Peer Review of Project Cardinal's Initial Sound Study

Aimee Lalime, INCE Bd. Cert.
Senior Acoustic Consultant, Soundscape Engineering
August 12, 2025

Soundscape Engineering
Practical Solutions from Professional Engineers

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

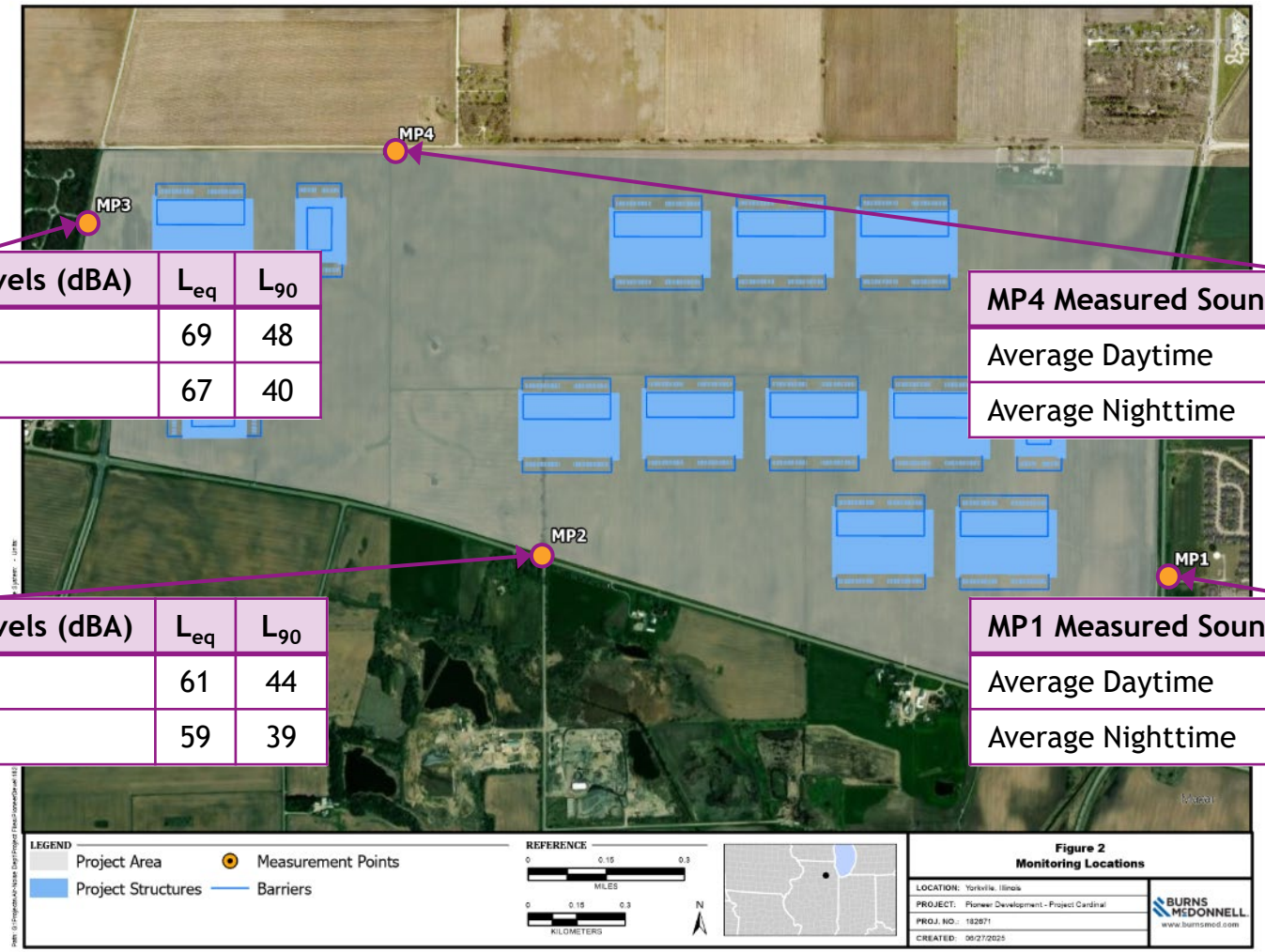
Site Noise Survey Conducted by Petitioner's Acoustic Consultant (Burns McDonnell)

MP3 Measured Sound Levels (dBA)	L_{eq}	L_{90}
Average Daytime	69	48
Average Nighttime	67	40

MP4 Measured Sound Levels (dBA)	L_{eq}	L_{90}
Average Daytime	59	37
Average Nighttime	57	37

MP2 Measured Sound Levels (dBA)	L_{eq}	L_{90}
Average Daytime	61	44
Average Nighttime	59	39

MP1 Measured Sound Levels (dBA)	L_{eq}	L_{90}
Average Daytime	69	52
Average Nighttime	67	40

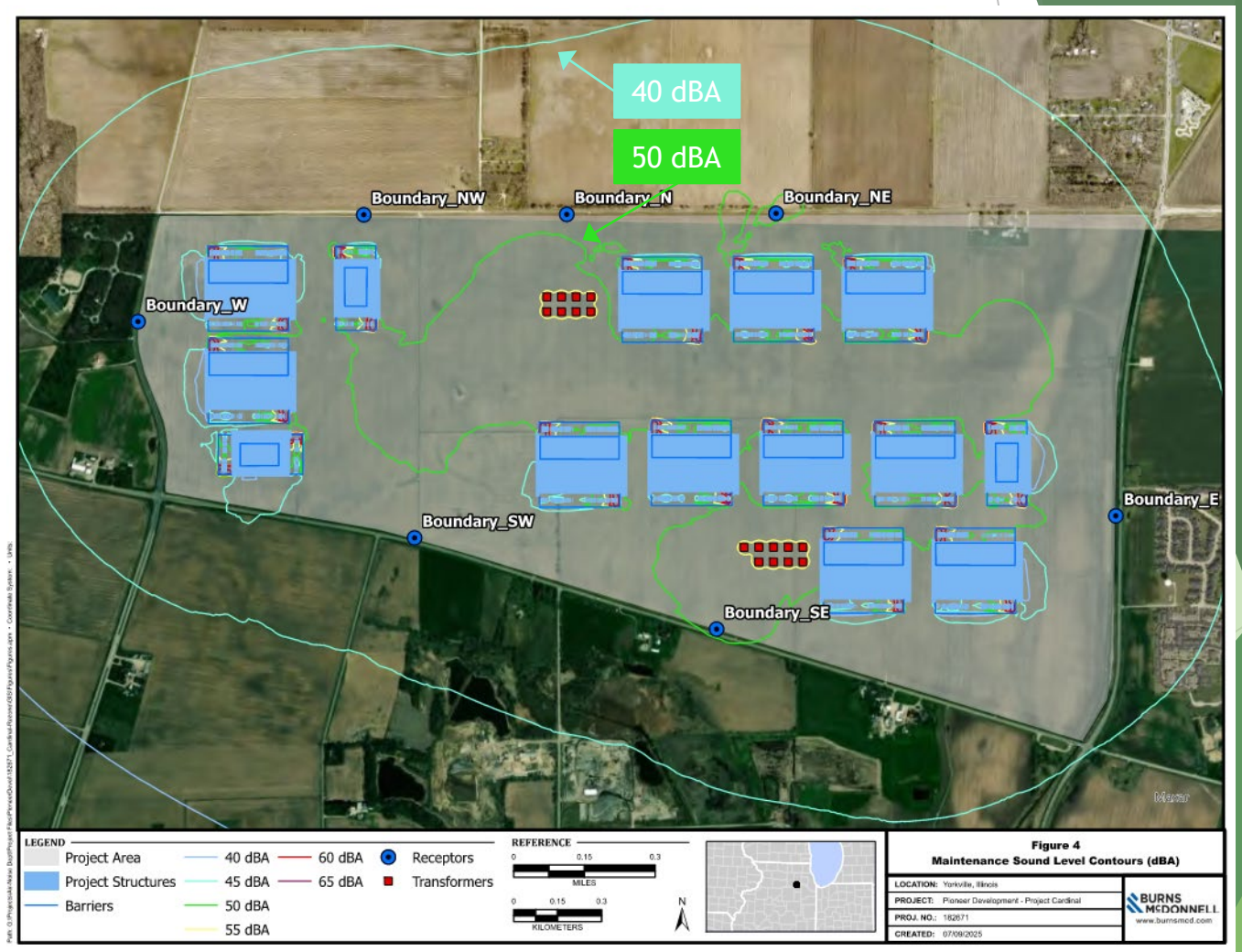


Results from Initial Study Produced by Petitioner's Acoustic Consultant (Burns McDonnell)

- 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