

NOW AVAILABLE

50,000 SF POWERED SHELL DATA CENTER

Catawba County, North Carolina



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Catawba County Data Center Park

Powered Shell Data Center

OVERVIEW

LOCATION

HAZARD AVOIDANCE

UPFIT INSET

ENERGY PAGES

UTILITIES

FLOOR PLANS

MECHANICAL FLOW

MAN-MADE HAZARDS

500 YEAR FLOOD ZONE



For more information,
please contact Doug
Hollidge, or visit the
Five 9s Digital website:

www.five9sdigital.com

OVERVIEW

Catawba County, NC Powered Shell Data Center

Building Size:

Planned 50,000 SF – Expandable to over 100,000 SF

Power:

Duke Energy – Up to 120MW

Water:

Public City Water Supply

Ceiling Height:

Approximately 24' Clear Ceilings

Column Spacing:

Average 48' x 40' Column Spacing

Fiber:

AT&T – Less than 4,800' from Central Office (CO)
DukeNet

Floors:

Concrete slab on grade – 4,000 PSI

Walls:

Concrete Walls

Service Yard:

Exterior space designated for generators and other equipment needs

Parking:

Approximately 40 spaces planned– Additional capacity available

Market:

Western NC, near the New Apple & Google Data Centers, among others

LOCATION

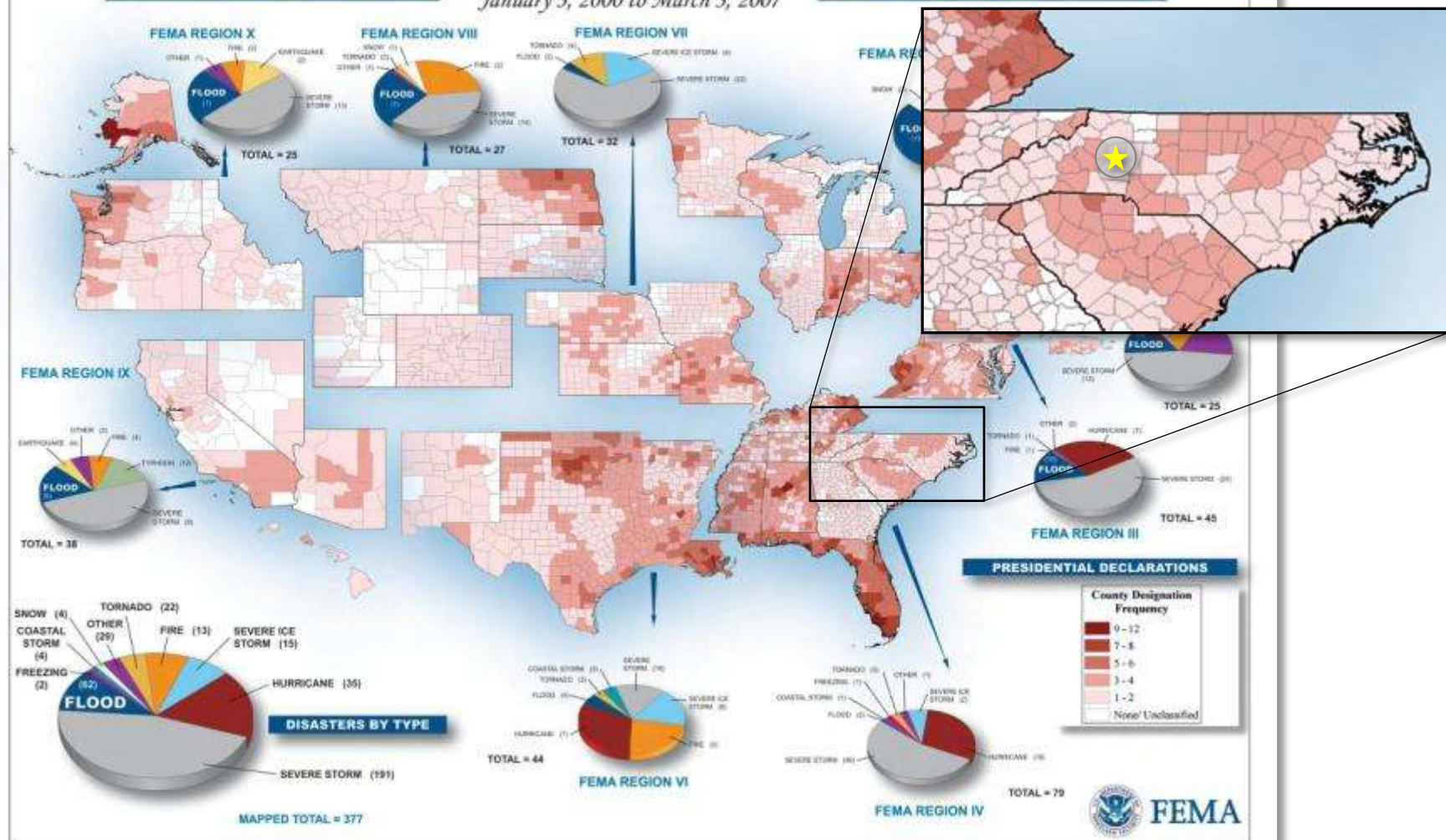
Catawba County, NC Powered Shell Data Center

The Catawba County Powered Shell Data Center is located in Claremont, North Carolina, just off I-40, with close access to I-77 and US-321, within 60 miles of Charlotte, and within Duke Energy's power footprint near Apple's New Data Center and Google's Data Center. The North Carolina data center corridor is home to numerous "enterprise" data centers.



PRESIDENTIAL DISASTER DECLARATIONS

January 3, 2000 to March 3, 2007



Catawba County Powered Shell Data Center Sample Design Criteria Upfit

The following inset provides a detailed look at a conceptual infrastructure layout:

SPECIFICATIONS

BUILDING SHELL

PERFORMANCE CRITERIA

CRITICAL ELECTRICAL SYSTEMS

CRITICAL COOLING SYSTEMS

FIRE DETECTION/PROTECTION

**NETWORK ACCESS &
INFRASTRUCTURE**

STRUCTURED CABLING



SAMPLE DESIGN SPECIFICATIONS

SITE

50,000 SF powered shell building in Catawba County, North Carolina

PROPOSED FLOOR PLAN (DAY 1 READINESS)

- Day One 10,000 SF Data Hall
- 16' Cold aisle pitch
- Approximately 461 24" x 48" cabinets
- CRAC units and PDUs located in galleries along perimeter of data hall
- 24,000+/- SF infrastructure support, CRAC galleries, staging/storage, and circulation areas
- 1,000+/- SF office area
- Shell expansion space for a future Day 2 10,000 SF data hall, for a total of 20,000 SF usable IT white space (excluding galleries)
- Site provides future building expansion pad of up to 100,000 SF+

DAY 1 FLOORPLAN (SQUARE FOOTAGE BREAKDOWN)

• Data Hall:	10,000 SF	• Telecom:	400 SF	
• Galleries:	2,670 SF	• Support:	9,200 SF	
• Office:	1,000 SF		-----	
• Corridors:	1,700 SF	• TOTAL:	24,970 SF	(Measured per BOMA Standards)

NATURAL THREAT RESISTANCE

- No major seismic issue
- Sufficiently inland to minimize coastal hurricane threats
- Located outside of the FEMA 500 Year Flood Plain
- Minimal tornado probability

SAMPLE DESIGN SPECIFICATIONS

ACCIDENTAL THREAT RESISTANCE

- Sufficient distance from major highways, military bases, and aircraft takeoff and landing paths.
- No rail line immediately adjacent to property

INTENTIONAL THREAT RESISTANCE

- Secure exterior equipment yard which obscures direct view and access to exterior mechanical/electrical equipment
- Earthen Berm along street frontage
- Perimeter fencing and access controlled gates

UTILITY - POWER

- Total power capacity is available to support Day 1 and future Day 2 loads plus future building expansion
- N utility, with utility bus sized for Day 2
- Two 100/12.5kV physically distinct power company substations in close proximity to the site
- On-site feeders sized for ultimate total building load
- Existing 100kV power line to site

UTILITY - WATER

- Sufficient capacity for ultimate load (existing shell footprint + expansion area).
- 1M gal/day available to the site
- Water service from public main in Penny Road adjacent to site
- Secondary service available from Kelly Blvd. adjacent to site

SAMPLE DESIGN SPECIFICATIONS**UTILITY - SEWER**

- Sufficient capacity for ultimate build-out of shell and expansion area
- 180,000 gal/day+ available to the site
- Drainage capacity to absorb tropical rain events and unusual local conditions (i.e.: water main rupture or collapse)

NETWORK PROVIDERS AND FIBER

- Fiber of sufficient capacity and numbers
- AT&T and DukeNet can provide multiple (10G-40G) waves.
- AT&T and DukeNet have indicated they can provide whatever bandwidth a client would desire
- Separate fiber providers
- Two separate and distinct paths onto the site and into the building available

STRUCTURAL SHELL

- Tilt-wall concrete and structural steel frame
- Minimum clear height 24' throughout
- Able to resist 90+ mph winds
- Bay configuration (column grid) 48' x 40' average throughout

FLOOR SYSTEM

- Planned 6" slab on grade
- Structural footings provide design rating for 90 mph wind speeds

SAMPLE DESIGN SPECIFICATIONS

EXTERIOR WALLS

- Tilt-wall concrete
- Exterior screening around equipment yard

ROOF SYSTEM

- Design rated for minimum 90 mph wind speeds
- No interior drains or rooftop equipment
- Master label lightning protection system
- Mechanically fastened roof system

INTRUSION DETECTION

- Exterior door monitoring and motion detection
- CCTV video surveillance system covering building perimeter and main entrances at all critical equipment areas
- Direct line to local police department

SECURITY ENTRANCE AND ACCESS CONTROL

- Man-trap at main building entry to control facility access
- Card-entry access control with electronic door locks at main facility entrance and data hall entrances
- Access management system to control access of employees, partners, vendors, and visitors
- Access to server rooms only on “need to access” basis

SAMPLE DESIGN SPECIFICATIONS

SECURITY MANAGEMENT & VIDEO SYSTEM

- Capability to view intrusion and record/control event at critical locations throughout the facility
- Motion detectors to protect critical access areas
- Graphical view and control on all detectors

OFFICE SPACE

- Anticipate five (5) to eight (8) on-site staff
- Minimal office area requirement

WALL FINISHES

- Fully demised cell walls on painted sheetrock
- Painted finish on exposed overhead structure in data floor areas

SAMPLE PERFORMANCE CRITERIA

TIER LEVEL

- Tier III concurrent maintainability for electrical infrastructure
- Tier II mechanical infrastructure
- Client-specific requirements can be accommodated during the design process

SAMPLE PERFORMANCE CRITERIA**ENERGY MONITORING**

- Electrical Power Monitoring System (EPMS) to provide real-time monitoring of electrical data
- EPMS monitoring includes interval and event history storage and reporting
- Monitoring includes MV switchgear, all main and feeder breakers, and UPS switchgears
- All monitoring functions available on each feeder breaker by web browser at assigned IP addresses

FIRE CELLS OR DATA HALLS

- Capable of providing 2 data halls of 10,000 SF each (only one initially)
- Designed as fire cells with 1-hour firewall separation

CRITICAL IT LOAD CAPACITY

- Day 1 critical power density of 150 watts/SF on 10,000 SF of white space
- Total capacity of 1.5 MW
- Expansion available for Day 2 via a second 10,000 SF data hall
- Day 2 shell area is adjacent to Day 1 white space

CRITICAL MEP SYSTEMS

- Mechanical and electrical systems separated from critical primary systems to minimize risk of system disruptions

RAISED FLOOR

- 30" Concrete-filled raised access flooring with 2,000 lb rating
- Rigid bolted stringer understructure assembly, under-floor grounding, and access ramps with safety rails
- Uniform floor load capacity of 550 lbs/SF

SAMPLE CRITICAL ELECTRICAL SYSTEMS

INCOMING POWER DISTRIBUTION & DESIGN

- N utility (utility bus sized for Day 2)
- 2N distribution utilizing independent transformer
- Eight (8) 500kVA PDUs provided (4 per side)
- 800 3-pole, 30 amp breakers providers (400 per side)
- Automatic transfer switches (ATS) provided at each chiller (typical 3)
- ATS also provided at other major mechanical equipment within the equipment yard
- Elements of Day 2 infrastructure are included in Day 1 scope such that facility shutdown is not required for Day 2 build-out
- Exterior grounding ring, bonded to the facility principal ground busses

UPS

- 1500 kW static UPS systems in N+1 configuration
- Four (4) modules at 500kW each with flooded vented cell 15 minute lead acid storage batteries
- 15 minutes of capacity at full load

UPS DISTRIBUTION

- UPS system outputs to Day 1 data hall via critical distribution switchgear and PDUs and RPPs on the floor

SAMPLE CRITICAL COOLING SYSTEMS**DESIGN AND CONFIGURATION**

- N+1 configuration of air-cooled chillers
- N+20% CRAC unit distribution for Day 1 white space
- N+1 CRAC unit configuration for electrical room
- Raise floor plenum for under-floor air distribution
- All chilled water equipment shall be installed in equipment yard and protected by NEMA 4X enclosures

CHILLERS

- N+1 air-cooled chillers, 3 chillers at 275 tons each
- N+1 chilled water pumps, 3 at 475 GPM/20HP each

CRACS

- Twelve (12) 50-ton CRAC units in mechanical/electrical galleries along the perimeter of IT space
- 62F discharge, plug fans, no heat and no humidification
- Two (2) 35-ton CRAC units serving electrical room

SAMPLE CRITICAL BACKUP SYSTEMS**DIESEL GENERATORS**

- Three (3) 1.5MW medium voltage primary duty diesel engine generators
- Capable of supporting Day 1 total building load in an N+1 configuration
- Configured to expand to Day 2 total load in an N+1 configuration
- No provisions for EPA Tier 4 emissions requirements

SAMPLE CRITICAL BACKUP SYSTEMS**DIESEL FUEL**

- Generators will be equipped with 3,000 gallon sub-base or “belly” tanks to provide 72-hour run time

LOAD BANKS

- Electrical load bank for testing and associated switchgear to test UPS and engine generators

SAMPLE FIRE DETECTION / PROTECTION**DAY 1 IT AREA**

- Pre-action dry pipe fire sprinklers
- VESDA smoke detection
- VESDA smoke detectors installed below and above raised floor
- Capability to detect all fire events and extinguish the event
- Direct line to local fire department

INFRASTRUCTURE & OFFICE SUPPORT AREAS

- Wet-pipe systems in office and office support areas
- A pre-action system will protect the electrical infrastructure and interior mechanical areas

SAMPLE NETWORK ACCESS & INFRASTRUCTURE**REGIONAL LANDSCAPE****Internet and Private Line**

- Multiple Tier 1 telecom providers (minimum 2) within the area/city
- Full redundant and diverse fiber infrastructure/central offices
- No single point of failure and no shared components

DC FACILITY - NETWORK INFRASTRUCTURE**Internet, Private Line, and LEC**

- Multiple Tier 1 telecom providers (minimum 2) into the facility
- Fully redundant and diverse fiber facility infrastructure with no single point of failure
- Capability to expand to more telecom providers with additional alternate paths

DC FACILITY - INTERNAL NETWORK INFRASTRUCTURE**Carrier Entrance**

- Two (2) independent, fully diverse and dedicated telecom interconnected rooms located outside the computer room
- Rooms are located at opposite ends of the building

SAMPLE STRUCTURED CABLING**STRUCTURED CABLING**

- Backbone cabling to horizontal distribution areas
- Zone distribution to rack aisles / equipment areas

Claremont Data Shell

10,000 sf Data Hall, 150 Watts/sf

Data Hall 10K @150W

ITEM	QTY @100% DEMAND	UNIT	REQUIRED COOLING LOADS (TONS)	KW INPUT @ 100% DEMAND	TOTAL KW INPUT @ 100% DEMAND	OPERATING HOURS PER YEAR	KW-HRS	RATE PER KW-HR	ENERGY COST PER YR	% OVERALL COST
IT LOAD	10,000.00	SQFt	EAS	0.15	1,500.00	8760	13,140,000.00	0.05	\$ 657,000.00	44.10%
UPS/PDU & Electrical Distribution	1,500.00	KW	EAS	0.15	225.00	8760	1,971,000.00	0.05	\$ 98,550.00	6.61%
Air Cooled Chillers	2	EA	275	445	890.00	8760	7,796,400.00	0.05	\$ 389,820.00	26.16%
Chiller Water Pumps	2	EA	20	18	36.00	8760	315,360.00	0.05	\$ 15,768.00	1.06%
CRAC Units	10	EA	50	65	650.00	8760	5,694,000.00	0.05	\$ 284,700.00	19.11%
CRAC Units	1	EA	35	33	33.00	8760	289,080.00	0.05	\$ 14,454.00	0.97%
Air Handling Units	1	EA		22.5	22.50	8760	197,100.00	0.05	\$ 9,855.00	0.66%
Exhaust Fans	2	EA		4	8.00	8760	70,080.00	0.05	\$ 3,504.00	0.24%
		EA			-		-	0.05	\$ -	0.00%
Lighting	48000	SQFT	EAS	0.00125	60.00	4380	262,800.00	0.05	\$ 13,140.00	0.88%
Fire Alarm	2	EA		2	4.00	8760	35,040.00	0.05	\$ 1,752.00	0.12%
Security System	1	EA		2	2.00	2920	5,840.00	0.05	\$ 292.00	0.02%
Office/Conference/Misc	1	EA	EAS	5	5.00	4380	21,900.00	0.05	\$ 1,095.00	0.07%
TOTAL					3,435.50	90,520.00	29,798,600.00		\$ 1,489,930.00	100.00%

PUE= TOTAL FACILITY POWER/IT EQUIPMENT POWER

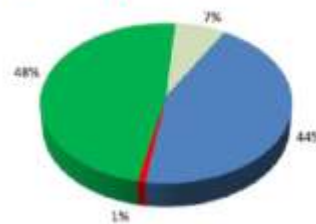
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TOTAL KW-HR IT	13,140,000.00
TOTAL KW-HR FACILITY	29,798,600.00

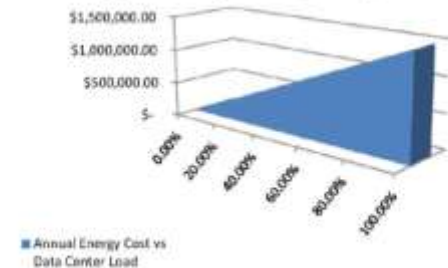
CATEGORY	% OF BUILDING DEMAND	ANNUAL ENERGY COST
Computing	44.10%	\$ 755,550.00
Lighting	0.88%	\$ 13,140.00
Cooling	47.96%	\$ 714,597.00
Other	7.06%	\$ 6,643.00
Total	100.00%	\$ 1,489,930.00

% OF BUILDING DEMAND

■ Computing ■ Lighting ■ Cooling ■ Other



Energy Consumption @150w/sf



RATE SCHEDULE

Catawba County, NC Powered Shell Data Center



Rate Schedule:

**OPT-H-NC
General Service**

Prepared by Harry Poovey
Duke Energy Economic Development

On-Peak LF: 100%
Hours Use: 723
Annual kWh: 29,798,600

Month	On - Peak Max. kW	Off- Peak Max. kW	On - Peak kWh	Off - Peak kWh	Rate Schedule OPT
Jan	3,436	3,436	522,272	1,960,945	\$ 119,531.59
Feb	3,436	3,436	522,272	1,960,945	\$ 119,531.59
Mar	3,436	3,436	522,272	1,960,945	\$ 119,531.59
Apr	3,436	3,436	522,272	1,960,945	\$ 119,531.59
May	3,436	3,436	522,272	1,960,945	\$ 119,531.59
Jun	3,436	3,436	594,428	1,888,789	\$ 137,516.75
Jul	3,436	3,436	594,428	1,888,789	\$ 137,516.75
Aug	3,436	3,436	594,428	1,888,789	\$ 137,516.75
Sep	3,436	3,436	594,428	1,888,789	\$ 137,516.75
Oct	3,436	3,436	522,272	1,960,945	\$ 119,531.59
Nov	3,436	3,436	522,272	1,960,945	\$ 119,531.59
Dec	3,436	3,436	522,272	1,960,945	\$ 119,531.59
Totals			6,555,888	23,242,712	\$ 1,506,319.75

*Rates effective January 1, 2010
Calculations include sales tax*

Annual Cost for OPT:	\$ 1,506,319.75
Average Cost/kWh:	\$ 0.0506

With RIDER "EC" Billing Credits

	Annual Cost	Rider EC Savings	Avg. Cost per kWh
Year 1	\$ 1,205,055.80	\$ 301,263.95	\$ 0.0404
Year 2	\$ 1,280,371.79	\$ 225,947.96	\$ 0.0430
Year 3	\$ 1,355,687.78	\$ 150,631.98	\$ 0.0455
Year 4	\$ 1,431,003.76	\$ 75,315.99	\$ 0.0480

Cumulative Savings	\$ 753,159.88
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Four-Year Average Cost per kWh	\$ 0.0442
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Rates are based on assumptions in demand and energy usage patterns. Actual costs will vary.



Duke Energy Carolina Service Area

Power availability is excellent. Duke Energy has multiple 12.5kV three Phase lines within the Claremont International Business Park, as well as a single circuit 100kV line just northeast of the Powered Shell Data Center. Approximately 8,500 feet northeast of the site is a dual circuit 100kV line which provides power to the Claremont Retail 100/12.5kV dual transformer electrical station. There is an existing electrical transmission right of way from the dual circuit 100kV line into the park. Up to 120 MW of power could be delivered to the building or to-be-built buildings via the 100kV line.

For an electrical load up to 10 MW, Duke Energy could potentially provide power from the existing 12.5kV system. For a 10 to 120 MW need, Duke Energy would typically provide service from a 24.9kV or 100kV system. At the 10+ MW level, a 24.9kV transformer could potentially be installed just northeast of the site, or a 100kV tap line could be built from the existing 100kV line in the park to a new substation on, or adjacent to, the site.

The double circuit 100kV line, providing power to the local 100/12.5kV electrical substation, is the Hickory Black line and Hickory White line. The following is the 7 year outage history for these 100kV lines:

Hickory Black 100kV - Uptime history of 99.99991
Hickory White 100kV - Uptime record of 99.99997

Relaying at the existing 100/12.5kV substation is set up to protect Duke Energy equipment. Duke has CTs on the high side of the transformer set up to trip to prevent damage to the transformer bank and substation equipment.

If the end user requires capacity which would require a 100kV delivery, Duke Energy would anticipate a 6-12 month schedule to build the substation and deliver service. If an end user has a more aggressive schedule, Duke Energy could potentially upgrade and utilize the existing 12.5kV system and plan for a conversion once a new substation and line are in place to the client's facility. Duke typically has 100/12.5kV and 100/24.9kV transformers available in the capacity range discussed for

this project. This could provide for an expedited delivery in less than 6 months if required. Duke Energy is committed to make every effort to match the end user's schedule.

Duke Energy typically provides a single electrical delivery point, at a single voltage, with no delivery cost to the customer. If dual feed is required, or electrical deliveries beyond what are considered "standard electrical service," these can be made available under extra facilities. Extra facility charges are typically billed on a monthly basis. Once Duke Energy fully understands a client's wishes related to "desired electrical service options," an evaluation can take place to determine if any extra facility charges will apply. At this time any estimated cost associated with requested extra facilities could be provided.

45.7% of Duke Energy's power is generated at Nuclear Generation Plants, which gives the end user the benefit of pricing less susceptible to commodities prices swings than power produced by coal and gas generation sources. Nuclear generation also helps minimize the carbon footprint. In addition to nuclear generation, Duke Energy plans to generate 12.5% of its power from renewable resources by 2021.

Power cost for high load factor loads above 1 MW can be in the low 4 cents per kWh range (first year cost with Rider EC credits). To qualify for EC credits a user must have 1 MW service or greater. The credit lowers the power cost for the first four years. This is one of the lowest cost power locations on the east coast.



WATER

Water service to the site is provided by the City of Claremont, NC. The city gets its water through agreements with the Cities of Conover and Hickory, NC who obtain their water from the Catawba River Basin. There is a main dual feed line serving the city from Conover with valves at Highway 70 and Main Street as well as at Rockbarn. The City owns and maintains two water towers (300,000 & 250,000 gal) in close proximity to the site. Water serves the site via a 12" main in Penny Road and Kelly Blvd. This line is a looped system from three diverse connection points providing redundancy. This 12" main has a direct feed from the water tower as well as Hwy 70. The 12" line can provide approximately 2,500 gpm and 70-100 psi. Capacity in the system is approximately 1.0 million gallons per day (MGD) available to the site. Although there is ample capacity in place to service this facility, additional capacity is available and could be requested through an agreement with the City of Hickory if needed in the future.

SEWER

Sewer service to the site is provided by the City of Claremont, NC. The city operates two sewer treatment plants (400,000 and 100,000 gal/day) with a total of 500,000 gal/day of capacity. The 400,000 gal/day plant serves this site. There is a 10" main line along Penny Road and Kelly Blvd that ties directly to an 18" main approximately 1,000 feet from the site. This 18" main then ties into a 24" main further down the line. The city currently has 160,000 – 180,000 gal/day of available capacity with no prospects in line to acquire any of this capacity. Our estimated sewer demand for this entire facility is approximately 40,000 – 45,000 gal/day, so there is sufficient capacity available. Should additional sewer capacity be needed in the future, the town could expand the current plant by doubling its size. A more long-range plan that is being discussed would allow the city to tie onto a Super Discharge Line that would run to the City of Hickory, providing over 1M gal/day capacity.

FIBER

AT&T

For Additional Information:

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DukeNet

For Additional Information:

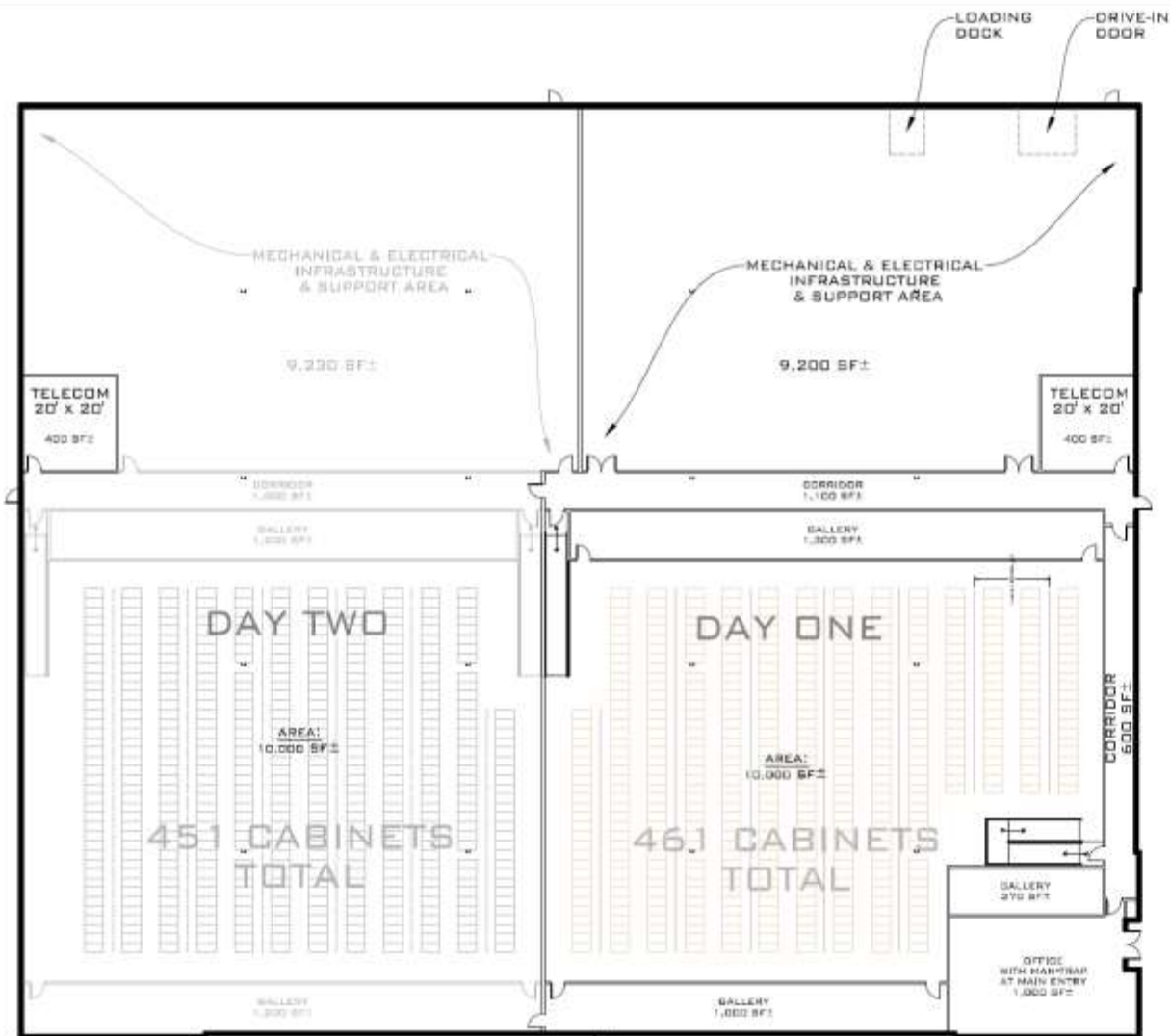
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PRELIMINARY FLOOR PLAN
CLAREMONT DATA SHELL

INCORPORATING

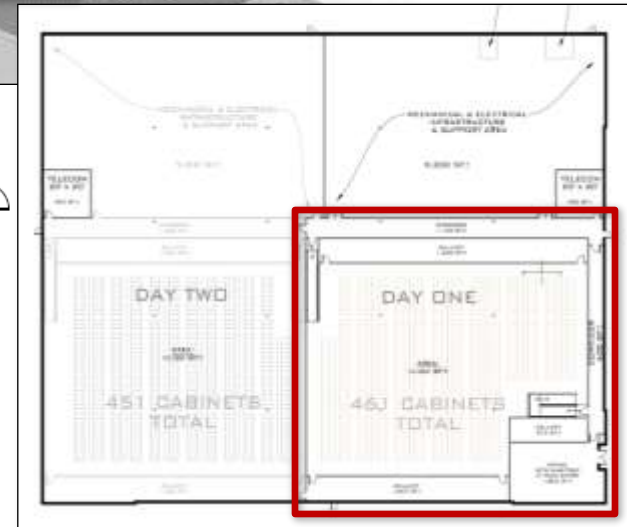
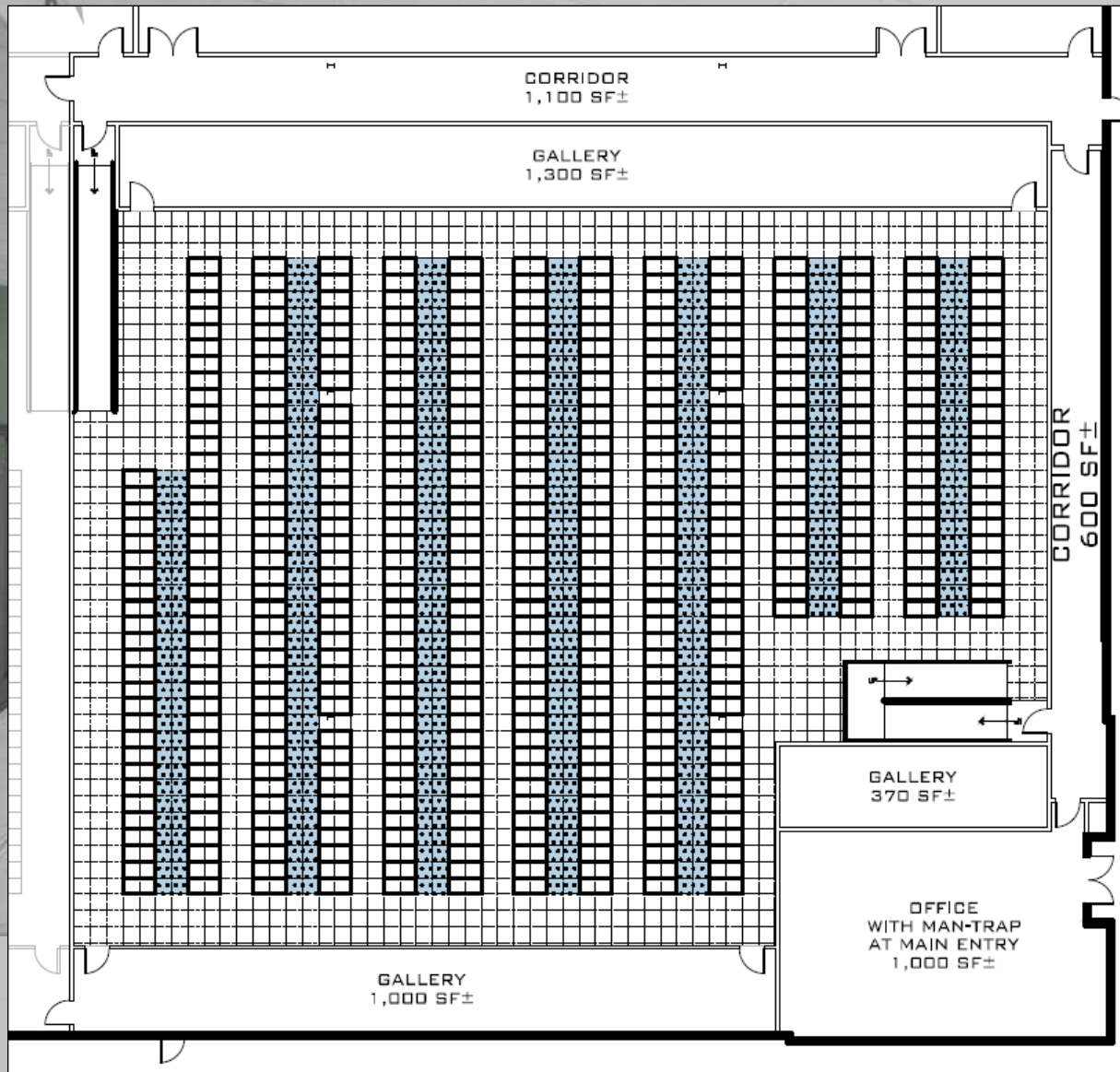
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
FLOOR PLAN

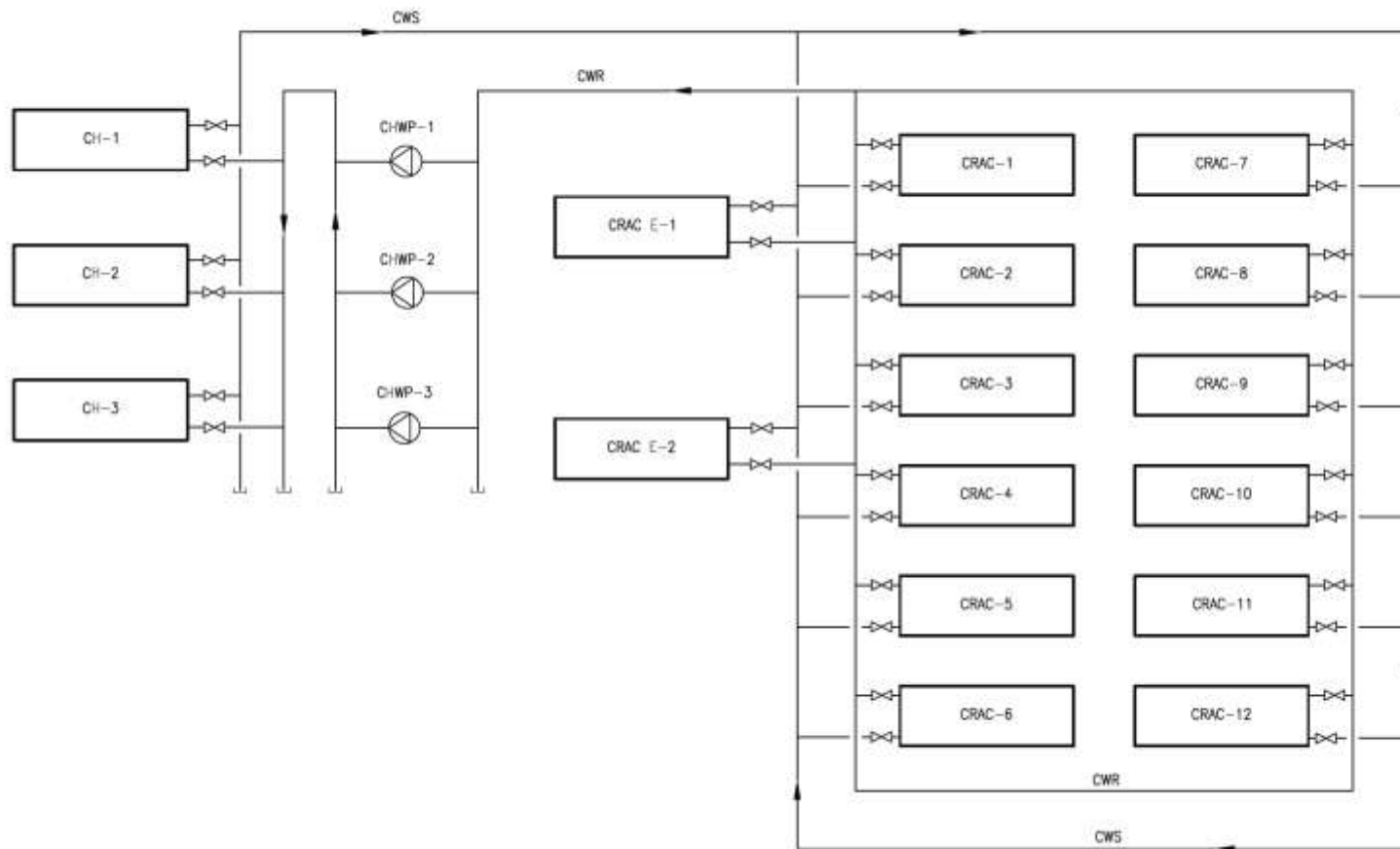
Catawba County, NC Powered Shell Data Center

PERFORATED FLOOR TILE PLAN



LEGEND:

-  2 x 4 CABINET
-  2 x 2 SOLID TILE
-  2 x 2 PERF. TILE
-  COLUMN



**SYSKA HENNESSY
GROUP**

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WEST CORP

MARK	DATE	DESCRIPTION

ISSUE:

PROJECT No: -

CAD DWG FILE:

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SHEET TITLE

**MECHANICAL
FLOW DIAGRAM**

SK01

Airfield:

Charlotte-Douglas International Airport – 37 miles away
Hickory Regional Airport – 13.50 miles away
Site is NOT located in the flight path of any airports

Rail:

Closest rail line is .6 miles away
Rail line services local hauls, thru freights, coal, and grain

4-Lane Highways:

I-40 is the closest 4-lane highway at 1.59 miles away

**Point-to-Point or
Panel Systems/Towers:**

There are no known point to point or panel systems/towers within the immediate area

Quarry:

The closest quarry is over 11.1 miles from the site

Gas Transmission Lines:

4' Distribution line runs on the west side of Penny Road
Distribution line runs in the front of the building at a distance of 100 feet
The closest transmission line is at Fairgrove Church Road
Transmission line is approximately 6 miles from the building

Military Base:

Fort Jackson in Columbia, SC is the closest base at 159 miles away

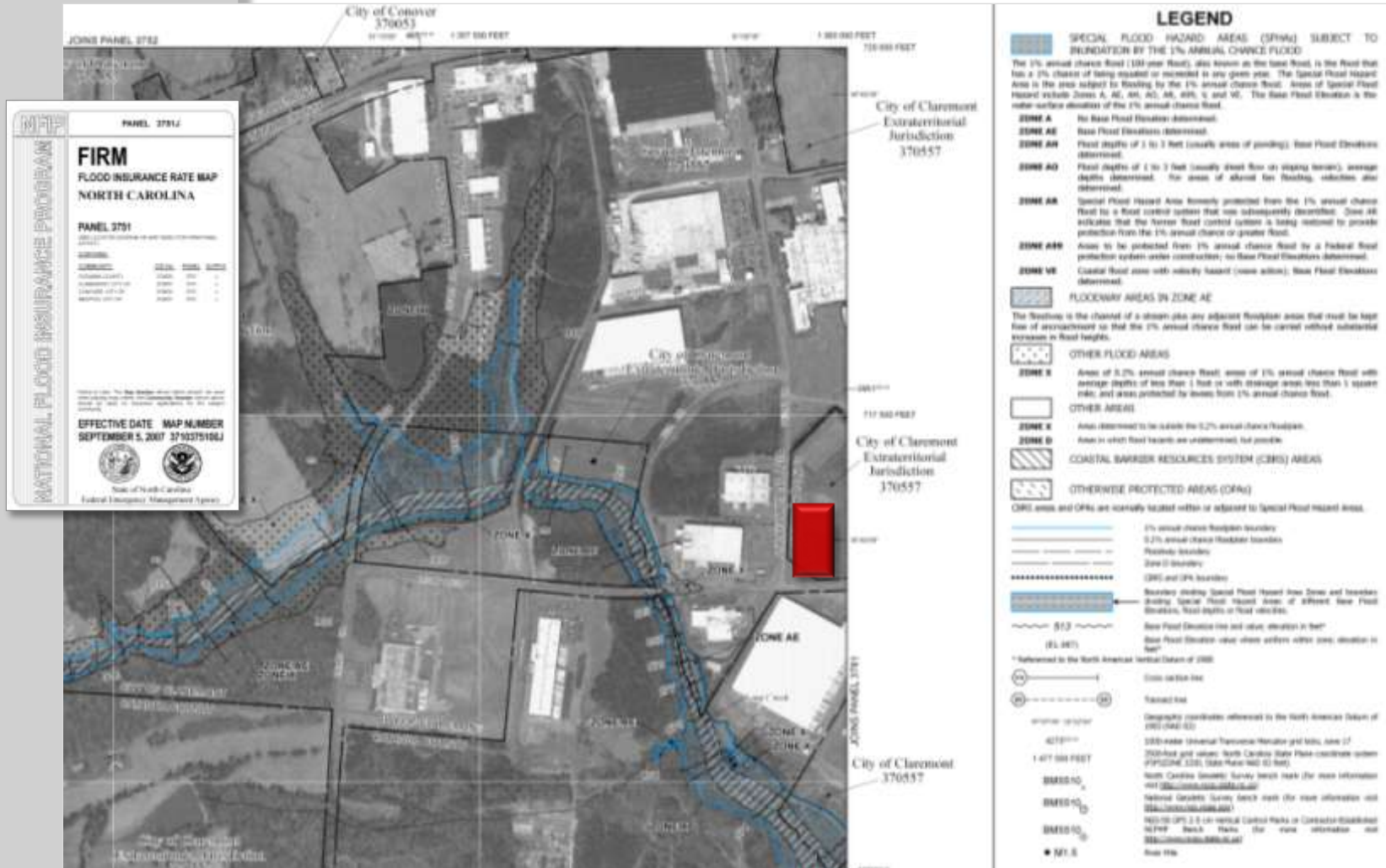
Nuclear Facilities:

McGuire Nuclear Plant in Charlotte, NC is the closest at 21.72 miles away

500 YEAR FLOOD ZONE

Catawba County, NC Powered Shell Data Center

The Catawba County Powered Shell Data Center is safely located *outside* of the 500 year flood zone



NOW AVAILABLE

50,000 SF POWERED SHELL DATA CENTER

Catawba County, North Carolina

WEBSITE:

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FOR MORE INFORMATION:

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