



Reviewed By:	
Legal	<input checked="" type="checkbox"/>
Finance	<input type="checkbox"/>
Engineer	<input checked="" type="checkbox"/>
City Administrator	<input checked="" type="checkbox"/>
Community Development	<input checked="" type="checkbox"/>
Purchasing	<input type="checkbox"/>
Police	<input type="checkbox"/>
Public Works	<input type="checkbox"/>
Parks and Recreation	<input type="checkbox"/>

Agenda Item Number

Planning and Zoning Commission #2

Tracking Number

PZC 2025-08 & EDC 2025-50**Agenda Item Summary Memo****Title:** Project Cardinal – Pioneer (Data Center) – Discussion**Meeting and Date:** City Council – August 12, 2025**Synopsis:** Please see below for agenda item notes.**Council Action Previously Taken:**Date of Action: CC – 7/22/25 Action Taken: A discussion took place.Item Number: PZC 2025-08 & EDC 2025-50**Type of Vote Required:** None**Council Action Requested:** Informational

Submitted by: Krysti J. Barksdale-Noble, AICP Community Development

Name Department

Agenda Item Notes:

No vote will take place on this agenda item at this meeting. The developer will be in attendance

and will present the attached sound study they conducted for the project. In addition, the City's

sound engineer will also present the attached sound study they conducted as well.

Packet material can be found at: <https://www.yorkville.il.us/Archive.aspx?ADID=6369>.

Have a question or comment about this agenda item?

Call us Monday-Friday, 8:00am to 4:30pm at 630-553-4350, email us at agendas@yorkville.il.us, post at www.facebook.com/CityofYorkville, tweet us at @CityofYorkville, and/or contact any of your elected officials at http://www.yorkville.il.us/gov_officials.php



Pioneer Development Project Cardinal Sound Study

YORKVILLE, IL

08.08.25

Introduction



STUDY LEAD

Gabriel Weger
Acoustics Section Manager

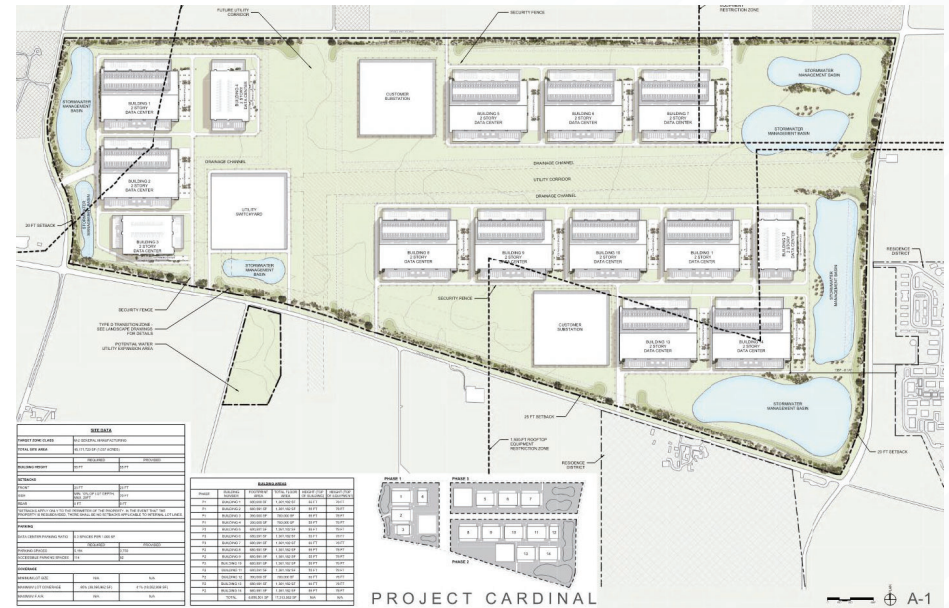
- BS in Civil Environmental Engineering, Post-Graduate Courses in Acoustics
- 13 years in acoustics and vibration experience
- Acoustical studies for industries all over the world. Power generation, renewables generation, aviation, transportation, oil and gas, data centers, etc.
- Over 50+ data center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

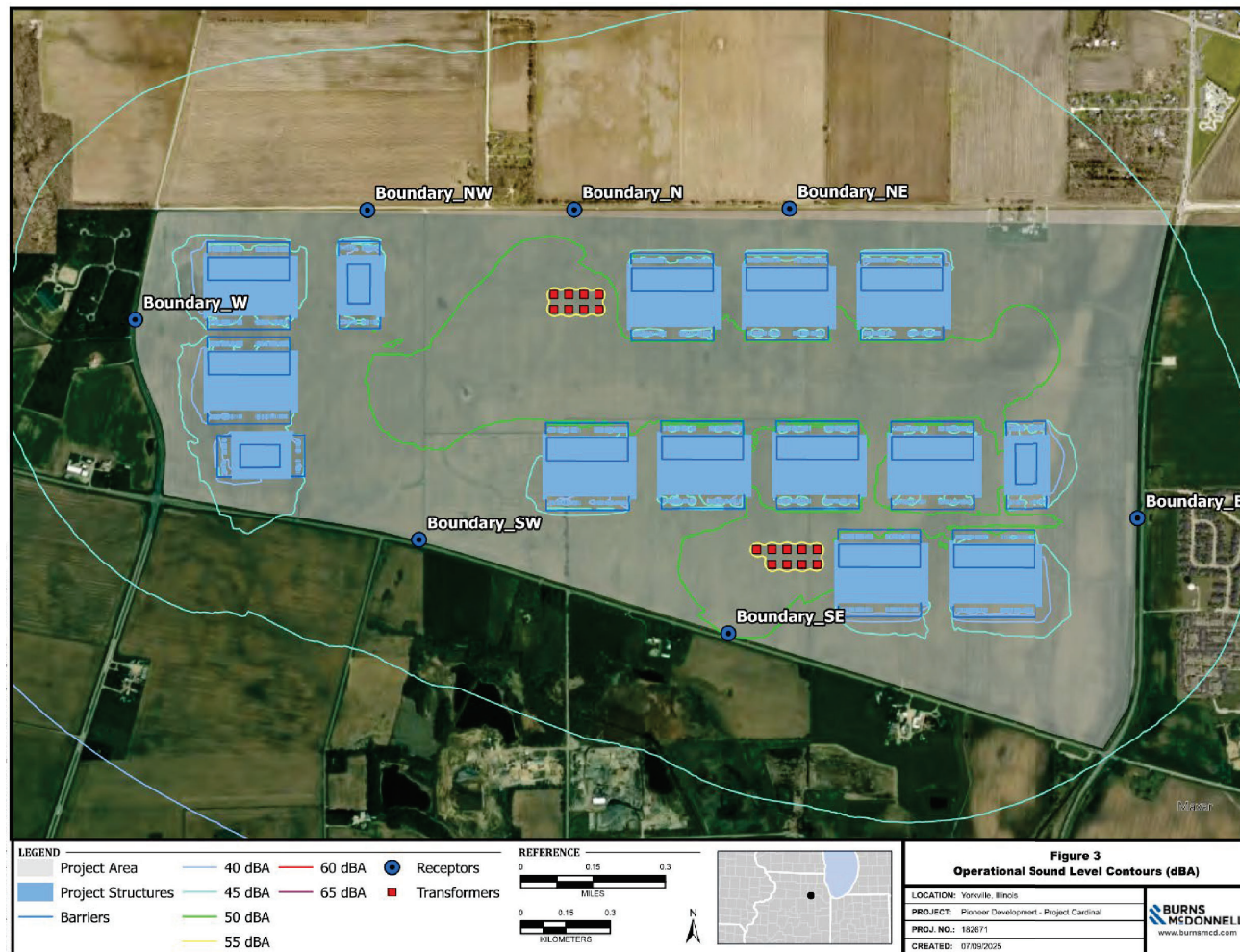
Source	Number of Sources	Modeled Equipment Sound Level Assumption ^a
Chillers (Low-Noise)	1,350	$L_w = 91$ dBA
Emergency Generators	1,000	$L_p = 65$ dBA at 50 feet
Substation Transformer (Low Noise)	17	$L_w = 89$ dBA

(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?

Peer Review of Project Cardinal's Initial Sound Study

Aimee Lalime, INCE Bd. Cert.

Senior Acoustic Consultant, Soundscape Engineering

August 12, 2025

Soundscape Engineering

- ▶ Project lead:
 - ▶ Aimee Lalime, Senior Consultant
 - ▶ Master's degree in Mechanical Engineering with a concentration in acoustics
 - ▶ 24 years of experience in sound and vibration, with 13 years at Soundscape Engineering
 - ▶ Board Certified by the Institute of Noise Control Engineering
- ▶ Soundscape has worked on over 1300 projects:
 - ▶ Drafting community noise ordinances
 - ▶ Controlling industrial noise and vibration
 - ▶ Assessing environmental noise
 - ▶ Optimizing building acoustics

Introduction

- ▶ Project Cardinal: 1037-acre data center campus proposed by Pioneer Development, LLC
- ▶ The United City of Yorkville retained Soundscape Engineering to provide acoustic consulting related to the proposed development, including peer reviews of the project's noise control strategies
- ▶ The Yorkville data center ordinance (Section 10-4-10.A.5) requires a phased sound study approach and noise monitoring:
 - ▶ Initial Sound Study at Planned Unit Development (PUD) review
 - ▶ Final Sound Study at Permitting review
 - ▶ Noise monitoring

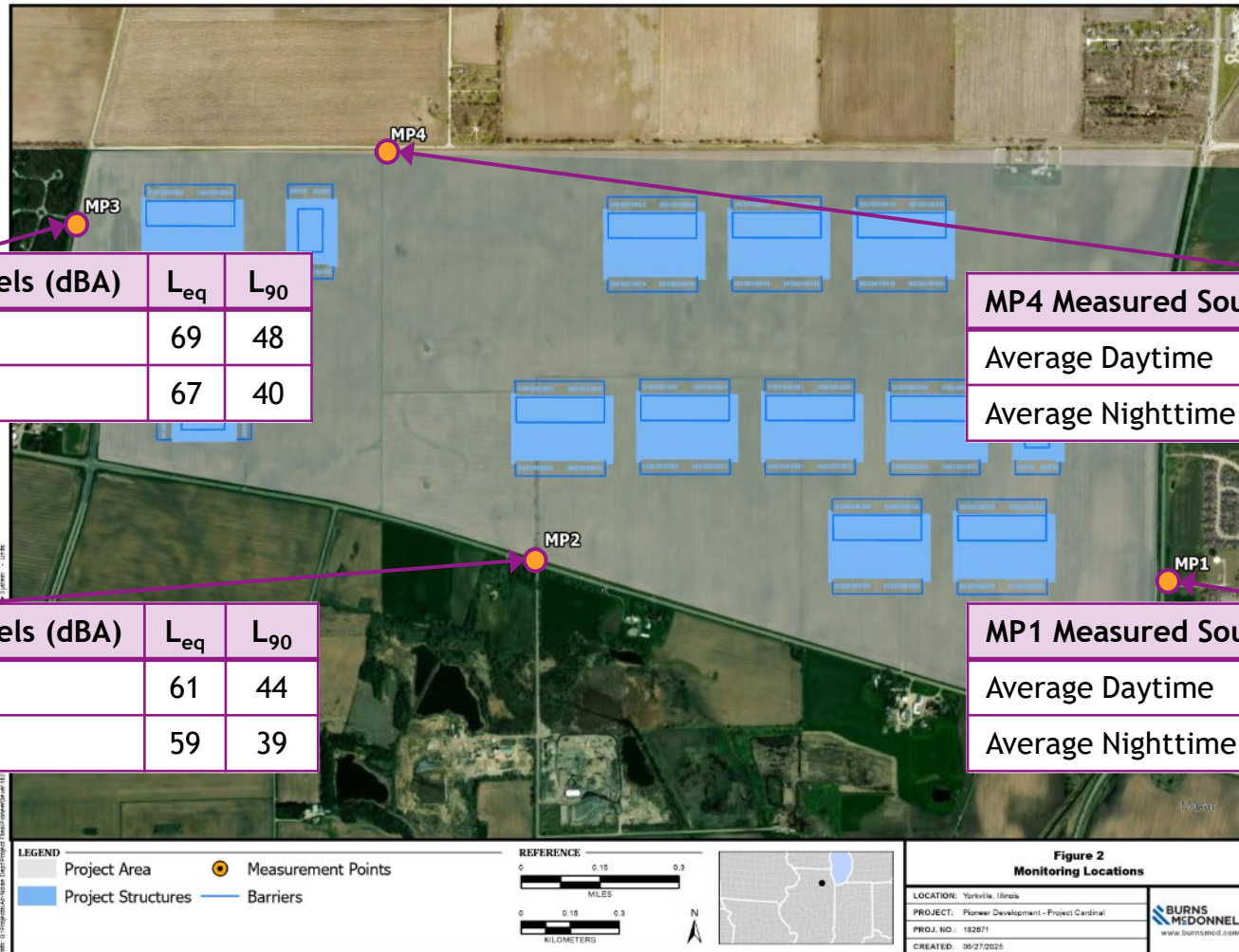
Initial Sound Study - Background

- ▶ A Project Cardinal initial sound study was conducted by Burns McDonnell and submitted on July 1st
- ▶ Soundscape provided comments, which were largely addressed in the revised version submitted on July 9th
- ▶ This discussion focuses on the revised version of the initial sound study

Requirements for the Initial Sound Study

- ▶ Conduct a **site noise survey** to establish the existing ambient noise environment in the vicinity of the development
- ▶ Generate an initial **3D computer model** of the project
 - ▶ Use the tentative site plan and representative sound levels from the planned project's mechanical equipment
 - ▶ Model peak daytime and nighttime operations
 - ▶ Consider the source tonality and apply the 10-dB penalty as appropriate
 - ▶ Describe mitigation measures needed to meet the City of Yorkville noise ordinance
- ▶ Issue a **report** to document the results

Site Noise Survey Conducted by Petitioner's Acoustic Consultant (Burns McDonnell)

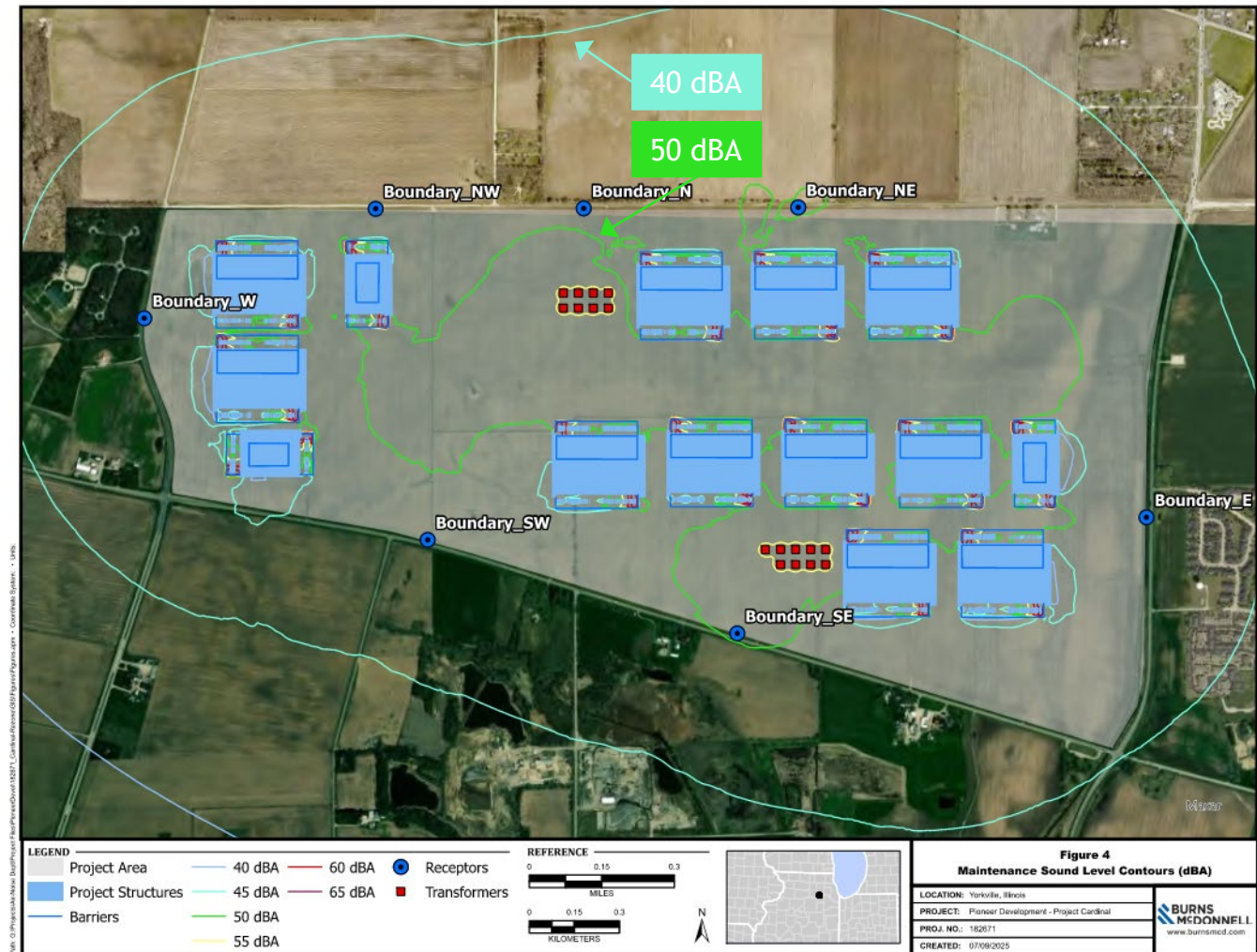


Results from Initial Study Produced by Petitioner's Acoustic Consultant (Burns McDonnell)

- ▶ Sources included representative non-tonal chillers, transformers, and generators
- ▶ Mitigations may include barriers, mufflers, silencers, acoustic stacks, louvers, and compressor wraps
- ▶ Initial model results are within Yorkville noise ordinance limits for residential noise:

	Non-tonal	Tonal
Daytime	60 dBA	50 dBA
Nighttime	50 dBA	40 dBA

See Title 4, Chapter 4 of the Yorkville Code of Ordinances



Requirements for the Initial Sound Study

- ▶ Conduct a **site noise survey** to establish the existing ambient noise environment in the vicinity of the development - **completed**
- ▶ Generate an initial **3D computer model** of the project
 - ▶ Use the tentative site plan and representative sound levels from the planned project's mechanical equipment - **completed**
 - ▶ Model peak daytime and nighttime operations - **completed**
 - ▶ Consider the source tonality and apply the 10-dB penalty as appropriate - **assumes non-tonal chillers**
 - ▶ Describe mitigation measures needed to meet the City of Yorkville noise ordinance - **barriers, mufflers, silencers, acoustical stacks, louvers, compressor wraps possible**
- ▶ Issue a **report** to document the results - **report showed that it is possible for the project to meet the noise ordinance with the current site plan and non-tonal equipment**



What's next?

- ▶ Project Cardinal must provide a final, detailed noise study at the permitting stage
 - ▶ For the final noise study, noise source data for the cooling equipment shall be based on actual sound level measurements of the specific equipment planned.
 - ▶ A mitigation plan will be included in the final noise study to demonstrate that operational noise does not exceed the local noise limits detailed in Yorkville's Code of Ordinances, including the penalty for tonal equipment.
 - ▶ The final noise impact report will describe how the assessment was performed, list the specific noise-generating equipment associated with operation of the Data Center Campus and On-site Substation, describe any noise control approaches and equipment that will be included in the project design, and confirm that the City's noise ordinance will be met.
- ▶ We (Soundscape Engineering) will peer review the final noise study

Soundscape Engineering

Practical Solutions from Professional Engineers