Amphenol ANTENNA SOLUTIONS

LPA-80063-6CF-EDIN-X

V-Pol | Log Periodic | 63° | 14.5 dBd

Replace "X" with desired electrical downtilt.

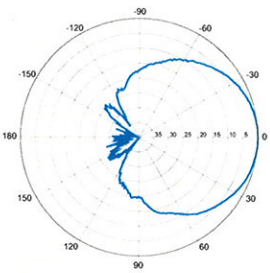
Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.

Electrical Characteristics	
Frequency bands	806-960 MHz
Polarization	Vertical
Horizontal beamwidth	63°
Vertical beamwidth	10°
Gain	14.5 dBd (16.6 dBi)
Electrical downtilt (X)	0, 2, 4, 5, 6, 8, 10
Impedance	50Ω
VSWR	≤1.4:1
Null fill	5% (-26.02 dB)
Input power	500 W
Lightning protection	Direct Ground
Connector(s)	1 Port / EDIN or NE / Female / Center (Back)

Mechanical Characteristics		
Dimensions Length x Width x Depth	1805 x 385 x 332 mm	71.1 x 15.2 x 13.1 in
Depth of antenna with z-bracket	372 mm	14.6 in
Weight without mounting brackets	12.3 kg	27 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.70 m^2 Side: 0.59 m^2	Front: 7.5 ft^2 Side: 6.3 ft^2
Wind load @ 161 km/hr (100 mph)	Front: 885 N Side: 757 N	Front: 199 lbf Side: 170 lbf

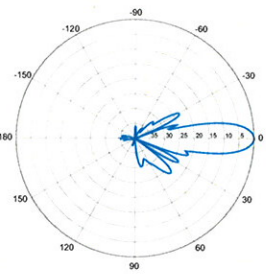
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit (0-20°)	21700000	50-102 mm 2.0-4.0 in	11 kg 25 lbs
Lock-Down Brace	If the lock-down brace is used, the maximum diameter of the mounting pipe is 88.9 mm or 3.5 in.		

LPA-80063-6CF-EDIN-X



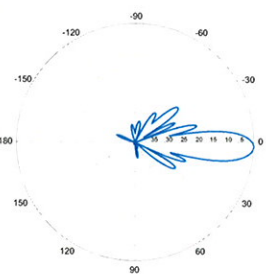
Horizontal

LPA-80063-6CF-EDIN-0



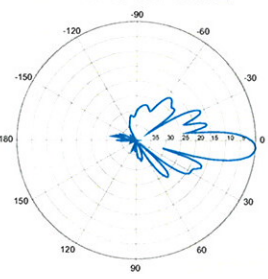
0° | Vertical

LPA-80063-6CF-EDIN-2



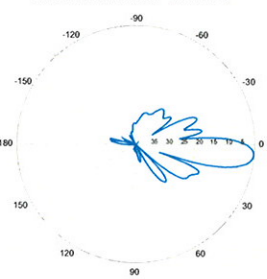
2° | Vertical

LPA-80063-6CF-EDIN-4



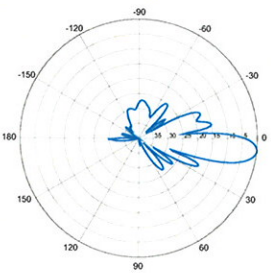
4° | Vertical

LPA-80063-6CF-EDIN-5



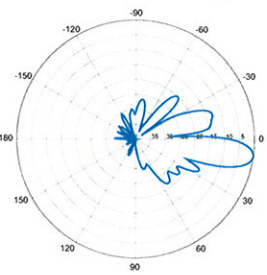
5° | Vertical

LPA-80063-6CF-EDIN-6



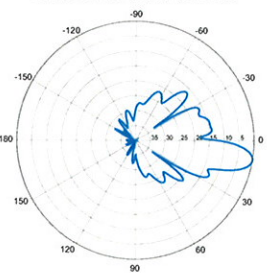
6° | Vertical

LPA-80063-6CF-EDIN-8



8° | Vertical

LPA-80063-6CF-EDIN-10



10° | Vertical

Vertically Polarized, Log Periodic 63° / 18.5 dBi

LPA-185063/12CF ___

When ordering replace "___" with connector type.

Mechanical specifications

Length	1806 mm	71.1 in
Width	167 mm	6.6 in
Depth	148 mm	5.8 in
Depth with t-bracket	176 mm	6.9 in
[4] Weight	6.1 kg	13.5 lbs
Wind Area		
Fore/Aft	0.30 m^2	3.3 ft^2
Side	0.27 m^2	2.9 ft^2
Rated Wind Velocity (Safety factor 2.0)	>224 km/hr	>139 mph
Wind Load @ 100 mph (161 km/hr)		
Fore/Aft	479 N	107.6 lbs
Side	434 N	97.6 lbs

Antenna consisting of aluminum alloy with brass feedlines covered by a UV safe fiberglass radome.

Mounting and Downtilting

Mounting brackets attach to a pipe diameter of Ø50-102 mm (2.0-4.0 in).

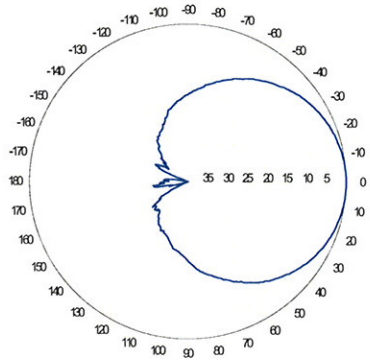
Mounting bracket kit #26799997
Downtilt bracket kit #26799999

The downtil bracket kit includes the mounting bracket kit.

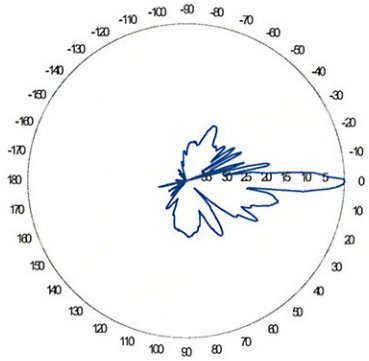
Electrical specifications

Frequency Range	1850-1990 MHz
Impedance	50Ω
[3] Connector(s)	NE or E-DIN 1 port / center
[1] VSWR	≤ 1.4:1
Polarization	Vertical
[1] Gain	18.5 dBi
[2] Power Rating	250 W
[1] Half Power Angle	
H-Plane	63°
E-Plane	5°
[1] Electrical Downtilt	0°
[1] Null Fill	10%
Lightning Protection	Direct Ground

Radiation pattern[1]



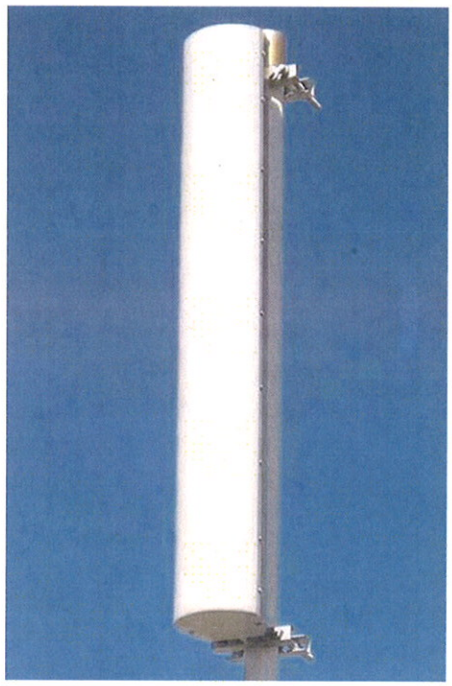
Horizontal



Vertical

Radiation patterns for all antennas are measured with the antenna mounted on a fiberglass pole.

Mounting on a metal pole will typically improve the Front-to-Back ratio.



Amphenol Antel's Exclusive 3T (True Transmission Line Technology) Antenna Design:

- True log-periodic design allows for superior front-to-side characteristics to minimize sector overlap.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad band-width and superior performance.
- Air as insulation for virtually no internal signal loss.

This Amphenol Antel antenna is under a five-year limited warranty for repair or replacement.

Antenna available with center-fed connector only.

CF Denotes a Center-Fed Connector.

1850-1990 MHz

[1] Typical values.
[2] Power rating limited by connector only.
[3] NE indicates an elongated N connector.
E-DIN indicates an elongated DIN connector.
[4] The antenna weight listed above does not include the bracket weight.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.

Amphenol Antel, Inc. 1300 Capital Drive Rockford, Illinois 61109 USA Tel. (815) 399-0001
Toll-Free (888) 417-9562 Fax. (815) 399-0156 antel@antelinc.com www.antelinc.com

Amphenol Antel, Inc. The Antenna Technology Company

Revision Date: 712/07

Amphenol ANTENNA SOLUTIONS

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

Replace "X" with desired electrical downtilt.

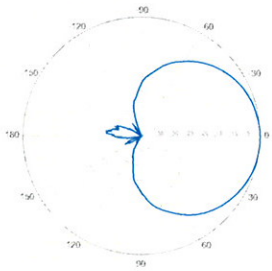
Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.

Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	65°	63°
Vertical beamwidth	13°	11°
Gain	14.0 dBd (16.1 dBi)	14.5 dBd (16.6 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-18.3 dB	-18.2 dB
Front-to-back ratio (+/-30°)	-33.4 dB	-36.3 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -25 dB	
Input power	500 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)	

Mechanical Characteristics		
Dimensions Length x Width x Depth	1804 x 285 x 132 mm	71.0 x 11.2 x 5.2 in
Depth with z-brackets	172 mm	6.8 in
Weight without mounting brackets	7.9 kg	17 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.51 m² Side: 0.24 m²	Front: 5.5 ft² Side: 2.6 ft²
Wind load @ 161 km/hr (100 mph)	Front: 759 N Side: 391 N	Front: 169 lbf Side: 89 lbf

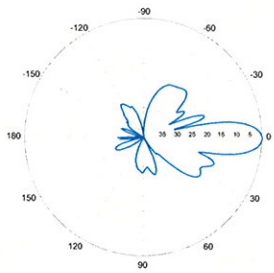
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting Bracket Kit	36210003	50-160 mm 2.0-6.3 in	6.3 kg 14 lbs
3-Point Downtilt Bracket Kit (0-14°)	36210004	50-160 mm 2.0-6.3 in	7.3 kg 16 lbs
Downtilt Mounting Applications	A mounting bracket and downtilt bracket kit must be ordered for downtilt applications		
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP		

BXA-70063-6CF-EDIN-X



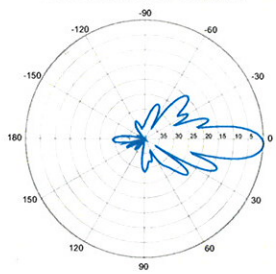
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

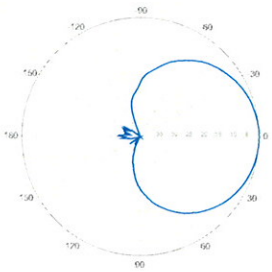


0° | Vertical | 750 MHz

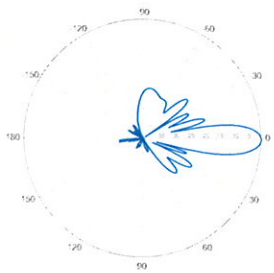
BXA-70063-6CF-EDIN-2



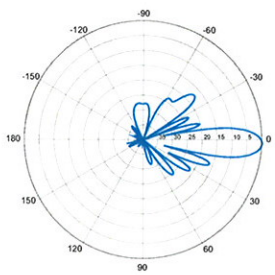
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz

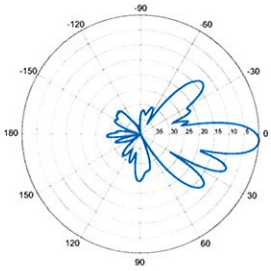


2° | Vertical | 850 MHz

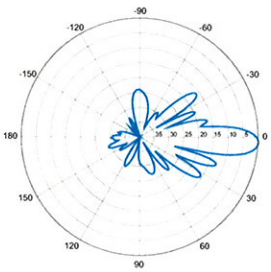
BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3

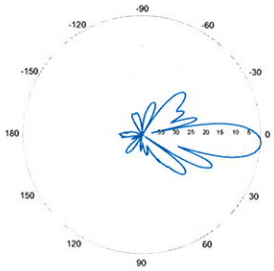


3° | Vertical | 750 MHz

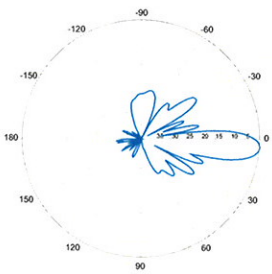


3° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-4

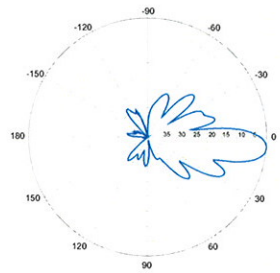


4° | Vertical | 750 MHz

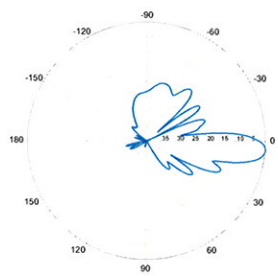


4° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-5

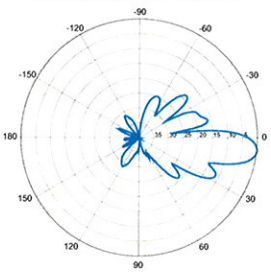


5° | Vertical | 750 MHz

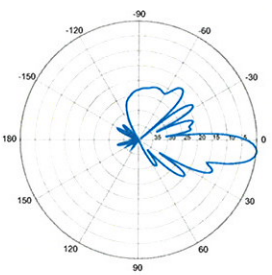


5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6

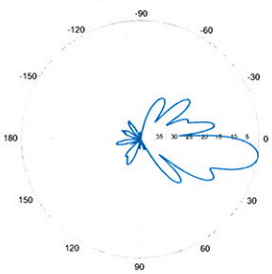


6° | Vertical | 750 MHz

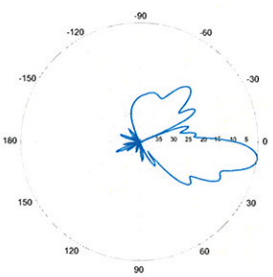


6° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-8

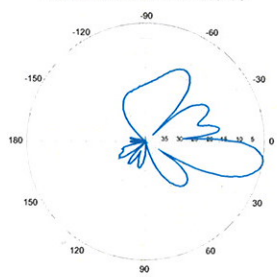


8° | Vertical | 750 MHz

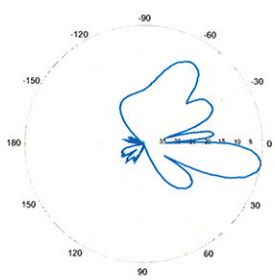


8° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-10



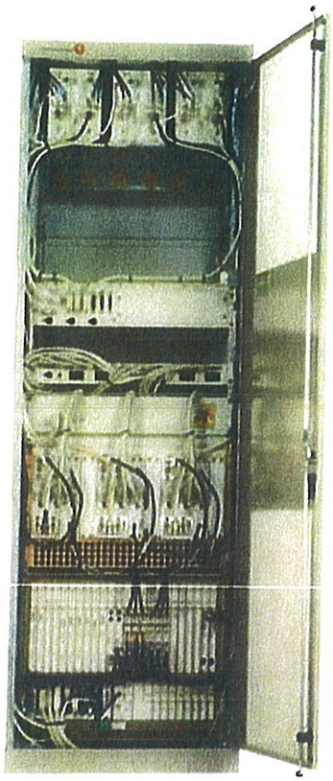
10° | Vertical | 750 MHz



10° | Vertical | 850 MHz

Lucent CDMA Modular Cell 4.0B Indoor

For CDMA Networks



Lucent CDMA Modular Cell 4.0B is a high capacity base station equipped with the state-of-the-art technologies developed by Bell Labs. The product brings you outstanding carrier density and immediate OPEX savings. This indoor product can support up to 8 carriers/3 sectors per frame. It is twice the density of Modular Cell 4.0 (indoor). Modular Cell 4.0B offers full spectrum coverage in a single frame, dramatically simplifying growth patterns. As the leader in spread spectrum technology, Lucent Technologies continues to introduce innovations to the market: Multi-Carrier Radio (15MHz), Block Filters/Wideband Filters, and 40W Power Amplifier Modules are the latest assets integrated in the base station.

Features

The Modcell 4.0B indoor version offers a small footprint with exceptional carrier density in a standard ETSI cabinet.

- Indoor Single Frame Configuration
- 1-8 carriers per frame at 3 sectors (will support up to 11 carriers with Auxiliary Amplifier Frame)
- Dual Band: one cell to the ECP & mobile
- Close Loop Gain Control
- Timing and Controller Redundancy
- Integrated Power option
- Support CDMA2000™1X, and EV-DO Rev.0, with future support to EV-DO Rev. A
- IP Backhaul and Ethernet Backhaul capable
- 6-Sector option ready
- Intelligent Antenna option ready

Benefits

- Optimized for highest carrier density, smooth growth in one frame
- Conserves indoor footprint, reducing hardware and floor space requirements
- Minimizes configuration complexity
- Software-Only Carrier Add at certain carrier counts
- Flexible channel growth planning
- Designed to use existing power supply
- Grow CDMA carriers on only 2 antennas/sector
- Multi-Carrier Radio (15MHz), Block Filters/ Wideband Filters, and 40W Power Amplifier Modules

Lucent Technologies
Bell Labs Innovations

Technical Specifications

Description	Specification
1. **Configurations**	
a. Sectors	3, 4 and 6
b. Carriers	1–8 per frame at 3 sectors (up to 11 with Auxiliary Amplifier Frame)
2. **CDMA Channel Card Capacity**	12 slots; CMU IVB capable
3. **T1, E1 Facilities**	Maximum of 20 per cabinet when equipped with URC-II's
4. **User Alarms**	7 Power Alarms, 25 User Alarms
5. **GPS Antenna**	Yes
6. **Air Interface Standards**	T1A/E1A 95-A plus TSB-74; T1A/E1A 95-B for 850 MHz; CDMA 2000
7. **Frequency Bands**	850MHz/1900 MHz; 300 to 2100 MHz capable
8. **Vocoder**	8 Kbps; 8 Kbps EVRC; 13 Kbps; SMV-ready
9. **Environmental Cabinet Housing**	Standard ETSI cabinet; UL50 compliant; zero rear clearance
10. **Cabinet Access**	Front Access
11. **Operating Temperature Range**	Range: -5 to +40°C (continuous)
12. **Dimensions**	600 mm W x 600 mm D x 1880 mm H (23.6 x 23.6 x 74) inches
13. **Estimated Installed Weight**	365 kg (785 lbs.) DC [8 carriers in one cabinet]
14. **Power Options**	Integrated Power, AC 120/240 Volt Input, -48V or +24 V DC Conversion Non-integrated Power requires either + 24 VDC Input or - 48 VDC Input
15. **Power Consumption**	
a. 3 Carrier/3 Sectors	2167 W
b. 6 Carrier/3 Sectors	5449 W
c. 11 Carrier/3 Sectors	10026 W
16. **RF Power (at J4)**	25 W per carrier (850) FCC Rated short-term average 20 W per carrier (850) FCC Rated long-term average 20 W per carrier (1900) FCC Rated short-term average 16 W per carrier (1900) FCC Rated long-term average
17. **Minimal Antenna Configuration**	2 antennas/sector
18. **Filter**	Block and Wide Band Dual Duplex
19. **Growth Frame**	PCS AUX Frame, Dual Band Growth Frame
20. **Operational Accessories**	Integrated Power
21. **Channel Elements**	Channel pooling across sectors or carriers

To learn more about our comprehensive portfolio, please contact your Lucent Technologies Sales Representative or visit our web site at http://www.lucent.com.

MOB-Mod4B-i 0106

Lucent Technologies
Bell Labs Innovations

SITE 1

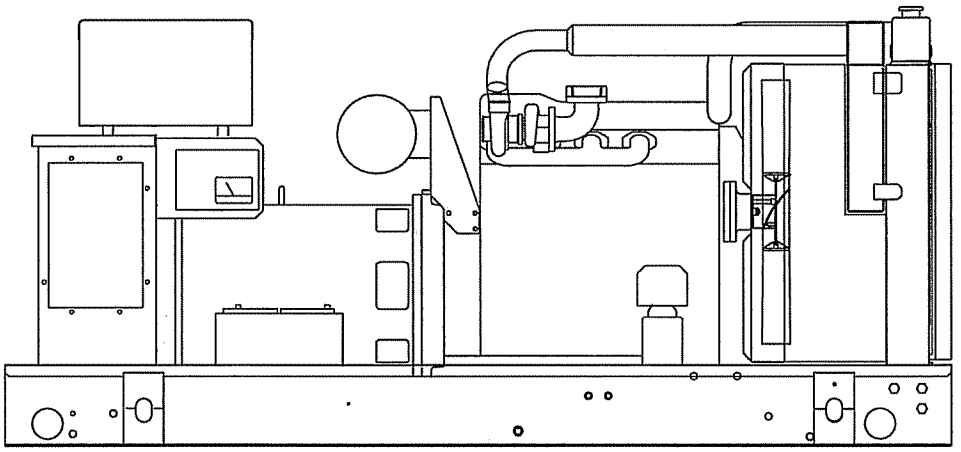
GENERATOR SPECIFICATIONS

SD048

Liquid Cooled Diesel Engine Generator Sets

Standby Power Rating
48KW 60 Hz

Prime Power Rating
44KW 60 Hz



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

VERIZON WIRELESS
Models:
0058080 2.4L 48kW 240V 1ø Open Unit
0058090 2.4L 2 48kW 240V 1ø Level 2A Enclosure
0058100 2.4L 50kW 208V 3ø Open Unit
0058110 50kW 208V 3ø Level 2A Enclosure

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®

APPLICATION & ENGINEERING DATA

SD048

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
  - 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
  - Not in auto position (flashing light)
- INTERNAL FUNCTIONS:
  - I^2T 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	See Exhaust Emission Sheet
ENGINE FAMILY	First digit is Cert. Yr. (i.e. 7, 8, 9) _JDXL03.0113
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

❒ 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, 110 A.H., 31
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).

GENERAC®

SD048

OPERATING DATA

	STANDBY	PRIME
	SD048	SD048
GENERATOR OUTPUT VOLTAGE/KW-60Hz	Rated AMP	Rated AMP
120/240V, 1-phase, 1.0 pf	48 — 200	44 — 183
120/208V, 3-phase, 0.8 pf	50 — 173	44 — 153
MOTOR STARTING KVA		
Maximum at 35% instantaneous voltage dip with standard alternator; 50/60 Hz	208/240/416V 75/90	208/240/416V 75/90
FUEL		
Fuel consumption—60 Hz — Load	25% / 50% / 75% / 100%	25% / 50% / 75% / 100%
gal./hr.	1.08 / 2.12 / 3.08 / 4.01	0.99 / 1.93 / 2.82 / 3.66
liters/hr.	4.08 / 8.0 / 11.66 / 15.18	3.74 / 7.3 / 10.68 / 13.87
Fuel pump lift	40"	40"
COOLING		
Coolant capacity — System - US gal. (lit.)	3.45 (13.0)	3.45 (13.0)
Engine - US gal. (lit.)	2.75 (10.4)	2.75 (10.4)
Coolant flow/min. — 60 Hz - US gal. (lit.)	28 (106)	28 (106)
Heat rejection to coolant 60 Hz full load BTU/hr.	135,900	109,000
Inlet air — 60 Hz - cfm (m^3/min.)	7500 (212.4)	7500 (212.4)
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 (m^3/min.)	166 (4.7)	140 (4.0)
EXHAUST		
Exhaust flow at rated output 60 Hz - cfm (m^3/min.)	448 (12.7)	380 (10.8)
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	1800	1800
HP at rated KW — 60 Hz	80	64 / 52
Piston speed — 60 Hz - ft./min. (m/min.)	1536 (1230)	1536 (1230)
BMEP — 60 Hz - psi	189	151
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

SD048

- 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
- Secondary Fuel Filter
- Fuel Shutdown Solenoid
- Battery - 12 Volt 925 AH
- Stainless Steel Flexible Exhaust Connection
- Battery Charge Alternator
- Battery Cables
- Composite Battery Box
- Vibration Isolation of Unit to Mounting Base
- 12 Volt, Solenoid-Activated Starter Motor
- Air Cleaner
- Air Cleaner Service Indicator
- Fan Guard (CSA and UL Compliant)
- CSA Guarding
- Critical Grade Muffler (Shipped Loose With Open Unit)
- High Temperature Exhaust Wrap
- Alternator Tropicalization
  - Resists Moisture, Fungus and Abrasives
  - In Addition to Standard Class H Epoxy Impregnation Coating
- Upsized Alternator For Increased Motor Starting
- Propylene Glycol 50/50 Mix Antifreeze
- Oil (7.5 Quarts)
- Coolant Expansion and Recovery Tank
- Extended Factory Test (2.5 Hr.)
  - Stepped Loads
  - Frame Temperature Test
- Specification Sheet Does Not Reflect Any Verizon Wireless Corporate Authorized Variances.
- 21 Light Annunciator Generator Alarms
- 8 Form C Dry Contact Output Relays
- 120 Volt Coolant Heater 1500 Watt with 3 Wire Connection Cord
- Mainline Circuit Breaker
  - 200 Amp – 120/240 Single Phase
  - 200 Amp – 120/208 Three Phase
- Flexible Fuel Lines
- Fuel Pressure Loss Protection System
- UL2200 Listed
- Basetank
  - 48 Hr. Runtime at 100% Load
  - Double Wall
  - 125% Engine Fluid Containment and Alarms of all Generator Liquids
  - Fuel Level Sender and Visible Level Gauge
  - Rupture Basin Alarm
  - Emergency Vents
  - Check Valve (inlet and return)
  - FM Fusible Link (165°F) Shutoff
  - UL 142 Listed

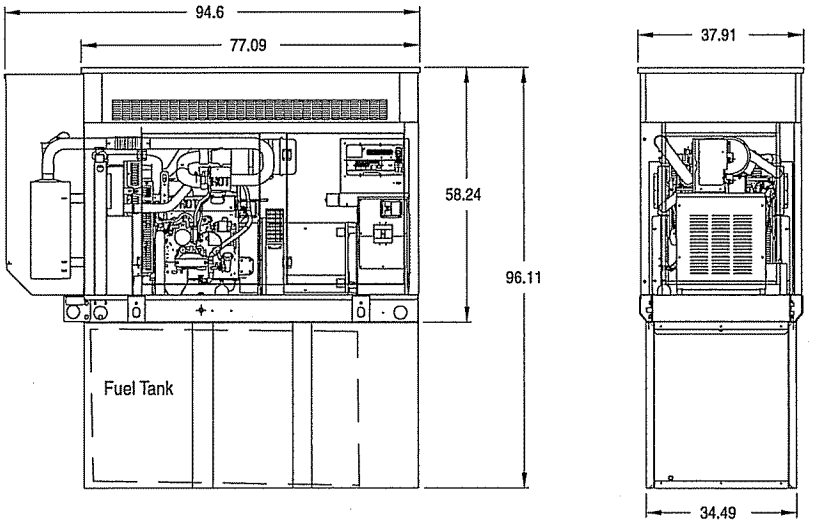
  Consult State and Local Codes for Specific Requirements in your area.
- Five Year Extended Warranty
- Enclosure Options
  - Open Generator Set w/ Duct Adapter
  - Weather Protective Sound Attenuated Enclosure w/ Enclosed Critical Grade Muffler and Flex Exhaust
- 12V Dual-Rate 10 Amp Battery Charger With 120V 3 Wire Connection Cord

H-CONTROL PANEL FEATURES

- TWO FOUR LINE LCD DISPLAYS READ:
  - Voltage (all phases)
  - Power factor
  - kVAR
  - Engine speed
  - Run hours
  - Fault history
  - Coolant temperature
  - Overvoltage
  - Low coolant level
  - Not in auto position (flashing light)
  - Current (all phases)
  - kW
  - Transfer switch status
  - Service reminders
  - Oil pressure
  - Time and date
  - High coolant temperature shutdown
  - Overspeed
  - Low coolant level
  - Exercise speed
- INTERNAL FUNCTIONS:
  - I^2T 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
  - RS232 port for GenLink® control
  - RS485 port remote communication
  - Governor controller and voltage regulator are built into the master control board

Design and specifications subject to change without notice. Dimensions shown are approximate. Contact your Generac dealer for certified drawings. DO NOT USE THESE DIMENSIONS FOR INSTALLATION PURPOSES.

See Installation Drawing For Details



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GENERAC®

Generac Power Systems, Inc. • S45 W29290 HWY. 59, Waukesha, WI 53189 • generac.com

SITE 2

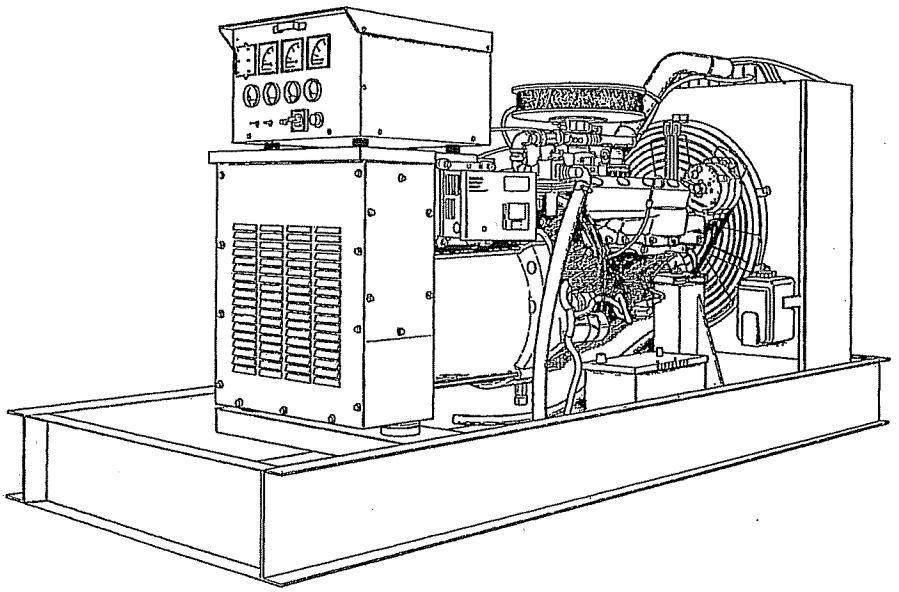
GENERATOR SPECIFICATIONS

SG060

Liquid Cooled Gas Engine Generator Sets

Standby Power Rating

60KW 60 Hz



Power Matched

GENERAC 6.8 GN ENGINE

Naturally Aspirated

VERIZON WIRELESS MODELS

NATURAL GAS

4816 - 120/240 - 1ø Open
4817 - 120/240 - 1ø Sound Encl.
4874 - 120/208 - 3ø Open
4875 - 120/208 - 3ø Sound Encl.

LP VAPOR

4931 - 120/240 - 1ø Open
4932 - 120/240 - 1ø Sound Encl.
4935 - 120/208 - 3ø Open
4936 - 120/208 - 3ø Sound Encl.

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 2200 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.

- **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

SG060

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: 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
- ☐ 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
- Not in auto position (flashing light)
- ATS selection
- Current (all phases)
- kW
- Transfer switch status
- Low fuel pressure
- Service reminders
- Oil pressure
- Time and date
- High coolant temperature shutdown
- Overspeed
- Low coolant level
- Exercise speed

☐ INTERNAL FUNCTIONS:

- I^2T 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
MODEL	6.8GN
CYLINDERS	V-10
DISPLACEMENT	6.8 Liter (417 cu. in.)
BORE	90.2 mm (3.55 in.)
STROKE	105.8 mm (4.17 in.)
COMPRESSION RATIO	9:1
INTAKE AIR	Naturally Aspirated
NUMBER OF MAIN BEARINGS	6
CONNECTING RODS	10-Drop forged steel
CYLINDER HEAD	Aluminum
PISTONS	Aluminum Alloy
CRANKSHAFT	Forged Steel

VALVE TRAIN

CAM POLLOWER	Hydraulic
INTAKE VALVE MATERIAL	Copper Infiltrated Iron Base
EXHAUST VALVE MATERIAL	Copper Infiltrated Iron Base
HARDENED VALVE SEATS	Standard

ENGINE GOVERNOR

☐ ELECTRONIC	Standard
FREQUENCY REGULATION, NO-LOAD TO FULL LOAD	0.5%
STEADY STATE REGULATION	±0.25%

LUBRICATION SYSTEM

TYPE OF OIL PUMP	Gerotor
OIL FILTER	Full flow, Spin On Cartridge
CRANKCASE CAPACITY	(6 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	558.8 mm (22 in.)
COOLANT HEATER	120V, 1500 W

FUEL SYSTEM

FUEL

☐ Natural Gas or L.P. Vapor	Standard
☐ L.P. Liquid Withdrawal	Optional
CARBURETOR	Down draft
SECONDARY FUEL REGULATOR	Nat. Gas or L.P. Vapor Systems
HOT WATER VAPORIZER	L.P. Liquid Withdrawal Systems
AUTOMATIC FUEL LOCKOFF SOLENOID	Standard
OPERATING FUEL PRESSURE VAPOR SYSTEMS	7" to 14" H_2O

ELECTRICAL SYSTEM

BATTERY CHARGE ALTERNATOR	18 Amps at 12 V
STARTER MOTOR	12 V
RECOMMENDED BATTERY	(1) - 12 V, 700 CCA, 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).

GENERAC®
POWER SYSTEMS, INC.

SG060

OPERATING DATA

	STANDBY		STANDBY	
	SG060		SG060	
GENERATOR OUTPUT VOLTAGE/KW-60Hz	NG	Rated AMP	LPG	Rated AMP
120/240V, 1-phase, 1.0 pf	60	250	60	250
120/208V, 3-phase, 0.8 pf NOTE: Consult your Generac dealer for additional	60	208	60	208
MOTOR STARTING KVA				
Maximum at 35% instantaneous voltage dip	240V	480V	240V	480V
with standard alternator—60 Hz	110	146	110	146
FUEL				
Fuel consumption—60 Hz—100% Load	NG		LPG	
ft.³ hr. / gal. hr.	925 / NA		334 / 9.1	
COOLING				
Coolant capacity System - lit. (US gal.)	23.7 (6.3)			
Engine - lit. (US gal.)	12.3 (3.3)			
Radiator - lit. (US gal.)	11.4 (3.0)			
Coolant flow/min. 60 Hz - lit. (US gal.)	148 (39.2)			
Heat rejection to coolant BTU/hr.	218,000			
Inlet air 60 Hz - m³/min.(cfm)	159 (5600)			
Max. operating air temp onto radiator* °F	140			
Max. operating ambient temp* °F	120			
Max. external pressure drop on radiator in. H_2O	0.5			
COMBUSTION AIR REQUIREMENTS				
Flow at rated power 60 Hz - m³/min.(cfm)	5.2 (185)			
EXHAUST				
Exhaust flow at rated output 60 Hz—m³/min.(cfm)	19 (679.5)			
Max recommended back pressure Kpa(Hg)	10 (2.9)			
Exhaust temp at rated output °C (°F)	565 (1050)			
Exhaust outlet size (2) mm (in.)	64 (2.5)			
ENGINE				
Rated RPM 60 Hz	1800			
HP at rated KW 60 Hz	107			
Piston speed 60 Hz - m/sec. (ft./min.)	6.3 (1250)			
BMEP 60 Hz - psi	113.1			
DERATION FACTORS				
Temperature				
5% for every 10°C above - °C	25		25	
2.77% for every 10°F above - °F	104		104	
Altitude				
1.1% for every 100 m above - m	1067		1067	
3.5% for every 1000 ft. above - ft.	3500		3500	

* Note: Values given are maximum temperatures to which power adjustments can be applied. Consult your Generac Power Systems representative if operating conditions exceed these maximums.

STANDARD ENGINE & SAFETY FEATURES

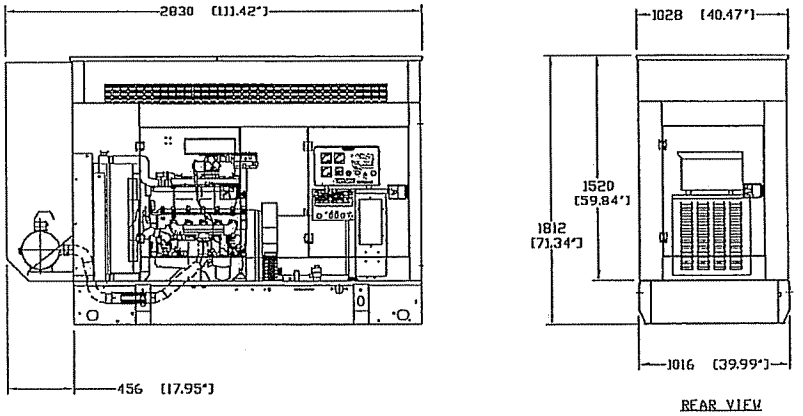
SG060

- 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
- Secondary Fuel Filter
- Fuel Shutdown Solenoid
- Battery - 12 Volt 90 AH
- Stainless Steel Flexible Exhaust Connection
- Battery Charge Alternator
- Battery Cables
- Composite Battery Box
- Vibration Isolation of Unit to Mounting Base
- 12 Volt, Solenoid-Activated Starter Motor
- Air Cleaner
- Air Cleaner Service Indicator
- Fan Guard (CSA Compliant)
- CSA Guarding
- Critical Grade Muffler (Shipped Loose With Open Unit)
- High Temperature Exhaust Wrap
- Alternator Tropicalization
  - Resists Moisture, Fungus and Abrasives
  - In Addition to Standard Class H Epoxy Impregnation Coating
- Upsized Alternator For Increased Motor Starting
- Propylene Glycol 50/50 Mix Antifreeze
- Oil
- Coolant Expansion and Recovery Tank
- Extended Factory Test (2.5 Hr.)
  - Stepped Loads
  - Frame Temperature Test
- Specification Sheet Does Not Reflect Any Verizon Wireless Corporate Authorized Variances.

- "H" Control Console – Digital Controller
  - Communication Software for Remote Access
  - Digital Reading AC Volts
  - Digital Reading AC Amps
  - Digital Frequency
  - Emergency Stop Button
  - Audible Alarm
  - Programmable Engine Control (See Bulletin #0172110SBY For Details)
- 20 Light Annunciator Generator Alarms
- 8 Form C Dry Contact Output Relays
- 120 Volt Coolant Heater 1500 Watt with 3 Wire Connection Cord
- Mainline Circuit Breaker
  - 200 Amp & 100 Amp – 120/240 Single Phase
  - 200 Amp & 50 Amp – 120/208 Three Phase
- Flexible Fuel Lines
- Fuel Pressure Loss Protection System
- UL2200 Listed
- Five Year Extended Warranty
- Enclosure Options
  - Open Generator Set w/ Duct Adapter
  - Weather Protective Level III Sound Attenuated Enclosure w/ Enclosed Critical Grade Muffler and Flex Exhaust
- 12V Dual-Rate 10 Amp Battery Charger With 120V 3 Wire Connection Cord

Distributed by:

Design and specifications subject to change without notice. Dimensions shown are approximate. Contact your Generac dealer for certified drawings. DO NOT USE THESE DIMENSIONS FOR INSTALLATION PURPOSES.



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262/544-4811 • FAX 262/544-4851

Bulletin 0170550SBY / Printed in USA 09.04, rev: 07.06

Site Search Summary
Waterford NE Facility
Waterford, Connecticut

Section 16-50j-74(j) of the Regulations of Connecticut State Agencies requires the submission of a statement that describes "the narrowing process by which other possible sites were considered and eliminated." In accordance with this requirement, descriptions of the general site search process, the identification of the applicable search area and the alternative locations considered for development of the proposed telecommunications facility in the Town of Waterford are provided below.

Site Search Process

To initiate its site selection process in an area where wireless service problems have been identified, Cellco first establishes a "site search ring" or "site search area". In any search ring or search area, Cellco seeks to avoid the unnecessary proliferation of towers and to reduce the potential adverse environmental effects of the cell site, while at the same time maximizing the quality of service provided from a particular facility. These objectives are achieved by initially locating existing towers and other sufficiently tall structures within and near the site search area. If any are found, they are evaluated to determine whether they are capable of supporting Cellco's telecommunications equipment at a location and elevation that satisfies its technical requirements.

Cellco has identified fifteen (15) existing telecommunications facilities within approximately four (4) miles of the proposed Waterford NE Facility. Cellco currently shares six (6) of these towers today. None of these existing facilities, however, can provide the service needed in the identified problem areas along portions of Interstate 395 (I-395) and local roads, as well as residential and commercial land uses in northeast Waterford. (See Attachment 7).

Existing and Approved Telecommunication Facilities

	Owner (Cellco Site Name)	**Facility Height and Type**	**Location**	**Cellco Antenna Height**
1.	Mariner Towers (Uncasville)	190' (Guyed Lattice)	71 Moxley Hill Road Montville, CT	142'
2.	SBA (Montville 2)	183' (Monopole)	45 Fargo Road Waterford, CT	173'
3.	Cohanzie Fire Department (Waterford)	170' (Lattice)	53 Dayton Road Waterford, CT	170'

	Owner (Cellco Site Name)	Facility Height and Type	Location	Cellco Antenna Height
4.	SBA (Groton 2)	150' (Monopole)	1294 Pleasant Valley Road Groton, CT	147'
5.	Eastern CT Cable (Montville)	385' (Guyed Lattice)	Old Colchester Road Montville, CT	303'
6.	Sprint (Waterford 2)	137' (Lattice)	41 Manitok Hill Road Waterford, CT	107'
7.	Town of Waterford	170' (Monopole)	607 Mohegan Avenue Waterford, CT	N/A
8.	AT&T/Northeast Utilities	109' (Powermount)	126 Old Colchester Road Waterford, CT	N/A
9.	State of Connecticut Department of Public Safety	180' (Lattice)	136 Vinegar Hill Road Ledyard, CT	N/A
10.	Citadel Broadcasting	250' (Guyed Lattice)	99 Briar Hill Road Groton, CT	N/A
11.	T-Mobile/Northeast Utilities	90' (Powermount)	61 Hawthorne Drive North New London, CT	N/A
12.	T-Mobile/Northeast Utilities	93' (Powermount)	71 Oil Mill Road Waterford, CT	N/A
13.	American Tower	1033' (Guyed Lattice)	1334 Route 85 Montville, CT	N/A
14.	Wireless Solutions	195' (Guyed Lattice)	376 Butlertown Road Montville, CT	N/A
15.	State of Connecticut DPS Troop E	260' (Lattice)	I-395 Montville, CT	N/A

If existing towers or structures are not available or technically feasible, other locations are investigated where the construction of a new tower is required to satisfy Cellco's service requirements. The list of available locations may be further reduced if, after preliminary negotiations, the property owners withdraw a site from further consideration. From among the remaining locations, the proposed sites are selected by eliminating those that have greater

potential for adverse environmental effects and fewer benefits to the public (i.e., those requiring taller towers, possibly with lights; those with substantial adverse environmental impacts, or in densely populated residential areas; and those with limited ability to share space with other public or private telecommunications entities). It should be noted that in any given site search, the weight afforded to factors considered in the selection process will vary depending upon the availability and nature of sites within the search area.

Identification of the Waterford NE Search Area

The purpose of the proposed Waterford NE Facility is to provide reliable PCS, cellular and LTE service to significant gaps that have been identified along I-395 and local roads, as well as residential and commercial areas in northeast Waterford. These coverage gaps were identified using system performance data including, but not limited to, dropped calls and ineffective attempt data, baseline drive data and Cellco's best server propagation modeling tool.

Cellco issued its Waterford NE search area in September of 2006. (See attached Search Area Map). Cellco's initial site search effort public and/or private lands within or near a designated search area.

Sites Investigated in Northeast Waterford

In addition to the existing facilities listed above, Cellco identified and investigated three (3) additional sites in the northeast portion of Waterford. A listing of the additional sites investigated is provided below.

1. Town of Waterford – 146 Old Colchester Road

   This is an approximately 45.9 acre undeveloped parcel; a former Sportsman's Club, acquired by the Town of Waterford in 1973. The Town of Waterford offered this parcel for lease at the beginning of Cellco's municipal consultation process. Cellco signed a lease with the Town in November of 2010. For the purposes of this application, the proposed alternative cell site on the Town parcel has been designated "Site 1".

2. Padgett Parcel – 164 Old Colchester Road

   This is an approximately 13 acre residential parcel located to the west of the Town-owned parcel at 146 Old Colchester Road. Cellco signed a lease with Jimmie Padgett, Jr., the owner of this parcel, in March, 2010. For the purposes of this application, the proposed alternative cell site on the Padgett parcel has been designated "Site 2".

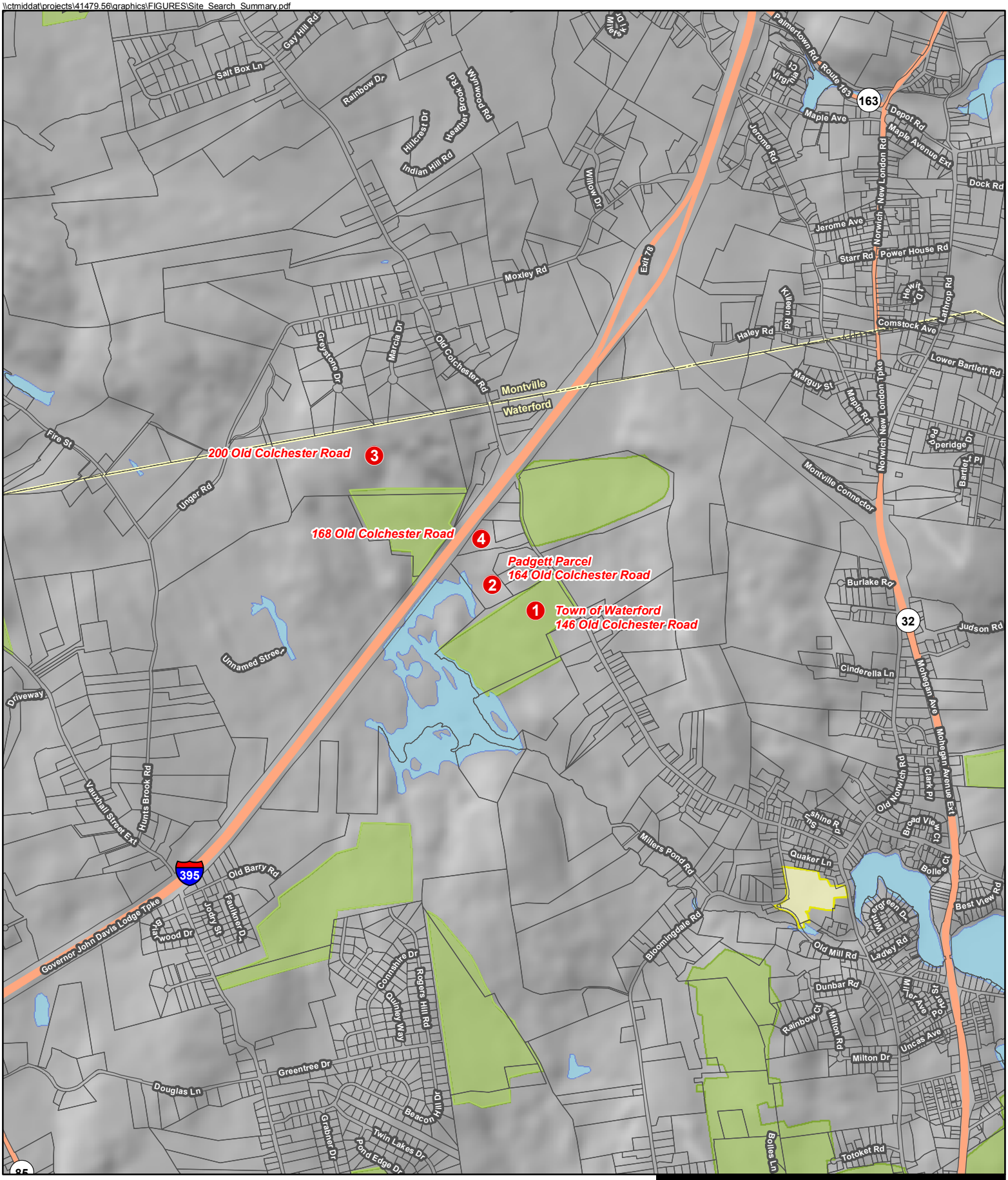
3. 200 Old Colchester Road

   This is a 90 acre parcel located to the west of I-395 and south of Old Colchester. Cellco's RF engineers determined that the company's Waterford NE coverage objectives could not be satisfied from this location and rejected the site.

4. 168 Old Colchester Road

This is a 6.8 acre parcel located to the northwest of the Padgett parcel. The land owner did not respond when contacted by Cellco's real estate representatives about leasing a portion of this property.

\\ctmiddat\projects\41479.56\graphics\FIGURES\Site_Search_Summary.pdf



Legend

- 1 Potential Sites Investigated
- Parcels
- Open Water
- Municipal and Private Open Space
- School

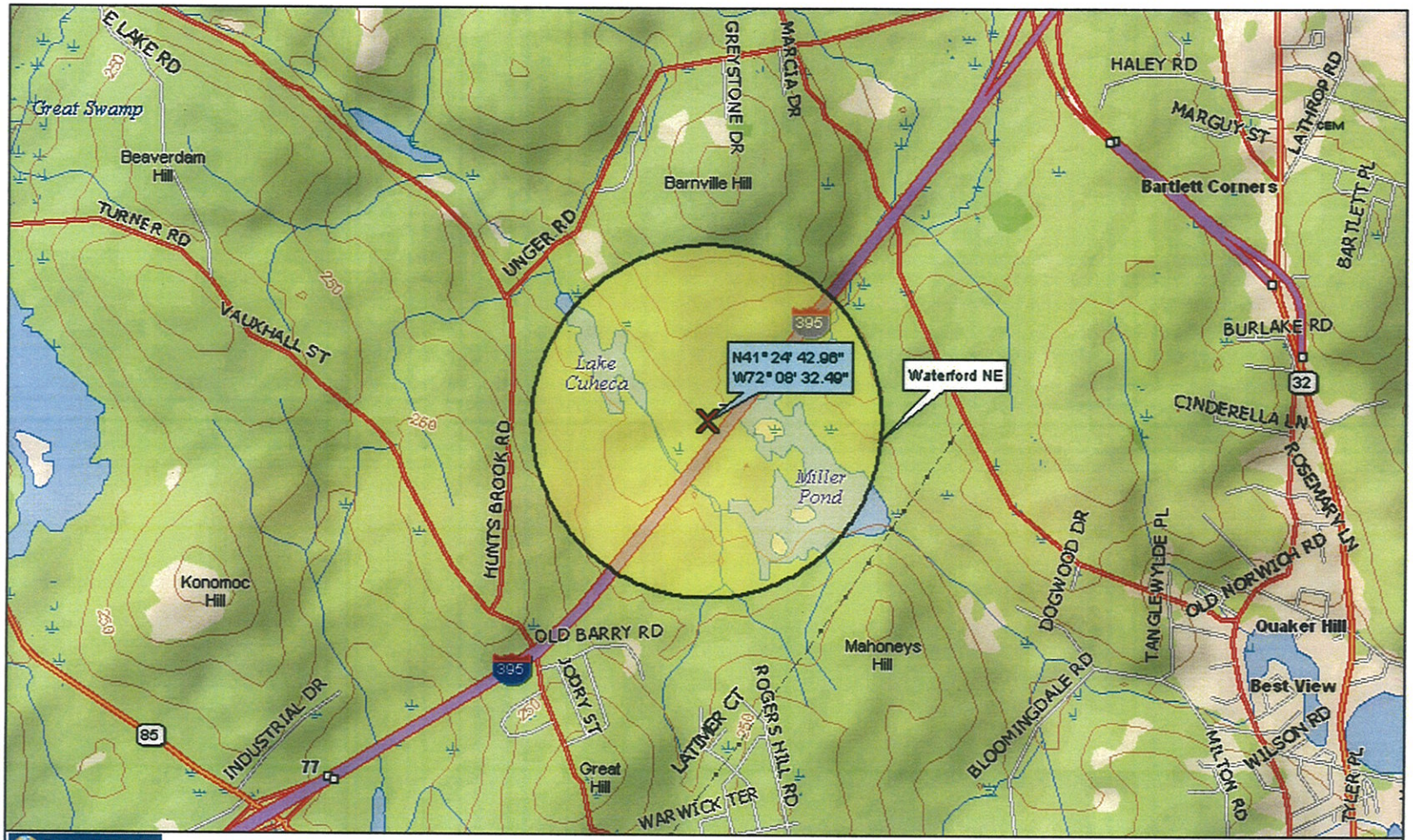
N

0.5 0.25 0 Miles

Vanasse Hangen Brustlin, Inc.

Site Search Summary Map
Proposed Verizon Wireless
Telecommunications Facility
Waterford, Connecticut

verizon wireless


E LAKE RD
Great Swamp
Beaverdam Hill
TURNER RD
VAUXHALL ST
UNGER RD
GREYSTONE DR
MARCIA DR
Barnville Hill
HALEY RD
MARGUY ST
LATHROP RD
CEM
Bartlett Corners
BARTLETT PL
BURLAKE RD
32
CINDERELLA LN
ROSEMARY LN
OLD NORWICH RD
Quaker Hill
Best View
WILSON RD
TYLER PL
MILTON RD
BLOOMINGDALE RD
TANGLEWYLDE PL
DOGWOOD DR
Mahoneys Hill
ROGERS HILL RD
LATIMER CT
WARWICK TER
Great Hill
JODRY ST
OLD BARRY RD
HUNTS BROOK RD
Lake Cuheca
Miller Pond
N41° 24' 42.96"
W72° 08' 32.40"
Waterford NE
Konomoc Hill
INDUSTRIAL DR
85
77
395
250
260
DeLORME
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MN (14.4° W)
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Data Zoom 12-4

Proposed Wireless Telecommunications Facility

Waterford Northeast
146 Old Colchester Road
Waterford, Connecticut

Prepared for verizon wireless

Prepared by *VHB*/Vanasse Hangen Brustlin, Inc.
54 Tuttle Place
Middletown, CT 06457

November 2010

Visual Resource Evaluation

Cellco Partnership, dba Verizon Wireless, seeks approval from the Connecticut Siting Council for a Certificate of Environmental Compatibility and Public Need for the construction of a wireless telecommunications facility ("Facility") in the northeast portion of the Town of Waterford, Connecticut. The potential candidate site that is the subject of this report would be located on municipally-owned property at 146 Old Colchester Road (identified herein as the "host property"), in Waterford. This Visual Resource Evaluation was conducted to evaluate the visibility of the proposed Facility within a two-mile radius ("Study Area"). The Study Area also includes land located within the neighboring municipalities of Montville, Connecticut to the north and Ledyard, Connecticut to the east. Attachment A contains a map that depicts the location of the proposed Facility and the limits of the Study Area.

Project Introduction

The proposed Facility would include the installation of a 130-foot tall monopole tower with associated ground equipment to be located at its base. Both the monopole and ground equipment would be situated within a fence-enclosed compound. The proposed Facility would be located at a ground elevation of approximately 140 feet Above Mean Sea Level (AMSL). Access to the Facility would be provided via a new, 12-foot wide gravel driveway that would extend to the proposed compound area in a southwesterly direction from Old Colchester Road.

Site Description and Setting

The host property consists of approximately 45.9 acres of wooded, undeveloped land. The proposed Facility would be located in the eastern portion of the host property, roughly 675 feet to the west of Old Colchester Road. Land use within the general vicinity of the proposed Facility is comprised of undeveloped woodlands, the Interstate 395 traffic corridor, medium-density residential development and several overhead electrical utility rights of way and their associated infrastructure. In addition to Interstate 395, which is located within close proximity to the host property, segments of Route 32 and Route 163 are also contained within the Study Area. In total, the Study Area features approximately 84 linear miles of roadways.

The topography within the Study Area is generally characterized by gently rolling hills with ground elevations that range from approximately sea level to approximately 395 feet AMSL. The Study Area contains approximately 508 acres of surface water, which includes Miller Pond located approximately 1,000 feet to the west of the proposed Facility; Smith Cove located roughly 1.23-miles to the southeast; Lake Cuheca situated roughly 0.74-mile to the west and portions of the Thames River which is located approximately 1.73-miles to the east. The tree cover within the Study Area consists mainly of mixed deciduous hardwood species that occupy approximately 5,843 acres of the 8,042-acre study area (73%). The average tree canopy height throughout the Study Area was determined to be approximately 65 feet.

METHODOLOGY

To evaluate the visibility associated with the proposed Facility, VHB used the combination of a predictive computer model and in-field analysis. The predictive model provided a preliminary assessment of potential visibility throughout the entire study area, including private property and other areas inaccessible for direct observations. A "balloon float" and Study Area reconnaissance were subsequently conducted for field verification to back-check the initial computer modeling results, to obtain location and height representations, and to provide photographic documentation from publicly accessible areas. A description of the procedures used in the analysis is provided below.

Visibility Analysis

VHB uses ArcGIS® Spatial Analyst, a computer modeling tool developed by Environmental Systems Research Institute, Inc., to calculate the areas from which at least the top of the proposed Facility is expected to be visible. Project- and Study Area-specific data were incorporated into the computer model, including Facility height, its ground elevation, underlying and surrounding topography and existing vegetation. Information used in the model included Connecticut LiDAR[1]-based digital elevation data and model and a digital forest (or tree canopy) layer developed for the Study Area. The LiDAR-based Digital Elevation Model (DEM) represents ten-foot spatial resolution elevation information for the state of Connecticut that was derived through the spatial interpolation of airborne LiDAR-based data collected in the year 2000 and has a horizontal resolution of ten (10) feet. The data was edited in 2007 and made available by the University of Connecticut through its Center for Land Use Education and Research (CLEAR). To create the forest layer, mature trees and woodland areas depicted on aerial photographs (ranging in dates from 2004 to 2008) were manually digitized (hand traced) in ArcGIS®, creating a geographic data layer for inclusion in the computer model. The black and white, digital aerial photographs, obtained from the Connecticut Department of Transportation, were flown in the spring of 2004 and selected for use in this analysis because of their image quality and depiction of pre-leaf emergence (i.e., "leaf-off") conditions. These photographs are half-foot pixel resolution. The more recent aerial photographs (2006 and 2008) were overlaid and evaluated to identify any new development resulting in the removal of trees.

Once the specific data layers were entered, the ArcGIS® Spatial Analyst Viewshed tool was applied to achieve an estimate of locations where the proposed Facility could be visible. First, only topography was used as a possible visual constraint; the tree canopy was omitted to evaluate potential visibility with no intervening vegetative screening. The initial omission of this data layer resulted in an excessively conservative prediction, but it provided an opportunity to identify areas within potential direct lines of sight of the Facility.

[1] LiDAR is an acronym for Light Detection and Ranging. It is a technology that utilized lasers to determine the distance to an object or surface. LiDAR is similar to radar, but incorporates laser pulses rather than sound waves. It measures the time delay between transmission and reflection of the laser pulse.

The forest data layer was then overlaid and built into the DEM, using a conservative average tree canopy height of 50 feet, to establish a baseline assessment of intervening vegetation. The resultant preliminary viewshed map was used during the in-field activities (described further below) to compare the outcome of the initial computer modeling with observations of the balloon float to identify deviations. Information obtained from the field reconnaissance was ultimately incorporated into the model to refine the viewshed map.

The average tree canopy height, in this case 65 feet, was determined based on information collected in the field using a combination of a hand-held laser range finder and comparative observations. The revised average tree canopy height of 65 feet was then incorporated into the model and the results displayed on the viewshed map. The forested areas were overlaid on the DEM with a height of 65 feet added to the base elevation and the visibility within the Study Area calculated.

As a final step, the forested areas were extracted from the areas of visibility, using a conservative assumption that a person standing within the forest will not be able to view the proposed Facility beyond a distance of approximately 500 feet. Depending on the density of the intervening tree canopy and understory of the surrounding woodlands, it is assumed that some locations within this distance could provide visibility of at least portions of the proposed Facility at any time of the year. In "leaf-on" conditions, this distance may be overly conservative for most locations. However, for purposes of this analysis, it was reasoned that forested land beyond 500 feet of the proposed Facility would consist of light-impenetrable trees of a uniform height.

Also included on the map is a data layer, obtained from the State of Connecticut Department of Environmental Protection ("CTDEP"), which depicts various land and water resources such as parks and forests, recreational facilities, dedicated open space, CTDEP boat launches and other categories. Lastly, based on both a review of published information and discussions with municipal officials in Waterford it was determined that there are no locally- or state-designated scenic roadways located within the Study Area.

Balloon Float and Study Area Reconnaissance

On November 12, 2010 Vanasse Hangen Brustlin Inc., (VHB) conducted a balloon float to further evaluate the potential viewshed within the Study Area. The balloon float consisted of raising and maintaining an approximate four-foot diameter, helium-filled balloon at the proposed site location at a height of 130 feet. Once the balloon was secured, VHB staff conducted a drive-by reconnaissance along the roads located within the Study Area with an emphasis on nearby residential areas and other potential sensitive receptors in order to evaluate the results of the preliminary viewshed map and to document where the balloon was, and was not, visible above and/or through the tree canopy. During the balloon float, the temperature was approximately 60 degrees Fahrenheit with occasional breezes and sunny skies.

Photographic Documentation

During the balloon float, VHB personnel drove the public road system within the Study Area to inventory those areas where the balloon was and was not visible. The balloon was photographed from a number of different vantage points to document the actual view towards the proposed Facility. Several locations where the balloon was not visible are also included. The locations of the photos are described below:

View	Location	Orientation	Dist. To Site	Visibility
1	Old Colchester Road	Southwest	± 0.25-Mile	Seasonal
2	Old Colchester Road	Northeast	± 0.27-Mile	Non-Visible
3	Vauxhall Street Extension at Interstate 395 Overpass	Northeast	± 1.38-Mile	Non-Visible
4	Miller Pond	Northwest	± 0.50-Mile	Non-Visible
5	Miller Pond	Northeast	± 0.37-Mile	Non-Visible
6	Moxley Road	Southwest	± 1.16-Mile	Non-Visible

Photographs of the balloon from the view points listed above were taken with a Nikon D-80 digital camera body and fixed Nikon 50 mm lens. "The lens that most closely approximates the view of the unaided human eye is known as the normal focal-length lens. For the 35 mm camera format, which gives a 24x36 mm image, the normal focal length is about 50 mm.[1]"

The locations of the photographic points are recorded in the field using a GPS-enabled tablet computer and were subsequently plotted on the maps contained in the attachments to this document.

Photographic Simulation

A photographic simulation was generated for the location where the balloon was visible during the in-field activities. The photographic simulation portrays a scaled rendering of the proposed Facility from that location, with four wireless service providers represented. Using field data, site plan information and 3-dimension (3D) modeling software, a spatially referenced model of the site area was generated. Geographic coordinates (latitude and longitude) were collected in the field for all of the photograph locations via GPS and later used to generate virtual camera positions within the spatial 3D model. The photo-simulation was then created using a combination of renderings generated in the 3D model and photo rendering software programs. The balloon was included in the photographs to provide a visual marker and to cross-reference the height and proportions of the proposed Facility. A photolog map, the simulation and photographs are contained in Attachment A.

CONCLUSIONS

Based on this analysis, areas from where the proposed 130-foot tall Facility would be visible above the tree canopy comprise approximately 14 acres. As depicted on the attached

[1] Warren, Bruce. *Photography*, West Publishing Company, Eagan, MN, c. 1993, (page 70).

viewshed map, the majority of year-round visibility associated with the proposed Facility would occur over open water on southern portions of Miller Pond to the southwest. An additional area of potential year-round visibility is also depicted on private property west of Old Colchester Road within the immediate vicinity of the host property. VHB estimates that at least partial year-round views of the proposed Facility may be achieved from portions of two residential properties within the Study Area, both of which are located along Old Colchester Road (#156 and #158). This information is summarized in the table below. Overall, potential year-round views of the proposed Facility would be limited to the areas described above by a combination of the intervening topography and vegetation contained within the Study Area.

The viewshed map also depicts several additional areas where seasonal (i.e. during "leaf off" conditions) views are anticipated. These areas comprise approximately 30 acres and are located within the immediate vicinity of the proposed Facility, including select portions of Old Colchester Road. VHB estimates that limited seasonal views of the proposed Facility may be achieved from portions of approximately three additional residential properties located along Old Colchester Road (#136, #152 and #164). This information is summarized in the table below.

Location	*Number of Residential Properties With Potential Year-Round Visibility (Leaf-On)	*Number of Residential Properties With Potential Seasonal Visibility (Leaf-Off)
Old Colchester Road	2	3
TOTAL:	**2**	**3**

*Indicates potential year-round or seasonal visibility from portions of the properties listed in the table above. Potential visibility on a "residential property" does not necessarily mean that the property is developed with a home or views would be achieved from within residential dwellings, exterior decks, porches or patios that might be located on such properties. Further, it may be possible to view the Facility from within portions of the shaded areas indicating potential visibility, but not necessarily from all locations within those shaded areas.

Attachment A

Study Area Map, Balloon Float Photographs, and Photographic Simulations

Photolog Map

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VHB

Photographic Documentation

J:\41479.56\graphics\FIGURES\41479.56-Photosim

VIEW	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
1	OLD COLCHESTER ROAD	SOUTHWEST	0.25 MILE +/-	SEASONAL

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VHB

Photographic Simulation

J:\41479.56\graphics\FIGURES\41479.56-Photosim

VIEW	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
1	OLD COLCHESTER ROAD	SOUTHWEST	0.25 MILE +/-	SEASONAL

verizonwireless

VHB

Photographic Documentation

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VIEW	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
2	OLD COLCHESTER ROAD	NORTHWEST	0.27 MILE +/-	NON-VISIBLE

verizonwireless

VHB

Photographic Documentation

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VIEW	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
3	VAUXHALL STREET AT INTERSTATE 395 OVERPASS	NORTHEAST	1.38 MILES +/-	NON-VISIBLE

verizonwireless

VHB

Photographic Documentation

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VIEW	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
4	MILLER POND	NORTHEAST	0.50 MILE +/-	NON-VISIBLE

verizonwireless

VHB

Photographic Documentation

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VIEW	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
5	MILLER POND	NORTHEAST	0.37 MILE +/-	NON-VISIBLE

verizonwireless

VHB

Photographic Documentation

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VIEW	LOCATION	ORIENTATION	DISTANCE TO SITE	VISIBILITY
6	MOXLEY ROAD	SOUTHWEST	1.10 MILES +/-	NON-VISIBLE

verizonwireless

VHB

Attachment B

Viewshed Map

Viewshed Analysis
Proposed Verizon Wireless
Telecommunications Facility
Waterford NE
146 Old Colchester Road
Waterford, Connecticut

NOTE:
- Viewshed analysis conducted using ESRI's Spatial Analyst.
- Proposed Facility height is 130 feet.
- Existing tree canopy height estimated at 65 feet.
- Study Area is comprised of a two-mile radius surrounding the proposed facility and includes 8,042 acres of land.

DATA SOURCES:
- Digital elevation model (DEM) derived from Connecticut LiDAR-based Digital Elevation Data (collected in 2000) with a 10-foot spatial resolution produced by the University of Connecticut and the Center for Land Use Education and Research (CLEAR); 2007
- Forest areas derived from 2008 digital orthophotos with 1-meter pixel resolution; digitized by VHB, 2010
- Base map comprised of Uncasville (1970) and Montville (1983) USGS Quadrangle Maps
- Municipal and Private Open Space data layer provided by CT DEP, 1997
- Federal Open Space data layer provided by CT DEP, 2004
- CT DEP Property data layer provided by CT DEP, April 2010
- CT DEP boat launches data layer provided by CT DEP, Dec 2009
- Scenic Roads layer derived from available State and Local listings

Map Compiled November, 2010

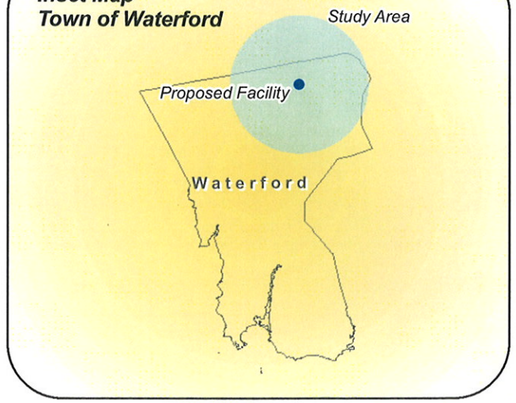
Legend

- Proposed Tower Location

Photographs - November 12, 2010
- Balloon is not visible
- Balloon visible above trees

- Seasonal Visibility Area (Approximately 30 acres)
- Year-Round Visibility (Approximately 14 acres)
- Protected Municipal and Private Open Space (CT DEP, 1997)
  - Cemetery
  - Preservation
  - Conservation
  - Existing Preserved Open Space
  - Recreation
  - General Recreation
  - School
  - Uncategorized
- CT DEP Property (CT DEP, May 2010)
  - State Forest
  - State Park
  - DEP Owned Waterbody
  - State Park Scenic Reserve
  - Historic Preserve
  - Natural Area Preserve
  - Fish Hatchery
  - Flood Control
  - Other
  - State Park Trail
  - Water Access
  - Wildlife Area
  - Wildlife Sanctuary
- Federal Open Space (CT DEP, 2004)
- Boat Launches (CT DEP, Dec 2009)
- Scenic Road (State and Local)
- Town Line

Inset Map
Town of Waterford



0.5 0.25 0 0.5 Miles

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//ctmidat/projects/41479.78/graphics/figures/Viewshed_Map_Sportsmans_Alt1_130.pdf