 4.5 (17.0) | | | |
| | Engine - US gal. (lit.) | 2.75 (10.4) | | | | 2.75 (10.4) | | | |
| Coolant flow/min. | 60 Hz - US gal. (lit.) | 28 (106) | | | | 28 (106) | | | |
| | 50 Hz - US gal. (lit.) | 23 (87) | | | | 23 (87) | | | |
| Heat rejection to coolant 60 Hz full load | BTU/hr. | 135,900 | | | | 109,000 | | | |
| Heat rejection to coolant 50 Hz full load | BTU/hr. | 115,500 | | | | 92,600 | | | |
| Inlet air | 60 Hz - cfm (m³/min.) | 7500 (212.4) | | | | 7500 (212.4) | | | |
| | 50 Hz - cfm (m³/min.) | 6225 (176.3) | | | | 6225 (176.3) | | | |
| Max. air temperature to radiator | °C (°F) | 60 (140) | | | | 60 (140) | | | |
| Max. ambient temperature | °C (°F) | 50 (122) | | | | 50 (122) | | | |
| COMBUSTION AIR REQUIREMENTS | | | | | | | | | |
| Flow at rated power | 60 Hz - cfm (m³/min.) | 166 (4.7) | | | | 140 (4.0) | | | |
| | 50 Hz - cfm (m³/min.) | 140 (4.0) | | | | 120 (3.4) | | | |
| EXHAUST | | | | | | | | | |
| Exhaust flow at rated output 60 Hz - cfm (m³/min.) | | 448 (12.7) | | | | 380 (10.8) | | | |
| | 50 Hz - cfm (m³/min.) | 380 (10.8) | | | | 320 (9.1) | | | |
| Max recommended back pressure | Inches Hg | 2.2 | | | | 2.2 | | | |
| Exhaust temperature 60 Hz (full load) | °F (°C) | 1044 (562) | | | | 925 (496) | | | |
| Exhaust outlet size | | 2.5" O.D. Turbo | | | | 2.5" O.D. Muffler | | | |
| ENGINE | | | | | | | | | |
| Rated RPM | 60 Hz / 50 Hz | 1800 / 1500 | | | | 1800 | | | |
| HP at rated KW | 60 Hz / 50 Hz | 79 / 64 | | | | 64 / 52 | | | |
| Piston speed | 60 Hz - ft./min. (m/min.) | 1536 (1230) | | | | 1536 (1230) | | | |
| | 50 Hz - ft./min. (m/min.) | 1279 (1025) | | | | 1279 (1025) | | | |
| BMEP | 60 Hz / 50 Hz - psi | 189 / 181 | | | | 151 / 147 | | | |
| DERATION FACTORS | | | | | | | | | |
| Temperature | | | | | | | | | |
| | 6.7% for every 10°C above - °C | 25 | | | | 25 | | | |
| | 4.0% for every 10°F above - °F | 77 | | | | 77 | | | |
| Altitude | | | | | | | | | |
| | 0.8% for every 100 m above - m | 1067 | | | | 1067 | | | |
| | 2.6% for every 1000 ft. above - ft. | 3500 | | | | 3500 | | | |

STANDARD ENGINE & SAFETY FEATURES

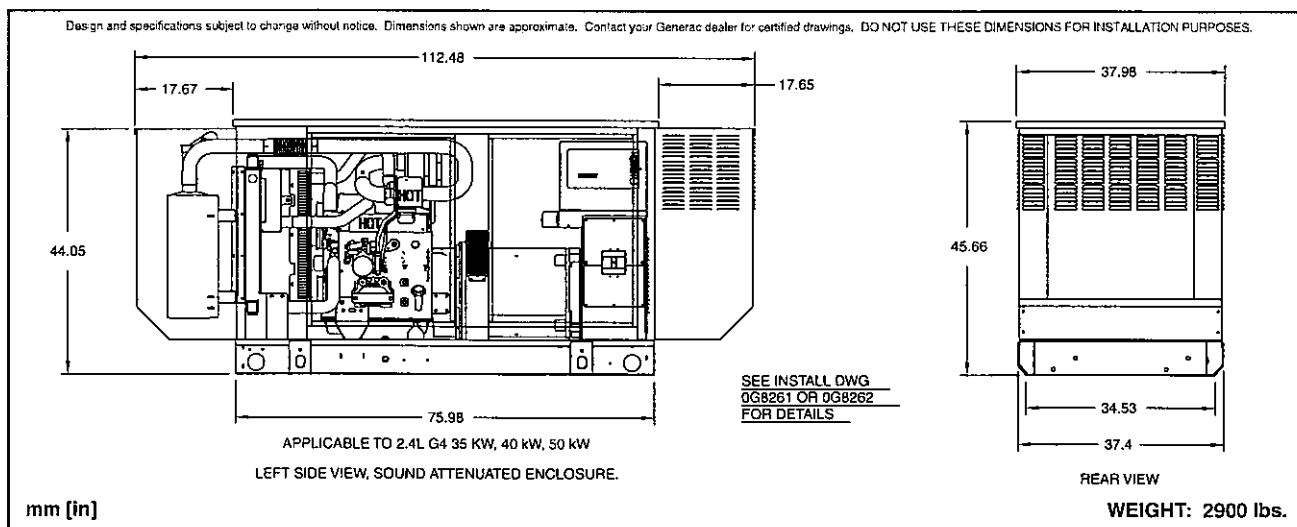
SD050

- High Coolant Temperature Automatic Shutdown
- Low Coolant Level Automatic Shutdown
- Low Oil Pressure Automatic Shutdown
- Overspeed Automatic Shutdown (Solid-state)
- Crank Limiter (Solid-state)
- Oil Drain Extension
- Radiator Drain Extension
- Factory-Installed Cool Flow Radiator
- Closed Coolant Recovery System
- UV/Ozone Resistant Hoses
- Rubber-Booted Engine Electrical Connections
- Coolant Heater
- Secondary Fuel Filter
- Fuel Lockoff Solenoid
- Stainless Steel Flexible Exhaust Connection
- Battery Charge Alternator
- Battery Cables
- Battery Tray
- Vibration Isolation of Unit to Mounting Base
- 12 Volt, Solenoid-activated Starter Motor
- Air Cleaner
- Fan Guard
- Control Console
- Radiator Duct Adaptor
- Ischronous Governor

OPTIONS

- **OPTIONAL COOLING SYSTEM ACCESSORIES**
 - 208/240V Coolant Heater
- **OPTIONAL FUEL ACCESSORIES**
 - Flexible Fuel Lines
 - UL Listed Fuel Tanks
 - Base Tank Low Fuel Alarm
 - Primary Fuel Filters
- **OPTIONAL EXHAUST ACCESSORIES**
 - Critical Exhaust Silencer
- **OPTIONAL ELECTRICAL ACCESSORIES**
 - 2A Battery Charger
 - 10A Dual Rate Battery Charger
 - Battery, 12 Volt, 135 A.H.
- **OPTIONAL ALTERNATOR ACCESSORIES**
 - Alternator Upsizing
 - Alternator Strip Heater
 - Alternator Tropicalization
 - Voltage Changeover Switch
 - Main Line Circuit Breaker
- **CONTROL CONSOLE OPTIONS**
 - Digital Controller H100 (Bulletin 0172110SBY)
- **ADDITIONAL OPTIONAL EQUIPMENT**
 - Automatic Transfer Switch
 - Remote Relay Panels
 - Unit Vibration Isolators
 - Oil Make-Up System
 - Oil Heater
 - 5 Year Warranties
 - Export Boxing
 - GenLink® Communications Software
- **OPTIONAL ENCLOSURE**
 - Weather Protective
 - Sound Attenuated
 - Aluminum and Stainless Steel
 - Enclosed Muffler

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DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF AN EXISTING 195' MONOPOLE AND ITS FOUNDATION FOR PROPOSED ANTENNA ARRANGEMENT

Site I.D: SR1447 Goshen
Address: 113 Brush Hill Road
Goshen, CT

prepared for

cingular
WIRELESS



at&t

New Cingular Wireless PCS, LLC

now AT&T Mobility

500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06067

prepared by

URS

URS CORPORATION
500 ENTERPRISE DRIVE, SUITE 3B
ROCKY HILL, CT 06067
TEL. 860-529-8882

36924702.00000
SAI-032

April 30, 2008

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the existing 195' steel tapered monopole structure, located at 113 Brush Hill Road, Goshen, CT. The analysis was conducted in accordance with the 2005 Connecticut State Building Code and the TIA/EIA-222-F standard for a wind velocity of 80 mph (fastest mile) and 69 mph (fastest mile) concurrent with 0.5" ice.

The antenna loading considered in the analysis consists of all existing and proposed antennas, transmission lines, and ancillary items as outlined in the Introduction Section of this report.

The proposed AT&T/Cingular Wireless installation is as follows:

| Proposed Antenna and Mount | Carrier | Antenna Center Elevation |
|---|-----------------------------|--------------------------|
| <u>Install:</u> <u>Alpha, Beta and Gamma Sectors</u> (6) Powerwave 7770 panel antennas (12) Powerwave LGP 21401 TMA's on (1) 13' Low Profile Platform (Valmont P/N 852206) (12) 1 5/8" coaxial cables (all proposed coax feed lines shall be located within the existing monopole) | AT&T/Cingular (Proposed) | @ 175' |

The results of the analysis indicate that the tower structure has the capacity to support the proposed loading conditions. **The tower and its foundation are considered structurally adequate with the wind load classification specified above and the proposed antenna loading.**

1. EXECUTIVE SUMMARY - *continued*

This analysis is based on:

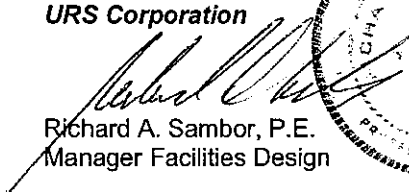
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- 2) Tower geometry and structural member sizes utilized in the preparation of this report obtained from manufacturers original design documents prepared by Engineered Endeavors, Incorporated, (EEI); Job No. 12782, signed and sealed July 28, 2004.
- 3) Site documentation and visual verification of existing appurtenances conducted from the existing grade by URS during December 2007.
- 4) Antenna and mount configuration as specified within Section 2 and 6 of this report.

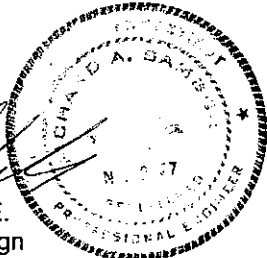
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If you should have any questions, please call.

Sincerely,

URS Corporation


Richard A. Sambor, P.E.
Manager Facilities Design



RAS/jrm
cc: AA, DR, ICA – URS, CF/Book

2. INTRODUCTION

The subject tower is located at 113 Brush Hill Road, Goshen, CT. The structure is an existing 195' steel tapered monopole structure, designed and manufactured by Engineered Endeavors, Incorporated, (EEI).

The inventory is summarized in the table below:

| Antenna Type | Carrier | Mount | Antenna Centerline Elevation | Cable |
|--|--------------------------|---|-------------------------------------|---------------------------------------|
| 7' Lightning Rod | N/A | 5' Pipe Mount Extension | 202.5' | N/A |
| (12) Dapa 48000 panel antennas (see note below) | Sprint/Nextel (existing) | Low Profile Platform | 195' | (12) 1 5/8" (within monopole) |
| (6) Antel LPA-185080/12CF panel antennas | Verizon (existing) | Low profile Platform (existing to remain) | 185' | (12) 1 5/8" (within monopole) |
| (6) Antel LPA-80080/6CF panel antennas | Verizon (reserved) | Low profile Platform (same as above) | 185' | (include in the above) |
| (6) Powerwave 7770 panel antennas and (12) Powerwave LGP 21401 TMA's | AT&T/Cingular (proposed) | (1) 13' Low Profile Platform (Valmont P/N 852206) | 175' | (12) 1 5/8" (located within pole) |
| (1) GPS antenna | Sprint/Nextel (existing) | GPS mount | 50' | (1) 7/8" coax cable (within monopole) |

Note:

Existing Sprint/Nextel inventory based on original design documents.

This structural analysis of the communications tower was performed by URS Corporation (URS) for AT&T/Cingular Wireless. The purpose of this analysis was to investigate the structural integrity of the existing tower with its existing and proposed antenna loads. This analysis was conducted to evaluate stress on the tower and the effect of forces to the foundation of the tower resulting from existing and proposed antenna arrangement.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

The structural analysis was conducted in accordance with the 2005 Connecticut State Building Code, TIA/EIA-222-F - Structural Standard for Steel Antenna Towers and Antenna Supporting Structures, and the American Institute of Steel Construction (AISC) Manual of Steel Construction - Allowable Stress Design (ASD).

The analysis was conducted using RISA Tower 5.1.1. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

Load Condition 1 = 80 mph (fastest mile) Wind Load (without ice) + Tower Dead Load

Load Condition 2 = 69 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

Please note that wind pressure is a function of velocity squared. Under Load Condition 2, a 25 percent reduction in wind pressure is allowed by code to account for the unlikelihood of the full wind pressure and ice load occurring at the same time. The same results may be achieved by utilizing a lower wind pressure without taking the 25 percent reduction, as shown above.

The TIA/EIA standard permits a one-third increase in allowable stresses for towers and monopoles less than 700 feet tall. For the purposes of this analysis, in computing the load capacity the allowable stresses of the tower members were increased by one-third.

4. FINDINGS AND EVALUATION

Combined axial and bending stresses on the monopole structure were evaluated to compare with allowable stresses in accordance with AISC. The calculated stresses under the proposed loading were below the allowable stresses (see table below). Detailed analysis and calculations for the proposed load condition are provided in section 6 of this report. Additionally, the anchor bolts, base plate and foundation were found to be within the allowable limits.

Tower Reactions:

For detailed proposed tower reactions, see drawing no. E-1 in section 6 of this report.

TABLE 1: Tower Base Reactions vs. Original Design Reactions

| Base Reactions | Original Design Reactions ⁽¹⁾ | Proposed Reactions |
|-----------------------|--|--------------------|
| Axial Load (kips) | 51.1 | 51 |
| Shear (kips) | 33.6 | 25 |
| O.T. Moment (ft-kips) | 4719 | 3369 |

Notes:

- 1) Original Design reactions based on TIA-EIA 222F with 85mph Basic Wind Speed (fastest mile).

TABLE 2: Tower Component Stress vs. Capacity Summary

| Component (Section No.) | Controlling Component / Elevation | Stress Ratio (% capacity) | Pass/Fail | Notes: |
|-------------------------|-----------------------------------|---------------------------|-----------|--------|
| Pole Shaft (L3) | 48.2'-95.7 | 65.1% | Pass | |
| Anchor Bolts | Compression | 53% | Pass | |
| Base Plate | Bending | 65% | Pass | |

TABLE 3: Foundation Summary

| Foundation | Component | Stress (% capacity/FOS) | Pass/Fail | Comments: |
|------------------------------|-----------|-------------------------|-----------|---|
| Reinf. Concrete Pad and Pier | OTM | 61%/3.28 | Pass | Min. F.O.S of 2.0 req'd per IBC 2003 Section 3108.4.2 |

Note: OTM denotes overturning moment.

5. CONCLUSIONS AND RECOMMENDATIONS

The results of the analysis indicate that the tower structure has the capacity to support the proposed loading conditions. **The tower and its foundation are considered structurally adequate with the wind load classification specified above and the proposed antenna loading.**

Limitations/Assumptions:

This report is based on the following:

1. Tower inventory as listed in this report.
2. Tower is properly installed and maintained.
3. All members are as specified in the original design documents and are in good condition.
4. All required members are in place.
5. All bolts are in place and are properly tightened.
6. Tower is in plumb condition.
7. All member protective coatings are in good condition.
8. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
9. Foundations were properly constructed to support original design loads as specified in the original design documents.
10. All coaxial cable is installed within the monopole unless specified otherwise.

URS is not responsible for any modifications completed prior to or hereafter in which URS is not or was not directly involved. Modifications include but are not limited to:

- A. Adding antennas
- B. Removing/replacing antennas
- C. Adding coaxial cables

URS 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 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 URS. URS disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

Ongoing and Periodic Inspection and Maintenance:

After the Contractor has successfully completed the installation and the work has been accepted, the owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

The owner shall refer to TIA/EIA-222-F for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. According to TIA/EIA-222-F section 14.1, Note 1: It is recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading conditions.

**DETAILED STRUCTURAL ANALYSIS AND
EVALUATION OF AN EXISTING 195'
MONOPOLE AND ITS FOUNDATION FOR
PROPOSED ANTENNA ARRANGEMENTS**

RECEIVED
MAY - 9 2008

Site I.D: SR1447 Goshen
Address: 113 Brush Hill Road
Goshen, CT

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SITING COUNCIL

prepared for

cingular
WIRELESS



at&t

Now Cingular Wireless PCS, LLC

now AT&T Mobility

500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06067

prepared by

URS

URS CORPORATION
500 ENTERPRISE DRIVE, SUITE 3B
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TEL. 860-529-8882

36924702.00000
SAI-032

April 30, 2008

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- 2. INTRODUCTION**
- 3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS**
- 4. FINDINGS AND EVALUATION**
- 5. CONCLUSIONS AND RECOMMENDATIONS**
- 6. DRAWINGS AND DATA**
 - **RISA TOWER INPUT / OUTPUT SUMMARY**
 - **RISA TOWER DETAILED OUTPUT**
 - **ANCHOR BOLT AND BASE PLATE ANALYSIS**
 - **FOUNDATION ANALYSIS**

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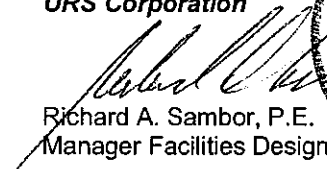
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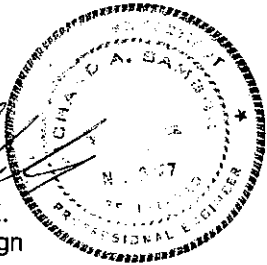
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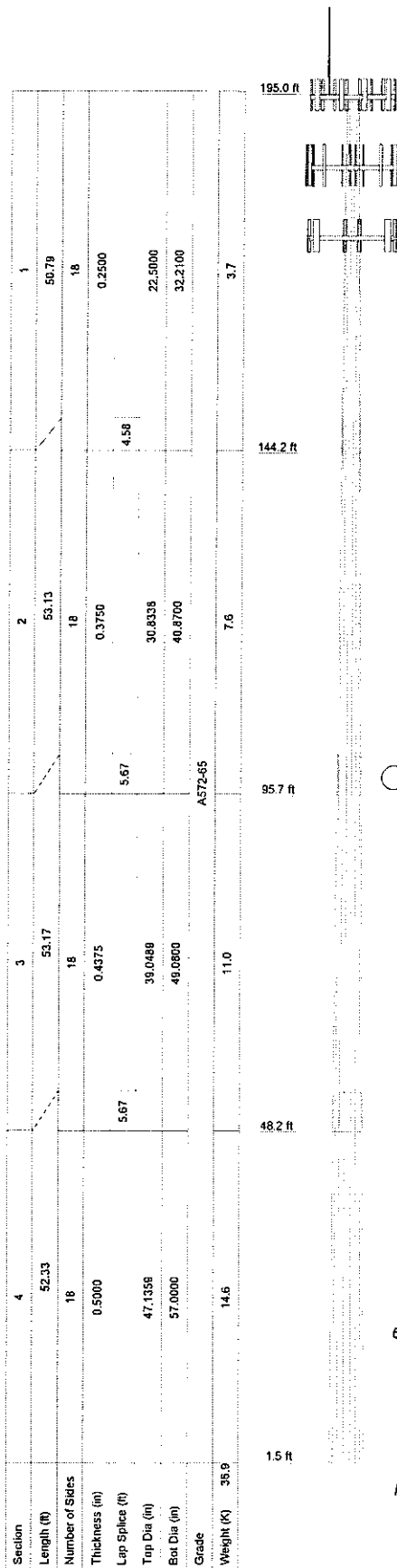
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6. DRAWINGS AND DATA

RISA TOWER INPUT/OUTPUT SUMMARY



DESIGNED APPURTENANCE LOADING

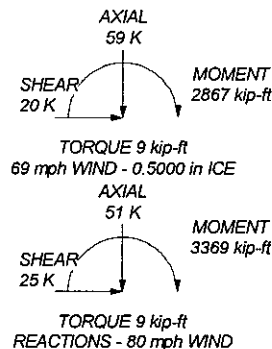
| TYPE | ELEVATION | TYPE | ELEVATION |
|---|-----------|--|-----------|
| Lightning Rod 1"x7" (None) | 202.5 | LPA-185080/12CF w/ Mount Pipe (Verizon - existing) | 185 |
| 50"x3" Pipe Mount (None) | 197.5 | LPA-185080/12CF w/ Mount Pipe (Verizon - existing) | 185 |
| (4) 48000 w/Mount Pipe (Sprint/Nextel) | 195 | EEL Tube (New) Low Profile Platform (Verizon) | 185 |
| (4) 48000 w/Mount Pipe (Sprint/Nextel) | 195 | (2) 7770.00 w/ mount pipe (ATTI - proposed) | 175 |
| (4) 48000 w/Mount Pipe (Sprint/Nextel) | 195 | (2) 7770.00 w/ mount pipe (ATTI - proposed) | 175 |
| EEL Chamel (Old) Low Profile Platform (Sprint/Nextel) | 195 | (2) 7770.00 w/ mount pipe (ATTI - proposed) | 175 |
| LPA-80080/6CF w/ Mount Pipe (Verizon - reserved) | 185 | (2) LPG 13519 Diplexer (ATTI - proposed) | 175 |
| LPA-80080/6CF w/ Mount Pipe (Verizon - reserved) | 185 | (2) LPG 13519 Diplexer (ATTI - proposed) | 175 |
| LPA-80080/6CF w/ Mount Pipe (Verizon - reserved) | 185 | (2) LPG 13519 Diplexer (ATTI - proposed) | 175 |
| LPA-80080/6CF w/ Mount Pipe (Verizon - reserved) | 185 | (2) LPG 13519 Diplexer (ATTI - proposed) | 175 |
| LPA-80080/6CF w/ Mount Pipe (Verizon - reserved) | 185 | (4) LPG 21401 TMA (ATTI - proposed) | 175 |
| LPA-80080/6CF w/ Mount Pipe (Verizon - reserved) | 185 | (4) LPG 21401 TMA (ATTI - proposed) | 175 |
| LPA-185080/12CF w/ Mount Pipe (Verizon - existing) | 185 | Valmont 13' Low Profile Platform (ATTI - proposed) | 175 |
| LPA-185080/12CF w/ Mount Pipe (Verizon - existing) | 185 | Generic Stand-Off Mount (Sprint/Nextel) | 50 |
| LPA-185080/12CF w/ Mount Pipe (Verizon - existing) | 185 | GPS Antenna (Sprint/Nextel) | 50 |

MATERIAL STRENGTH

| GRADE | Fy | Fu | GRADE | Fy | Fu |
|---------|--------|--------|-------|----|----|
| A572-65 | 65 ksi | 80 ksi | | | |

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. Connections use galvanized A325 bolts, nuts and locking devices.
6. Installation per TIA/EIA-222-F and AISC Specifications.
7. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
8. Top of foundation taken as 1.5 ft above finished grade.
9. TOWER RATING: 65.1%



| | | | |
|--------------------------------|--|---|-----------------|
| URS Corporation | | Job: 195' EEI Monopole | |
| 500 Enterprise Drive, Suite 3B | | Project: 113 Brush Hill Road, Goshen, CT | |
| Rocky Hill, CT 06067 | | Client: Site Acquisitions Inc. - AT&T | Drawn by: Staff |
| Phone: (860) 529-8882 | | Code: TIA/EIA-222-F | Date: 04/30/08 |
| FAX: (860) 529-3991 | | Path: P:\08\ER Files\195 EEI Monopole Goshen CT.eri | Scale: NTS |
| | | Dwg No. E-1 | |

RISA TOWER DETAILED OUTPUT

| | | | |
|--|---------|---------------------------------|---------------------------|
| RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991 | Job | 195' EEI Monopole | Page 1 of 20 |
| | Project | 113 Brush Hill Road, Goshen, CT | Date 13:12:30 04/30/08 |
| | Client | Site Acquisitions Inc. - AT&T | Designed by Staff |

Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Tower is located in Litchfield County, Connecticut.

Basic wind speed of 80 mph.

Nominal ice thickness of 0.5000 in.

Ice density of 56 pcf.

A wind speed of 69 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 50 mph.

Connections use galvanized A325 bolts, nuts and locking devices..

Installation per TIA/EIA-222-F and AISC Specifications..

Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..

Top of foundation taken as 1.5 ft above finished grade..

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.333.

Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

| | | |
|-------------------------------------|--------------------------------------|-------------------------------------|
| Consider Moments - Legs | Distribute Leg Loads As Uniform | Treat Feedline Bundles As Cylinder |
| Consider Moments - Horizontals | Assume Legs Pinned | Use ASCE 10 X-Brace Ly Rules |
| Consider Moments - Diagonals | ✓ Assume Rigid Index Plate | Calculate Redundant Bracing Forces |
| Use Moment Magnification | Use Clear Spans For Wind Area | Ignore Redundant Members in FEA |
| ✓ Use Code Stress Ratios | Use Clear Spans For KL/r | SR Leg Bolts Resist Compression |
| Use Code Safety Factors - Guys | Retension Guys To Initial Tension | All Leg Panels Have Same Allowable |
| Escalate Ice | ✓ Bypass Mast Stability Checks | Offset Girt At Foundation |
| Always Use Max Kz | Use Azimuth Dish Coefficients | Consider Feedline Torque |
| Use Special Wind Profile | ✓ Project Wind Area of Appurt. | Include Angle Block Shear Check |
| Include Bolts In Member Capacity | Autocalc Torque Arm Areas | Poles |
| Leg Bolts Are At Top Of Section | SR Members Have Cut Ends | ✓ Include Shear-Torsion Interaction |
| Secondary Horizontal Braces Leg | ✓ Sort Capacity Reports By Component | Always Use Sub-Critical Flow |
| Use Diamond Inner Bracing (4 Sided) | Triangulate Diamond Inner Bracing | Use Top Mounted Sockets |
| Add IBC .6D+W Combination | | |

Tapered Pole Section Geometry

| Section | Elevation ft | Section Length ft | Splice Length ft | Number of Sides | Top Diameter in | Bottom Diameter in | Wall Thickness in | Bend Radius in | Pole Grade |
|---------|-----------------|-------------------------|------------------------|-----------------------|-----------------------|--------------------------|-------------------------|----------------------|---------------------|
| L1 | 195.00-144.21 | 50.79 | 4.58 | 18 | 22.5000 | 32.2100 | 0.2500 | 1.0000 | A572-65 (65 ksi) |
| L2 | 144.21-95.66 | 53.13 | 5.67 | 18 | 30.8338 | 40.8700 | 0.3750 | 1.5000 | A572-65 (65 ksi) |
| L3 | 95.66-48.16 | 53.17 | 5.67 | 18 | 39.0489 | 49.0800 | 0.4375 | 1.7500 | A572-65 |

| | | | | |
|--|---------|---------------------------------|-------------|-------------------|
| RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991 | Job | 195' EEI Monopole | Page | 2 of 20 |
| | Project | 113 Brush Hill Road, Goshen, CT | Date | 13:12:30 04/30/08 |
| | Client | Site Acquisitions Inc. - AT&T | Designed by | Staff |

| Section | Elevation | Section Length | Splice Length | Number of Sides | Top Diameter | Bottom Diameter | Wall Thickness | Bend Radius | Pole Grade |
|---------|------------|----------------|---------------|-----------------|--------------|-----------------|----------------|-------------|---------------------------------|
| | ft | ft | ft | | in | in | in | in | |
| L4 | 48.16-1.50 | 52.33 | | 18 | 47.1359 | 57.0000 | 0.5000 | 2.0000 | (65 ksi) A572-65 (65 ksi) |

Tapered Pole Properties

| Section | Tip Dia. | Area | I | r | C | I/C | J | Iu/Q | w | w/t |
|---------|----------|-----------------|-----------------|---------|---------|-----------------|-----------------|-----------------|--------|--------|
| | in | in ² | in ⁴ | in | in | in ³ | in ⁴ | in ³ | in | |
| L1 | 22.8471 | 17.6554 | 1104.2678 | 7.8987 | 11.4300 | 96.6114 | 2209.9887 | 8.8294 | 3.5200 | 14.08 |
| | 32.7069 | 25.3603 | 3272.6887 | 11.3458 | 16.3627 | 200.0093 | 6549.6836 | 12.6825 | 5.2290 | 20.916 |
| L2 | 32.1886 | 36.2536 | 4249.2773 | 10.8129 | 15.6636 | 271.2839 | 8504.1460 | 18.1303 | 4.7668 | 12.711 |
| | 41.5005 | 48.1992 | 9985.7307 | 14.3757 | 20.7620 | 480.9628 | 19984.6009 | 24.1042 | 6.5331 | 17.422 |
| L3 | 40.7375 | 53.6168 | 10098.8199 | 13.7071 | 19.8369 | 509.0936 | 20210.9282 | 26.8135 | 6.1026 | 13.949 |
| | 49.8371 | 67.5462 | 20191.5702 | 17.2681 | 24.9326 | 809.8449 | 40409.7089 | 33.7795 | 7.8681 | 17.984 |
| L4 | 48.9477 | 74.0111 | 20336.4179 | 16.5557 | 23.9450 | 849.2964 | 40699.5950 | 37.0126 | 7.4159 | 14.832 |
| | 57.8793 | 89.6655 | 36162.6061 | 20.0575 | 28.9560 | 1248.8813 | 72372.7958 | 44.8413 | 9.1520 | 18.304 |

| Tower Elevation | Gusset Area | Gusset Thickness | Gusset Grade | Adjust. Factor | Adjust. Factor | Weight Mult. | Double Angle | Double Angle |
|------------------|-----------------|------------------|--------------|----------------|----------------|--------------|--------------|--------------|
| | (per face) | | | A _f | A _r | | Stitch Bolt | Stitch Bolt |
| ft | ft ² | in | | | | | Spacing | Spacing |
| | | | | | | | Diagonals | Horizontal |
| | | | | | | | in | in |
| L1 195.00-144.21 | | | | 1 | 1 | 1 | | |
| L2 144.21-95.66 | | | | 1 | 1 | 1 | | |
| L3 95.66-48.16 | | | | 1 | 1 | 1 | | |
| L4 48.16-1.50 | | | | 1 | 1 | 1 | | |

Feed Line/Linear Appurtenances - Entered As Area

| Description | Face or Leg | Allow Shield | Component Type | Placement | Total Number | C _{MA} | Weight |
|-------------------------|-------------|--------------|----------------|---------------|--------------|---------------------|--------|
| | | | | ft | | ft ² /ft | plf |
| 1 5/8 (Sprint/Nextel) | C | No | Inside Pole | 195.00 - 6.50 | 12 | No Ice | 1.04 |
| | | | | | | 1/2" Ice | 1.04 |
| 1 5/8 (Verizon) | C | No | Inside Pole | 185.00 - 6.50 | 12 | No Ice | 1.04 |
| | | | | | | 1/2" Ice | 1.04 |
| 7/8 (Sprint/Nextel) | C | No | Inside Pole | 50.00 - 6.50 | 1 | No Ice | 0.54 |
| | | | | | | 1/2" Ice | 0.54 |
| 1 5/8 (AT&T - proposed) | C | No | Inside Pole | 175.00 - 7.50 | 12 | No Ice | 1.04 |
| | | | | | | 1/2" Ice | 1.04 |

Feed Line/Linear Appurtenances Section Areas

| Tower Section | Tower Elevation | Face | A _R | A _F | C _{MA} In Face | C _{MA} Out Face | Weight |
|---------------|-----------------|------|-----------------|-----------------|-------------------------|--------------------------|--------|
| | ft | | ft ² | ft ² | ft ² | ft ² | K |
| L1 | 195.00-144.21 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |

| | | | |
|--|---------|---------------------------------|---------------------------|
| RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991 | Job | 195' EEI Monopole | Page 3 of 20 |
| | Project | 113 Brush Hill Road, Goshen, CT | Date 13:12:30 04/30/08 |
| | Client | Site Acquisitions Inc. - AT&T | Designed by Staff |

| Tower Section | Tower Elevation ft | Face | A_R ft ² | A_F ft ² | $C_A A_A$ In Face ft ² | $C_A A_A$ Out Face ft ² | Weight K |
|---------------|-----------------------|------|--------------------------|--------------------------|---|--|-------------|
| L2 | 144.21-95.66 | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 1.53 |
| | | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| L3 | 95.66-48.16 | C | 0.000 | 0.000 | 0.000 | 0.000 | 1.82 |
| | | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 1.78 |
| L4 | 48.16-1.50 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 1.57 |

Feed Line/Linear Appurtenances Section Areas - With Ice

| Tower Section | Tower Elevation ft | Face or Leg | Ice Thickness in | A_R ft ² | A_F ft ² | $C_A A_A$ In Face ft ² | $C_A A_A$ Out Face ft ² | Weight K |
|---------------|-----------------------|-------------|---------------------|--------------------------|--------------------------|---|--|-------------|
| L1 | 195.00-144.21 | A | 0.500 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 1.53 |
| L2 | 144.21-95.66 | A | 0.500 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 1.82 |
| L3 | 95.66-48.16 | A | 0.500 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 1.78 |
| L4 | 48.16-1.50 | A | 0.500 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 1.57 |

Discrete Tower Loads

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustment ° | Placement ft | $C_A A_A$ Front ft ² | $C_A A_A$ Side ft ² | Weight K |
|---|-------------|-------------|---|-------------------------|-----------------|---------------------------------------|--------------------------------------|-------------|
| Lightning Rod 1"x7" (None) | A | From Face | 3.00 | 0.0000 | 202.50 | No Ice | 0.70 | 0.02 |
| | | | 0.00 | | | 1/2" Ice | 1.42 | 0.03 |
| | | | 0.00 | | | | | |
| 5"0"x3" Pipe Mount (None) | A | From Face | 3.00 | 0.0000 | 197.50 | No Ice | 1.36 | 0.03 |
| | | | 0.00 | | | 1/2" Ice | 1.67 | 0.04 |
| | | | 0.00 | | | | | |
| (4) 48000 w/Mount Pipe (Sprint/Nextel) | A | From Face | 3.00 | 0.0000 | 195.00 | No Ice | 5.12 | 0.04 |
| | | | 0.00 | | | 1/2" Ice | 5.79 | 0.08 |
| | | | 0.00 | | | | | |
| (4) 48000 w/Mount Pipe (Sprint/Nextel) | B | From Face | 3.00 | 0.0000 | 195.00 | No Ice | 5.12 | 0.04 |
| | | | 0.00 | | | 1/2" Ice | 5.79 | 0.08 |
| | | | 0.00 | | | | | |
| (4) 48000 w/Mount Pipe (Sprint/Nextel) | C | From Face | 3.00 | 0.0000 | 195.00 | No Ice | 5.12 | 0.04 |
| | | | 0.00 | | | 1/2" Ice | 5.79 | 0.08 |
| | | | 0.00 | | | | | |

| | | | | |
|--|---------|---------------------------------|-------------|-------------------|
| RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991 | Job | 195' EEI Monopole | Page | 4 of 20 |
| | Project | 113 Brush Hill Road, Goshen, CT | Date | 13:12:30 04/30/08 |
| | Client | Site Acquisitions Inc. - AT&T | Designed by | Staff |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustment ° | Placement ft | | C _{AA} Front ft ² | C _{AA} Side ft ² | Weight K |
|----------------------------|-------------------|----------------|---|----------------------------|-----------------|----------|---|--|-------------|
| EEI Channel (Old) Low | A | From Face | 3.00 | 0.0000 | 195.00 | No Ice | 22.50 | 22.50 | 1.50 |
| Profile Platform | | | 0.00 | | | 1/2" Ice | 28.40 | 28.40 | 2.25 |
| (Sprint/Nextel) | | | 0.00 | | | | | | |
| LPA-80080/6CF w/ Mount | A | From Face | 3.00 | 0.0000 | 185.00 | No Ice | 4.35 | 10.51 | 0.04 |
| Pipe | | | 6.00 | | | 1/2" Ice | 4.79 | 11.56 | 0.10 |
| (Verizon - reserved) | | | 0.00 | | | | | | |
| LPA-80080/6CF w/ Mount | A | From Face | 3.00 | 0.0000 | 185.00 | No Ice | 4.35 | 10.51 | 0.04 |
| Pipe | | | -6.00 | | | 1/2" Ice | 4.79 | 11.56 | 0.10 |
| (Verizon - reserved) | | | 0.00 | | | | | | |
| LPA-80080/6CF w/ Mount | B | From Face | 3.00 | 0.0000 | 185.00 | No Ice | 4.35 | 10.51 | 0.04 |
| Pipe | | | 6.00 | | | 1/2" Ice | 4.79 | 11.56 | 0.10 |
| (Verizon - reserved) | | | 0.00 | | | | | | |
| LPA-80080/6CF w/ Mount | B | From Face | 3.00 | 0.0000 | 185.00 | No Ice | 4.35 | 10.51 | 0.04 |
| Pipe | | | -6.00 | | | 1/2" Ice | 4.79 | 11.56 | 0.10 |
| (Verizon - reserved) | | | 0.00 | | | | | | |
| LPA-80080/6CF w/ Mount | C | From Face | 3.00 | 0.0000 | 185.00 | No Ice | 4.35 | 10.51 | 0.04 |
| Pipe | | | 6.00 | | | 1/2" Ice | 4.79 | 11.56 | 0.10 |
| (Verizon - reserved) | | | 0.00 | | | | | | |
| LPA-80080/6CF w/ Mount | C | From Face | 3.00 | 0.0000 | 185.00 | No Ice | 4.35 | 10.51 | 0.04 |
| Pipe | | | -6.00 | | | 1/2" Ice | 4.79 | 11.56 | 0.10 |
| (Verizon - proposed) | | | 0.00 | | | | | | |
| LPA-185080/12CF w/ Mount | A | From Face | 3.00 | 0.0000 | 185.00 | No Ice | 3.55 | 5.99 | 0.03 |
| Pipe | | | 4.00 | | | 1/2" Ice | 3.99 | 6.94 | 0.07 |
| (Verizon - existing) | | | 0.00 | | | | | | |
| LPA-185080/12CF w/ Mount | A | From Face | 3.00 | 0.0000 | 185.00 | No Ice | 3.55 | 5.99 | 0.03 |
| Pipe | | | -4.00 | | | 1/2" Ice | 3.99 | 6.94 | 0.07 |
| (Verizon - existing) | | | 0.00 | | | | | | |
| LPA-185080/12CF w/ Mount | B | From Face | 3.00 | 0.0000 | 185.00 | No Ice | 3.55 | 5.99 | 0.03 |
| Pipe | | | 4.00 | | | 1/2" Ice | 3.99 | 6.94 | 0.07 |
| (Verizon - existing) | | | 0.00 | | | | | | |
| LPA-185080/12CF w/ Mount | B | From Face | 3.00 | 0.0000 | 185.00 | No Ice | 3.55 | 5.99 | 0.03 |
| Pipe | | | -4.00 | | | 1/2" Ice | 3.99 | 6.94 | 0.07 |
| (Verizon - existing) | | | 0.00 | | | | | | |
| LPA-185080/12CF w/ Mount | C | From Face | 3.00 | 0.0000 | 185.00 | No Ice | 3.55 | 5.99 | 0.03 |
| Pipe | | | 4.00 | | | 1/2" Ice | 3.99 | 6.94 | 0.07 |
| (Verizon - existing) | | | 0.00 | | | | | | |
| LPA-185080/12CF w/ Mount | C | From Face | 3.00 | 0.0000 | 185.00 | No Ice | 3.55 | 5.99 | 0.03 |
| Pipe | | | -4.00 | | | 1/2" Ice | 3.99 | 6.94 | 0.07 |
| (Verizon - existing) | | | 0.00 | | | | | | |
| EEI Tube (New) Low Profile | A | From Face | 3.00 | 0.0000 | 185.00 | No Ice | 15.00 | 15.00 | 2.60 |
| Platform | | | 0.00 | | | 1/2" Ice | 18.00 | 18.00 | 3.50 |
| (Verizon) | | | 0.00 | | | | | | |
| GPS Antenna | A | From Face | 2.00 | 0.0000 | 50.00 | No Ice | 4.00 | 4.00 | 0.09 |
| (Sprint/Nextel) | | | 0.00 | | | 1/2" Ice | 4.31 | 4.31 | 0.14 |
| | | | 0.00 | | | | | | |
| Generic Stand-Off Mount | A | From Face | 2.00 | 0.0000 | 50.00 | No Ice | 1.00 | 1.00 | 0.04 |
| (Sprint/Nextel) | | | 0.00 | | | 1/2" Ice | 1.40 | 1.40 | 0.08 |
| | | | 0.00 | | | | | | |
| (2) 7770.00 w/ mount pipe | A | From Face | 3.00 | 0.0000 | 175.00 | No Ice | 5.99 | 4.26 | 0.06 |
| (AT&T - proposed) | | | 0.00 | | | 1/2" Ice | 6.45 | 4.91 | 0.11 |
| | | | 0.00 | | | | | | |
| (2) 7770.00 w/ mount pipe | B | From Face | 3.00 | 0.0000 | 175.00 | No Ice | 5.99 | 4.26 | 0.06 |
| (AT&T - proposed) | | | 0.00 | | | 1/2" Ice | 6.45 | 4.91 | 0.11 |
| | | | 0.00 | | | | | | |
| (2) 7770.00 w/ mount pipe | C | From Face | 3.00 | 0.0000 | 175.00 | No Ice | 5.99 | 4.26 | 0.06 |
| (AT&T - proposed) | | | 0.00 | | | 1/2" Ice | 6.45 | 4.91 | 0.11 |
| | | | 0.00 | | | | | | |

| | | | | |
|--|---------|---------------------------------|-------------|-------------------|
| RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991 | Job | 195' EEI Monopole | Page | 5 of 20 |
| | Project | 113 Brush Hill Road, Goshen, CT | Date | 13:12:30 04/30/08 |
| | Client | Site Acquisitions Inc. - AT&T | Designed by | Staff |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustment ° | Placement ft | | C _{MA} Front ft ² | C _{MA} Side ft ² | Weight K |
|--|-------------------|----------------|---|----------------------------|-----------------|--------------------|---|--|--------------|
| (2) LPG 13519 Diplexer (AT&T - proposed) | A | From Face | 2.50 0.00 0.00 | 0.0000 | 175.00 | No Ice 1/2" Ice | 0.27 0.34 | 0.18 0.25 | 0.01 0.01 |
| (2) LPG 13519 Diplexer (AT&T - proposed) | B | From Face | 2.50 0.00 0.00 | 0.0000 | 175.00 | No Ice 1/2" Ice | 0.27 0.34 | 0.18 0.25 | 0.01 0.01 |
| (2) LPG 13519 Diplexer (AT&T - proposed) | C | From Face | 2.50 0.00 0.00 | 0.0000 | 175.00 | No Ice 1/2" Ice | 0.27 0.34 | 0.18 0.25 | 0.01 0.01 |
| (4) LPG 21401 TMA (AT&T - proposed) | A | From Face | 2.50 0.00 0.00 | 0.0000 | 175.00 | No Ice 1/2" Ice | 0.95 1.09 | 0.37 0.48 | 0.02 0.02 |
| (4) LPG 21401 TMA (AT&T - proposed) | B | From Face | 2.50 0.00 0.00 | 0.0000 | 175.00 | No Ice 1/2" Ice | 0.95 1.09 | 0.37 0.48 | 0.02 0.02 |
| Valmont 13' Low Profile Platform (AT&T - proposed) | C | None | | 0.0000 | 175.00 | No Ice 1/2" Ice | 15.70 20.10 | 15.70 20.10 | 1.30 1.76 |

Tower Pressures - No Ice

$$G_H = 1.690$$

| Section Elevation ft | z ft | K _z | q _z psf | A _G ft ² | F a c e | A _F ft ² | A _R ft ² | A _{leg} ft ² | Leg % | C _{MA} In Face ft ² | C _{MA} Out Face ft ² |
|----------------------------|---------|----------------|-----------------------|-----------------------------------|------------------|-----------------------------------|-----------------------------------|-------------------------------------|----------|--|---|
| L1 195.00- 144.21 | 168.37 | 1.593 | 26 | 115.780 | A | 0.000 | 115.780 | 115.780 | 100.00 | 0.000 | 0.000 |
| | | | | | B | 0.000 | 115.780 | | 100.00 | 0.000 | 0.000 |
| | | | | | C | 0.000 | 115.780 | | 100.00 | 0.000 | 0.000 |
| L2 144.21- 95.66 | 119.27 | 1.444 | 24 | 146.793 | A | 0.000 | 146.793 | 146.793 | 100.00 | 0.000 | 0.000 |
| | | | | | B | 0.000 | 146.793 | | 100.00 | 0.000 | 0.000 |
| | | | | | C | 0.000 | 146.793 | | 100.00 | 0.000 | 0.000 |
| L3 95.66-48.16 | 71.68 | 1.248 | 20 | 176.539 | A | 0.000 | 176.539 | 176.539 | 100.00 | 0.000 | 0.000 |
| | | | | | B | 0.000 | 176.539 | | 100.00 | 0.000 | 0.000 |
| | | | | | C | 0.000 | 176.539 | | 100.00 | 0.000 | 0.000 |
| L4 48.16-1.50 | 24.34 | 1 | 17 | 204.547 | A | 0.000 | 204.547 | 204.547 | 100.00 | 0.000 | 0.000 |
| | | | | | B | 0.000 | 204.547 | | 100.00 | 0.000 | 0.000 |
| | | | | | C | 0.000 | 204.547 | | 100.00 | 0.000 | 0.000 |

Tower Pressure - With Ice

$$G_H = 1.690$$

| | | | | |
|--|---------|---------------------------------|-------------|-------------------|
| RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991 | Job | 195' EEI Monopole | Page | 6 of 20 |
| | Project | 113 Brush Hill Road, Goshen, CT | Date | 13:12:30 04/30/08 |
| | Client | Site Acquisitions Inc. - AT&T | Designed by | Staff |

| Section Elevation | z | K _Z | q _z | t _z | A _G | F a c e | A _F | A _R | A _{leg} | Leg % | C _M A _A In Face ft ² | C _M A _A Out Face ft ² |
|----------------------|--------|----------------|----------------|----------------|-----------------|------------------|-----------------|-----------------|------------------|----------|--|---|
| ft | ft | | psf | in | ft ² | | ft ² | ft ² | ft ² | | | |
| L1 195.00-144.21 | 168.37 | 1.593 | 20 | 0.5000 | 120.013 | A | 0.000 | 120.013 | 120.013 | 100.00 | 0.000 | 0.000 |
| | | | | | | B | 0.000 | 120.013 | | 100.00 | 0.000 | 0.000 |
| | | | | | | C | 0.000 | 120.013 | | 100.00 | 0.000 | 0.000 |
| L2 144.21-95.66 | 119.27 | 1.444 | 18 | 0.5000 | 150.839 | A | 0.000 | 150.839 | 150.839 | 100.00 | 0.000 | 0.000 |
| | | | | | | B | 0.000 | 150.839 | | 100.00 | 0.000 | 0.000 |
| | | | | | | C | 0.000 | 150.839 | | 100.00 | 0.000 | 0.000 |
| L3 95.66-48.16 | 71.68 | 1.248 | 15 | 0.5000 | 180.497 | A | 0.000 | 180.497 | 180.497 | 100.00 | 0.000 | 0.000 |
| | | | | | | B | 0.000 | 180.497 | | 100.00 | 0.000 | 0.000 |
| | | | | | | C | 0.000 | 180.497 | | 100.00 | 0.000 | 0.000 |
| L4 48.16-1.50 | 24.34 | 1 | 12 | 0.5000 | 208.436 | A | 0.000 | 208.436 | 208.436 | 100.00 | 0.000 | 0.000 |
| | | | | | | B | 0.000 | 208.436 | | 100.00 | 0.000 | 0.000 |
| | | | | | | C | 0.000 | 208.436 | | 100.00 | 0.000 | 0.000 |

Tower Pressure - Service

$$G_H = 1.690$$

| Section Elevation | z | K _Z | q _z | A _G | F a c e | A _F | A _R | A _{leg} | Leg % | C _M A _A In Face ft ² | C _M A _A Out Face ft ² |
|----------------------|--------|----------------|----------------|-----------------|------------------|-----------------|-----------------|------------------|----------|--|---|
| ft | ft | | psf | ft ² | | ft ² | ft ² | ft ² | | | |
| L1 195.00-144.21 | 168.37 | 1.593 | 10 | 115.780 | A | 0.000 | 115.780 | 115.780 | 100.00 | 0.000 | 0.000 |
| | | | | | B | 0.000 | 115.780 | | 100.00 | 0.000 | 0.000 |
| | | | | | C | 0.000 | 115.780 | | 100.00 | 0.000 | 0.000 |
| L2 144.21-95.66 | 119.27 | 1.444 | 9 | 146.793 | A | 0.000 | 146.793 | 146.793 | 100.00 | 0.000 | 0.000 |
| | | | | | B | 0.000 | 146.793 | | 100.00 | 0.000 | 0.000 |
| | | | | | C | 0.000 | 146.793 | | 100.00 | 0.000 | 0.000 |
| L3 95.66-48.16 | 71.68 | 1.248 | 8 | 176.539 | A | 0.000 | 176.539 | 176.539 | 100.00 | 0.000 | 0.000 |
| | | | | | B | 0.000 | 176.539 | | 100.00 | 0.000 | 0.000 |
| | | | | | C | 0.000 | 176.539 | | 100.00 | 0.000 | 0.000 |
| L4 48.16-1.50 | 24.34 | 1 | 6 | 204.547 | A | 0.000 | 204.547 | 204.547 | 100.00 | 0.000 | 0.000 |
| | | | | | B | 0.000 | 204.547 | | 100.00 | 0.000 | 0.000 |
| | | | | | C | 0.000 | 204.547 | | 100.00 | 0.000 | 0.000 |

Tower Forces - No Ice - Wind Normal To Face

| Section Elevation | Add Weight | Self Weight | F a c e | e | C _F | R _R | D _F | D _R | A _E | F | w | Ctrl. Face |
|----------------------|---------------|----------------|------------------|---|----------------|----------------|----------------|----------------|-----------------|------|-------|---------------|
| ft | K | K | | | | | | | ft ² | K | plf | |
| L1 195.00-144.21 | 1.53 | 3.72 | A | 1 | 0.65 | 1 | 1 | 1 | 115.780 | 3.32 | 65.29 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 115.780 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 115.780 | | | |
| L2 144.21-95.66 | 1.82 | 7.63 | A | 1 | 0.65 | 1 | 1 | 1 | 146.793 | 3.81 | 78.41 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 146.793 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 146.793 | | | |
| L3 95.66-48.16 | 1.78 | 10.96 | A | 1 | 0.65 | 1 | 1 | 1 | 176.539 | 3.95 | 83.06 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 176.539 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 176.539 | | | |
| L4 48.16-1.50 | 1.57 | 14.57 | A | 1 | 0.65 | 1 | 1 | 1 | 204.547 | 3.73 | 79.95 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 204.547 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 204.547 | | | |

| | | | | |
|--|---------|---------------------------------|-------------|-------------------|
| RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991 | Job | 195' EEI Monopole | Page | 7 of 20 |
| | Project | 113 Brush Hill Road, Goshen, CT | Date | 13:12:30 04/30/08 |
| | Client | Site Acquisitions Inc. - AT&T | Designed by | Staff |

| Section Elevation | Add Weight | Self Weight | F a c e | e | C _F | R _R | D _F | D _R | A _E | F | w | Ctrl. Face |
|----------------------|---------------|----------------|------------------|---|----------------|----------------|----------------|----------------|-------------------|-------|-----|---------------|
| ft | K | K | | | | | | | ft ² | K | plf | |
| Sum Weight: | 6.69 | 36.88 | | | | | | OTM | 1363.75 kip-ft | 14.80 | | |

Tower Forces - No Ice - Wind 45 To Face

| Section Elevation | Add Weight | Self Weight | F a c e | e | C _F | R _R | D _F | D _R | A _E | F | w | Ctrl. Face |
|----------------------|---------------|----------------|------------------|---|----------------|----------------|----------------|----------------|-------------------|-------|-------|---------------|
| ft | K | K | | | | | | | ft ² | K | plf | |
| L1 195.00- 144.21 | 1.53 | 3.72 | A | 1 | 0.65 | 1 | 1 | 1 | 115.780 | 3.32 | 65.29 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 115.780 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 115.780 | | | |
| L2 144.21- 95.66 | 1.82 | 7.63 | A | 1 | 0.65 | 1 | 1 | 1 | 146.793 | 3.81 | 78.41 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 146.793 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 146.793 | | | |
| L3 95.66- 48.16 | 1.78 | 10.96 | A | 1 | 0.65 | 1 | 1 | 1 | 176.539 | 3.95 | 83.06 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 176.539 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 176.539 | | | |
| L4 48.16-1.50 | 1.57 | 14.57 | A | 1 | 0.65 | 1 | 1 | 1 | 204.547 | 3.73 | 79.95 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 204.547 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 204.547 | | | |
| Sum Weight: | 6.69 | 36.88 | | | | | | OTM | 1363.75 kip-ft | 14.80 | | |

Tower Forces - No Ice - Wind 60 To Face

| Section Elevation | Add Weight | Self Weight | F a c e | e | C _F | R _R | D _F | D _R | A _E | F | w | Ctrl. Face |
|----------------------|---------------|----------------|------------------|---|----------------|----------------|----------------|----------------|-------------------|-------|-------|---------------|
| ft | K | K | | | | | | | ft ² | K | plf | |
| L1 195.00- 144.21 | 1.53 | 3.72 | A | 1 | 0.65 | 1 | 1 | 1 | 115.780 | 3.32 | 65.29 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 115.780 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 115.780 | | | |
| L2 144.21- 95.66 | 1.82 | 7.63 | A | 1 | 0.65 | 1 | 1 | 1 | 146.793 | 3.81 | 78.41 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 146.793 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 146.793 | | | |
| L3 95.66- 48.16 | 1.78 | 10.96 | A | 1 | 0.65 | 1 | 1 | 1 | 176.539 | 3.95 | 83.06 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 176.539 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 176.539 | | | |
| L4 48.16-1.50 | 1.57 | 14.57 | A | 1 | 0.65 | 1 | 1 | 1 | 204.547 | 3.73 | 79.95 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 204.547 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 204.547 | | | |
| Sum Weight: | 6.69 | 36.88 | | | | | | OTM | 1363.75 kip-ft | 14.80 | | |

Tower Forces - No Ice - Wind 90 To Face

RISATower

URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: (860) 529-8882
FAX: (860) 529-3991

Job

195' EEI Monopole

Page

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Project

113 Brush Hill Road, Goshen, CT

Date

13:12:30 04/30/08

Client

Site Acquisitions Inc. - AT&T

Designed by

Staff

| Section Elevation | Add Weight | Self Weight | F a c e | e | C _F | R _R | D _F | D _R | A _E | F | w | Ctrl. Face |
|----------------------|---------------|----------------|------------------|---|----------------|----------------|----------------|----------------|-------------------|-------|-------|---------------|
| ft | K | K | | | | | | | ft ² | K | plf | |
| L1 195.00- 144.21 | 1.53 | 3.72 | A | 1 | 0.65 | 1 | 1 | 1 | 115.780 | 3.32 | 65.29 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 115.780 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 115.780 | | | |
| L2 144.21- 95.66 | 1.82 | 7.63 | A | 1 | 0.65 | 1 | 1 | 1 | 146.793 | 3.81 | 78.41 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 146.793 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 146.793 | | | |
| L3 95.66- 48.16 | 1.78 | 10.96 | A | 1 | 0.65 | 1 | 1 | 1 | 176.539 | 3.95 | 83.06 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 176.539 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 176.539 | | | |
| L4 48.16-1.50 | 1.57 | 14.57 | A | 1 | 0.65 | 1 | 1 | 1 | 204.547 | 3.73 | 79.95 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 204.547 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 204.547 | | | |
| Sum Weight: | 6.69 | 36.88 | | | | | | OTM | 1363.75 kip-ft | 14.80 | | |

Tower Forces - With Ice - Wind Normal To Face

| Section Elevation | Add Weight | Self Weight | F a c e | e | C _F | R _R | D _F | D _R | A _E | F | w | Ctrl. Face |
|----------------------|---------------|----------------|------------------|---|----------------|----------------|----------------|----------------|-------------------|-------|-------|---------------|
| ft | K | K | | | | | | | ft ² | K | plf | |
| L1 195.00- 144.21 | 1.53 | 4.59 | A | 1 | 0.65 | 1 | 1 | 1 | 120.013 | 2.58 | 50.76 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 120.013 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 120.013 | | | |
| L2 144.21- 95.66 | 1.82 | 8.74 | A | 1 | 0.65 | 1 | 1 | 1 | 150.839 | 2.93 | 60.43 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 150.839 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 150.839 | | | |
| L3 95.66- 48.16 | 1.78 | 12.28 | A | 1 | 0.65 | 1 | 1 | 1 | 180.497 | 3.03 | 63.69 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 180.497 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 180.497 | | | |
| L4 48.16-1.50 | 1.57 | 16.10 | A | 1 | 0.65 | 1 | 1 | 1 | 208.436 | 2.85 | 61.10 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 208.436 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 208.436 | | | |
| Sum Weight: | 6.69 | 41.71 | | | | | | OTM | 1053.12 kip-ft | 11.39 | | |

Tower Forces - With Ice - Wind 45 To Face

| Section Elevation | Add Weight | Self Weight | F a c e | e | C _F | R _R | D _F | D _R | A _E | F | w | Ctrl. Face |
|----------------------|---------------|----------------|------------------|---|----------------|----------------|----------------|----------------|-----------------|------|-------|---------------|
| ft | K | K | | | | | | | ft ² | K | plf | |
| L1 195.00- 144.21 | 1.53 | 4.59 | A | 1 | 0.65 | 1 | 1 | 1 | 120.013 | 2.58 | 50.76 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 120.013 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 120.013 | | | |
| L2 144.21- 95.66 | 1.82 | 8.74 | A | 1 | 0.65 | 1 | 1 | 1 | 150.839 | 2.93 | 60.43 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 150.839 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 150.839 | | | |
| L3 95.66- 48.16 | 1.78 | 12.28 | A | 1 | 0.65 | 1 | 1 | 1 | 180.497 | 3.03 | 63.69 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 180.497 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 180.497 | | | |

| | | | | |
|--|---------|---------------------------------|-------------|-------------------|
| RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991 | Job | 195' EEI Monopole | Page | 9 of 20 |
| | Project | 113 Brush Hill Road, Goshen, CT | Date | 13:12:30 04/30/08 |
| | Client | Site Acquisitions Inc. - AT&T | Designed by | Staff |

| Section Elevation | Add Weight | Self Weight | F a c e | e | C _F | R _R | D _F | D _R | A _E | F | w | Ctrl. Face |
|-------------------|------------|-------------|---------|---|----------------|----------------|----------------|----------------|-----------------|-------|-------|------------|
| ft | K | K | | | | | | | ft ² | K | plf | |
| L4 48.16-1.50 | 1.57 | 16.10 | A | 1 | 0.65 | 1 | 1 | 1 | 208.436 | 2.85 | 61.10 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 208.436 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 208.436 | | | |
| Sum Weight: | 6.69 | 41.71 | | | | | | OTM | 1053.12 kip-ft | 11.39 | | |

Tower Forces - With Ice - Wind 60 To Face

| Section Elevation | Add Weight | Self Weight | F a c e | e | C _F | R _R | D _F | D _R | A _E | F | w | Ctrl. Face |
|-------------------|------------|-------------|---------|---|----------------|----------------|----------------|----------------|-----------------|-------|-------|------------|
| ft | K | K | | | | | | | ft ² | K | plf | |
| L1 195.00-144.21 | 1.53 | 4.59 | A | 1 | 0.65 | 1 | 1 | 1 | 120.013 | 2.58 | 50.76 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 120.013 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 120.013 | | | |
| L2 144.21-95.66 | 1.82 | 8.74 | A | 1 | 0.65 | 1 | 1 | 1 | 150.839 | 2.93 | 60.43 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 150.839 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 150.839 | | | |
| L3 95.66-48.16 | 1.78 | 12.28 | A | 1 | 0.65 | 1 | 1 | 1 | 180.497 | 3.03 | 63.69 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 180.497 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 180.497 | | | |
| L4 48.16-1.50 | 1.57 | 16.10 | A | 1 | 0.65 | 1 | 1 | 1 | 208.436 | 2.85 | 61.10 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 208.436 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 208.436 | | | |
| Sum Weight: | 6.69 | 41.71 | | | | | | OTM | 1053.12 kip-ft | 11.39 | | |

Tower Forces - With Ice - Wind 90 To Face

| Section Elevation | Add Weight | Self Weight | F a c e | e | C _F | R _R | D _F | D _R | A _E | F | w | Ctrl. Face |
|-------------------|------------|-------------|---------|---|----------------|----------------|----------------|----------------|-----------------|-------|-------|------------|
| ft | K | K | | | | | | | ft ² | K | plf | |
| L1 195.00-144.21 | 1.53 | 4.59 | A | 1 | 0.65 | 1 | 1 | 1 | 120.013 | 2.58 | 50.76 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 120.013 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 120.013 | | | |
| L2 144.21-95.66 | 1.82 | 8.74 | A | 1 | 0.65 | 1 | 1 | 1 | 150.839 | 2.93 | 60.43 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 150.839 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 150.839 | | | |
| L3 95.66-48.16 | 1.78 | 12.28 | A | 1 | 0.65 | 1 | 1 | 1 | 180.497 | 3.03 | 63.69 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 180.497 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 180.497 | | | |
| L4 48.16-1.50 | 1.57 | 16.10 | A | 1 | 0.65 | 1 | 1 | 1 | 208.436 | 2.85 | 61.10 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 208.436 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 208.436 | | | |
| Sum Weight: | 6.69 | 41.71 | | | | | | OTM | 1053.12 kip-ft | 11.39 | | |

| | | | | |
|--|---------|---------------------------------|-------------|-------------------|
| RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991 | Job | 195' EEI Monopole | Page | 10 of 20 |
| | Project | 113 Brush Hill Road, Goshen, CT | Date | 13:12:30 04/30/08 |
| | Client | Site Acquisitions Inc. - AT&T | Designed by | Staff |

Tower Forces - Service - Wind Normal To Face

| Section Elevation | Add Weight | Self Weight | F a c e | e | C _F | R _R | D _F | D _R | A _E | F | w | Ctrl. Face |
|-------------------|------------|-------------|---------|---|----------------|----------------|----------------|----------------|-----------------|------|-------|------------|
| ft | K | K | | | | | | | ft ² | K | plf | |
| L1 195.00-144.21 | 1.53 | 3.72 | A | 1 | 0.65 | 1 | 1 | 1 | 115.780 | 1.30 | 25.50 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 115.780 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 115.780 | | | |
| L2 144.21-95.66 | 1.82 | 7.63 | A | 1 | 0.65 | 1 | 1 | 1 | 146.793 | 1.49 | 30.63 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 146.793 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 146.793 | | | |
| L3 95.66-48.16 | 1.78 | 10.96 | A | 1 | 0.65 | 1 | 1 | 1 | 176.539 | 1.54 | 32.45 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 176.539 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 176.539 | | | |
| L4 48.16-1.50 | 1.57 | 14.57 | A | 1 | 0.65 | 1 | 1 | 1 | 204.547 | 1.46 | 31.23 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 204.547 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 204.547 | | | |
| Sum Weight: | 6.69 | 36.88 | | | | | | OTM | 532.72 kip-ft | 5.78 | | |

Tower Forces - Service - Wind 45 To Face

| Section Elevation | Add Weight | Self Weight | F a c e | e | C _F | R _R | D _F | D _R | A _E | F | w | Ctrl. Face |
|-------------------|------------|-------------|---------|---|----------------|----------------|----------------|----------------|-----------------|------|-------|------------|
| ft | K | K | | | | | | | ft ² | K | plf | |
| L1 195.00-144.21 | 1.53 | 3.72 | A | 1 | 0.65 | 1 | 1 | 1 | 115.780 | 1.30 | 25.50 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 115.780 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 115.780 | | | |
| L2 144.21-95.66 | 1.82 | 7.63 | A | 1 | 0.65 | 1 | 1 | 1 | 146.793 | 1.49 | 30.63 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 146.793 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 146.793 | | | |
| L3 95.66-48.16 | 1.78 | 10.96 | A | 1 | 0.65 | 1 | 1 | 1 | 176.539 | 1.54 | 32.45 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 176.539 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 176.539 | | | |
| L4 48.16-1.50 | 1.57 | 14.57 | A | 1 | 0.65 | 1 | 1 | 1 | 204.547 | 1.46 | 31.23 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 204.547 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 204.547 | | | |
| Sum Weight: | 6.69 | 36.88 | | | | | | OTM | 532.72 kip-ft | 5.78 | | |

Tower Forces - Service - Wind 60 To Face

| Section Elevation | Add Weight | Self Weight | F a c e | e | C _F | R _R | D _F | D _R | A _E | F | w | Ctrl. Face |
|-------------------|------------|-------------|---------|---|----------------|----------------|----------------|----------------|-----------------|------|-------|------------|
| ft | K | K | | | | | | | ft ² | K | plf | |
| L1 195.00-144.21 | 1.53 | 3.72 | A | 1 | 0.65 | 1 | 1 | 1 | 115.780 | 1.30 | 25.50 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 115.780 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 115.780 | | | |
| L2 144.21-95.66 | 1.82 | 7.63 | A | 1 | 0.65 | 1 | 1 | 1 | 146.793 | 1.49 | 30.63 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 146.793 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 146.793 | | | |

| | | | | |
|--|---------|---------------------------------|-------------|-------------------|
| RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991 | Job | 195' EEI Monopole | Page | 11 of 20 |
| | Project | 113 Brush Hill Road, Goshen, CT | Date | 13:12:30 04/30/08 |
| | Client | Site Acquisitions Inc. - AT&T | Designed by | Staff |

| Section Elevation | Add Weight | Self Weight | F a c e | e | C _F | R _R | D _F | D _R | A _E | F | w | Ctrl. Face |
|----------------------|---------------|----------------|------------------|---|----------------|----------------|----------------|----------------|------------------|------|-------|---------------|
| ft | K | K | | | | | | | ft ² | K | plf | |
| L3 95.66-48.16 | 1.78 | 10.96 | A | 1 | 0.65 | 1 | 1 | 1 | 176.539 | 1.54 | 32.45 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 176.539 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 176.539 | | | |
| L4 48.16-1.50 | 1.57 | 14.57 | A | 1 | 0.65 | 1 | 1 | 1 | 204.547 | 1.46 | 31.23 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 204.547 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 204.547 | | | |
| Sum Weight: | 6.69 | 36.88 | | | | | | OTM | 532.72 kip-ft | 5.78 | | |

Tower Forces - Service - Wind 90 To Face

| Section Elevation | Add Weight | Self Weight | F a c e | e | C _F | R _R | D _F | D _R | A _E | F | w | Ctrl. Face |
|----------------------|---------------|----------------|------------------|---|----------------|----------------|----------------|----------------|------------------|------|-------|---------------|
| ft | K | K | | | | | | | ft ² | K | plf | |
| L1 195.00-144.21 | 1.53 | 3.72 | A | 1 | 0.65 | 1 | 1 | 1 | 115.780 | 1.30 | 25.50 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 115.780 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 115.780 | | | |
| L2 144.21-95.66 | 1.82 | 7.63 | A | 1 | 0.65 | 1 | 1 | 1 | 146.793 | 1.49 | 30.63 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 146.793 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 146.793 | | | |
| L3 95.66-48.16 | 1.78 | 10.96 | A | 1 | 0.65 | 1 | 1 | 1 | 176.539 | 1.54 | 32.45 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 176.539 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 176.539 | | | |
| L4 48.16-1.50 | 1.57 | 14.57 | A | 1 | 0.65 | 1 | 1 | 1 | 204.547 | 1.46 | 31.23 | C |
| | | | B | 1 | 0.65 | 1 | 1 | 1 | 204.547 | | | |
| | | | C | 1 | 0.65 | 1 | 1 | 1 | 204.547 | | | |
| Sum Weight: | 6.69 | 36.88 | | | | | | OTM | 532.72 kip-ft | 5.78 | | |

Force Totals

| Load Case | Vertical Forces | Sum of Forces X | Sum of Forces Z | Sum of Overturning Moments, M _x | Sum of Overturning Moments, M _z | Sum of Torques |
|--------------------------|--------------------|-----------------------|-----------------------|--|--|----------------|
| | K | K | K | kip-ft | kip-ft | kip-ft |
| Leg Weight | 36.88 | | | | | |
| Bracing Weight | 0.00 | | | | | |
| Total Member Self-Weight | 36.88 | | | -8.82 | 14.78 | |
| Total Weight | 50.61 | | | -8.82 | 14.78 | |
| Wind 0 deg - No Ice | | 0.00 | -24.77 | -3193.83 | 14.78 | -6.76 |
| Wind 30 deg - No Ice | | 12.44 | -21.45 | -2767.12 | -1586.78 | -7.93 |
| Wind 45 deg - No Ice | | 17.59 | -17.52 | -2260.97 | -2250.17 | -7.71 |
| Wind 60 deg - No Ice | | 21.54 | -12.39 | -1601.33 | -2759.20 | -6.97 |
| Wind 90 deg - No Ice | | 24.88 | 0.00 | -8.82 | -3188.34 | -4.14 |
| Wind 120 deg - No Ice | | 21.54 | 12.39 | 1583.68 | -2759.20 | -0.20 |
| Wind 135 deg - No Ice | | 17.59 | 17.52 | 2243.32 | -2250.17 | 1.85 |
| Wind 150 deg - No Ice | | 12.44 | 21.45 | 2749.48 | -1586.78 | 3.79 |
| Wind 180 deg - No Ice | | 0.00 | 24.77 | 3176.19 | 14.78 | 6.76 |
| Wind 210 deg - No Ice | | -12.44 | 21.45 | 2749.48 | 1616.35 | 7.93 |
| Wind 225 deg - No Ice | | -17.59 | 17.52 | 2243.32 | 2279.74 | 7.71 |

| | | | | |
|--|---------|---------------------------------|-------------|-------------------|
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| Load Case | Vertical Forces K | Sum of Forces X K | Sum of Forces Z K | Sum of Overturning Moments, M_x kip-ft | Sum of Overturning Moments, M_z kip-ft | Sum of Torques kip-ft |
|------------------------|----------------------|-------------------------|-------------------------|---|---|--------------------------|
| Wind 240 deg - No Ice | | -21.54 | 12.39 | 1583.68 | 2788.77 | 6.97 |
| Wind 270 deg - No Ice | | -24.88 | 0.00 | -8.82 | 3217.91 | 4.14 |
| Wind 300 deg - No Ice | | -21.54 | -12.39 | -1601.33 | 2788.77 | 0.20 |
| Wind 315 deg - No Ice | | -17.59 | -17.52 | -2260.97 | 2279.74 | -1.85 |
| Wind 330 deg - No Ice | | -12.44 | -21.45 | -2767.12 | 1616.35 | -3.79 |
| Member Ice | 4.83 | | | | | |
| Total Weight Ice | 59.16 | | | -12.38 | 20.86 | |
| Wind 0 deg - Ice | | 0.00 | -20.18 | -2672.98 | 20.86 | -6.30 |
| Wind 30 deg - Ice | | 10.13 | -17.48 | -2316.53 | -1316.56 | -7.39 |
| Wind 45 deg - Ice | | 14.33 | -14.27 | -1893.71 | -1870.54 | -7.19 |
| Wind 60 deg - Ice | | 17.55 | -10.09 | -1342.68 | -2295.62 | -6.50 |
| Wind 90 deg - Ice | | 20.26 | 0.00 | -12.38 | -2653.98 | -3.87 |
| Wind 120 deg - Ice | | 17.55 | 10.09 | 1317.93 | -2295.62 | -0.20 |
| Wind 135 deg - Ice | | 14.33 | 14.27 | 1868.95 | -1870.54 | 1.72 |
| Wind 150 deg - Ice | | 10.13 | 17.48 | 2291.77 | -1316.56 | 3.52 |
| Wind 180 deg - Ice | | 0.00 | 20.18 | 2648.23 | 20.86 | 6.30 |
| Wind 210 deg - Ice | | -10.13 | 17.48 | 2291.77 | 1358.27 | 7.39 |
| Wind 225 deg - Ice | | -14.33 | 14.27 | 1868.95 | 1912.25 | 7.19 |
| Wind 240 deg - Ice | | -17.55 | 10.09 | 1317.93 | 2337.33 | 6.50 |
| Wind 270 deg - Ice | | -20.26 | 0.00 | -12.38 | 2695.69 | 3.87 |
| Wind 300 deg - Ice | | -17.55 | -10.09 | -1342.68 | 2337.33 | 0.20 |
| Wind 315 deg - Ice | | -14.33 | -14.27 | -1893.71 | 1912.25 | -1.72 |
| Wind 330 deg - Ice | | -10.13 | -17.48 | -2316.53 | 1358.27 | -3.52 |
| Total Weight | 50.61 | | | -8.82 | 14.78 | |
| Wind 0 deg - Service | | 0.00 | -9.68 | -1252.97 | 14.78 | -2.64 |
| Wind 30 deg - Service | | 4.86 | -8.38 | -1086.28 | -610.83 | -3.10 |
| Wind 45 deg - Service | | 6.87 | -6.84 | -888.57 | -869.96 | -3.01 |
| Wind 60 deg - Service | | 8.42 | -4.84 | -630.90 | -1068.80 | -2.72 |
| Wind 90 deg - Service | | 9.72 | 0.00 | -8.82 | -1236.44 | -1.62 |
| Wind 120 deg - Service | | 8.42 | 4.84 | 613.25 | -1068.80 | -0.08 |
| Wind 135 deg - Service | | 6.87 | 6.84 | 870.92 | -869.96 | 0.72 |
| Wind 150 deg - Service | | 4.86 | 8.38 | 1068.64 | -610.83 | 1.48 |
| Wind 180 deg - Service | | 0.00 | 9.68 | 1235.32 | 14.78 | 2.64 |
| Wind 210 deg - Service | | -4.86 | 8.38 | 1068.64 | 640.40 | 3.10 |
| Wind 225 deg - Service | | -6.87 | 6.84 | 870.92 | 899.53 | 3.01 |
| Wind 240 deg - Service | | -8.42 | 4.84 | 613.25 | 1098.37 | 2.72 |
| Wind 270 deg - Service | | -9.72 | 0.00 | -8.82 | 1266.01 | 1.62 |
| Wind 300 deg - Service | | -8.42 | -4.84 | -630.90 | 1098.37 | 0.08 |
| Wind 315 deg - Service | | -6.87 | -6.84 | -888.57 | 899.53 | -0.72 |
| Wind 330 deg - Service | | -4.86 | -8.38 | -1086.28 | 640.40 | -1.48 |

Load Combinations

| Comb. No. | Description |
|-----------|----------------------------|
| 1 | Dead Only |
| 2 | Dead+Wind 0 deg - No Ice |
| 3 | Dead+Wind 30 deg - No Ice |
| 4 | Dead+Wind 45 deg - No Ice |
| 5 | Dead+Wind 60 deg - No Ice |
| 6 | Dead+Wind 90 deg - No Ice |
| 7 | Dead+Wind 120 deg - No Ice |
| 8 | Dead+Wind 135 deg - No Ice |
| 9 | Dead+Wind 150 deg - No Ice |
| 10 | Dead+Wind 180 deg - No Ice |
| 11 | Dead+Wind 210 deg - No Ice |

| | | | | |
|--|---------|---------------------------------|-------------|-------------------|
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| Comb. No. | Description |
|-----------|-----------------------------|
| 12 | Dead+Wind 225 deg - No Ice |
| 13 | Dead+Wind 240 deg - No Ice |
| 14 | Dead+Wind 270 deg - No Ice |
| 15 | Dead+Wind 300 deg - No Ice |
| 16 | Dead+Wind 315 deg - No Ice |
| 17 | Dead+Wind 330 deg - No Ice |
| 18 | Dead+Ice+Temp |
| 19 | Dead+Wind 0 deg+Ice+Temp |
| 20 | Dead+Wind 30 deg+Ice+Temp |
| 21 | Dead+Wind 45 deg+Ice+Temp |
| 22 | Dead+Wind 60 deg+Ice+Temp |
| 23 | Dead+Wind 90 deg+Ice+Temp |
| 24 | Dead+Wind 120 deg+Ice+Temp |
| 25 | Dead+Wind 135 deg+Ice+Temp |
| 26 | Dead+Wind 150 deg+Ice+Temp |
| 27 | Dead+Wind 180 deg+Ice+Temp |
| 28 | Dead+Wind 210 deg+Ice+Temp |
| 29 | Dead+Wind 225 deg+Ice+Temp |
| 30 | Dead+Wind 240 deg+Ice+Temp |
| 31 | Dead+Wind 270 deg+Ice+Temp |
| 32 | Dead+Wind 300 deg+Ice+Temp |
| 33 | Dead+Wind 315 deg+Ice+Temp |
| 34 | Dead+Wind 330 deg+Ice+Temp |
| 35 | Dead+Wind 0 deg - Service |
| 36 | Dead+Wind 30 deg - Service |
| 37 | Dead+Wind 45 deg - Service |
| 38 | Dead+Wind 60 deg - Service |
| 39 | Dead+Wind 90 deg - Service |
| 40 | Dead+Wind 120 deg - Service |
| 41 | Dead+Wind 135 deg - Service |
| 42 | Dead+Wind 150 deg - Service |
| 43 | Dead+Wind 180 deg - Service |
| 44 | Dead+Wind 210 deg - Service |
| 45 | Dead+Wind 225 deg - Service |
| 46 | Dead+Wind 240 deg - Service |
| 47 | Dead+Wind 270 deg - Service |
| 48 | Dead+Wind 300 deg - Service |
| 49 | Dead+Wind 315 deg - Service |
| 50 | Dead+Wind 330 deg - Service |

Maximum Member Forces

| Section No. | Elevation ft | Component Type | Condition | Gov. Load Comb. | Force K | Major Axis Moment kip-ft | Minor Axis Moment kip-ft |
|-------------|-----------------|----------------|------------------|-----------------|---------|--------------------------|--------------------------|
| L1 | 195 - 144.21 | Pole | Max Tension | 47 | 0.00 | -0.00 | -0.00 |
| | | | Max. Compression | 18 | -16.03 | 21.17 | 12.57 |
| | | | Max. Mx | 14 | -10.54 | 481.03 | 8.67 |
| | | | Max. My | 2 | -10.56 | 14.52 | 472.18 |
| | | | Max. Vy | 14 | -13.79 | 481.03 | 8.67 |
| | | | Max. Vx | 2 | -13.68 | 14.52 | 472.18 |
| | | | Max. Torque | 3 | | | 8.27 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| L2 | 144.21 - 95.663 | Pole | Max. Compression | 18 | -25.93 | 22.06 | 13.10 |
| | | | Max. Mx | 14 | -19.59 | 1225.91 | 9.06 |
| | | | Max. My | 2 | -19.60 | 15.17 | 1211.66 |
| | | | Max. Vy | 14 | -17.60 | 1225.91 | 9.06 |
| | | | Max. Vx | 2 | -17.49 | 15.17 | 1211.66 |
| | | | | | | | |

| | | | | |
|--|---------|---------------------------------|-------------|-------------------|
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| Section No. | Elevation ft | Component Type | Condition | Gov. Load Comb. | Force K | Major Axis Moment kip-ft | Minor Axis Moment kip-ft |
|-------------|-----------------|----------------|------------------|-----------------|---------|--------------------------|--------------------------|
| L3 | 95.663 - 48.163 | Pole | Max. Torque | 3 | | | 8.25 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 18 | -39.59 | 22.64 | 13.45 |
| | | | Max. Mx | 14 | -32.31 | 2152.83 | 9.30 |
| | | | Max. My | 2 | -32.32 | 15.57 | 2133.21 |
| | | | Max. Vy | 14 | -21.32 | 2152.83 | 9.30 |
| | | | Max. Vx | 2 | -21.21 | 15.57 | 2133.21 |
| | | | Max. Torque | 3 | | | 8.23 |
| | | | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 18 | -59.16 | 23.61 | 14.01 |
| L4 | 48.163 - 1.5 | Pole | Max. Mx | 14 | -50.60 | 3368.83 | 9.63 |
| | | | Max. My | 2 | -50.60 | 16.15 | 3343.35 |
| | | | Max. Vy | 14 | -24.90 | 3368.83 | 9.63 |
| | | | Max. Vx | 2 | -24.80 | 16.15 | 3343.35 |
| | | | Max. Torque | 3 | | | 8.84 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Maximum Reactions

| Location | Condition | Gov. Load Comb. | Vertical K | Horizontal, X K | Horizontal, Z K |
|----------|---------------------|-----------------|------------|-----------------|-----------------|
| Pole | Max. Vert | 31 | 59.16 | 20.26 | 0.00 |
| | Max. H _x | 14 | 50.61 | 24.88 | 0.00 |
| | Max. H _z | 2 | 50.61 | 0.00 | 24.77 |
| | Max. M _x | 2 | 3343.35 | 0.00 | 24.77 |
| | Max. M _z | 6 | 3336.61 | -24.88 | 0.00 |
| | Max. Torsion | 3 | 8.83 | -12.44 | 21.45 |
| | Min. Vert | 1 | 50.61 | 0.00 | 0.00 |
| | Min. H _x | 6 | 50.61 | -24.88 | 0.00 |
| | Min. H _z | 10 | 50.61 | 0.00 | -24.77 |
| | Min. M _x | 10 | -3324.12 | 0.00 | -24.77 |
| | Min. M _z | 14 | -3368.83 | 24.88 | 0.00 |
| | Min. Torsion | 11 | -8.83 | 12.44 | -21.45 |
| | | | | | |
| | | | | | |

Tower Mast Reaction Summary

| Load Combination | Vertical K | Shear _x K | Shear _z K | Overturning Moment, M _x kip-ft | Overturning Moment, M _z kip-ft | Torque kip-ft |
|----------------------------|------------|----------------------|----------------------|---|---|---------------|
| Dead Only | 50.61 | -0.00 | -0.00 | -9.67 | 16.20 | -0.00 |
| Dead+Wind 0 deg - No Ice | 50.61 | -0.00 | -24.77 | -3343.35 | 16.14 | -7.55 |
| Dead+Wind 30 deg - No Ice | 50.61 | 12.44 | -21.45 | -2896.72 | -1660.24 | -8.83 |
| Dead+Wind 45 deg - No Ice | 50.61 | 17.59 | -17.52 | -2366.93 | -2354.61 | -8.59 |
| Dead+Wind 60 deg - No Ice | 50.61 | 21.54 | -12.39 | -1676.49 | -2887.42 | -7.75 |
| Dead+Wind 90 deg - No Ice | 50.61 | 24.88 | -0.00 | -9.63 | -3336.61 | -4.59 |
| Dead+Wind 120 deg - No Ice | 50.61 | 21.54 | 12.39 | 1657.23 | -2887.44 | -0.20 |
| Dead+Wind 135 deg - No Ice | 50.61 | 17.59 | 17.52 | 2347.68 | -2354.63 | 2.09 |
| Dead+Wind 150 deg - No Ice | 50.61 | 12.44 | 21.45 | 2877.48 | -1660.25 | 4.24 |
| Dead+Wind 180 deg - No Ice | 50.61 | -0.00 | 24.77 | 3324.12 | 16.15 | 7.55 |
| Dead+Wind 210 deg - No Ice | 50.61 | -12.44 | 21.45 | 2877.45 | 1692.53 | 8.83 |
| Dead+Wind 225 deg - No Ice | 50.61 | -17.59 | 17.52 | 2347.65 | 2386.89 | 8.58 |
| Dead+Wind 240 deg - No Ice | 50.61 | -21.54 | 12.39 | 1657.21 | 2919.68 | 7.75 |

| | | | | |
|--|---------|---------------------------------|-------------|-------------------|
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| Load Combination | Vertical K | Shear _x K | Shear _y K | Overturning Moment, M _x kip-ft | Overturning Moment, M _y kip-ft | Torque kip-ft |
|-----------------------------|---------------|-------------------------|-------------------------|---|---|------------------|
| Dead+Wind 270 deg - No Ice | 50.61 | -24.88 | -0.00 | -9.63 | 3368.83 | 4.59 |
| Dead+Wind 300 deg - No Ice | 50.61 | -21.54 | -12.39 | -1676.46 | 2919.67 | 0.20 |
| Dead+Wind 315 deg - No Ice | 50.61 | -17.59 | -17.52 | -2366.90 | 2386.87 | -2.09 |
| Dead+Wind 330 deg - No Ice | 50.61 | -12.44 | -21.45 | -2896.69 | 1692.51 | -4.24 |
| Dead+Ice+Temp | 59.16 | -0.00 | -0.00 | -14.01 | 23.61 | -0.00 |
| Dead+Wind 0 deg+Ice+Temp | 59.16 | -0.00 | -20.18 | -2842.26 | 23.54 | -7.33 |
| Dead+Wind 30 deg+Ice+Temp | 59.16 | 10.13 | -17.48 | -2463.35 | -1398.21 | -8.58 |
| Dead+Wind 45 deg+Ice+Temp | 59.16 | 14.33 | -14.27 | -2013.88 | -1987.12 | -8.34 |
| Dead+Wind 60 deg+Ice+Temp | 59.16 | 17.55 | -10.09 | -1428.12 | -2439.01 | -7.53 |
| Dead+Wind 90 deg+Ice+Temp | 59.16 | 20.26 | -0.00 | -13.97 | -2819.96 | -4.46 |
| Dead+Wind 120 deg+Ice+Temp | 59.16 | 17.55 | 10.09 | 1400.19 | -2439.02 | -0.20 |
| Dead+Wind 135 deg+Ice+Temp | 59.16 | 14.33 | 14.27 | 1985.96 | -1987.13 | 2.03 |
| Dead+Wind 150 deg+Ice+Temp | 59.16 | 10.13 | 17.48 | 2435.44 | -1398.22 | 4.12 |
| Dead+Wind 180 deg+Ice+Temp | 59.16 | -0.00 | 20.18 | 2814.35 | 23.55 | 7.33 |
| Dead+Wind 210 deg+Ice+Temp | 59.16 | -10.13 | 17.48 | 2435.41 | 1445.30 | 8.58 |
| Dead+Wind 225 deg+Ice+Temp | 59.16 | -14.33 | 14.27 | 1985.93 | 2034.19 | 8.34 |
| Dead+Wind 240 deg+Ice+Temp | 59.16 | -17.55 | 10.09 | 1400.17 | 2486.06 | 7.53 |
| Dead+Wind 270 deg+Ice+Temp | 59.16 | -20.26 | -0.00 | -13.97 | 2866.98 | 4.46 |
| Dead+Wind 300 deg+Ice+Temp | 59.16 | -17.55 | -10.09 | -1428.09 | 2486.04 | 0.20 |
| Dead+Wind 315 deg+Ice+Temp | 59.16 | -14.33 | -14.27 | -2013.85 | 2034.17 | -2.03 |
| Dead+Wind 330 deg+Ice+Temp | 59.16 | -10.13 | -17.48 | -2463.32 | 1445.28 | -4.11 |
| Dead+Wind 0 deg - Service | 50.61 | -0.00 | -9.68 | -1313.36 | 16.24 | -2.98 |
| Dead+Wind 30 deg - Service | 50.61 | 4.86 | -8.38 | -1138.71 | -639.33 | -3.48 |
| Dead+Wind 45 deg - Service | 50.61 | 6.87 | -6.84 | -931.53 | -910.87 | -3.39 |
| Dead+Wind 60 deg - Service | 50.61 | 8.42 | -4.84 | -661.53 | -1119.23 | -3.06 |
| Dead+Wind 90 deg - Service | 50.61 | 9.72 | -0.00 | -9.69 | -1294.88 | -1.81 |
| Dead+Wind 120 deg - Service | 50.61 | 8.42 | 4.84 | 642.15 | -1119.24 | -0.08 |
| Dead+Wind 135 deg - Service | 50.61 | 6.87 | 6.84 | 912.15 | -910.87 | 0.82 |
| Dead+Wind 150 deg - Service | 50.61 | 4.86 | 8.38 | 1119.34 | -639.33 | 1.67 |
| Dead+Wind 180 deg - Service | 50.61 | -0.00 | 9.68 | 1293.98 | 16.24 | 2.98 |
| Dead+Wind 210 deg - Service | 50.61 | -4.86 | 8.38 | 1119.33 | 671.80 | 3.48 |
| Dead+Wind 225 deg - Service | 50.61 | -6.87 | 6.84 | 912.15 | 943.34 | 3.38 |
| Dead+Wind 240 deg - Service | 50.61 | -8.42 | 4.84 | 642.15 | 1151.70 | 3.06 |
| Dead+Wind 270 deg - Service | 50.61 | -9.72 | -0.00 | -9.69 | 1327.35 | 1.81 |
| Dead+Wind 300 deg - Service | 50.61 | -8.42 | -4.84 | -661.53 | 1151.70 | 0.08 |
| Dead+Wind 315 deg - Service | 50.61 | -6.87 | -6.84 | -931.53 | 943.34 | -0.82 |
| Dead+Wind 330 deg - Service | 50.61 | -4.86 | -8.38 | -1138.71 | 671.80 | -1.67 |

Solution Summary

| Load Comb. | Sum of Applied Forces | | | Sum of Reactions | | | % Error |
|------------|-----------------------|---------|---------|------------------|---------|---------|---------|
| | PX K | PY K | PZ K | PX K | PY K | PZ K | |
| 1 | 0.00 | -50.61 | 0.00 | 0.00 | 50.61 | 0.00 | 0.000% |
| 2 | 0.00 | -50.61 | -24.77 | 0.00 | 50.61 | 24.77 | 0.000% |
| 3 | 12.44 | -50.61 | -21.45 | -12.44 | 50.61 | 21.45 | 0.000% |
| 4 | 17.59 | -50.61 | -17.52 | -17.59 | 50.61 | 17.52 | 0.000% |
| 5 | 21.54 | -50.61 | -12.39 | -21.54 | 50.61 | 12.39 | 0.000% |
| 6 | 24.88 | -50.61 | 0.00 | -24.88 | 50.61 | 0.00 | 0.000% |
| 7 | 21.54 | -50.61 | 12.39 | -21.54 | 50.61 | -12.39 | 0.000% |
| 8 | 17.59 | -50.61 | 17.52 | -17.59 | 50.61 | -17.52 | 0.000% |
| 9 | 12.44 | -50.61 | 21.45 | -12.44 | 50.61 | -21.45 | 0.000% |
| 10 | 0.00 | -50.61 | 24.77 | 0.00 | 50.61 | -24.77 | 0.000% |
| 11 | -12.44 | -50.61 | 21.45 | 12.44 | 50.61 | -21.45 | 0.000% |
| 12 | -17.59 | -50.61 | 17.52 | 17.59 | 50.61 | -17.52 | 0.000% |
| 13 | -21.54 | -50.61 | 12.39 | 21.54 | 50.61 | -12.39 | 0.000% |
| 14 | -24.88 | -50.61 | 0.00 | 24.88 | 50.61 | 0.00 | 0.000% |
| 15 | -21.54 | -50.61 | -12.39 | 21.54 | 50.61 | 12.39 | 0.000% |

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| Load Comb. | Sum of Applied Forces | | | Sum of Reactions | | | % Error |
|------------|-----------------------|---------|---------|------------------|---------|---------|---------|
| | PX K | PY K | PZ K | PX K | PY K | PZ K | |
| 16 | -17.59 | -50.61 | -17.52 | 17.59 | 50.61 | 17.52 | 0.000% |
| 17 | -12.44 | -50.61 | -21.45 | 12.44 | 50.61 | 21.45 | 0.000% |
| 18 | 0.00 | -59.16 | 0.00 | 0.00 | 59.16 | 0.00 | 0.000% |
| 19 | 0.00 | -59.16 | -20.18 | 0.00 | 59.16 | 20.18 | 0.000% |
| 20 | 10.13 | -59.16 | -17.48 | -10.13 | 59.16 | 17.48 | 0.000% |
| 21 | 14.33 | -59.16 | -14.27 | -14.33 | 59.16 | 14.27 | 0.000% |
| 22 | 17.55 | -59.16 | -10.09 | -17.55 | 59.16 | 10.09 | 0.000% |
| 23 | 20.26 | -59.16 | 0.00 | -20.26 | 59.16 | 0.00 | 0.000% |
| 24 | 17.55 | -59.16 | 10.09 | -17.55 | 59.16 | -10.09 | 0.000% |
| 25 | 14.33 | -59.16 | 14.27 | -14.33 | 59.16 | -14.27 | 0.000% |
| 26 | 10.13 | -59.16 | 17.48 | -10.13 | 59.16 | -17.48 | 0.000% |
| 27 | 0.00 | -59.16 | 20.18 | 0.00 | 59.16 | -20.18 | 0.000% |
| 28 | -10.13 | -59.16 | 17.48 | 10.13 | 59.16 | -17.48 | 0.000% |
| 29 | -14.33 | -59.16 | 14.27 | 14.33 | 59.16 | -14.27 | 0.000% |
| 30 | -17.55 | -59.16 | 10.09 | 17.55 | 59.16 | -10.09 | 0.000% |
| 31 | -20.26 | -59.16 | 0.00 | 20.26 | 59.16 | 0.00 | 0.000% |
| 32 | -17.55 | -59.16 | -10.09 | 17.55 | 59.16 | 10.09 | 0.000% |
| 33 | -14.33 | -59.16 | -14.27 | 14.33 | 59.16 | 14.27 | 0.000% |
| 34 | -10.13 | -59.16 | -17.48 | 10.13 | 59.16 | 17.48 | 0.000% |
| 35 | 0.00 | -50.61 | -9.68 | 0.00 | 50.61 | 9.68 | 0.000% |
| 36 | 4.86 | -50.61 | -8.38 | -4.86 | 50.61 | 8.38 | 0.000% |
| 37 | 6.87 | -50.61 | -6.84 | -6.87 | 50.61 | 6.84 | 0.000% |
| 38 | 8.42 | -50.61 | -4.84 | -8.42 | 50.61 | 4.84 | 0.000% |
| 39 | 9.72 | -50.61 | 0.00 | -9.72 | 50.61 | 0.00 | 0.000% |
| 40 | 8.42 | -50.61 | 4.84 | -8.42 | 50.61 | -4.84 | 0.000% |
| 41 | 6.87 | -50.61 | 6.84 | -6.87 | 50.61 | -6.84 | 0.000% |
| 42 | 4.86 | -50.61 | 8.38 | -4.86 | 50.61 | -8.38 | 0.000% |
| 43 | 0.00 | -50.61 | 9.68 | 0.00 | 50.61 | -9.68 | 0.000% |
| 44 | -4.86 | -50.61 | 8.38 | 4.86 | 50.61 | -8.38 | 0.000% |
| 45 | -6.87 | -50.61 | 6.84 | 6.87 | 50.61 | -6.84 | 0.000% |
| 46 | -8.42 | -50.61 | 4.84 | 8.42 | 50.61 | -4.84 | 0.000% |
| 47 | -9.72 | -50.61 | 0.00 | 9.72 | 50.61 | 0.00 | 0.000% |
| 48 | -8.42 | -50.61 | -4.84 | 8.42 | 50.61 | 4.84 | 0.000% |
| 49 | -6.87 | -50.61 | -6.84 | 6.87 | 50.61 | 6.84 | 0.000% |
| 50 | -4.86 | -50.61 | -8.38 | 4.86 | 50.61 | 8.38 | 0.000% |

Non-Linear Convergence Results

| Load Combination | Converged? | Number of Cycles | Displacement Tolerance | Force Tolerance |
|------------------|------------|------------------|------------------------|-----------------|
| 1 | Yes | 4 | 0.00000001 | 0.00000001 |
| 2 | Yes | 5 | 0.00000001 | 0.00028400 |
| 3 | Yes | 5 | 0.00000001 | 0.00090989 |
| 4 | Yes | 6 | 0.00000001 | 0.00006445 |
| 5 | Yes | 6 | 0.00000001 | 0.00006535 |
| 6 | Yes | 5 | 0.00000001 | 0.00017083 |
| 7 | Yes | 6 | 0.00000001 | 0.00005443 |
| 8 | Yes | 6 | 0.00000001 | 0.00006095 |
| 9 | Yes | 5 | 0.00000001 | 0.00093735 |
| 10 | Yes | 5 | 0.00000001 | 0.00028096 |
| 11 | Yes | 6 | 0.00000001 | 0.00006752 |
| 12 | Yes | 6 | 0.00000001 | 0.00006514 |
| 13 | Yes | 5 | 0.00000001 | 0.00093627 |
| 14 | Yes | 5 | 0.00000001 | 0.00017388 |
| 15 | Yes | 6 | 0.00000001 | 0.00005845 |
| 16 | Yes | 6 | 0.00000001 | 0.00006452 |

| | | | | |
|--|---------|---------------------------------|-------------|-------------------|
| RISATower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991 | Job | 195' EEI Monopole | Page | 17 of 20 |
| | Project | 113 Brush Hill Road, Goshen, CT | Date | 13:12:30 04/30/08 |
| | Client | Site Acquisitions Inc. - AT&T | Designed by | Staff |

| | | | | |
|----|-----|---|------------|------------|
| 17 | Yes | 6 | 0.00000001 | 0.00006295 |
| 18 | Yes | 4 | 0.00000001 | 0.00016352 |
| 19 | Yes | 5 | 0.00000001 | 0.00073819 |
| 20 | Yes | 6 | 0.00000001 | 0.00012872 |
| 21 | Yes | 6 | 0.00000001 | 0.00016518 |
| 22 | Yes | 6 | 0.00000001 | 0.00016165 |
| 23 | Yes | 5 | 0.00000001 | 0.00057999 |
| 24 | Yes | 6 | 0.00000001 | 0.00013614 |
| 25 | Yes | 6 | 0.00000001 | 0.00015479 |
| 26 | Yes | 6 | 0.00000001 | 0.00012896 |
| 27 | Yes | 5 | 0.00000001 | 0.00072229 |
| 28 | Yes | 6 | 0.00000001 | 0.00016835 |
| 29 | Yes | 6 | 0.00000001 | 0.00016881 |
| 30 | Yes | 6 | 0.00000001 | 0.00013296 |
| 31 | Yes | 5 | 0.00000001 | 0.00060066 |
| 32 | Yes | 6 | 0.00000001 | 0.00015181 |
| 33 | Yes | 6 | 0.00000001 | 0.00017059 |
| 34 | Yes | 6 | 0.00000001 | 0.00016138 |
| 35 | Yes | 4 | 0.00000001 | 0.00098990 |
| 36 | Yes | 5 | 0.00000001 | 0.00007402 |
| 37 | Yes | 5 | 0.00000001 | 0.00011288 |
| 38 | Yes | 5 | 0.00000001 | 0.00012022 |
| 39 | Yes | 4 | 0.00000001 | 0.00058192 |
| 40 | Yes | 5 | 0.00000001 | 0.00007961 |
| 41 | Yes | 5 | 0.00000001 | 0.00009350 |
| 42 | Yes | 5 | 0.00000001 | 0.00006985 |
| 43 | Yes | 4 | 0.00000001 | 0.00095020 |
| 44 | Yes | 5 | 0.00000001 | 0.00012994 |
| 45 | Yes | 5 | 0.00000001 | 0.00011719 |
| 46 | Yes | 5 | 0.00000001 | 0.00007680 |
| 47 | Yes | 4 | 0.00000001 | 0.00062320 |
| 48 | Yes | 5 | 0.00000001 | 0.00009965 |
| 49 | Yes | 5 | 0.00000001 | 0.00011384 |
| 50 | Yes | 5 | 0.00000001 | 0.00011579 |

Maximum Tower Deflections - Service Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|-------------|------------------|---------------------------|-----------------------|-----------|------------|
| L1 | 195 - 144.21 | 47.646 | 48 | 2.3552 | 0.0382 |
| L2 | 148.793 - 95.663 | 26.725 | 48 | 1.8262 | 0.0142 |
| L3 | 101.333 - 48.163 | 11.737 | 48 | 1.1535 | 0.0060 |
| L4 | 53.83 - 1.5 | 3.121 | 48 | 0.5536 | 0.0023 |

Critical Deflections and Radius of Curvature - Service Wind

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|-----------------|-----------------------------|-----------------------|------------------|-----------|------------|------------------------------|
| 202.50 | Lightning Rod 1"x7" | 48 | 47.646 | 2.3552 | 0.0382 | 29714 |
| 197.50 | 50"x3" Pipe Mount | 48 | 47.646 | 2.3552 | 0.0382 | 29714 |
| 195.00 | (4) 48000 w/Mount Pipe | 48 | 47.646 | 2.3552 | 0.0382 | 29714 |
| 185.00 | LPA-80080/6CF w/ Mount Pipe | 48 | 42.844 | 2.2466 | 0.0322 | 14857 |
| 175.00 | (2) 7770.00 w/ mount pipe | 48 | 38.122 | 2.1363 | 0.0264 | 7427 |

| | | | |
|--|---------|---------------------------------|---------------------------|
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| Elevation | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|-----------|--------------|-----------------|---------------|--------|---------|------------------------|
| ft | | | | | | |
| 50.00 | GPS Antenna | 48 | 2.711 | 0.5306 | 0.0022 | 4244 |

Maximum Tower Deflections - Design Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|-------------|------------------|---------------------|-----------------|--------|---------|
| L1 | 195 - 144.21 | 118.891 | 14 | 5.7630 | 0.0972 |
| L2 | 148.793 - 95.663 | 67.267 | 14 | 4.5680 | 0.0360 |
| L3 | 101.333 - 48.163 | 29.658 | 14 | 2.9080 | 0.0153 |
| L4 | 53.83 - 1.5 | 7.904 | 14 | 1.4009 | 0.0058 |

Critical Deflections and Radius of Curvature - Design Wind

| Elevation | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|-----------|-----------------------------|-----------------|---------------|--------|---------|------------------------|
| ft | | | | | | |
| 202.50 | Lightning Rod 1"x7" | 14 | 118.891 | 5.7630 | 0.0972 | 12794 |
| 197.50 | 5'0"x3" Pipe Mount | 14 | 118.891 | 5.7630 | 0.0972 | 12794 |
| 195.00 | (4) 48000 w/Mount Pipe | 14 | 118.891 | 5.7630 | 0.0972 | 12794 |
| 185.00 | LPA-80080/6CF w/ Mount Pipe | 14 | 107.075 | 5.5271 | 0.0819 | 6396 |
| 175.00 | (2) 7770.00 w/ mount pipe | 14 | 95.449 | 5.2845 | 0.0671 | 3196 |
| 50.00 | GPS Antenna | 14 | 6.867 | 1.3120 | 0.0053 | 1686 |

Compression Checks

Pole Design Data

| Section No. | Elevation ft | Size | L ft | L _a ft | Kl/r | F _a ksi | A in ² | Actual P K | Allow. P _a K | Ratio P/P _a |
|-------------|---------------------|------------------------|-------|-------------------|------|--------------------|-------------------|------------|-------------------------|------------------------|
| L1 | 195 - 144.21 (1) | TP32.21x22.5x0.25 | 50.79 | 0.00 | 0.0 | 39.000 | 24.6650 | -10.54 | 961.94 | 0.011 |
| L2 | 144.21 - 95.663 (2) | TP40.87x30.8338x0.375 | 53.13 | 0.00 | 0.0 | 39.000 | 46.9244 | -19.59 | 1830.05 | 0.011 |
| L3 | 95.663 - 48.163 (3) | TP49.08x39.0489x0.4375 | 53.17 | 0.00 | 0.0 | 39.000 | 66.0616 | -32.31 | 2576.40 | 0.013 |
| L4 | 48.163 - 1.5 (4) | TP57x47.1359x0.5 | 52.33 | 0.00 | 0.0 | 39.000 | 89.6655 | -50.60 | 3496.95 | 0.014 |

Pole Bending Design Data

Staff

| Section No. | Elevation | Size | Actual M_x kip-ft | Actual f_{bx} ksi | Allow. F_{bx} ksi | Ratio $\frac{f_{bx}}{F_{bx}}$ | Actual M_y kip-ft | Actual f_{by} ksi | Allow. F_{by} ksi | Ratio $\frac{f_{by}}{F_{by}}$ |
|-------------|------------------------|------------------------|---------------------------|---------------------------|---------------------------|----------------------------------|---------------------------|---------------------------|---------------------------|----------------------------------|
| L1 | 195 - 144.21 (1) | TP32.21x22.5x0.25 | 482.74 | 30.625 | 39.000 | 0.785 | 0.00 | 0.000 | 39.000 | 0.000 |
| L2 | 144.21 - 95.663 (2) | TP40.87x30.8338x0.375 | 1226.39 | 32.291 | 39.000 | 0.828 | 0.00 | 0.000 | 39.000 | 0.000 |
| L3 | 95.663 - 48.163 (3) | TP49.08x39.0489x0.4375 | 2152.85 | 33.357 | 39.000 | 0.855 | 0.00 | 0.000 | 39.000 | 0.000 |
| L4 | 48.163 - 1.5 (4) | TP57x47.1359x0.5 | 3368.84 | 32.370 | 39.000 | 0.830 | 0.00 | 0.000 | 39.000 | 0.000 |

Pole Shear Design Data

| Section No. | Elevation | Size | Actual V K | Actual f_v ksi | Allow. F_v ksi | Ratio $\frac{f_v}{F_v}$ | Actual T $kip-ft$ | Actual f_w ksi | Allow. F_w ksi | Ratio $\frac{f_w}{F_w}$ |
|-------------|------------------------|------------------------|----------------------|--------------------------|--------------------------|----------------------------|---------------------------|--------------------------|--------------------------|----------------------------|
| L1 | 195 - 144.21 (1) | TP32.21x22.5x0.25 | 13.77 | 0.558 | 26.000 | 0.043 | 0.21 | 0.006 | 26.000 | 0.000 |
| L2 | 144.21 - 95.663 (2) | TP40.87x30.8338x0.375 | 17.57 | 0.374 | 26.000 | 0.029 | 0.20 | 0.003 | 26.000 | 0.000 |
| L3 | 95.663 - 48.163 (3) | TP49.08x39.0489x0.4375 | 21.32 | 0.323 | 26.000 | 0.025 | 4.28 | 0.032 | 26.000 | 0.001 |
| L4 | 48.163 - 1.5 (4) | TP57x47.1359x0.5 | 24.90 | 0.278 | 26.000 | 0.021 | 4.59 | 0.022 | 26.000 | 0.001 |

Pole Interaction Design Data

| Section No. | Elevation | Ratio P | Ratio f_{bx} | Ratio f_{by} | Ratio f_v | Ratio f_{vt} | Comb. Stress Ratio | Allow. Stress Ratio | Criteria |
|-------------|---------------------|-----------|----------------|----------------|-------------|----------------|--------------------|---------------------|-----------|
| | f_t | P_u | F_{bx} | F_{by} | F_v | F_{vt} | | | |
| L1 | 195 - 144.21 (1) | 0.011 | 0.785 | 0.000 | 0.043 | 0.000 | 0.797 ✓ | 1.333 | H1-3+VT ✓ |
| L2 | 144.21 - 95.663 (2) | 0.011 | 0.828 | 0.000 | 0.029 | 0.000 | 0.839 ✓ | 1.333 | H1-3+VT ✓ |
| L3 | 95.663 - 48.163 (3) | 0.013 | 0.855 | 0.000 | 0.025 | 0.001 | 0.868 ✓ | 1.333 | H1-3+VT ✓ |
| L4 | 48.163 - 1.5 (4) | 0.014 | 0.830 | 0.000 | 0.021 | 0.001 | 0.845 ✓ | 1.333 | H1-3+VT ✓ |

Section Capacity Table

| Section No. | Elevation ft | Component Type | Size | Critical Element | P K | SF*P _{allow} K | % Capacity | Pass Fail |
|-------------|-----------------|----------------|------------------------|------------------|--------|-------------------------|------------|-----------|
| L1 | 195 - 144.21 | Pole | TP32.21x22.5x0.25 | 1 | -10.54 | 1282.26 | 59.8 | Pass |
| L2 | 144.21 - 95.663 | Pole | TP40.87x30.8338x0.375 | 2 | -19.59 | 2439.46 | 62.9 | Pass |
| L3 | 95.663 - 48.163 | Pole | TP49.08x39.0489x0.4375 | 3 | -32.31 | 3434.34 | 65.1 | Pass |
| L4 | 48.163 - 1.5 | Pole | TP57x47.1359x0.5 | 4 | -50.60 | 4661.43 | 63.4 | Pass |
| | | | | | | | Summary | |
| | | | | | | | Pole (L3) | 65.1 |
| | | | | | | | RATING = | 65.1 |

| | | |
|--|---|--------------------------------------|
| <i>RISATower</i> <i>URS Corporation</i> 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: (860) 529-8882 FAX: (860) 529-3991 | Job 195' EEI Monopole | Page 20 of 20 |
| | Project 113 Brush Hill Road, Goshen, CT | Date 13:12:30 04/30/08 |
| | Client Site Acquisitions Inc. - AT&T | Designed by Staff |

Program Version 5.1.1.4 - 2/25/2008 File:P:/08/ERI Files/195' EEI_Monopole_Goshen_CT.eri

**ANCHOR BOLT AND
BASE PLATE ANALYSIS**

ANCHOR BOLT AND BASE PLATE ANALYSIS

Input Data

Tower Reactions:

| | | |
|---------------------|--------------------|------------|
| Overturning Moment: | OM := 3369-ft-kips | user input |
| Shear Force: | Shear := 25-kips | user input |
| Axial Force: | Axial := 51-kips | user input |

Anchor Bolt Data:

| | | |
|----------------------------|-------------------------|------------|
| Use ASTM A615 Grade 75 | | user input |
| Number of Anchor Bolts = N | $N_{\text{max}} := 24$ | user input |
| Diameter of Bolt Circle: | $D_{bc} := 66\text{in}$ | user input |
| Bolt "Column" Distance: | $L_w := 3.0\text{in}$ | user input |
| Bolt Ultimate Strength: | $F_u := 100\text{-ksi}$ | user input |
| Bolt Yield Strength: | $F_y := 75\text{-ksi}$ | user input |
| Bolt Modulus: | $E := 29000\text{-ksi}$ | user input |
| Anchor Bolt Diameter | $D := 2.25\text{in}$ | user input |
| Threads per Inch: | $n := 4.5$ | user input |

Base Plate Data:

| | | |
|------------------------|------------------------------------|------------|
| Use ASTM A572 Grade 60 | | user input |
| Plate Yield Strength: | $F_{y_{bp}} := 60\text{-ksi}$ | user input |
| Base Plate Thickness: | PlateThickness := 2.25-in | user input |
| Base Plate Diameter: | $D_{bp} := 72.0\text{-in}$ | user input |
| Outer Pole Diameter: | $D_{\text{pole}} := 57.0\text{in}$ | user input |

Geometric Layout Data:

Distance from the center of gravity of the group to bolt in question = d(i)

Radius of Bolt Circle: $R_{bc} := \frac{D_{bc}}{2}$

Distance to Bolts: $i := 1..N$

$$d_i := \begin{cases} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N} \right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{cases}$$

| | |
|-------------------------------|----------------------------------|
| $d_1 = 8.54 \cdot \text{in}$ | $d_7 = 31.88 \cdot \text{in}$ |
| $d_2 = 16.50 \cdot \text{in}$ | $d_8 = 28.58 \cdot \text{in}$ |
| $d_3 = 23.33 \cdot \text{in}$ | $d_9 = 23.33 \cdot \text{in}$ |
| $d_4 = 28.58 \cdot \text{in}$ | $d_{10} = 16.50 \cdot \text{in}$ |
| $d_5 = 31.88 \cdot \text{in}$ | $d_{11} = 8.54 \cdot \text{in}$ |
| $d_6 = 33.00 \cdot \text{in}$ | etc. |

Critical Distances For Bending in Plate:

Outer Pole Radius: $R_{pole} := \frac{D_{pole}}{2}$ $R_{pole} = 28.50 \cdot \text{in}$

Moment Arms of Bolts about Neutral Axis: $MA_i := \text{if}(d_i \geq R_{pole}, d_i - R_{pole}, 0 \cdot \text{in})$

| | |
|-------------------------------|----------------------------------|
| $MA_1 = 0.00 \cdot \text{in}$ | $MA_7 = 3.38 \cdot \text{in}$ |
| $MA_2 = 0.00 \cdot \text{in}$ | $MA_8 = 0.08 \cdot \text{in}$ |
| $MA_3 = 0.00 \cdot \text{in}$ | $MA_9 = 0.00 \cdot \text{in}$ |
| $MA_4 = 0.08 \cdot \text{in}$ | $MA_{10} = 0.00 \cdot \text{in}$ |
| $MA_5 = 3.38 \cdot \text{in}$ | $MA_{11} = 0.00 \cdot \text{in}$ |
| $MA_6 = 4.50 \cdot \text{in}$ | etc. |

Effective Width of Baseplate for Bending: $\text{EffectiveWidth} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2} \right)^2 - \left(\frac{D_{pole}}{2} \right)^2}$ $\text{EffectiveWidth} = 35.19 \cdot \text{in}$

Anchor Bolt Analysis:Polar Moment of Inertia I_p :

$$I_p := \sum_i (d_i)^2 \quad I_p = 1.307 \times 10^4 \cdot \text{in}^2$$

Gross Area of Bolt:

$$A_g := \frac{\pi}{4} \cdot D^2 \quad A_g = 3.976 \cdot \text{in}^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot \text{in}}{n} \right)^2 \quad A_n = 3.248 \cdot \text{in}^2$$

Net Diameter:

$$D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} \quad D_n = 2.03 \cdot \text{in}$$

Radius of Gyration of Bolt:

$$r := \frac{D_n}{4} \quad r = 0.51 \cdot \text{in}$$

Section Modulus of Bolt:

$$S_x := \frac{\pi \cdot D_n^3}{32} \quad S_x = 0.826 \cdot \text{in}^3$$

Anchor Bolt Bending Stress:

Maximum Applied Bending:

$$M_x := \left(\frac{\text{Shear}}{N} \right) \cdot l \quad M_x = 0.260 \cdot \text{ft} \cdot \text{kips}$$

$$f_{bx} := \frac{M_x}{S_x} \quad f_{bx} = 3.8 \cdot \text{ksi}$$

Allowable Bending

$$F_{bx} := 1.333 \cdot 0.60 \cdot F_y \quad F_{bx} = 60.0 \cdot \text{ksi}$$

Note: 1.333 increase allowed per TIA/EIA

Check Tensile Forces:

Maximum Tensile Force (Gross Area):

$$\text{AllowableTension} := 1.333 \cdot (0.33 \cdot A_g \cdot F_u) \quad \text{AllowableTension} = 174.9 \cdot \text{kips}$$

Note: 1.333 increase allowed per TIA/EIA

Maximum Tensile Force (Net Area):

$$F_{\text{net.area}} := 1.333 \cdot (0.60 \cdot A_n \cdot F_y) \quad F_{\text{net.area}} = 194.8 \cdot \text{kips}$$

Note: 1.333 increase allowed per TIA/EIA

Applied Tension:

$$\text{MaxTension} := \frac{OM \cdot R_{bc}}{I_p} - \frac{\text{Axial}}{N} \quad \text{MaxTension} = 100.0 \cdot \text{kips}$$

Check Stresses:

Note: Bolts supplied are "upset bolts." Use net area for checking per AISC.

$$\frac{\text{MaxTension}}{F_{\text{net.area}}} = 0.51$$

$$\text{Condition} := \text{if} \left(\frac{\text{MaxTension}}{F_{\text{net.area}}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

Condition = "OK"

Check Compression & Combined Stresses (if required):

Check to see if a complete combined stress analysis is required:

Per ASCE Manual 72: "If the clearance between the base plate and concrete does not exceed two times the bolt diameter a bending stress analysis of the bolts is NOT normally required."

Set the clear space between the plate and bolt to zero and remove bending stresses if a combined stress analysis is not required:

$$l := \begin{cases} 1 & \text{if } l > 2 \cdot D_n \\ 0.00 \text{ in} & \text{otherwise} \end{cases} \quad l = 0.00 \text{ in}$$

$$f_{bx} := \begin{cases} f_{bx} & \text{if } l > 2 \cdot D_n \\ 0.0 \text{ ksi} & \text{otherwise} \end{cases} \quad f_{bx} = 0.0 \text{ ksi}$$

Allowable Compressive Force:

$$K_c := 0.65$$

$$C_c := \sqrt{\frac{2 \cdot \pi^2 \cdot E}{F_y}} \quad C_c = 87.36$$

$$F_a := \begin{cases} \frac{\left[1 - \left(\frac{K \cdot l}{r} \right)^2 \right] \cdot F_y}{2 \cdot C_c^2} & \text{if } \frac{K \cdot l}{r} \leq C_c \\ \frac{\frac{5}{3} + \frac{3 \cdot \left(\frac{K \cdot l}{r} \right)}{8 \cdot C_c} - \frac{\left(\frac{K \cdot l}{r} \right)^3}{8 \cdot C_c^3}}{\frac{12 \cdot \pi^2 \cdot E}{23 \cdot \left(\frac{K \cdot l}{r} \right)^2}} & \text{if } \frac{K \cdot l}{r} > C_c \end{cases} \quad F_a = 45.0 \text{ ksi}$$

$$F_a := 1.333 \cdot F_a \quad \text{Note: 1.333 increase allowed per TIA/EIA} \quad F_a = 60.0 \text{ ksi}$$

Applied Compressive Force:

$$\text{MaxCompression} := \frac{OM \cdot R_{bc}}{I_p} + \frac{\text{Axial}}{N} \quad \text{MaxCompression} = 104.2 \text{ kips}$$

$$f_a := \frac{\text{MaxCompression}}{A_n} \quad f_a = 32.1 \text{ ksi}$$

Check Combined Stresses:

$$\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} = 0.53$$

$$\text{Condition} := \text{if } \left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

Condition = "OK"

Job 195' EEI Monopole - Goshen, CT

Project No. SAI-032

Page of

Description Anchor Bolt and Base Plate Analysis

Computed by Staff

Sheet 6 of 6

Date 04/30/08

Checked by

Date

Base Plate Analysis:

Force from Bolt(s):

$$C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$$

$$C_1 = 28.5 \cdot \text{kips}$$

$$C_7 = 100.7 \cdot \text{kips}$$

$$C_2 = 53.2 \cdot \text{kips}$$

$$C_8 = 90.5 \cdot \text{kips}$$

$$C_3 = 74.3 \cdot \text{kips}$$

$$C_9 = 74.3 \cdot \text{kips}$$

$$C_4 = 90.5 \cdot \text{kips}$$

$$C_{10} = 53.2 \cdot \text{kips}$$

$$C_5 = 100.7 \cdot \text{kips}$$

$$C_{11} = 28.5 \cdot \text{kips}$$

$$C_6 = 104.2 \cdot \text{kips}$$

etc.

Bending Stress in Plate:

$$f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\text{EffectiveWidth} \cdot \text{PlateThickness}^2}$$

$$f_{bp} = 39.2 \cdot \text{ksi}$$

Check Stresses:

$$\frac{f_{bp}}{1.333 \cdot 0.75 F_{y_{bp}}} = 0.65$$

$$\text{Condition} := \text{if} \left(\frac{f_{bp}}{1.333 \cdot 0.75 F_{y_{bp}}} < 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

Condition = "OK"

FOUNDATION ANALYSIS

MONOPOLE FOUNDATION ANALYSIS

TOWER FORCES:

| | |
|------------------------|---|
| Moment Caused by Tower | $M_t := 3369 \cdot \text{ft} \cdot \text{kips}$ |
| Shear at Base of Tower | $S_t := 25 \text{ kip}$ |
| Max Compressive Force | $C_t := 51 \cdot \text{kip}$ |
| Height of Tower | $H_t := 193.5 \cdot \text{ft}$ |
| Base Plate Bolt Circle | $MP := 66.0 \text{ in}$ |

PROPERTIES:

| | |
|---------------------------------------|------------------------------------|
| Compressive Strength of Concrete | $f_c := 4000 \text{ psi}$ |
| Yield Strength of Steel Reinforcement | $f_y := 60000 \cdot \text{psi}$ |
| Yield Strength of Anchor Bolt | $f_{ya} := 75000 \cdot \text{psi}$ |
| Internal Friction Angle of Soil | $\phi_s := 30 \cdot \text{deg}$ |
| Allowable Bearing Capacity | $q_s := 3200 \cdot \text{psf}$ |
| Unit Weight of Soil | $\gamma_s := 110 \cdot \text{pcf}$ |

FOOTING DIMENSIONS:

| | |
|---------------------------------------|----------------------------------|
| Overall Depth of Footing | $D_f := 8.0 \text{ ft}$ |
| Length of Pier | $L_p := 5.0 \cdot \text{ft}$ |
| Extension of Pier Above Grade | $L_{pag} := 1.0 \cdot \text{ft}$ |
| Diameter of Pier | $d_p := 9.0 \cdot \text{ft}$ |
| Thickness of Footing | $T_f := 4.0 \cdot \text{ft}$ |
| Width of Footing: | $W_f := 26.0 \text{ ft}$ |
| Length of Anchor Bolts: | $L_{st} := 96 \text{ in}$ |
| Projection of anchor bolts above pier | $A_{BP} := 12.0 \cdot \text{in}$ |

| | |
|--|---|
| Unit Weight of Concrete | $\gamma_c := 150 \cdot \text{pcf}$ |
| Depth to Neglect | $n := 1.0 \text{ ft}$ |
| Cohesion of Clay Type Soil Note: Use 0 for Sandy Soil | $c_s := 0 \cdot \text{ksf}$ |
| Seismic Zone Factor: UBC Fig 23-2 | $Z := 2$ |
| Coefficient of Friction between Concrete: | $\mu := 0.45$ |
| Clear Cover of Reinforcement Pier: | $C_{vr \text{ pier}} := 3 \cdot \text{in}$ |
| Clear Cover of Reinforcement Pad: | $C_{vr \text{ pad}} := 3 \cdot \text{in}$ |
| Anchor Bolt Diameter | $d_{\text{anchor}} := 2.25 \text{ in}$ |
| Anchor bolt area | $A_{\text{anchor}} := 3.98 \cdot \text{in}^2$ |

PIER REINFORCEMENT:

| | | | |
|----------------|--------------------------|--------------|---|
| Bar Size | $BS_{\text{pier}} := 8$ | Bar Diameter | $d_{\text{bpier}} := 1.000 \cdot \text{in}$ |
| Number of Bars | $NB_{\text{pier}} := 48$ | Bar Area | $A_{\text{bpier}} := 0.790 \cdot \text{in}^2$ |

PAD REINFORCEMENT:

| | | | | |
|---------|----------------|-------------------------|--------------|--|
| TOP: | Bar Size | $BS_{\text{top}} := 8$ | Bar Diameter | $d_{\text{btop}} := 1.000 \cdot \text{in}$ |
| | Number of Bars | $NB_{\text{top}} := 31$ | Bar Area | $A_{\text{btop}} := 0.790 \cdot \text{in}^2$ |
| BOTTOM: | Bar Size | $BS_{\text{bot}} := 8$ | Bar Diameter | $d_{\text{bbot}} := 1.000 \cdot \text{in}$ |
| | Number of Bars | $NB_{\text{bot}} := 40$ | Bar Area | $A_{\text{bot}} := 0.790 \cdot \text{in}^2$ |

Coefficient of Lateral Soil Pressure: $K_p := \frac{1 + \sin(\phi_s)}{1 - \sin(\phi_s)} K_p = 3$

Load Factor (EIA 3.1.1): $LF := \left[\begin{aligned} &\text{if } H_t \leq 700 \cdot \text{ft}, 1.333, \text{ if } H_t \geq 1200, 1.7, 1.333 + \left(\frac{H_t - 700}{1200 - 700} \right) \cdot 0.4 \end{aligned} \right] LF = 1.333$

CHECK ANCHOR STEEL EMBEDMENT

Depth: $D_{ab} := L_{st} - A_{BP} \quad D_{ab} = 7 \cdot \text{ft}$ $L_{anchor} := \frac{(0.11 \cdot f_y) \cdot \text{in}}{\sqrt{f_c \cdot \text{psi}}} \quad L_{anchor} = 10.8703 \cdot \text{ft}$

DepthCheck := if($D_{ab} \geq L_{anchor}$, "Okay", "No Good")

DepthCheck = "No Good" **Note: anchor plate is provided**

STABILITY OF FOOTING

Passive Pressure: $P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} \quad P_{pn} = 0.33 \cdot \text{ksf}$

$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p} \quad P_{pt} = 1.32 \cdot \text{ksf}$

$P_{top} := \text{if}[n < (D_f - T_f), P_{pt}, P_{pn}] \quad P_{top} = 1.32 \cdot \text{ksf}$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} \quad P_{bot} = 2.64 \cdot \text{ksf}$

$P_{ave} := \frac{P_{top} + P_{bot}}{2} \quad P_{ave} = 1.98 \cdot \text{ksf}$

$T_p := \text{if}[n < (D_f - T_f), T_f, (D_f - n)] \quad T_p = 4 \cdot \text{ft}$

$A_p := W_f \cdot T_p \quad A_p = 104 \cdot \text{ft}^2$

Ultimate Shear: $S_u := P_{ave} \cdot A_p \quad S_u = 205.92 \cdot \text{kip}$

Weight of Concrete Pad: $WT_c := \left[(W_f^2 \cdot T_f) + \frac{d_p^2 \cdot \pi}{4} L_p \right] \cdot \gamma_c \quad WT_c = 453.3129 \cdot \text{kip}$

Weight of Soil above Footing: $WT_{s1} := \left[W_f^2 \cdot (|L_p - L_{pag}|) - \frac{d_p^2 \cdot \pi}{4} \cdot (|L_p - L_{pag}|) \right] \cdot \gamma_s \quad WT_{s1} = 269.4484 \cdot \text{kip}$

Weight of Soil Wedge at back face: $WT_{s2} := \left(\frac{D_f^2 \cdot \tan(\phi_s)}{2} \cdot W_f \right) \cdot \gamma_s \quad WT_{s2} = 52.8391 \cdot \text{kip}$

Total Weight: $WT_{tot} := WT_c + WT_{s1} + C_t \quad WT_{tot} = 773.7613 \cdot \text{kip}$

Resisting Moment: $M_r := (WT_{tot}) \cdot \frac{W_f}{2} + S_u \cdot \frac{T_f}{3} + WT_{s2} \cdot \left(W_f + \frac{D_f \tan(\phi_s)}{3} \right) \quad M_r = 11788.6251 \cdot \text{kip} \cdot \text{ft}$

Overturning Moment: $M_{ot} := M_t + S_t \cdot (L_p + T_f) \quad M_{ot} = 3594 \cdot \text{kip} \cdot \text{ft}$

Factor of Safety: $FS := \frac{M_r}{M_{ot}} \quad FS_{req} := 2 \quad FS = 3.28$

SafetyCheck := if($FS > FS_{req}$, "Okay", "No Good") SafetyCheck = "Okay"

SHEAR CAPACITY IN PIER

$$FS := 2$$

$$S_p := \frac{P_{ave} \cdot A_p + \mu \cdot WT_{tot}}{FS}$$

$$S_p = 277.0563 \cdot \text{kips}$$

$$\text{ShearCheck} := \text{if}(S_p > S_t, \text{"Okay"}, \text{"No Good"})$$

$$\text{ShearCheck} = \text{"Okay"}$$

BEARING PRESSURE CAUSED BY FOOTING

$$A_{mat} := W_f^2$$

$$A_{mat} = 676 \cdot \text{ft}^2$$

$$S := \frac{W_f^3}{6}$$

$$S = 2929.3333 \cdot \text{ft}^3$$

$$P_{max} := \frac{WT_{tot}}{A_{mat}} + \frac{M_{ot}}{S}$$

$$P_{max} = 2.3715 \cdot \text{ksf}$$

$$P_{min} := \frac{WT_{tot}}{A_{mat}} - \frac{M_{ot}}{S}$$

$$P_{min} = -0.0823 \cdot \text{ksf}$$

$$\text{MaxPressure} := \text{if}(P_{max} < q_s, \text{"Okay"}, \text{"No Good"})$$

$$\text{MaxPressure} = \text{"Okay"}$$

$$\text{MinPressure} := \text{if}[(P_{min} \geq 0) \cdot (P_{min} < q_s), \text{"Okay"}, \text{"No Good"}]$$

$$\text{MinPressure} = \text{"No Good"}$$

Distance to Resultant of Pressure Distribution:

$$X_p := \frac{P_{max}}{P_{max} - P_{min}} \cdot \frac{1}{3} \cdot W_f$$

$$X_p = 8.376 \cdot \text{ft}$$

Distance to Kern:

$$X_k := \frac{W_f}{6}$$

$$X_k = 4.3333 \cdot \text{ft}$$

Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity:

$$e := \frac{M_{ot}}{WT_{tot}}$$

$$e = 4.6448$$

Adjusted Soil Pressure:

$$P_a := \frac{2 \cdot WT_{tot}}{3 \cdot W_f \left(\frac{W_f}{2} - e \right)}$$

$$P_a = 2.3746 \cdot \text{ksf}$$

$$q_{adj} := \text{if} \left(P_{min} < 0, P_a, \frac{P_{max}}{\text{ft}^2} \right)$$

$$q_{adj} = 2.3746 \cdot \text{ksf}$$

$$\text{PressureCheck} := \text{if}(q_{adj} < q_s, \text{"Okay"}, \text{"No Good"})$$

$$\text{PressureCheck} = \text{"Okay"}$$

CONCRETE BEARING CAPACITY (ACI 10.17)

$$\phi_c := 0.75 \quad (\text{ACI 9.3.2.2})$$

$$P_b := \phi_c \cdot 0.85 \cdot f_c \cdot \frac{d_p^2 \cdot \pi}{4} \quad P_b = 23360.2547 \cdot \text{kip}$$

$$\text{BearingCheck} := \text{if}(P_b > LF \cdot C_t, \text{"Okay"}, \text{"No Good"}) \quad \text{BearingCheck} = \text{"Okay"}$$

SHEAR STRENGTH OF CONCRETE

Beam Shear: (Critical section located at a distance d from the face of Pier) (ACI 11.3.1.1)

$$\phi_{cs} := .85 \quad (\text{ACI 9.3.2.3})$$

$$d := T_f - C_{vr_pad} - d_{bot} \quad d = 44 \cdot \text{in}$$

$$d_1 := \frac{W_f}{2} - \frac{d_p}{2} \quad d_1 = 8.5 \cdot \text{ft}$$

$$d_2 := d_1 - d \quad d_2 = 4.8333 \cdot \text{ft}$$

$$L_{cs} := \left(\frac{W_f}{2} - e \right) \cdot 3 \quad L = 25.0655 \cdot \text{ft}$$

$$\text{Slope} := \text{if} \left(L > W_f, \frac{P_{\max} - P_{\min}}{W_f}, \frac{q_{\text{adj}}}{L} \right) \quad \text{Slope} = 0.0947 \cdot \text{kcf}$$

$$V_{\text{req}} := LF \cdot \left[(q_{\text{adj}} - \text{Slope} \cdot d_1) + \left(\frac{\text{Slope} \cdot d_1}{2} \right) \right] \cdot W_f \cdot d_1 \quad V_{\text{req}} = 580.9257 \cdot \text{kip}$$

$$\text{ACI 11.3.1.1} \quad V_{\text{Avail}} := \phi_c \cdot 2 \cdot \sqrt{f_c \cdot \text{psi}} \cdot W_f \cdot d \quad V_{\text{Avail}} = 1475.9994 \cdot \text{kip}$$

$$\text{BeamShearCheck} := \text{if}(V_{\text{req}} < V_{\text{Avail}}, \text{"Okay"}, \text{"No Good"}) \quad \text{BeamShearCheck} = \text{"Okay"}$$

Punching Shear: (Critical Section Located at a distance of d/2 from the face of pier) (ACI 11.12.2.1)

$$b_o := (d_p + d) \cdot \pi \quad b_o = 39.7935 \cdot \text{ft}$$

$$\text{Area included inside bo:} \quad A_{bo} := \frac{\pi \cdot (d_p + d)^2}{4} \quad A_{bo} = 126.0128 \cdot \text{ft}^2$$

$$\text{Area outside of bo:} \quad A_{\text{out}} := A_{\text{mat}} - A_{bo} \quad A_{\text{out}} = 549.9872 \cdot \text{ft}^2$$

Guess Value: $v_u := 1 \text{ ksf}$

(From "Foundation Analysis and design",
By Joseph Bowles, Eq. 8-9)

Given
$$d^2 + d_p \cdot d = \frac{W_{T_{tot}}}{\pi \cdot v_u}$$

$$v_u := \text{Find}(v_u)$$

$$v_u = 5.303 \cdot \text{ksf}$$

$$V_u := v_u \cdot d \cdot W_f$$

$$V_u = 505.5547 \cdot \text{kips}$$

$$V_{req} := LF \cdot V_u$$

$$V_{req} = 673.9044 \cdot \text{kips}$$

$$V_{Avail} := \phi_c \cdot 4 \cdot \sqrt{f_c \cdot \text{psi}} \cdot b_o \cdot d$$

$$V_{Avail} = 4518.0918 \cdot \text{kips}$$

$$\text{PunchingShearCheck} := \text{if}(V_{req} < V_{Avail}, \text{"Okay"}, \text{"No Good"})$$

$$\text{PunchingShearCheck} = \text{"Okay"}$$

STEEL REINFORCEMENT IN THE PAD

$$\phi_m := .90 \text{ ACI 9.3.2.2}$$

Take Maximum Bending at face of Pier:

$$q_b := q_{adj} - d_1 \cdot \text{Slope}$$

$$q_b = 1.5693 \cdot \text{ksf}$$

$$M_n := \frac{1}{LF \cdot \phi_m} \cdot \left[(q_{adj} - q_b) \cdot \frac{d_1^2}{3} + q_b \cdot \frac{d_1^2}{2} \right] \cdot W_f$$

$$M_n = 1648.9281 \cdot \text{kip} \cdot \text{ft}$$

ACI 10.2.7.3

$$\beta := \text{if} \left[f_c \leq 4000 \cdot \text{psi}, .85, \text{if} \left[f_c \geq 8000 \cdot \text{psi}, .65, .85 - \left(\frac{\frac{f_c}{\text{psi}} - 4000}{1000} \right) \cdot .05 \right] \right] \beta = 0.85$$

$$R_u := \frac{M_n}{\phi_m \cdot W_f \cdot d^2}$$

$$R_u = 5241.3 \text{ lbf}$$

$$\rho := \frac{0.85 \cdot f_c}{f_y} \left(1 - \sqrt{1 - \frac{2 \cdot R_u}{0.85 \cdot f_c}} \right)$$

$$\rho = 0.0006$$

$$\rho_{min} := 1.333 \cdot \rho$$

$$\rho_{min} = 0.00081$$

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Temperature and Shrinkage: $\rho_{sh} := \text{if}(f_y \geq 60000 \cdot \text{psi}, 0.0018, 0.0020)$

$\rho_{sh} = 0.0018$

(ACI 7.12.2.1b)

FOR BOTTOM BARS:

$$A_s := \max(\rho_{min}, \rho_{sh}) \cdot W_f \cdot d$$

$$A_s = 24.7104 \cdot \text{in}^2$$

$$A_{s_{prov}} := A_{bot} \cdot NB_{bot}$$

$$A_{s_{prov}} = 31.6 \cdot \text{in}^2$$

$$\text{PadReinforcement} := \text{if}(A_{s_{prov}} > A_s, \text{"Okay"}, \text{"No Good"})$$

PadReinforcement = "Okay"

FOR TOP BARS:

$$A_s := \rho_{sh} \cdot (W_f \cdot T_f)$$

$$A_s = 26.9568 \cdot \text{in}^2$$

$$A_{s_{prov}} := A_{btop} \cdot NB_{top}$$

$$A_{s_{prov}} = 24.49 \cdot \text{in}^2$$

$$\text{PadReinforcement} := \text{if}(A_{s_{prov}} > A_s, \text{"Okay"}, \text{"No Good"})$$

PadReinforcement = "No Good"

Note: Deemed Satisfactory i.e Does not control design

TENSION (ACI 12.2.3)

DEVELOPMENT LENGTH OF PAD REINFORCEMENT

Bar Spacing:

$$B_{sPad} := \frac{W_f - 2 \cdot C_{vr_{pad}} - NB_{bot} \cdot d_{bbot}}{NB_{bot} - 1}$$

$$B_{sPad} = 6.8205 \cdot \text{in}$$

Development Length Factors:

Reinforcement Location Factor $\alpha := 1.0$

Coating Factor $\beta := 1.0$

Concrete strength Factor $\lambda := 1.0$

Reinforcement Size Factor $\gamma := 1.0$

$$\text{Spacing or Cover Dimension: } c := \text{if}\left(C_{vr_{pad}} < \frac{B_{sPad}}{2}, C_{vr_{pad}}, \frac{B_{sPad}}{2}\right) \quad c = 3 \cdot \text{in}$$

Transverse Reinforcement Index As allowed by ACI 12.2.4

$$k_{tr} := 0$$

$$L_{dbt} := \frac{3}{40} \cdot \frac{f_y}{\sqrt{f_c \cdot \text{psi}}} \cdot \frac{\alpha \cdot \beta \cdot \gamma \cdot \lambda}{c + k_{tr}} \cdot d_{bbot}$$

$$L_{dbt} = 23.7171 \cdot \text{in}$$

$$L_{dbmin} := 12 \cdot \text{in}$$

Minimum Development Length:
(ACI 12.2.1)

$$L_{dbtCheck} := \text{if}(L_{dbt} \geq L_{dbmin}, \text{"Use L.dbt"}, \text{"Use L.dbmin"})$$

$$L_{dbtCheck} = \text{"Use L.dbt"}$$

Available Length in Pad:

$$L_{Pad} := \frac{W_f}{2} - \frac{d_p}{2} - C_{vr_{pad}}$$

$$L_{Pad} = 99 \cdot \text{in}$$

$$L_{padTension} := \text{if}(L_{Pad} > L_{dbt}, \text{"Okay"}, \text{"No Good"})$$

LpadTension = "Okay"

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REINFORCEMENT IN PIER

Pier Area: $A_p := \frac{\pi \cdot d_p^2}{4}$ $A_p = 9160.8842 \cdot \text{in}^2$

(ACI 10.8.4 and 10.9.1) $A_{smin} := 0.01 \cdot 0.05 \cdot A_p$ $A_{smin} = 4.5804 \cdot \text{in}^2$

$A_{sprov} := NB_{pier} \cdot A_{bpier}$ $A_{sprov} = 37.92 \cdot \text{in}^2$

SteelAreaCheck := if($A_{sprov} > A_{smin}$, "Okay", "No Good") SteelAreaCheck = "Okay"

NOTE: Anchor Bolts are not accounted for in reinforcement calculation and will provide additional reinforcement to satisfy minimum requirement of steel.

Bar Spacing In Pier: $B_{spier} := \frac{d_p \cdot \pi}{NB_{pier}} - d_{bpier}$ $B_{spier} = 6.0686 \cdot \text{in}$

Diameter of Reinforcement Cage: $D_{cage} := d_p - 2 \cdot C_{vpier}$ $D_{cage} = 102 \cdot \text{in}$

Maximum Moment in Pier: $M_p := \left[M_t + S_t \left(L_p + \frac{A_{BP}}{2} \right) \right] \cdot LF$ $M_p = 56089.974 \cdot \text{in-kips}$

Pier Check evaluated from outside program and results are listed below;

(defined variables) $(f_c \ f_y \ c1 \ Spiral) = (3 \ 60 \ 3 \ 0)$

The required input is column diameter in inches, number of reinforcing bars, bar size number, factored axial load in kips and moment in kip inches: $(D \ N_{\text{bars}} \ P_u \ M_{xu}) = (108 \ 48 \ 8 \ 68 \ 56090)$

Clears any previous output: $(\phi P_n \ \phi M_{xn} \ f_{sp} \ \rho) = (0 \ 0 \ 0 \ 0)$

$$(\phi P_n \ \phi M_{xn} \ f_{sp} \ \rho) := \phi P_n (D, N, n, P_u, M_{xu})^T$$

The Output is given as useable axial load in kips, moment capacity in kip inches, splicing stress in ksi, and reinforcement ratio: $(\phi P_n \ \phi M_{xn} \ f_{sp} \ \rho) = (121.3051 \ 100058.9019 \ -60 \ 0.0041)$

Column size and reinforcement may be changed to match capacity to the applied load.

AxialLoadCheck := if($\phi P_n \geq P_u$, "Okay", "No Good") AxialLoadCheck = "Okay"

BendingCheck := if($\phi M_{xn} \geq M_{xu}$, "Okay", "No Good") BendingCheck = "Okay"

DEVELOPMENT LENGTH OF PIER REINFORCEMENT

TENSION (ACI 12.2.3)

Factors for development: Reinforcement Location Factor $\alpha = 1.0$

Coating Factor $\beta = 1.0$

Concrete strength Factor $\lambda = 1.0$

Reinforcement Size Factor $\gamma = 1.0$

Spacing or Cover Dimension: $c := \text{if} \left(C_{vr_pier} < \frac{B_{sPier}}{2}, C_{vr_pier}, \frac{B_{sPier}}{2} \right)$ $c = 3 \cdot \text{in}$

Transverse Reinforcement: As allowed by ACI 12.2.4 $k_{tr} = 0$

$$L_{dbt} := \frac{3}{40} \cdot \frac{f_y}{\sqrt{f_c \cdot \text{psi}}} \cdot \frac{\alpha \cdot \beta \cdot \gamma \cdot \lambda}{c + k_{tr}} \cdot d_{bpier} \quad L_{dbt} = 23.7171 \cdot \text{in}$$

Minimum Development Length: (ACI 12.2.1) $L_{dbmin} = 12 \cdot \text{in}$

Pier reinforcement bars are standard 90 degree hooks and therefore development in the pad is computed as follows:

$$L_{dh} := \frac{1200 \cdot d_{bpier}}{\sqrt{f_c}} \cdot .7 \quad L_{dh} = 13.2816 \cdot \text{in}$$

$$L_{db} := \max(L_{dbt}, L_{dbmin}) \quad L_{db} = 23.7171 \cdot \text{in}$$

COMPRESSION: (ACI 12.3.2)

$$L_{dbc1} := \frac{.02 \cdot d_{bpier} \cdot f_y}{\sqrt{f_c \cdot \text{psi}}} \quad L_{dbc1} = 18.9737 \cdot \text{in}$$

$$L_{dbmin} := 0.0003 \cdot \frac{\text{in}^2}{\text{lb}} \cdot (d_{bpier} \cdot f_y) \quad L_{dbmin} = 18 \cdot \text{in}$$

$$L_{dbc} := \text{if}(L_{dbc1} \geq L_{dbmin}, L_{dbc1}, L_{dbmin}) \quad L_{dbc} = 18.9737 \cdot \text{in}$$

Available Length in Foundation:

$$L_{pier} := L_p - C_{vr_pier} \quad L_{pier} = 57 \cdot \text{in}$$

$$L_{pad} := T_f - C_{vr_pad} \quad L_{pad} = 45 \cdot \text{in}$$

$$L_{tension} := \text{if}(L_{pier} + L_{pad} > L_{dbt}, \text{"Okay"}, \text{"No Good"}) = \text{"Okay"} \quad L_{tension} = \text{"Okay"}$$

$$L_{compression} := \text{if}(L_{pier} + L_{pad} > L_{dbc}, \text{"Okay"}, \text{"No Good"}) \quad L_{compression} = \text{"Okay"}$$

NOTE: Anchor bolts and plate provided, OK

| | | | | | |
|-------------|---------------------------------|-------------|---------|-------|----------|
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TIE SIZE AND SPACING IN COLUMN

| | | |
|----------------------------------|---|---------------------------------|
| Minimum Tie Size: | $Tie_{min} := \text{if}(BS_{pier} \leq 10, 3, 4)$ | $Tie_{min} = 3$ |
| | Used #4 Ties | $d_{Tie} := 4$ |
| Seismic factor: (ACI 21.10.5) | $z := \text{if}(Z \leq 2, 1, 0.5)$ | $z = 1$ |
| | $s_{lim1} := 16 \cdot d_{bpier} \cdot z$ | $s_{lim1} = 16 \cdot \text{in}$ |
| | $s_{lim2} := \frac{48 \cdot d_{Tie} \cdot \text{in}}{8} \cdot z$ | $s_{lim2} = 24 \cdot \text{in}$ |
| | $s_{lim3} := D_f \cdot z$ | $s_{lim3} = 96 \cdot \text{in}$ |
| | $s_{lim4} := 18 \text{in}$ | $s_{lim4} = 18 \cdot \text{in}$ |
| Maximum Spacing: | $s_{tie} := \min \left(\begin{pmatrix} s_{lim1} \\ s_{lim2} \\ s_{lim3} \\ s_{lim4} \end{pmatrix} \right)$ | $s_{tie} = 16 \cdot \text{in}$ |
| Number of Ties Required: | $n_{tie} := \frac{L_{pier} - 3 \cdot \text{in}}{s_{tie}} + 1$ | $n_{tie} = 4.375$ |