

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

IN RE: :
: :
SPRINT NEXTEL CORPORATION : DOCKET NO. 338
APPLICATION FOR A CERTIFICATE OF :
ENVIRONMENTAL COMPATIBILITY AND :
PUBLIC NEED FOR THE CONSTRUCTION, :
MAINTENANCE AND OPERATION OF A :
TELECOMMUNICATIONS FACILITY :
LOCATED AT 160 WEST STREET, :
CROMWELL, CONNECTICUT : SEPTEMBER 17, 2007

RESPONSES OF CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS
TO CONNECTICUT SITING COUNCIL PRE-HEARING INTERROGATORIES

On September 6, 2007, the Connecticut Siting Council (“Council”) issued Pre-Hearing Interrogatories to the Intervenor, Cellco Partnership d/b/a Verizon Wireless (“Cellco”), relating to the above-captioned docket. Below are Cellco’s responses.

Question No. 1

Discuss Cellco’s need for the proposed facility. Specifically, what level of coverage does Cellco currently have in this area, and in what ways would the proposed facility improve the existing level of service?

Response

The primary use for the proposed Cromwell facility will be to provide PCS fill-in coverage along portions of Routes 9, 372 and 3 and local roads in the south-central portion of Cromwell. The proposed site will also provide cellular capacity relief in this same area.

Question No. 2

What is Cellco’s operating frequency and the minimum signal level threshold for this area?

Response

Cellco’s transmit frequencies from the proposed Cromwell site will be 869.88-878.49 MHz; 890.73 MHz and; 1970-1975 MHz. Cellco’s receive frequencies from the proposed Cromwell site will be 824.88-833.49 MHz; 845.73 MHz and; 1890-1895 MHz. Cellco’s minimum signal level threshold throughout its system nationwide is -85 dBm.

Question No. 3

Provide antenna specifications, including type, make, size, model, number of channels, and maximum power output. What is the proposed antenna height and the number of antennas to be installed.

Response

Cellco intends to install three (3) Antel Dual-Band antennas at the 59-foot level on the flag pole tower.

<u>Alpha Sector – 59 Ft.</u>	<u>Beta Sector – 59 Ft.</u>	<u>Gamma Sector – 59 Ft.</u>
Antel Type: BXD-63426382CF	CSA Type: BXD-63426382CF	CSA Type: BXD-63426382CF
Cellular and PCS	Cellular and PCS	Cellular and PCS
No. Channels: 9 Cellular, 3 PCS	No. Channels: 9 Cellular, 3 PCS	No. Channels: 9 Cellular, 3 PCS
ERP/Channel: 200 W Max Cellular, 485 W Max PCS	ERP/Channel: 200 W Max Cellular, 485 W Max PCS	ERP/Channel: 200 W Max Cellular, 485 W Max PCS

Question No. 4

Provide a multi-signal level propagation plot at a scale of 1:40,000, depicting coverage from all existing and/or approved Cellco sites in the area. Provide a brief description of the existing sites including location, distance to the proposed facility, facility type, and antenna height. Depict and label major roads on the plot.

Response

The plots requested are included in Attachment 1. The existing sites in the area include:

1. Cellco's proposed "Cromwell North" cell site is located approximately 1.26 miles to the north. Cellco antennas are proposed to be located at the 100-foot level on an existing 170-foot lattice tower at 179 Shunpike Road in Cromwell.
2. Cellco's "Cromwell SW" cell site is located approximately 1.6 miles to the west. Cellco antennas exist at the 78-foot level on a former hotel sign support structure at 100 Berlin Road in Cromwell.
3. Cellco's "Cromwell SE" cell site is located approximately 1.9 miles to the southeast. Cellco antennas exist at the 105-foot level on the existing 125-foot tower at 201 Main Street in Cromwell.
4. Cellco's "Rocky Hill 2" cell site is located approximately 2.15 miles to the north. Cellco antennas exist at the 146-foot level on an existing 180-foot tower at 1218 Cromwell Avenue in Rocky Hill.
5. Cellco's "Portland" cell site is located approximately 4.1 miles to the east. Cellco antennas exist at the 160-foot level on an existing 160-foot tower at 74 Goodrich Lane in Portland.

Question No. 5

Provide a multi-signal level propagation plot, at a scale of 1:40,000, depicting coverage from existing sites and the proposed site. Depict and label major roads on the plots.

Response

The plots requested are included in Attachment 2.

Question No. 6

Provide specifications of the equipment building or cabinets to be installed at the proposed site. What type of emergency power system will be used at the site?

Response

Attachment 3 contains the specifications for the equipment Cellco intends to install at the Cromwell sell site. Back-up power will be provided by batteries and an emergency generator installed inside the equipment shelter.

Question No. 7

Did Cellco have a search ring in this area prior to the filing of this application? If so, provide a map depicting the search ring and describe the properties and/or structures identified for possible use.

Response

Yes. Cellco issued a PCS fill-in search ring centered around the T-Mobile monopole at 207 West Street in Cromwell in February of 2007. See Attachment 4.

CERTIFICATE OF SERVICE

I hereby certify that on the 17th day of September 2007, a copy of the foregoing was sent,

postage prepaid, to:

Sprint Nextel Corporation

Thomas J. Regan, Esq.

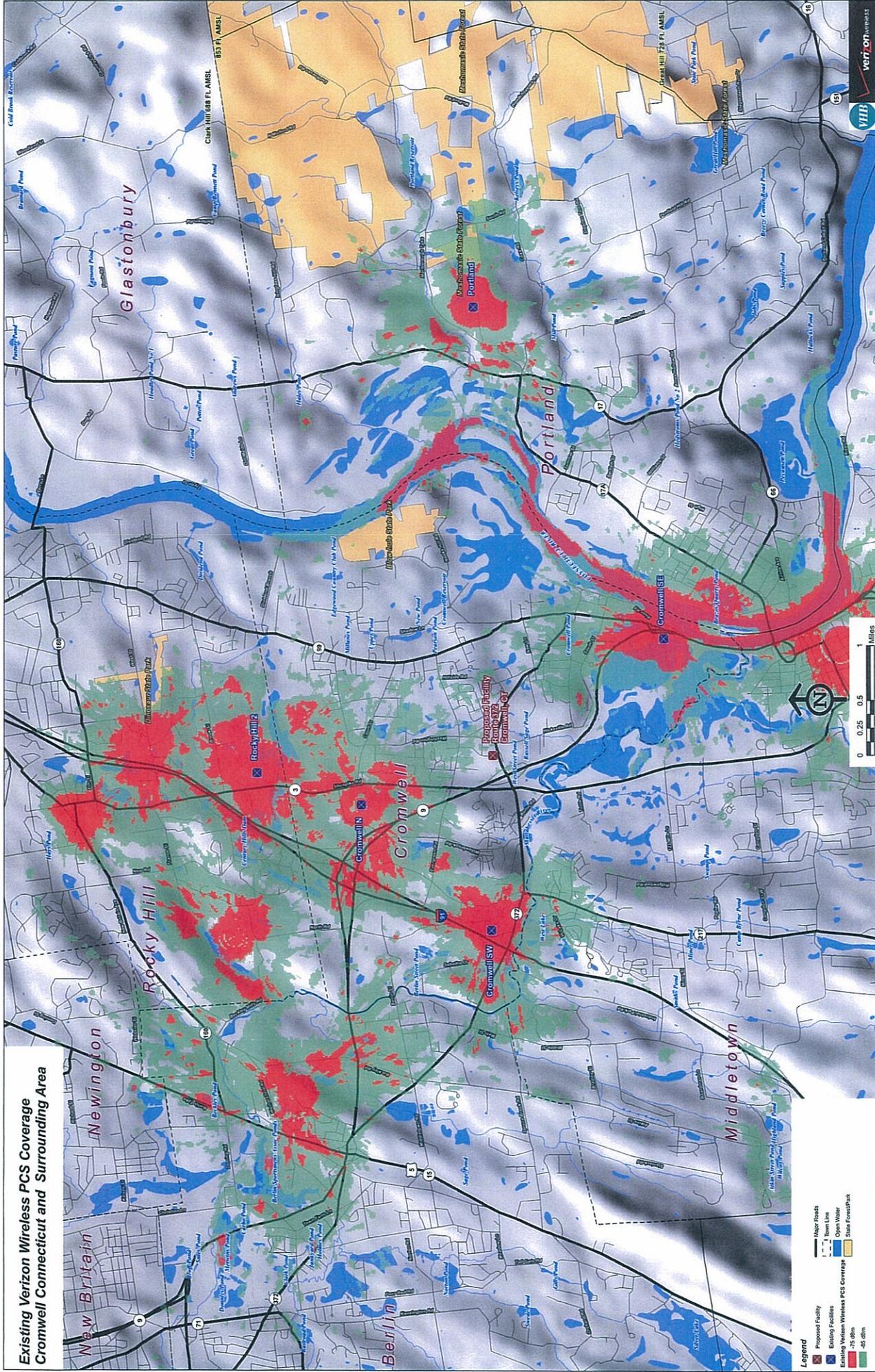
Brown, Rudnick, Berlack, Israels, LLP

CityPlace I, 38th Floor

Hartford, CT 06103-3402


Kenneth C. Baldwin

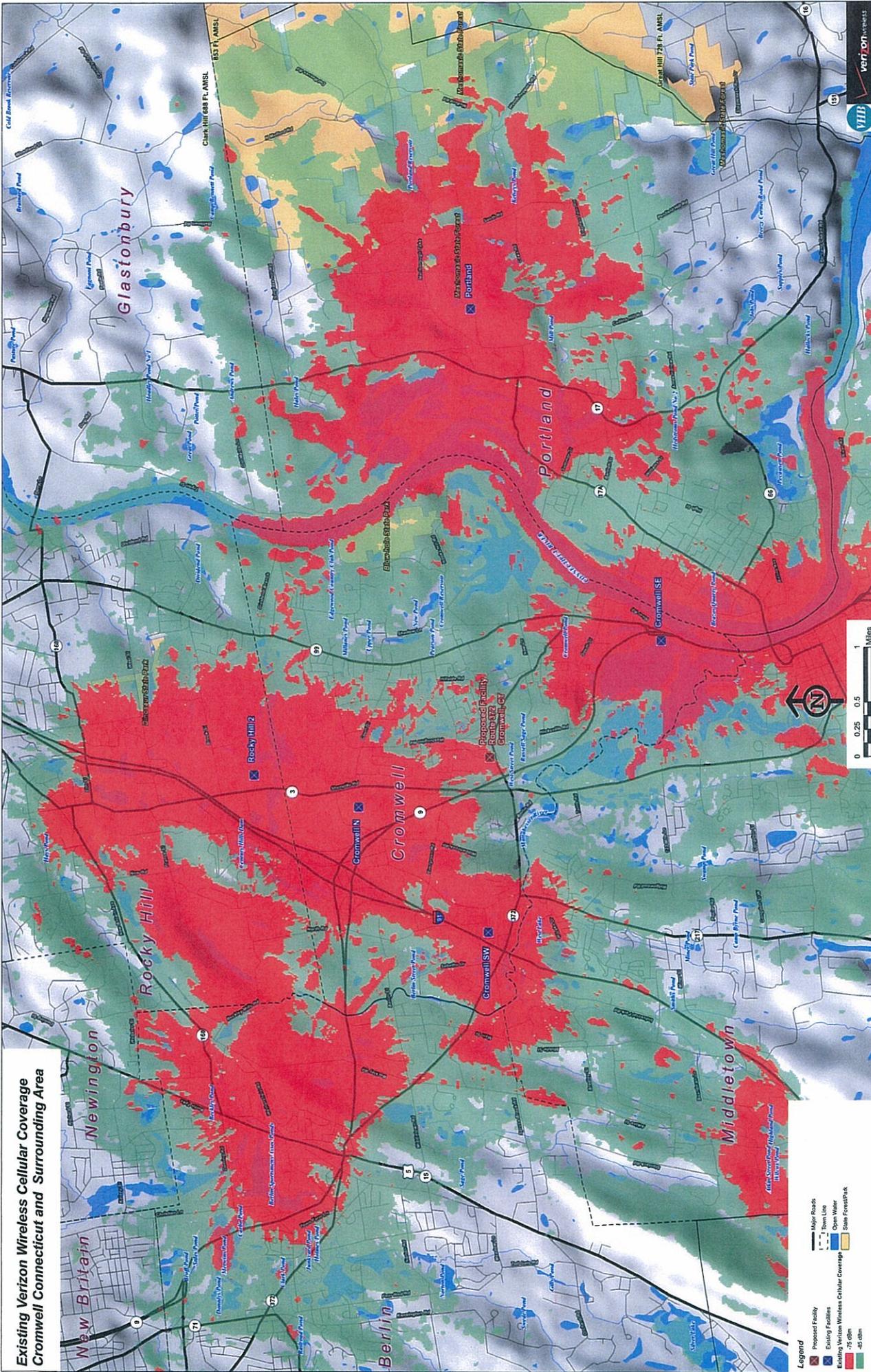
**Existing Verizon Wireless PCS Coverage
Cromwell Connecticut and Surrounding Area**



- Legend**
- Proposed Facility
 - Existing Facility
 - Existing Verizon Wireless PCS Coverage
 - 4G LTE
 - 3G
 - 2G
 - Major Roads
 - Term Line
 - Open Water
 - State Forest/Park



**Existing Verizon Wireless Cellular Coverage
Cromwell Connecticut and Surrounding Area**

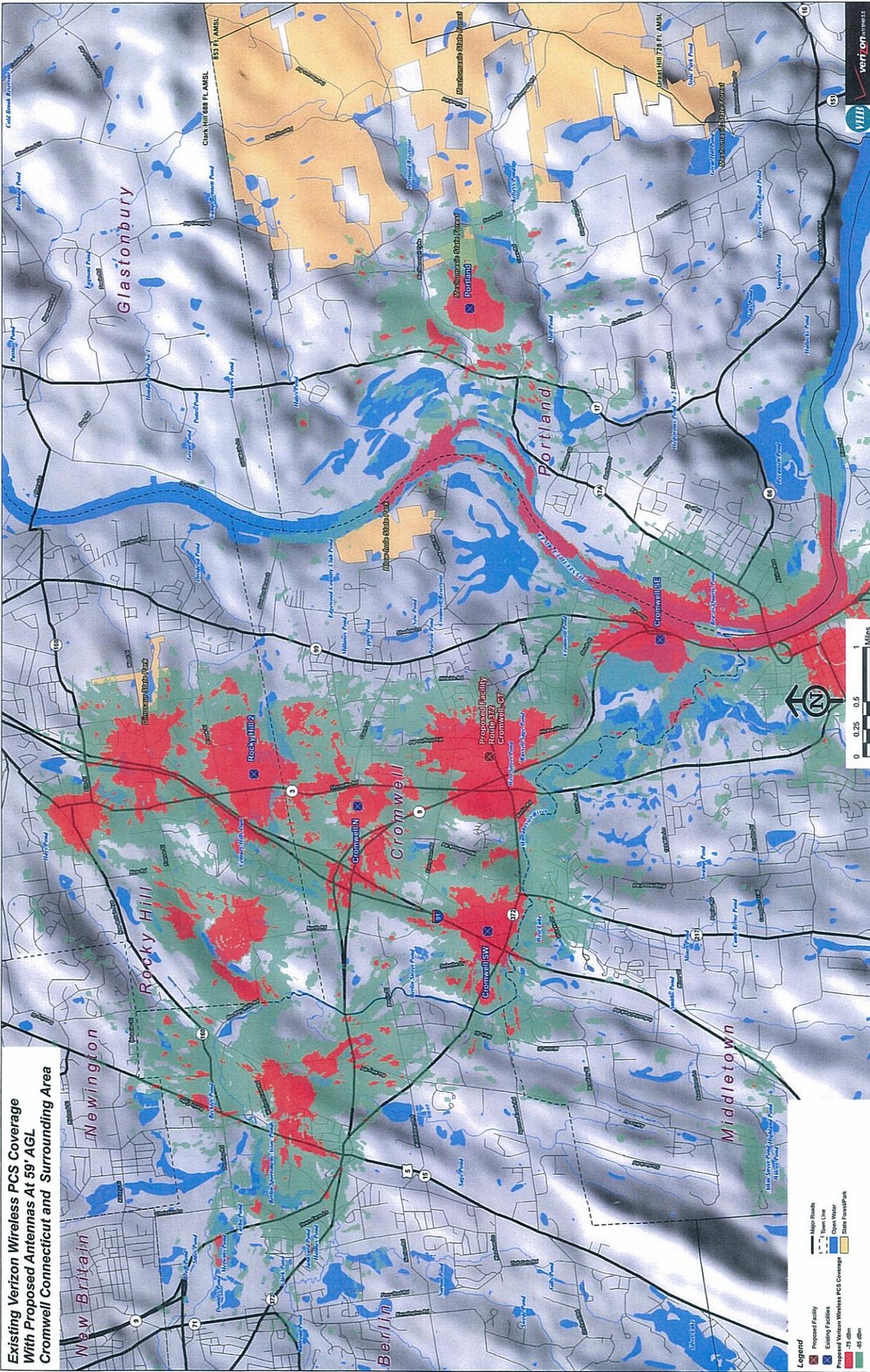


- Legend**
- Proposed Facility
 - Existing Facilities
 - Existing Verizon Wireless Cellular Coverage
 - 75 dBm
 - 65 dBm
 - Major Roads
 - Interstate
 - State Route
 - Open Water
 - State Forest/Park

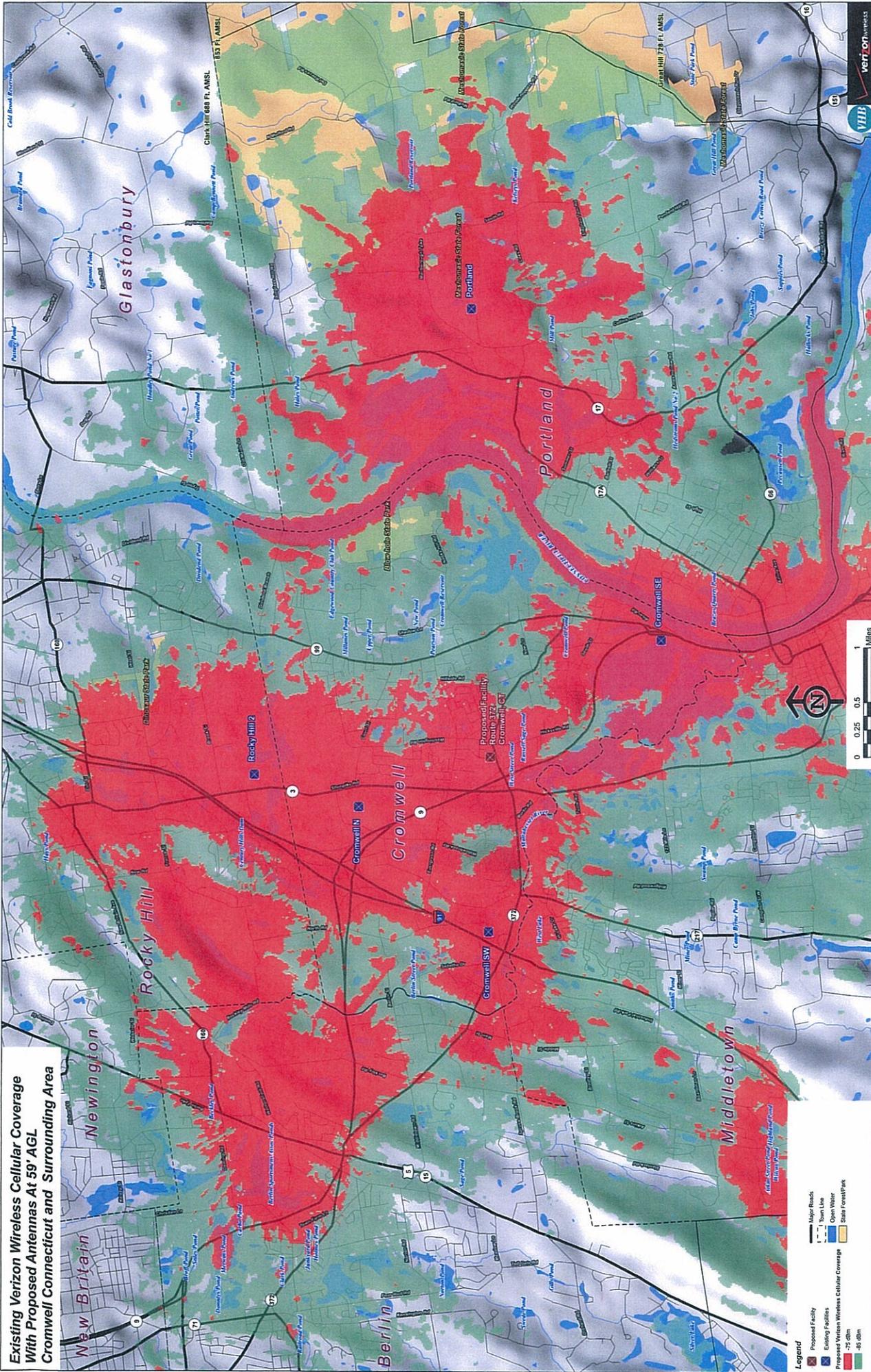
0 0.25 0.5 1 Miles



**Existing Verizon Wireless PCS Coverage
With Proposed Antennas At 59' AGL
Cromwell Connecticut and Surrounding Area**



**Existing Verizon Wireless Cellular Coverage
With Proposed Antennas At 59' AGL
Cromwell Connecticut and Surrounding Area**



- Legend**
- Proposed Facility
 - Existing Facilities
 - Proposed Verizon Wireless Cellular Coverage
 - 4G Sites
 - 5G Sites
 - Major Roads
 - Town Line
 - Open Water
 - State Forest/Park



Flexent® Modular Cell 4.0

Description

The *Flexent®* Modular Cell 4.0 builds on our vast experience in spread spectrum to deliver the most flexible, future-focused base station on the market. This base station introduces the *Flexent® OneBTS™* common platform digital shelf into CDMA networks. This shelf, with a field upgrade, will eventually support both CDMA and UMTS in the frame.

The *Flexent* Modular Cell 4.0 packs 6 carriers/3 sectors into an outdoor cabinet that is the same size as the *Flexent* Modular Cell 3.0. The smaller indoor cabinet will support 4 carriers/3 sectors. In addition to capacity gains, this digital shelf will support additional enhancements as we bring them to market.

Our Bell Labs developers are working on Intelligent Antennas, Transmit Diversity, and BLAST technologies. These technologies will enhance the capacities and capabilities of the *Flexent* Modular Cell 4.0. Each of the features can be added to the *Flexent* Modular Cell 4.0 in the field - in a single maintenance window. This means that you can deploy the *Flexent* Modular Cell 4.0 today and add capacity and capabilities whenever they are available and when you need them. It means that the future is available on your timetable, when your business plan calls for them, no matter what your business plan might be.

Value description

The *Flexent* Modular Cell 4.0, with its future-proof design, enables easy and cost-effective network upgrades to:

- Add additional capacity, when needed, to support network growth
- Support additional functionality and advanced capabilities

Features

Investment Protection

- Increase capacity, when you need it, to grow your network
- Add advanced features and capabilities, with quick and easy installation

Scalability

- Support up to 6 carriers/3 sectors in a single outdoor cabinet
- Support up to 4 carriers/3 sectors in the indoor cabinet

Reduced Footprint

- Provides additional capacity and functionality — in the same footprint as the *Flexent* Modular Cell 3.0

BLAST: Bell Labs Layered Space-Time

*An Architecture for Realizing Very High Data Rates
over Fading Wireless Channels*

What is BLAST?

BLAST is an extraordinarily bandwidth-efficient approach to wireless communication which takes advantage of the spatial dimension by transmitting and detecting a number of independent co-channel data streams using multiple, essentially co-located, antennas.

The central paradigm behind BLAST is the exploitation, rather than the mitigation, of multipath effects in order to achieve very high spectral efficiencies (bits/sec/Hz), significantly higher than are possible when multipath is viewed as an adversary rather than an ally.

Using our laboratory testbed, the BLAST team recently demonstrated what we believe to be **unprecedented wireless spectral efficiencies, ranging from 20 - 40 bps/Hz**. By comparison, the efficiencies achieved using traditional wireless modulation techniques range from around 1 - 5 bps/Hz (mobile cellular) to around 10 - 12 bps/Hz (point-to-point fixed microwave systems). In the 30 kHz bandwidth utilized by our research testbed, the raw spectral efficiencies realized thus far in the lab correspond to payload data rates ranging from roughly 0.5 Mb/s to 1 Mb/s. By contrast, the data rate achievable in this bandwidth using typical traditional methods is only about 50 kbps.

This [high-level overview](#) discusses BLAST in more detail.

[Blast Measurements](#) have been done and reported.

[Blast in the Press](#)

For additional information, contact rav@bell-labs.com.

BLAST-related open literature

- D. Chizhik, G. Foschini, M. Gans, and R. Valenzuela, *Keyholes, Correlations, and Capacities of Multielement Transmit and Receive Antennas*, IEEE Transaction on Wireless Communications. Vol. 1, No. 2, April 2002, pp 361-368.
- G. J. Foschini, M. J. Gans, *Capacity when Using Multiple Antennas at Transmit and Receive Sites and Rayleigh Faded Matrix Channel is Unknown to the Transmitter*, Advances in Wireless Communications, Ed. J. M Holtzman and M. Zorzi, Kulwer Academic Publishers, 1998.
- G. D. Golden, G. J. Foschini, R. A. Valenzuela, P. W. Wolniansky, *Detection Algorithm and Initial Laboratory Results using the V-BLAST Space-Time Communication Architecture*, Electronics Letters, Vol. 35, No. 1, Jan. 7, 1999, pp. 14-15.
- G. J. Foschini, G.D.Golden, R.A.Valenzuela, P.W.Wolniansky, *Simplified Processing for Wireless Communication at High Spectral Efficiency*, IEEE Journal on Select Areas in Coummunications, Vol. 17, No.

11, 1999.

- D-S. Shiu, G.J. Foschini, M.J. Gans, J.M.Kahn, Fading Correlation, and its Effect on the Capacity of Multielement Antenna Systems, IEEE Transactions on Communications, Vol. 48, No. 3, 2000.
 - P. W. Wolniansky, G. J. Foschini, G. D. Golden, R. A. Valenzuela, *V-BLAST: An Architecture for Realizing V High Data Rates Over the Rich-Scattering Wireless Channel*, invited paper, Proc. ISSSE-98, Pisa, Italy, Sept. 29, 1998.
[[PostScript \(839 kb\)](#)] [[gzipped PostScript \(71 kb\)](#)] [[PDF \(46 kb\)](#)]
 - G. D. Golden, G. J. Foschini, P. W. Wolniansky, R. A. Valenzuela, *V-BLAST: A High Capacity Space-Time Architecture for the Rich-Scattering Wireless Channel*, Proc. Int'l Symposium on Advanced Radio Technology, Boulder, CO, Sept. 10, 1998.
 - G. D. Golden, G. J. Foschini, R. A. Valenzuela, P. W. Wolniansky, *V-BLAST: A High Capacity Space-Time Architecture for the Rich-Scattering Wireless Channel*, Fifth Workshop on Smart Antennas in Wireless Mobile Communications, Stanford Univ., July 23-24, 1998.
 - G. J. Foschini and M. J. Gans, *On Limits of Wireless Communications in a Fading Environment When Using Multiple Antennas*, Wireless Personal Communications, Volume 6, No. 3, March 1998, p. 311.
 - G. J. Foschini and R. A. Valenzuela, *Initial Estimation of Communications Efficiency of Indoor Wireless Channels*, Wireless Networks, 3 (1997) pp 141-154.
 - G. J. Foschini, *Layered Space-Time Architecture for Wireless Communication in a Fading Environment When Using Multiple Antennas*, Bell Labs Technical Journal, Vol. 1, No. 2, Autumn 1996, pp 41-59.
 - G. J. Foschini and M. J. Gans, *Capacity When Using Diversity at Transmit and Receive Sites and the Matrix Channel is Unknown at the Transmitter*, Proceedings of the 6-th WINLAB Workshop on 3rd Generation Wireless Information Networks, March 20-21, 1996, New Brunswick, New Jersey.
-

BLAST- Measurement Literature

- M. Gans et. al., *Multielement Antenna Systems Capacity Measurements at 2.44GHz in Suburban Outdoor Environment*, IEEE Vehicular Technology Conference, Spring 2001.
- J. Ling, et. al., *Multiple Transmit Multiple Receive (MTMR) Capacity Survey in Manhattan*, Electronic Letters, Vol. 37, No. 16, August 2001, pg. 1041.
- D. Chizhik, J. Ling, P. Wolniansky, R. Valenzuela, N. Costa, and K. Huber, *Multiple Input Multiple Output Measurements and Modeling in Manhattan*, Submitted to JSAC Special Issue on MIMO.

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Last updated 6/5/00

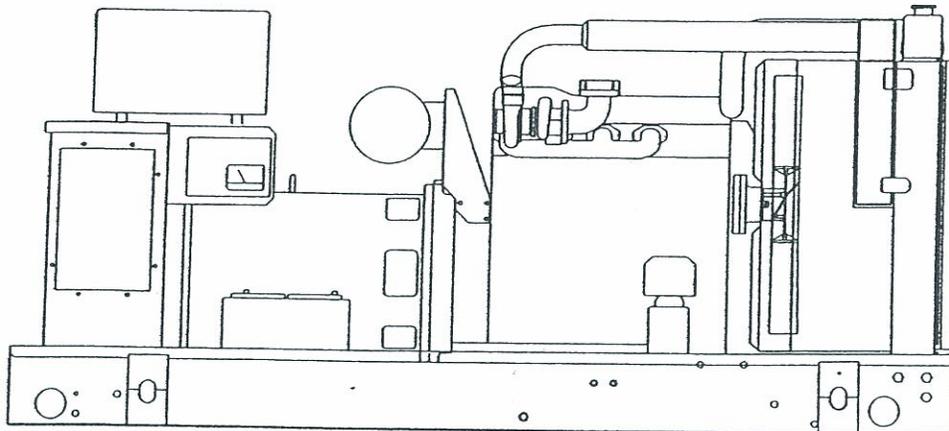
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SD060

Liquid Cooled Diesel Engine Generator Sets

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

Prime Power Rating
48KW 60 Hz / 48KVA 50 Hz



Power Matched
GENERAC 3.9DTA ENGINE
Turbocharged

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 MG1-22 EVALUATION
 - ✓ MOTOR STARTING ABILITY
 - ✓ SHORT CIRCUIT TESTING
 - ✓ UL 2200 COMPLIANCE AVAILABLE
- **SOLID-STATE, FREQUENCY COMPENSATED 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 an 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

SD060

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, paragraph 5-13.2.6. Generator rating and performance in accordance with ISO8528-5, BS5514, SAE J1349, ISO3046 and DIN6271 standards.

EXCITATION SYSTEM

- BRUSHLESS
- Magnetically coupled DC current ✓
 - Eight-pole exciter w/ battery-driven field boost ✓
 - Mounted outboard of main bearing ✓
- PERMANENT MAGNET EXCITER
- Eighteen pole exciter ✓
 - Magnetically coupled DC current ✓
 - Mounted outboard of main bearing ✓
- REGULATION
- Solid-state ✓
 - ±1% regulation ✓

GENERATOR FEATURES

- Four pole, revolving field generator is directly connected to the engine shaft through a heavy-duty, flexible disc for permanent alignment.
- Generator meets temperature rise standards for class "F" insulation as define by NEMA MG1-32.6 and NEMA1-1.65, while the insulation system meets the requirements for the higher class "H" rating.
- All models have passed a three-phase symmetrical short circuit test to assure system protection and reliability.
- Unit is tested with an oscillograph for motor-starting ability by measuring instantaneous voltage dip.
- All models utilize an advanced wire harness design for reliable interconnection within the circuitry.
- Magnetic circuit, including amortisseur windings, tooth and skewed stator design, provides a minimal level of waveform distortion and an electromagnetic interference level which meets accepted requirements for standard AM radio, TV, and marine radio telephone applications.
- Voltage waveform deviation, total harmonic content of the AC waveform, T.I.F. (Telephone Influence Factor) and non-linear loading have been evaluated to acceptable standards in accordance with NEMA MG1.
- Alternator is self-ventilated and drip-proof constructed.
- Fully life-tested protective systems, including "field circuit and thermal overload protection" and optional main-line circuit breakers are capable of handling full output capacity.
- System Torsional acceptability confirmed during Prototype Testing.

ENGINE SPECIFICATIONS

MAKE	GENERAC
MODEL	3.9DTA
CYLINDERS	4 in-line
DISPLACEMENT	3.9 Liter (238 cu.in.)
BORE	104 mm (4.09 in.)
STROKE	115 mm (4.52 in.)
COMPRESSION RATIO	16.5:1
INTAKE AIR	Turbocharged/Aftercooled
NUMBER OF MAIN BEARINGS	5
CONNECTING RODS	4-Drop Forged Steel
CYLINDER HEAD	Cast Iron Overhead Valve
PISTONS	4- Aluminum Alloy
CRANKSHAFT	Hardened, Steel

VALVE TRAIN

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

ENGINE GOVERNOR

- MECHANICAL (Gear Driven)
- Standard
 - FREQUENCY REGULATION, NO-LOAD TO FULL LOAD ... 5.0%
 - STEADY STATE REGULATION
 - ±0.33%
- ELECTRONIC
- Optional
 - FREQUENCY REGULATION, NO-LOAD TO FULL LOAD ... 0.5%
 - STEADY STATE REGULATION
 - ±0.25%

LUBRICATION SYSTEM

TYPE OF OIL PUMP	Gear
OIL FILTER	Full flow, Cartridge
CRANKCASE CAPACITY	18 Litres (19 qts.)
OIL COOLER	Oil to water

COOLING SYSTEM

TYPE OF SYSTEM	Pressurized, Closed Recovery
WATER PUMP	Pre-Lubed, Self-Sealing
TYPE OF FAN	Pusher
NUMBER OF FAN BLADES	7
DIAMETER OF FAN	457 mm (18 in.)
COOLANT HEATER	120V, 1800 W

FUEL SYSTEM

FUEL	#2D Fuel (Min Cetane #40) (Fuel should conform to ASTM Spec.)
FUEL FILTER	Single Cartridge
FUEL INJECTION PUMP	Stanadyne
FUEL PUMP	Mechanical
INJECTORS	Multi-Hole, Nozzle Type
ENGINE TYPE	Direct Injection
FUEL LINE (Supply)	7.94 mm (0.31 in.)
FUEL RETURN LINE	6.35 mm (0.25 in.)
STARTING AID	Glow Plugs

ELECTRICAL SYSTEM

BATTERY CHARGE ALTERNATOR	30 Amps at 24 V
STARTER MOTOR	24 V
RECOMMENDED BATTERY	(2)—12 Volt, 90 A.H., 4DLT
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).

SD060

OPERATING DATA

	STANDBY		PRIME	
	SD060		SD060	
GENERATOR OUTPUT VOLTAGE/KW-60Hz		<u>Rated AMP</u>		<u>Rated AMP</u>
120/240V, 1-phase, 1.0 pf	60	250	48	200
120/208V, 3-phase, 0.8 pf	60	208	48	166
120/240V, 3-phase, 0.8 pf	60	180	48	144
277/480V, 3-phase, 0.8 pf	60	90	48	72
600V, 3-phase, 0.8 pf	60	72	48	58
	NOTE: Consult your Generac dealer for additional voltages.			
GENERATOR OUTPUT VOLTAGE/KVA-50Hz		<u>Rated AMP</u>		<u>Rated AMP</u>
110/220V, 1-phase, 1.0 pf	48	218	38	172
115/200V, 3-phase, 0.8 pf	60	173	48	138
100/200V, 3-phase, 0.8 pf	60	173	48	138
231/400V, 3-phase, 0.8 pf	60	87	48	69
480V, 3-phase, 0.8 pf	60	72	48	58
	NOTE: Consult your Generac dealer for additional voltage			
MOTOR STARTING KVA				
Maximum at 35% instantaneous voltage dip				
with standard alternator; 50/60 Hz	<u>120/208/240V</u>	<u>277/480V</u>	<u>120/208/240V</u>	<u>277/480V</u>
with optional alternator; 50/60 Hz	100/120	117/141	100/120	117/141
	234/281	276/331	234/281	276/331
FUEL				
Fuel consumption—60 Hz	Load			
	gal./hr.	<u>100%</u>	<u>80%</u>	<u>100%</u>
	liters/hr.	4.3	3.6	3.6
Fuel consumption—50 Hz	gal./hr.	16.3	13.5	13.6
	liters/hr.	3.6	3.0	3.0
Fuel pump lift		13.5	11.2	11.3
COOLING				
Coolant capacity	System - lit. (US gal.)	15.9 (4.2)		15.9 (4.2)
	Engine - lit. (US gal.)	6.4 (1.7)		6.4 (1.7)
	Radiator - lit. (US gal.)	9.5 (2.5)		9.5 (2.5)
Coolant flow/min.	60 Hz - lit. (US gal.)	128 (34)		128 (34)
	50 Hz - lit. (US gal.)	107 (28)		107 (28)
Heat rejection to coolant 60 Hz full load	BTU/hr.	170,900		136,700
Heat rejection to coolant 50 Hz full load	BTU/hr.	142,400		113,900
Inlet air to radiator	60 Hz - m ³ /min. (cfm)	204 (7,200)		204 (7,200)
	50 Hz - m ³ /min. (cfm)	170 (6004)		170 (6004)
Max. air temperature to radiator	°C (°F)	54.4 (130)		54.4 (130)
Max. ambient temperature	°C (°F)	48.9 (120)		48.9 (120)
COMBUSTION AIR REQUIREMENTS				
Flow at rated power	60 Hz - cfm	209		168
	50 Hz - m ³ /min.	4.7		3.8
EXHAUST				
Exhaust flow at rated output	60 Hz - m ³ /min. (cfm)	15.5 (549)		12.4 (439)
	50 Hz - m ³ /min. (cfm)	12.3 (434)		10 (353)
Max recommended back pressure	"Hg	1.5		1.5
Exhaust temperature 60 Hz (full load)	°C (°F)	524 (975)		459 (858)
Exhaust outlet size		3"		3"
ENGINE				
Rated RPM	60 Hz	1800		1800
	50 Hz	1500		1500
HP at rated KW	60 Hz	92		74
	50 Hz	73		59
Piston speed	60 Hz - m/min. (ft./min.)	414 (1358)		414 (1358)
	50 Hz - m/min. (ft./min.)	345 (1132)		345 (1132)
BMEP	60 Hz - psi	170		138
	50 Hz - psi	161		130
DERATION FACTORS				
Temperature				
	5% for every 10°C above - °C	25		25
	2.77% for every 10°F above - °F	77		77
Altitude				
	1.1% for every 100 m above - m	1829		1829
	3.5% for every 1000 ft. above - ft.	6000		6000

STANDARD ENGINE & SAFETY FEATURES

SD060

- 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 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 Adapter

OPTIONS

■ OPTIONAL COOLING SYSTEM ACCESSORIES

- Coolant Heater 120V

■ OPTIONAL FUEL ACCESSORIES

- Flexible Fuel Lines
- UL Listed Fuel Tanks
- Base Tank Low Fuel Alarm
- Primary Fuel Filter
- Primary Fuel Filter with Heater

■ OPTIONAL EXHAUST ACCESSORIES

- Critical Exhaust Silencer

■ OPTIONAL ELECTRICAL ACCESSORIES

- Battery, 12 Volt, 135 A.H., 4DLT
- 2A Battery Charger
- 10A Dual Rate Battery Charger
- Battery Heater

■ OPTIONAL ALTERNATOR ACCESSORIES

- Alternator Upsizing
- Alternator Strip Heater
- Alternator Tropicalization
- Voltage Changeover Switch
- Main Line Circuit Breaker

■ CONTROL CONSOLE OPTIONS

- Analog Control "C" Panel (Bulletin 0151160SBY)
- Analog/Digital Control "E" Panel (Bulletin 0161310SBY)

■ ADDITIONAL OPTIONAL EQUIPMENT

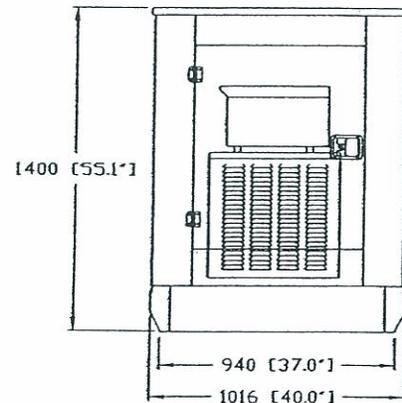
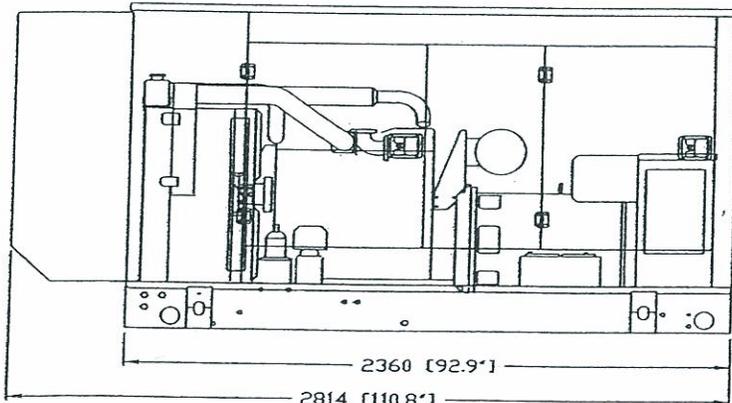
- Automatic Transfer Switch
- Isochronous Governor
- 3 Light Remote Annunciator
- 5 Light Remote Annunciator
- 20 Light Remote Annunciator
- Remote Relay Panels
- Unit Vibration Isolators (Pad/Spring)
- Oil Make-Up System
- Oil Heater
- 5 Year Warranties
- Export Boxing
- GenLink® Communications Software

■ OPTIONAL ENCLOSURE

- Weather Protective
- Sound Attenuated
- Aluminum and Stainless Steel
- Enclosed Muffler

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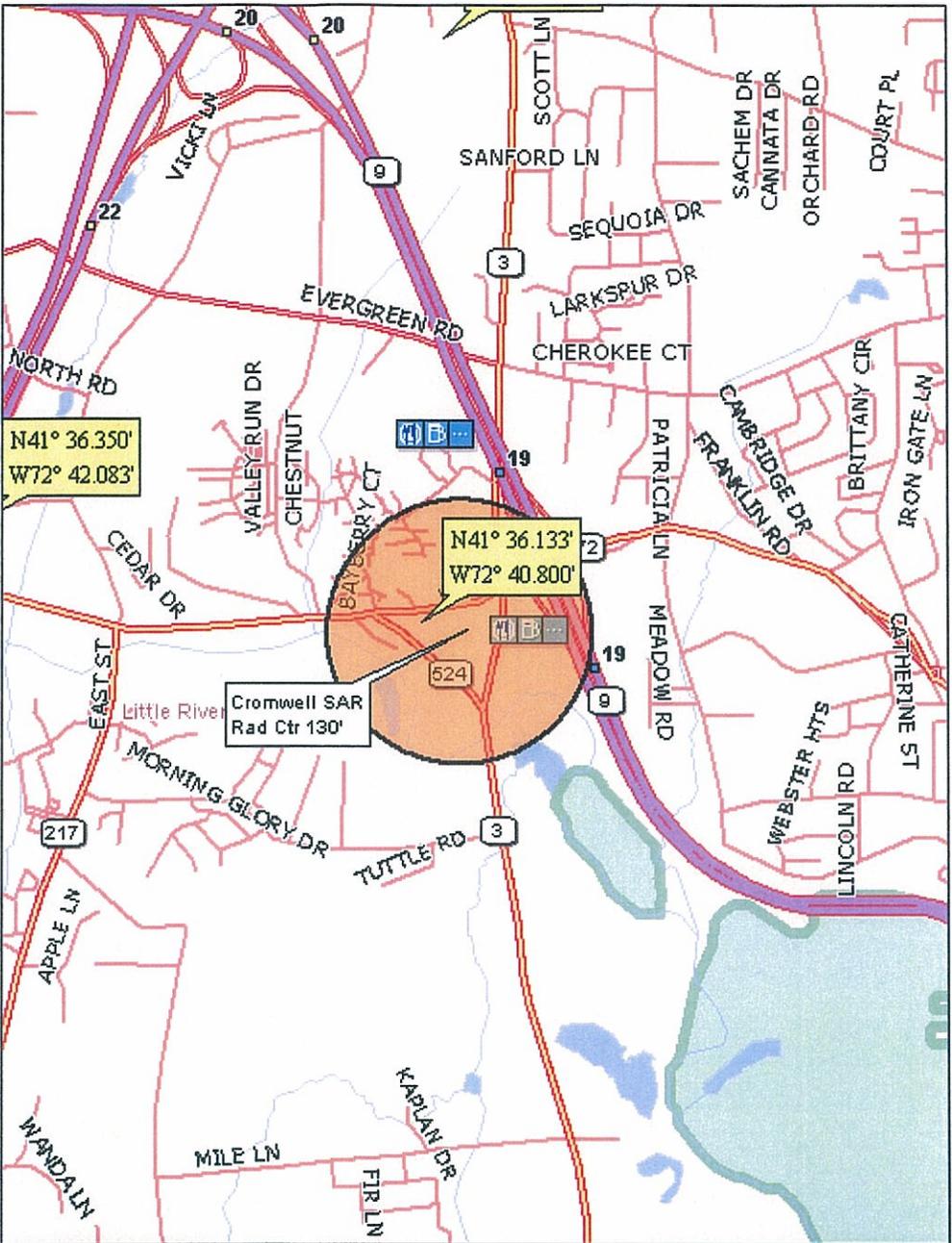
Design and specifications subject to change without notice. Dimensions shown are approximate. Contact your Generac dealer for certified drawings. DO NOT USE THESE DIMENSIONS FOR INSTALLATION PURPOSES.



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