



Pioneer Development Project Cardinal Sound Study

YORKVILLE, IL

08.08.25

Introduction



STUDY LEAD

Gabriel Weger
Acoustics Section Manager

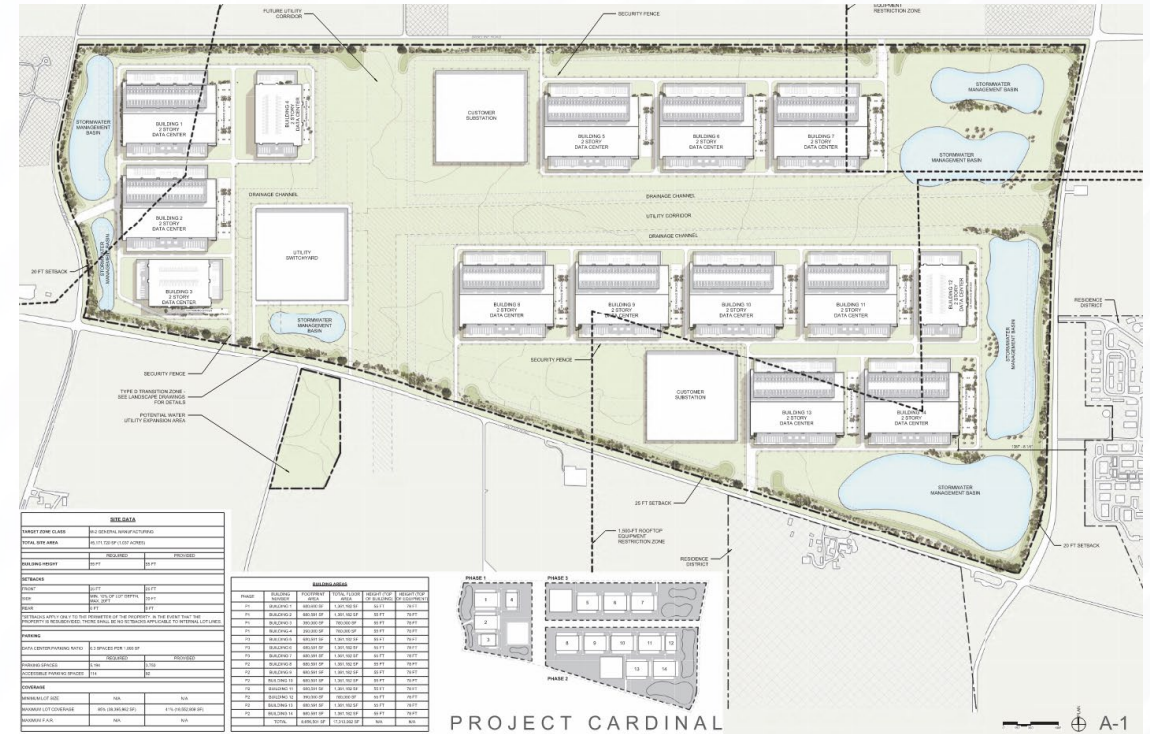
- BS in Civil Environmental Engineering, Post-Graduate Courses in Acoustics
- 13 years in acoustics and vibration experience
- Acoustical studies for industries all over the world. Power generation, renewables generation, aviation, transportation, oil and gas, data centers, etc.
- Over 50+ data center sound studies across multiple states, many in IL



- 15,000+ Professionals
- Founded in 1898
- 75+ Offices Worldwide
- **#1:** Power
#2: Data Centers
#7: Top Design Firms
Engineering News-Record
- 100% Employee-Owned

Sound Study Overview

- Preliminary sound study to estimate future noise impacts from a typical data center of this size.
- Project Limits
 - Code of Ordinances of Yorkville, Illinois Title IV, Chapter 4
 - Limited to **50 dBA** at residential properties during nighttime hours
- Ambient Measurements
- Preliminary Noise Modeling
 - Based on typical data center equipment



City of Yorkville Noise Ordinance

- Code of Ordinances of Yorkville, Illinois Title IV, Chapter 4
 - “No person shall operate or cause to be operated any source of sound in such a manner as to create a sound level which exceeds the sound level limits in table 1 of this section, as adjusted according to table 2 of this section”
 - Includes an exemption for “emergency short term operations”
 - Penalties could apply for noise of an impulsive character or tonal

Time of Day	Receiving Property Land Use		
	Residential	Commercial	Public Parks and Other Public Open Spaces
Daytime (7:00 a.m. - 10:00 p.m.)	60 dBA	67 dBA	67 dBA
Nighttime (10:00 p.m. - 7:00 a.m.)	50 dBA	67 dBA	67 dBA

Ambient Sound Level Measurements

- 24-hour continuous sound level measurements
- Four locations (MP1-MP4) near residences
- Set off the roadway, on developer property or right of way
- Measured sound levels
 - L_{eq} – equivalent continuous sound level
 - L_{90} – 90th-percentile exceedance sound level



Measurement Location	Time of Day	L_{eq} (dBA)	L_{90} (dBA)
MP1	Daytime	69	52
	Nighttime	67	40
MP2	Daytime	61	44
	Nighttime	59	39
MP3	Daytime	69	48
	Nighttime	67	40
MP4	Daytime	59	37
	Nighttime	57	37

Modeling Assumptions

- 3D model of the full facility operations
- Computer Aided Noise Abatement (CadnaA) software
- International Organization of Standardization (ISO) 9613-2:2024
- Estimated equipment sound levels

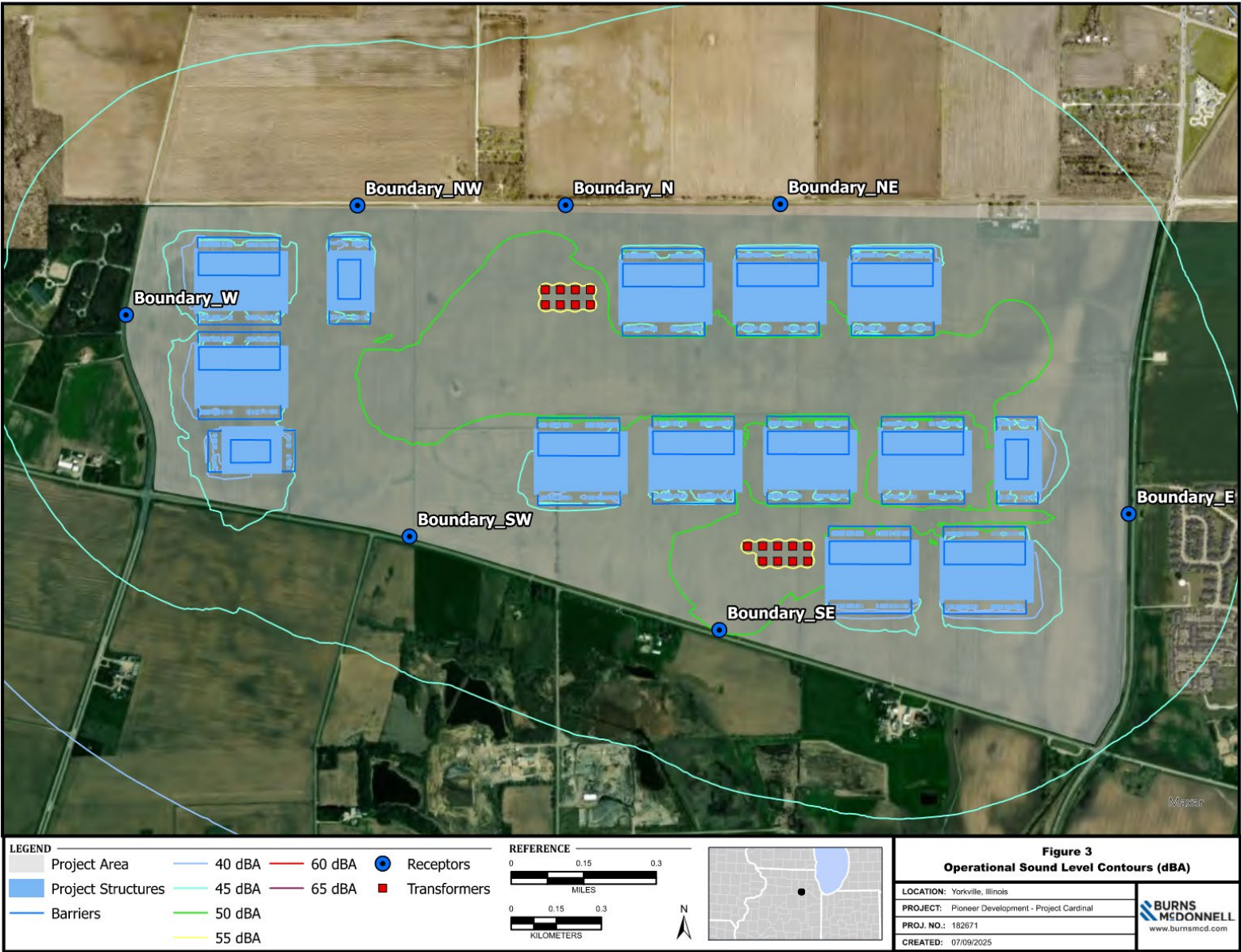
Source	Number of Sources	Modeled Equipment Sound Level Assumption ^a
Chillers (Low-Noise)	1,350	$L_w = 91$ dBA
Emergency Generators	1,000	$L_p = 65$ dBA at 50 feet
Substation Transformer (Low Noise)	17	$L_w = 89$ dBA

(a) L_w = sound power level; L_p = sound pressure level; dBA = A-weighted decibels, NEMA = National Electrical Manufacturers Association

- Various operating scenarios modeled

Operating Scenario	Normal Operation	Generator Testing	Emergency Operation
Design Goal	50 dBA at property lines	60 dBA at property lines	--
Equipment in Operation for Each Scenario			
Chiller	All On at 100% Load	All On at 100% Load	All On at 100% Load
Generators	All Off	2 per Building at 100% Load	All On at 100% Load
Transformers	All On	All On	All Off

Modeled Impacts



Questions?