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LUXURY HOTEL

Rooftop Air Cooled Condensing Unit Noise Control

Implementing an acoustic louvered enclosure and discharge plenum silencer to mitigate noise from a rooftop air cooled condensing unit.

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The Newbury Luxury Hotel in Boston, MA was faced with municipal noise bylaw enforcement after the installation of a new rooftop condensing unit, affecting the nearby hotel rooms and adjacent neighboring building residents. To bring The Newbury Hotel into compliance, significant sound attenuation was required while navigating limited roof capacity, limited space, and a challenging install location. Parklane worked closely with the project team to engineer and install a retrofit sound mitigation solution that reduced noise emissions while working within the structural limitations of a historic building.

Project Facility

Luxury Hotel Downtown Boston

Noise Source

120 T Air Cooled Condensing Unit

The Solution

PMA Discharge Plenum Silencer
PMA Acoustic Louvered Enclosure
Integrated Structural Support

Project Team

Owner's Representative – Ajax Consulting Services
Acoustic Consultant – Intertek
Owner's Engineer (structural) – McNamara Salvia
Owner' Engineer (mechanical) – C3 Engineering
Rep Partner - Trumbull Campbell Associates, Inc.

Reason for Mitigation

Compliance with City of Boston Municipal Noise Ordinance

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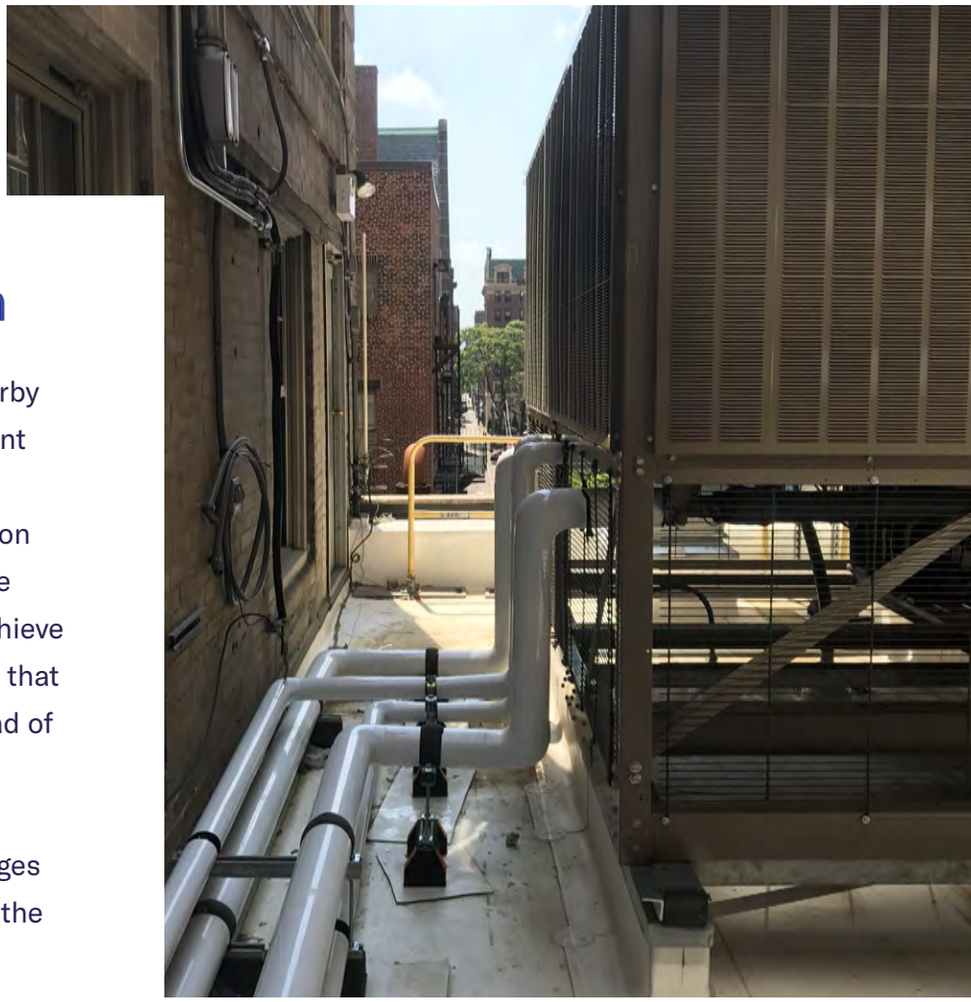

Noise Attenuation

The proximity of the chiller to nearby buildings meant that the equipment needed significant attenuation to achieve compliance with the Boston Municipal Noise Code. A complete custom design was required to achieve the desired acoustic performance that subsequently aligned with a myriad of mechanical, structural, and constructability constraints. This introduced unique design challenges that considered every segment of the project delivery process.

Limited Site Access

The chiller for The Newbury is situated between two high-rise buildings on a low rooftop near a narrow alleyway. The alleyway serves the hotel and several businesses and could not be closed for extended periods. This created massive restrictions in the amount of time that the crane could be placed and used, as well as requiring careful phasing of the construction schedule.

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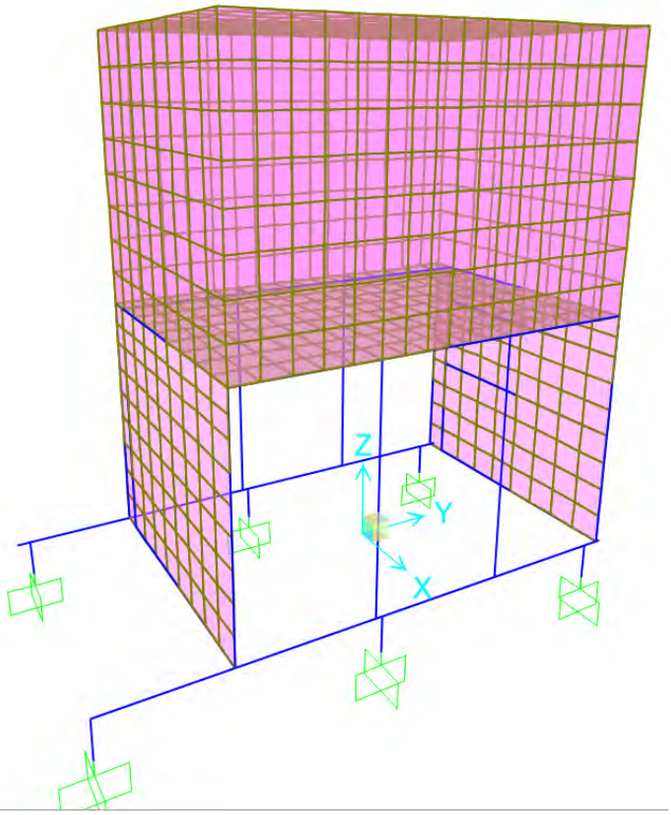
Mechanical Limitations

Space restrictions combined with significant acoustic performance requirements called for an aggressive aero-acoustic solution. The Parklane design team had to work closely with the owner's mechanical engineer to ensure external pressure drops did not impede cooling performance, and future service accessibility was maintained. A detailed airflow analysis confirmed the new attenuation system would not adversely affect cooling capacity, while service access was permitted through integrated access plenums and hinged assemblies.



Structural Limitations

The age of the building meant that there were limits to how much additional load it could support. This posed considerable challenges given the limited space on the rooftop and the relatively large attenuation required. To manage this, Parklane's structural team coordinated with the owner's structural engineer to ensure the integrated structural framing effectively transferred the newly imposed loads to specific bearing locations on the roof.

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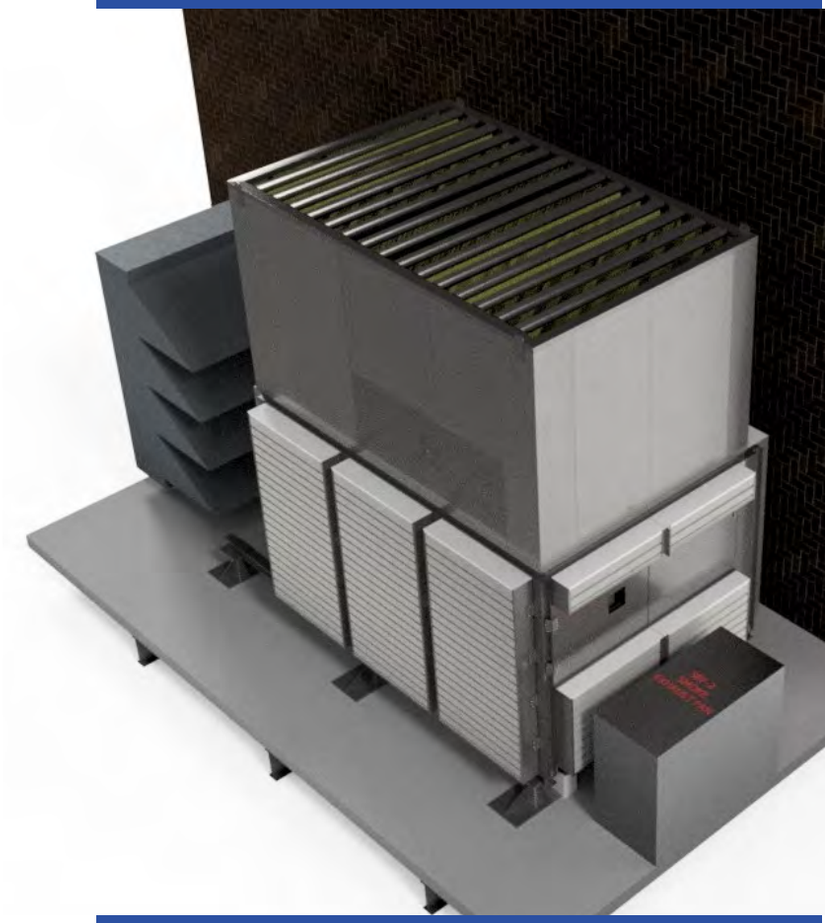
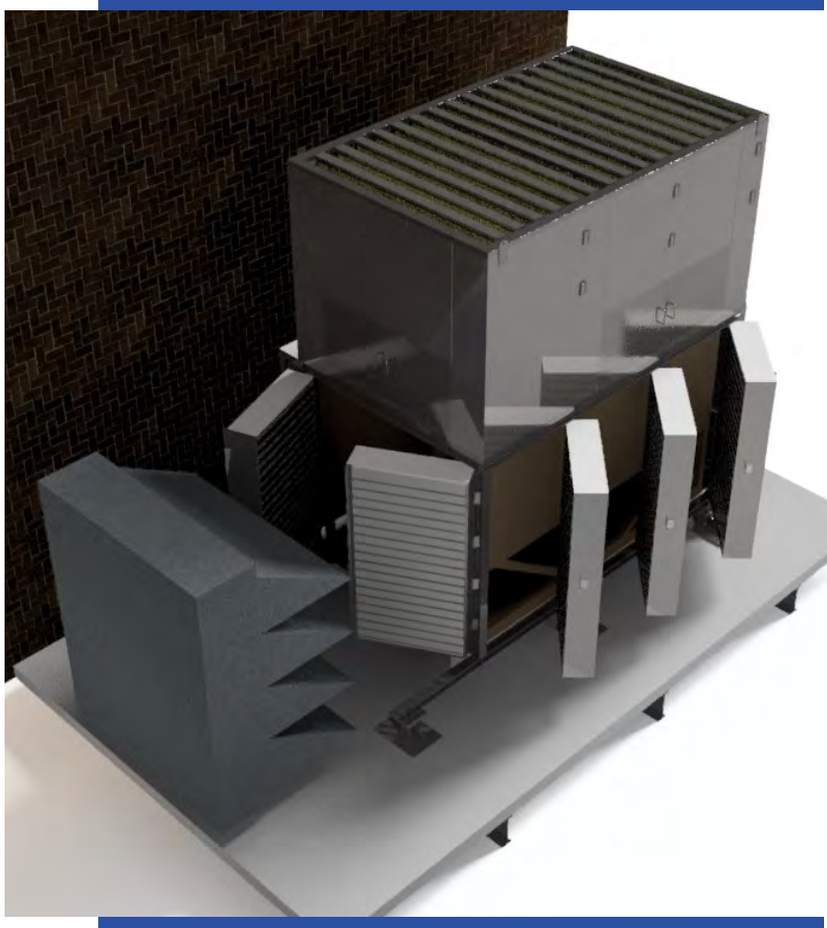
Design

Parklane designed a custom louvered enclosure and discharge silencers to bring the facility into compliance with the local municipal code while accounting for physical limitations on the rooftop and street access. The final solution also ensured that all the louvers were hinged, providing full accessibility for maintenance.

The design required Parklane to collaborate closely with the owner, owner's engineers, and consultants over several months to create a solution that reduced the noise enough to mitigate impacts to the nearby suites and businesses. The proximity of buildings in the area introduced new challenges to designing a compact, and highly-performing enclosure.





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Access Efficiency

To reduce the duration of closures, stub columns were installed days prior to the crane arriving on site. The final acoustic solution was manufactured and shipped in modular sections to the site shipment to dramatically limit site time and installation risk. Parklane carefully scheduled the installation, coordinating with local offices to close off the road for only a single weekend.

Once the crane arrived we were able to hoist the acoustic plenum silencer and louvered wall sections swiftly onto the roof, closing off the road for only a single weekend and significantly reducing the impact for the facility owner and nearby businesses.

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Ordinance Compliance

Compliance with the local municipal code required significant attenuation. A highly efficient design was created to produce a solution that exceeded the insertion loss requirements, validated through in-field testing. Performance data for the acoustic louvered enclosures and discharge plenum silencers shows the amount of attenuation achieved.

Chiller Intake

Frequency Band (Hz)	63	125	250	500	1000	2000	4000	8000
Required Insertion Loss (dB)	0	5	10	16	20	23	23	16
Designed Insertion Loss (dB)	9	14	19	24	26	26	25	19

Chiller Discharge

Frequency Band (Hz)	63	125	250	500	1000	2000	4000	8000
Required Insertion Loss (dB)	2	10	15	21	25	28	28	21
Designed Insertion Loss (dB)	7	12	24	36	50	45	42	25

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Results

The chiller installed as part of the renovation project generated excess noise that exceeded the local municipal code. Parklane was able to design a highly effective plenum silencer and acoustic enclosure that maintained the mechanical integrity of the chiller and install it quickly and efficiently to avoid disrupting hotel operations or local businesses. Post-installation field testing by the owner's acoustic consultant confirmed that the designed performance levels were achieved, and the equipment was successfully brought into regulatory compliance.

PMA Plenum Silencer

Attentuates Fan Noise

Integrated Steel Structure

Efficiently transfers forces for specified roof locations and facilitates a modular design.

Hinged Acoustic Louvers

Attenuate intake air and compressor noise, while providing clear service access.

Noise Control Simplified

We're dedicated to your success. Whether working with industry, acoustic engineers and consultants, or contractors, we're committed to providing effective solutions to noise and vibration challenges—no matter the size or scope.

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