ENVIRONMENTAL NOISE ASSESSMENT
ST. PHILIP ADDITION
Richmond, ON

For
Ottawa Catholic School Board

Prepared by
State of the Art Acoustik Inc.

Report Date: 2025-05-28

STATE OF THE ART ACOUSTIK INC.
43 – 1010 Polytek Street Ottawa, ON K1J 9J3 www.sota.ca E: sota@sota.ca T: 613-745-2003 F: 613-745-9687

2025-05-28

Jerzy Jurewicz, OAA, ARIDO, AIA
Vice President
Edward J. Cuhaci and Associates Architects Inc.
171 Slater St., Suite 100, Ottawa, Ontario K1P 5H7
www.cuhaci.com | Fax 613-236-1944 | Cell 613-324-5576
Telephone: 613-236 7135
Email: jerzyj@cuhaci.com

Ottawa Catholic School Board – St. Philip Catholic School Addition, Richmond
Environmental and Traffic Noise Impact Study

Dear Jerzy,

This report assesses the traffic noise impact and environmental noise effects related to the proposed addition to St. Philip Catholic School at 79 Maitland Street South, Richmond, Ontario. The calculations and methodology presented here comply with the City of Ottawa Environmental Noise Control Guidelines (ENCG, 2016) and the Ministry of Environment, Conservation and Parks' (MECP) publication NPC-300.

The traffic noise study (**Section 2.0**) indicates that daytime noise levels from Royal York Street and Fortune Street at the plane of window (POW) of the proposed addition are equal to or below 65 dBA. As these levels exceed 55 dBA, the classrooms require provisions for future central air conditioning to address potential noise from these collector roads (see **Section 2.10** for details).

The environmental noise assessment (**Section 3.0**) reveals that noise from rooftop mechanical and electrical equipment will exceed MECP NPC-300 limits of 50 dBA (day) and 45 dBA (night) for a Class 2 area. Acoustic mitigation measures, including reducing fan speeds, are necessary to ensure compliance with Ottawa's ENCG and are outlined in **Section 3.5.2**.

Should you have any questions regarding this report, please do not hesitate to contact us.

Sincerely,

Tiffany-Rose Filler, M.Sc.
Acoustic Consultant

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1.0 Introduction & Site Description

The Ottawa Catholic School Board has commissioned State of the Art Acoustik Inc. to complete a noise study for a new 2-storey, 10-classroom, 2-kindergarten room, and 1 multipurpose room addition that will be located to the southeast of the existing St. Philip Catholic School located at 79 Maitland Street South in Richmond, Ontario. The site is located in a mainly residential area, and the new addition will be within 100 meters of two collector roads: Royal York Street and Fortune Street. We have reviewed the projected impact of traffic noise from Royal York Street and Fortune Street, as well as the projected environmental noise impact on the residential area and building itself to review conformance with the City of Ottawa Environmental Noise Control Guidelines (ENCG), which are compliant with the Ministry of Environment, Conservation and Parks (MECP) NPC-300.

1.1 Scaled Area Location Plan

Figure 1.1 shows the site plan for the new development and **Figure 1.2** shows a satellite view of the existing site and surrounding area. Adjacent noise-sensitive buildings include mainly residential homes and buildings.

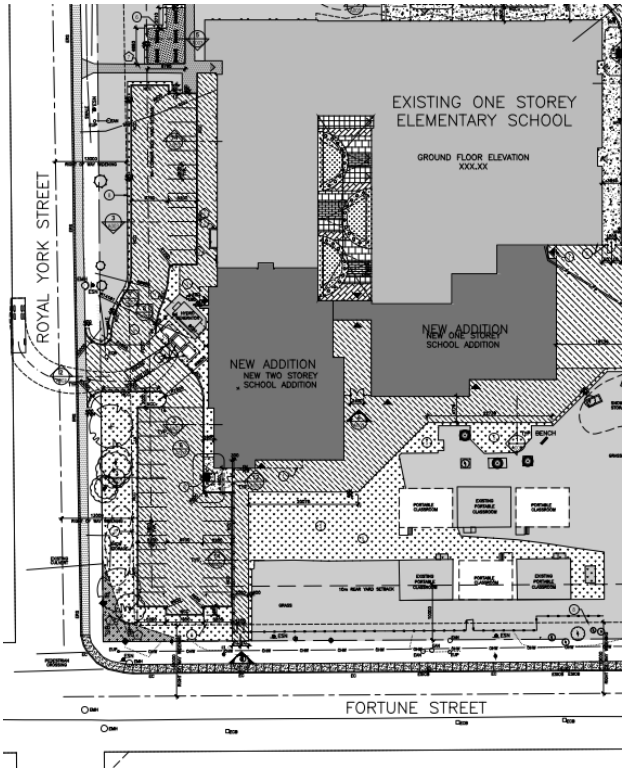


Figure 1.1 – Site Plan of the Proposed St. Philip Catholic School Addition

St. Philip School is classified as being in a Class 2 area under Ottawa's ENCG. The ENCG defines the core area of Richmond, where the school is located, as a Class 2 area. Class 2 areas are characterized by an urban hum during the day due to human activities and traffic, with reduced activity and noise at night.

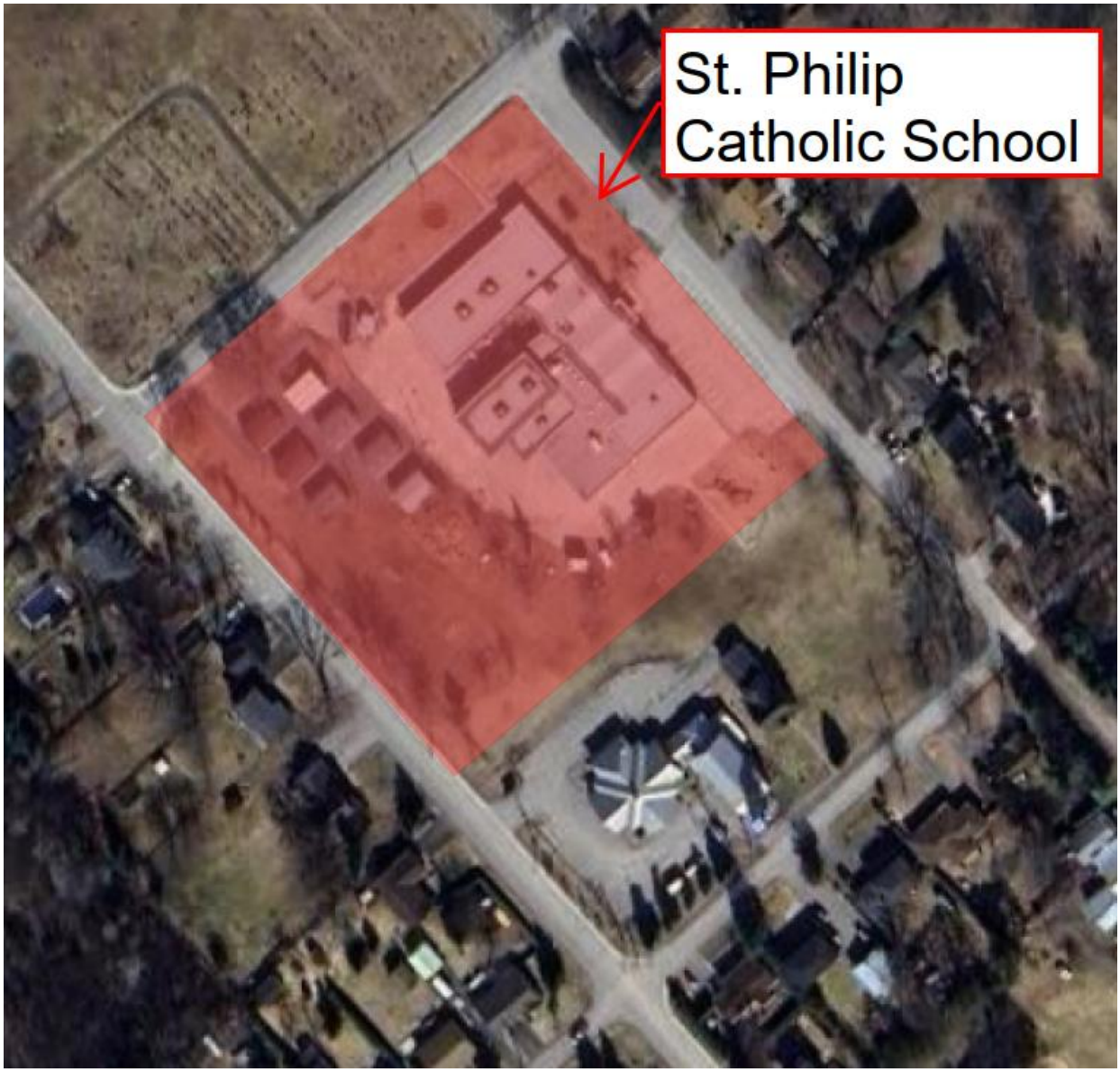


Figure 1.2 – Satellite view of the existing St. Philip Catholic School and surrounding residential area (Source: Google Earth Pro)

2.0 Traffic Noise Study

The following section describes our analysis of the impact of the road noise on the proposed building addition at St. Philip Catholic School located at 79 Maitland Street South in Richmond, Ontario.

2.1 MECP Environmental Noise Guidelines for Traffic Noise (Road & Rail)

This assessment uses the MECP's NPC-300 Guidelines, updated in September 2021, to assess and mitigate noise from roads, transit ways, railways, and aircraft. The maximum road and rail noise levels for indoor and outdoor living areas are taken from Tables C-1 and C-2 of NPC-300 and summarized in **Table 2.1** below.

Schools are explicitly included in the "living/dining areas" category in Table C-9 of NPC-300 and are included in **Table 2.1**. As St. Philip Catholic School is assumed to only operate during daytime hours, the traffic noise assessment will only focus on daytime levels to ensure indoor noise criteria are met during school hours.

Time	Indoor Leq Levels (dBA)	
	Road Traffic Noise Level Limit (dBA)	Rail Traffic Noise Level Limit (dBA)
07:00 – 23:00	**45** for living/dining areas of residences, sleeping quarters, and schools	**40** for living/dining areas of residences, sleeping quarters, and schools

Table 2.1 – Criteria for Indoor Area Road/Rail Noise Levels

A noise feasibility and/or detailed noise study is required for new noise-sensitive developments in proximity to surface transportation sources in the City of Ottawa, according to the Official Plan. The study is necessary if the development is located within:

- 100 meters of an arterial road, (major) collector road, light rail corridor, or bus transitway.
- 250 meters of a highway or secondary main railway line.
- 300 meters of a rail corridor or secondary main railway line.
- 500 meters of a 400-series highway, freeway, or principal main railway line.

There are no rail or aircraft noise sources within the vicinity that would require a study. Traffic noise sources are identified using the City of Ottawa's Urban Road Network Schedule E. The relevant transportation noise sources for this site are nearby roads, including:

Roads and Railways	Road or Rail Line	Distance to Façade[1]	Exclusionary Distance Limit
Royal York Street	Collector Road	14 metres	100 meters
Fortune Street	Collector Road	4.3 metres	100 meters

[1]Note: The Distance to the Façade Line is calculated from the façade of the proposed development to the right-of-way of the road/railway.

Table 2.2 – List of Nearby Traffic Noise Sources

The noise source must be analyzed when the listed distance to the property line is lower than the respective exclusionary distance limit. Based on the distances in **Table 2.2**, an analysis of the impact of traffic noise is required for the following roads:

- Royal York Street
- Fortune Street

The distance between St. Philip Catholic School and Royal York Street as well as Fortune Street is illustrated in **Figure 2.1**.

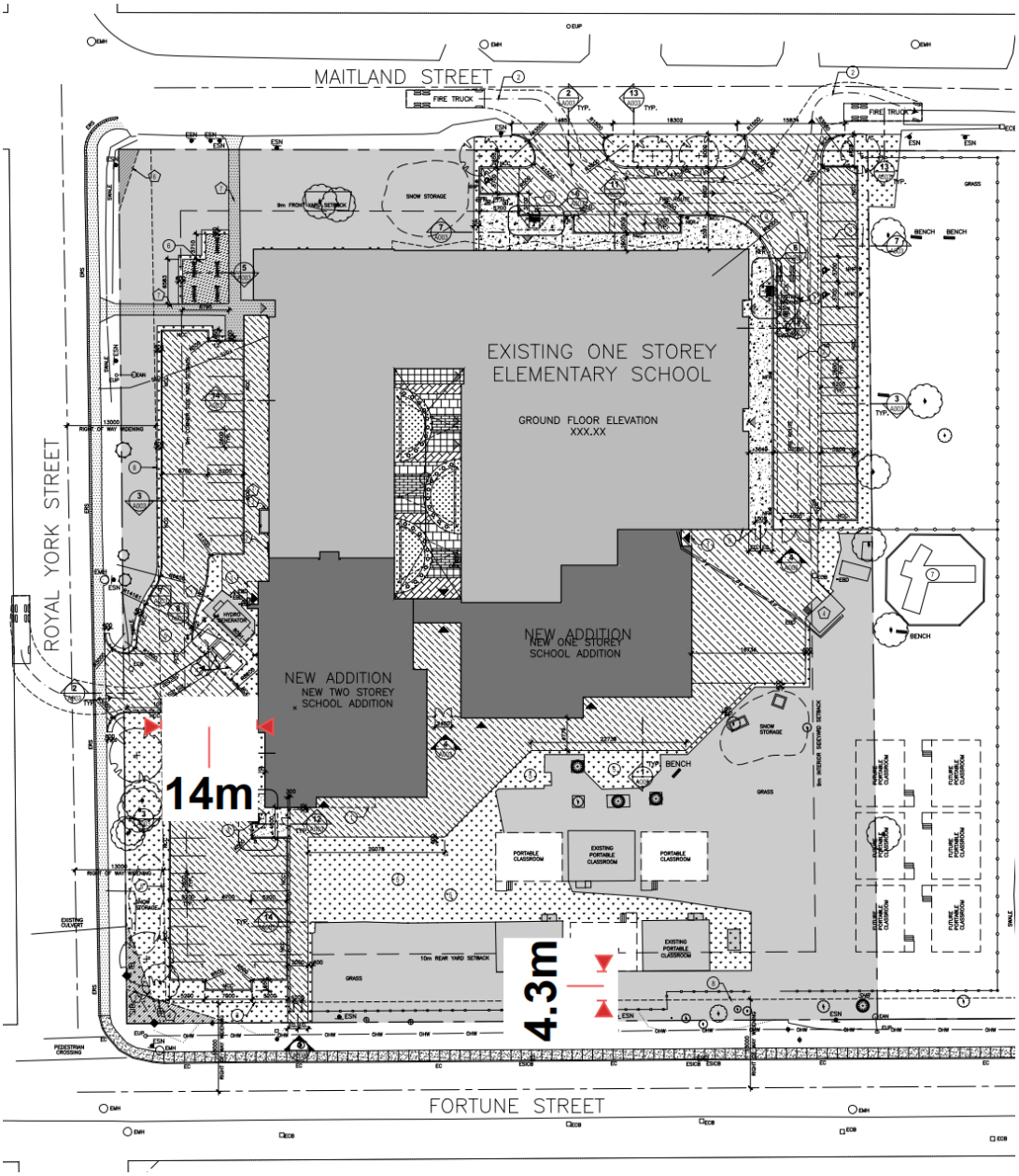


Figure 2.1 – Distances from the Façade of the St. Philip Catholic School Additions to the Right-of-Way for Royal York Street and Fortune Street

2.2 Noise Attenuation Requirements

This section outlines the required noise control measures and warning clauses and when to apply them, as stipulated by the ENCG and Ministry of Environment, Conservation and Parks (MECP) for placement within purchase agreements.

If sound levels are predicted to be less than the specified criteria, no attenuation measures are required on the part of the proponent. If the predicted noise exceeds the criteria, the City of Ottawa recommends several attenuation measures.

These attenuation measures may include any or all of the following:

- construction of a noise barrier wall and/or berm;
- installation of a forced air ventilation system with provision for central air;
- installation of central air;
- acoustically selected building façade components.

Where excessive noise levels may adversely affect the property or its use, the ENCG requires notices in the form of a Warning Clause to be placed on the title in order to alert the buyer or renter of a possible environmental noise condition or a limitation on their property rights. The notices on titles must be included in the Development Agreement(s) and the Agreement(s) or Offer(s) of Purchase and Sale.

The City of Ottawa, via MECP NPC-300, requires a Warning Clause whenever noise could meet or exceed 55 dBA 16-hour L_{eq} at the Outdoor Living Area or Plane of Window of any living area or 50 dBA at the Plane of Window of any sleeping area prior to any noise mitigation. Section C8.1 Transportation Sources of the MECP NPC-300 states:

"The use of warning clauses or easements in respect of noise are recommended when circumstances warrant. Noise warning clauses may be used to warn of potential annoyance due to an existing source of noise and/or to warn of excesses above the sound level limits. Direction on the use of warning clauses should be included in agreements that are registered on title to the lands in question. The warning clauses would be included in agreements of Offers of Purchase and Sale, lease/rental agreements and condominium declarations."

Since schools are not residential properties sold or rented to individuals and do not include a living area or sleeping area, warning clauses are not relevant. The focus of our report will remain on recommending effective noise attenuation.

2.3 Building Component Assessment (AIF Analysis)

According to the ENCG, when noise levels could exceed 65 dBA at the Plane of Windows (POW) of a noise-sensitive area like a school, the exterior cladding system of the building envelope must be acoustically designed to ensure the indoor noise criteria is achieved. The City of Ottawa recognizes the Acoustic Insulation Factor (AIF[1]) method as an appropriate analysis technique.

To comply with the City of Ottawa policies, the building envelope will require a minimum AIF rating to provide the indoor noise level required for living, dining and bedrooms of residential dwellings as described below.

The City of Ottawa's ENCG outlines the following maximum indoor L_{eq} limits:

- maximum daytime indoor L_{eq} for living spaces should be 45 dBA

For the overall exterior wall of any room, the required AIF for road and rail transportation noise is:

Required AIF = Outside L_{eq} - Indoor L_{eq} (Req) + 2dB (1)

When the exterior is comprised of components, then the AIF required of each component is determined by the following equation[1]:

Required AIF = Outside L_{eq} - Indoor L_{eq} (Req) + 10 $\log_{10}$ (Number of Components) + 2dB (2)

The required AIF is based on the Outside L_{eq}, Indoor L_{eq} required and the total number of exterior façade components. The AIF method allows for the number of components to be reduced if any component significantly exceeds the required AIF[1]:

"If the AIF of any component exceeds the required AIF by 10 or more, the calculation should be repeated for the other components with the 'total number of components' reduced by one. This reduction in the number of components lowers the required AIF for the others."

[1] J.D. Quirt, Building Research Note: Acoustic Insulation Factor: A Rating for the Insulation of Buildings against Outdoor Noise, National Research Council [Revised June 1980]

2.4 Road Traffic Information

This study focuses exclusively on the traffic noise generated by Fortune Street and Royal York Street, the collector roads northwest and southwest of the new building addition's façade. The proposed building is positioned at a distance greater than 100 meters from any other collector or arterial road, with no nearby rail lines or influence from the airport. Consequently, no other surface noise sources have been considered for this study.

Table 2.5 below summarizes the traffic data for Fortune Street, collected on Tuesday, December 4, 2018. This data was provided to us in the **St. Philip Catholic School Expansion TIA Scoping & Forecasting Report Draft, dated February 2025 (see Appendix A1)**, and is also available on the **Open Ottawa** website. While the annual average daily traffic (AADT) was not provided, we were given the number of cars and heavy vehicles travelling along Fortune Street during peak hours. Using this information, we extrapolated the daily traffic count and applied the assumed day/night split, referencing Table B1 from **The City of Ottawa Environmental Noise Control Guidelines (ENCG 2016)**, Appendix B: Table of Traffic and Road Parameters to Be Used for Sound Level Predictions.

From this, we estimated the Annual Average Daily Traffic (AADT) based on a worst-case scenario, assuming that traffic volume remains consistent throughout the day during the peak hour. We then subdivided these values to reflect the day/night split. For Fortune Street, given the absence of specific data on the distribution between medium and heavy trucks, we assumed an even split of the total truck percentage (9.06%) into 4.53% medium trucks and 4.53% heavy trucks to demonstrate a worst-case scenario, as heavy trucks typically generate higher noise levels. Specific traffic data for Royal York Street was unavailable. Therefore, an AADT of 8,000 vehicles per day was assumed based on typical traffic volumes for a 2-lane urban collector road (2-UCU) in a similar residential area, consistent with

the ENCG's Appendix B. The day/night split (92/8) and truck percentages (7% medium, 5% heavy) for Royal York Street were also inferred from standard parameters for this road class.

Roadway	Implied Roadway Class	Annual Average Daily Traffic (AADT) Veh/Day	Posted Speed	Day/Night Split (%)	Medium Trucks (%)	Heavy Trucks (%)
Fortune Street	2-Lane Urban Collector (2-UCU)	13,008	40 km/h	92/8	4.53	4.53
Royal York Street	2-Lane Urban Collector (2-UCU)	8,000	40 km/h	92/8	7	5

Table 2.3 – Summary of Major Roadways

2.5 Procedure Used for Roadway Noise Analysis

To assess the impact of road noise on the proposed development, we employed the Ministry of Environment's STAMSON modelling software version 5.04. This program enables us to input various road variables, including traffic volume, vehicle types, speed, barrier locations, and topography. We can accurately determine the environmental noise impact at specific reception points by utilizing these inputs.

2.6 Points of Reception (POR)

To identify the most severe noise impact on the building's façade, we have selected two PORs based on their proximity to Fortune Street and Royal York Street. These PORs include one on the first-floor façade and one on the second-floor façade, both located at classroom windows. **Figures 2.2 and 2.3** show the floor plans for PORs A and B. **Figures 2.4** shows the elevation plans for POR A, and there are no elevations available for POR B. POR A is located at a height of 5.7m on the second floor of the building addition, aligned with the plane of the window (POW). POR B is located at a height of 1.5m on the first floor of the portable classroom, also aligned with the POW. The angles between the PORs and the noise sources are illustrated in **Figure 2.5**. **Table 2.6** summarizes the POR heights, distances to noise sources, and the angles to these sources.

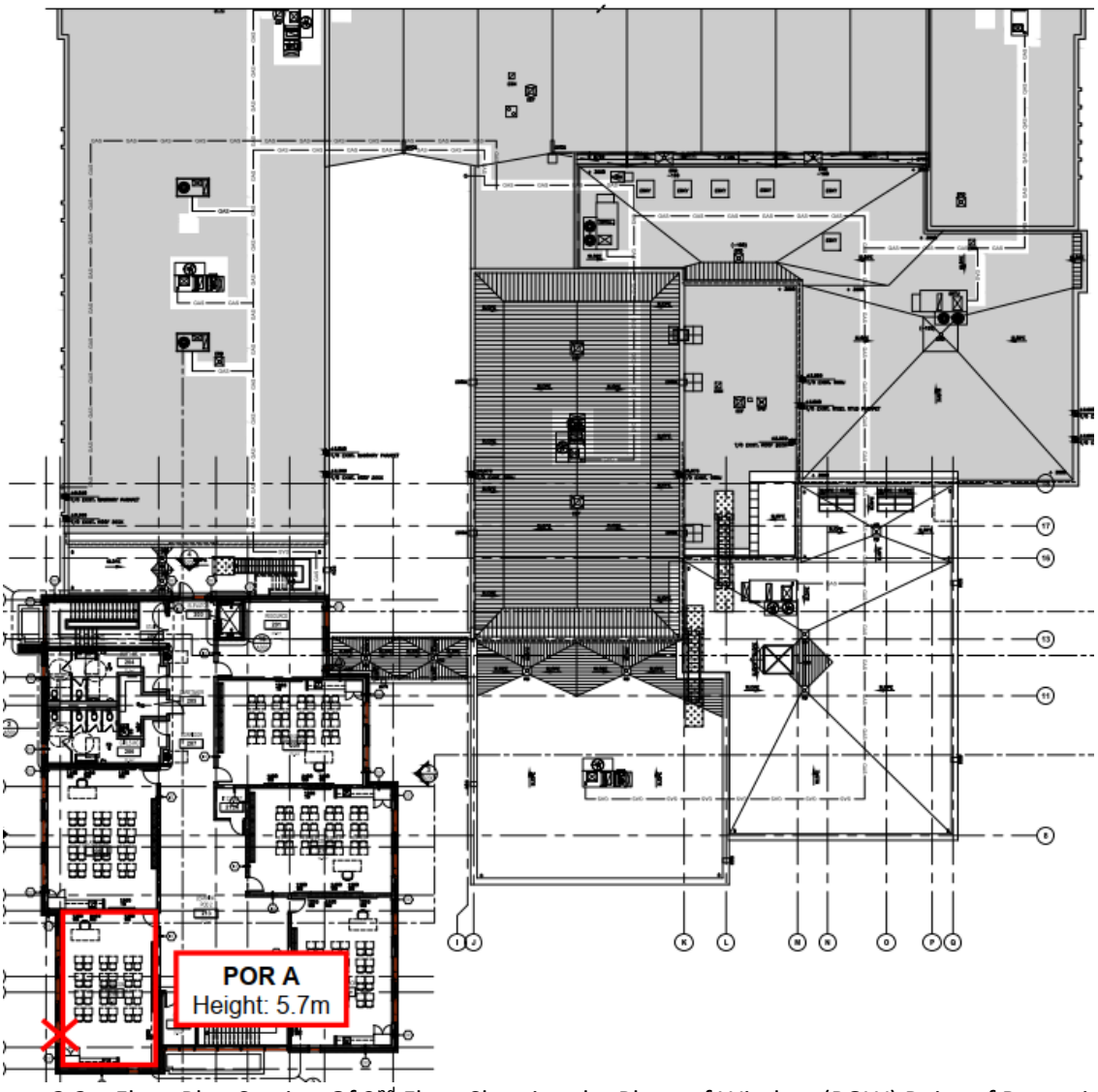


Figure 2.2 – Floor Plan Section Of 2nd Floor Showing the Plane of Window (POW) Point of Reception, With the Location of POR A. The Room Associated with the POR is Outlined in Red. The Red 'X' Denotes the Receiver Location Used in STAMSON.

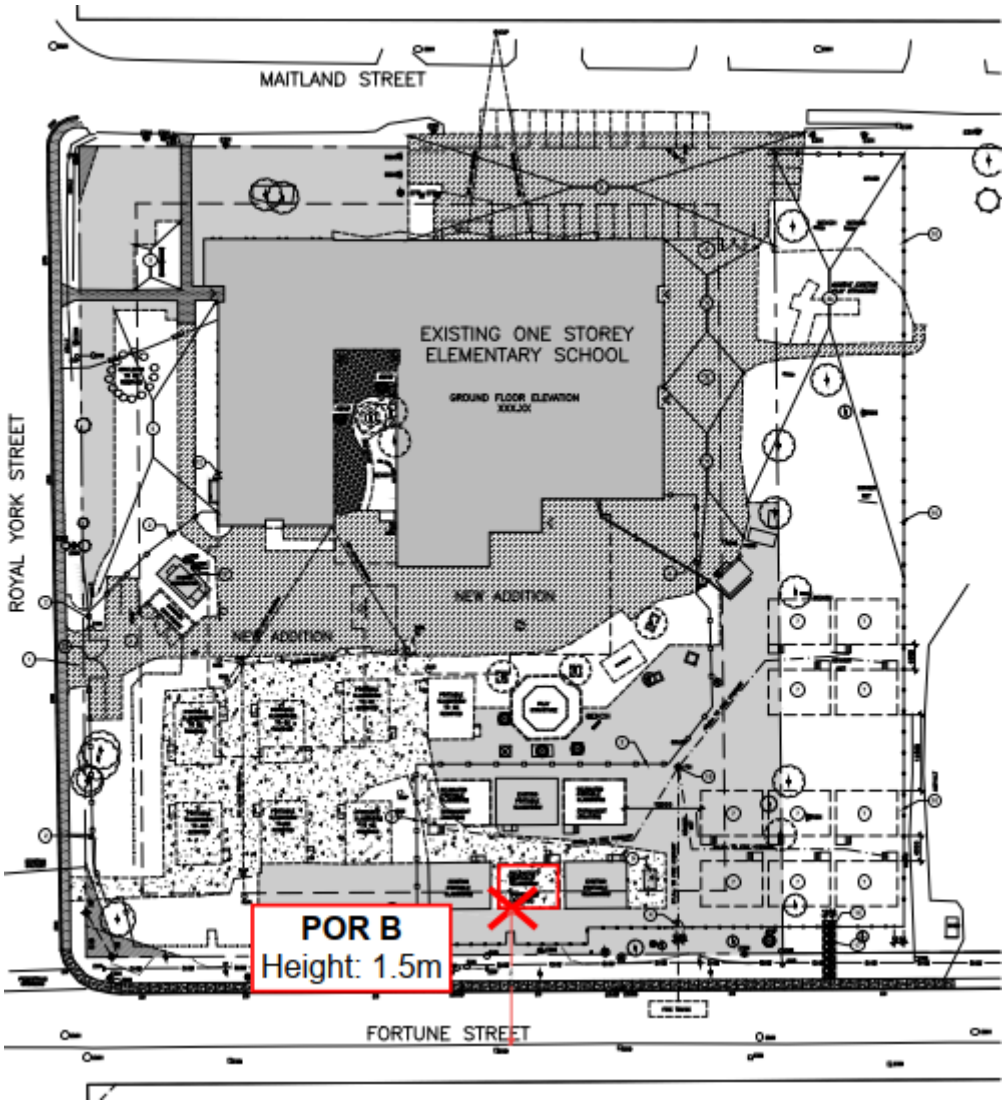


Figure 2.3 – Site Plan Showing the Plane of Window (POW) Point of Reception, With the Location of POR B. The Room Associated with the POR is Outlined in Red. The Red 'X' Denotes the Receiver Location Used in STAMSON.

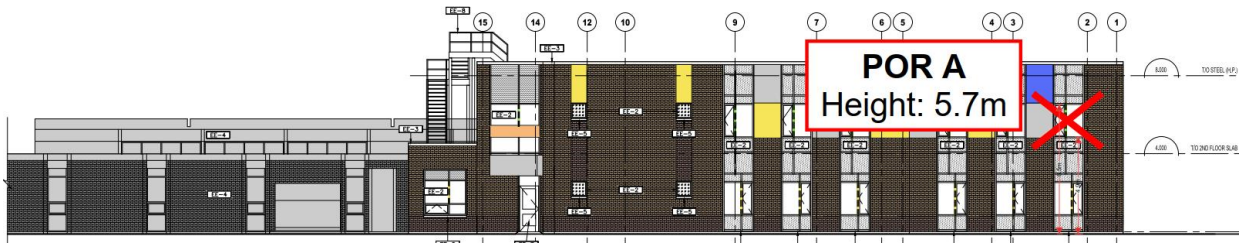


Figure 2.4 – Western Elevation Showing the Plane of Window (POW) Point of Reception, With the Locations and Heights of POR A. The Red 'X' Denotes the Receiver Location Used in STAMSON.

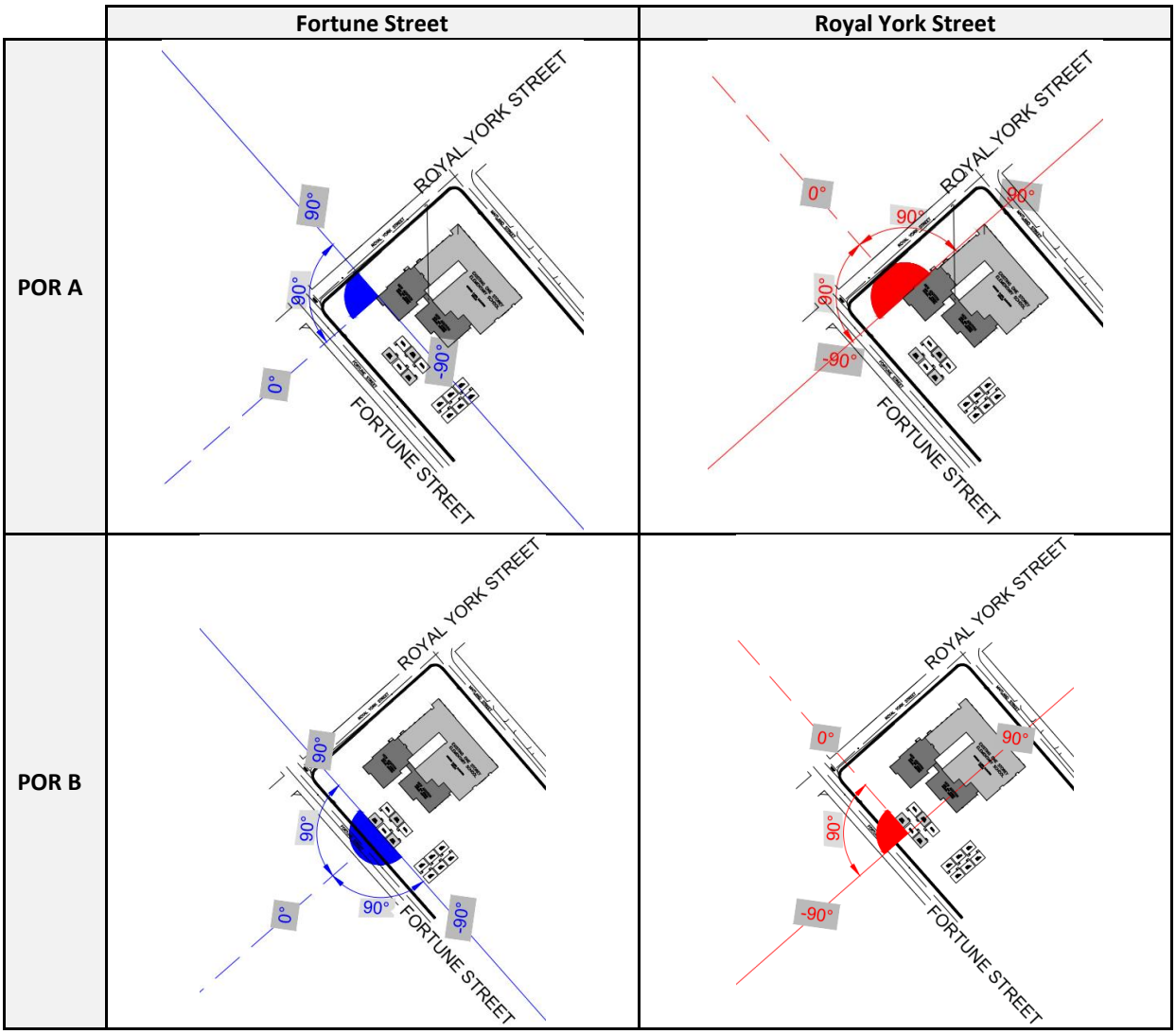


Figure 2.5 – Site Plan of St. Philip Catholic School Illustrating Angles between POR A and relevant noise sources: Fortune Street (top left; angle in blue) and Royal York Street (top right; angle in red). Site Plan of St. Philip Catholic School Showing Angles Between POR B and Relevant Noise Sources: Fortune Street (bottom left; angle in blue) and Royal York Street (bottom right; angle in red)

Receiver	Height (m)	Noise Source					
		Fortune Street			Royal York Street		
		Distance from Source (m)	Angle to source from left (°)	Angle to source from right (°)	Distance from Source (m)	Angle to source from left (°)	Angle to source from right (°)
POR A	5.7	29	0	90	44	90	90
POR B	1.5	17	90	90	79	90	0

Table 2.4 – Points of Reception and Corresponding Noise Exposure Details

2.7 Methodology Used in Traffic Noise Impact Calculation

To assess the impact of road noise on the proposed development, we utilized the Ministry of Environment's STAMSON modelling software version 5.04. This software allows us to input various variables related to road transportation, such as traffic volume, speed, day and night traffic splits, and topography. We can accurately determine the noise impact on specific PORs by utilizing these inputs.

According to the guidelines provided by the City of Ottawa, if noise levels are expected to exceed 65 dBA at the POW of a noise-sensitive building, the building's exterior cladding system must be acoustically designed to ensure compliance with the indoor noise criteria.

2.8 STAMSON Analysis Parameters

The parameters used in STAMSON to assess the noise impact at PORs A and B are indicated in **Tables 2.7 and 2.8**, respectively.

Parameter	Values Used
Road	Fortune Street
Time Period	16h/8h
Road Angle	0° to 90°
Topography	Elevated
Rows of Houses	0
Intermediate Surface	Reflective
Receiver Height (m)	5.7
Source Receiver Distance (m)	29
Source Elevation (m)	1.5

Parameter	Values Used
Road	Royal York Street
Time Period	16h/8h
Road Angle	-90° to 90°
Topography	Elevated
Rows of Houses	0
Intermediate Surface	Reflective
Receiver Height (m)	5.7
Source Receiver Distance (m)	44
Source Elevation (m)	1.5

Table 2.5 – Road Parameters used in the STAMSON model for POR A (2nd floor western unit)

Parameter	Values Used
Road	Fortune Street
Time Period	16h/8h
Road Angle	-90° to 90°
Topography	Flat/Gentle Slope
Rows of Houses	0
Intermediate Surface	Reflective
Receiver Height (m)	1.5
Source Receiver Distance (m)	17
Source Elevation (m)	1.5

Parameter	Values Used
Road	Royal York Street
Time Period	16h/8h
Road Angle	-90° to 0°
Topography	Flat/Gentle Slope
Rows of Houses	0
Intermediate Surface	Reflective
Receiver Height (m)	1.5
Source Receiver Distance (m)	79
Source Elevation (m)	1.5

Table 2.6 – Road Parameters used in the STAMSON model for POR B (Portable Classroom)

2.9 Predicted Surface Transportation Noise Levels

Table 2.9 below shows the predicted sound pressure levels at the points of reception from the results of the STAMSON noise software calculation (**Appendices A2 and A3**). When completing an analysis of a combination of the noises from both roads, the noise impact in the plane-of-window of St. Philip Catholic School should be determined by combining both road traffic sound levels.

Noise Source	POR A (dBA)	POR B (dBA)
	Day	Day
Fortune Street & Royal York Street	61.1	65.0

Table 2.7 – Predicted Combined Road Traffic Noise at PORs A and B

2.10 Noise Summary and Analysis

As noted in **Section 2.1**, St. Philip Catholic School operates primarily during daytime hours, making daytime noise levels the primary concern to ensure a suitable learning environment.

Our traffic noise calculations using STAMSON indicate daytime levels of **61.1 dBA** at POR A and **65.0 dBA** at POR B. According to the ENCG, since these daytime levels do not exceed 65 dBA, no exterior building component analysis (AIF) is required. However, since both daytime levels are greater than 55 and equal to or lower than 65 dBA, provisions for future central air conditioning are required.

3.0 Environmental Noise Assessment

This section evaluates the noise impact from the new building addition on both the surrounding residential area and the school itself. It details the applicable noise limits, identifies noise sources, specifies points of reception (PORs) used in the modelling, outlines the calculation procedures, and presents predicted noise levels. The assessment adheres to the ENCG and uses the CadnaA model for noise calculations where applicable, ensuring compliance with standard practices for noise-sensitive land uses.

3.1 Environmental Noise Control Guidelines

For the surrounding residential areas, classified as Class 2 per **Section 1.1**, the permissible sound pressure levels (SPL) at noise-sensitive locations are:

- 50 dBA during the daytime (7:00 AM to 11:00 PM)
- 45 dBA at night (11:00 PM to 7:00 AM)

These limits are mandatory under Ottawa's ENCG to achieve acoustic comfort for residents and align with Class 2 area standards.

For the school building, as an institutional noise-sensitive use, noise levels will be assessed at the plane of the window during daytime operational hours. The recommended target noise level is 50 dBA, based on ENCG's **Table 3.2a** for Class 2 areas, though this is not a strict requirement. This assessment considers noise from sources on the same property, such as rooftop mechanical units, and aligns with standard practices for institutional uses operating only during the day.

Emergency equipment, such as generators, may be assessed separately under Ottawa's ENCG, allowing a 5 dBA exceedance during non-emergency daytime use (e.g., testing). However, since this development includes no emergency equipment, this provision does not apply.

3.2 Significant Noise Sources

The noise sources that are being considered for this assessment per **the St. Philip's Catholic School Mechanical Drawings (dated 2025-01-31)** are listed in **Table 3.1** below.

Noise Source	Noise Source ID	Quantity	Location
Packaged Rooftop Unit	RTU-5, RTU-6, RTU-7, RTU-8, RTU-9, RTU-10, RTU-11, and RTU-12	8	Rooftop

Table 3.1 – Quantity and Location of Noise Sources Considered

All noise sources are located on the rooftop of the existing and proposed OCSB St. Philip Catholic School, as detailed in **Figure 3.1**. The analysis assumes continuous operation day and night to assess the worst-case noise impact.

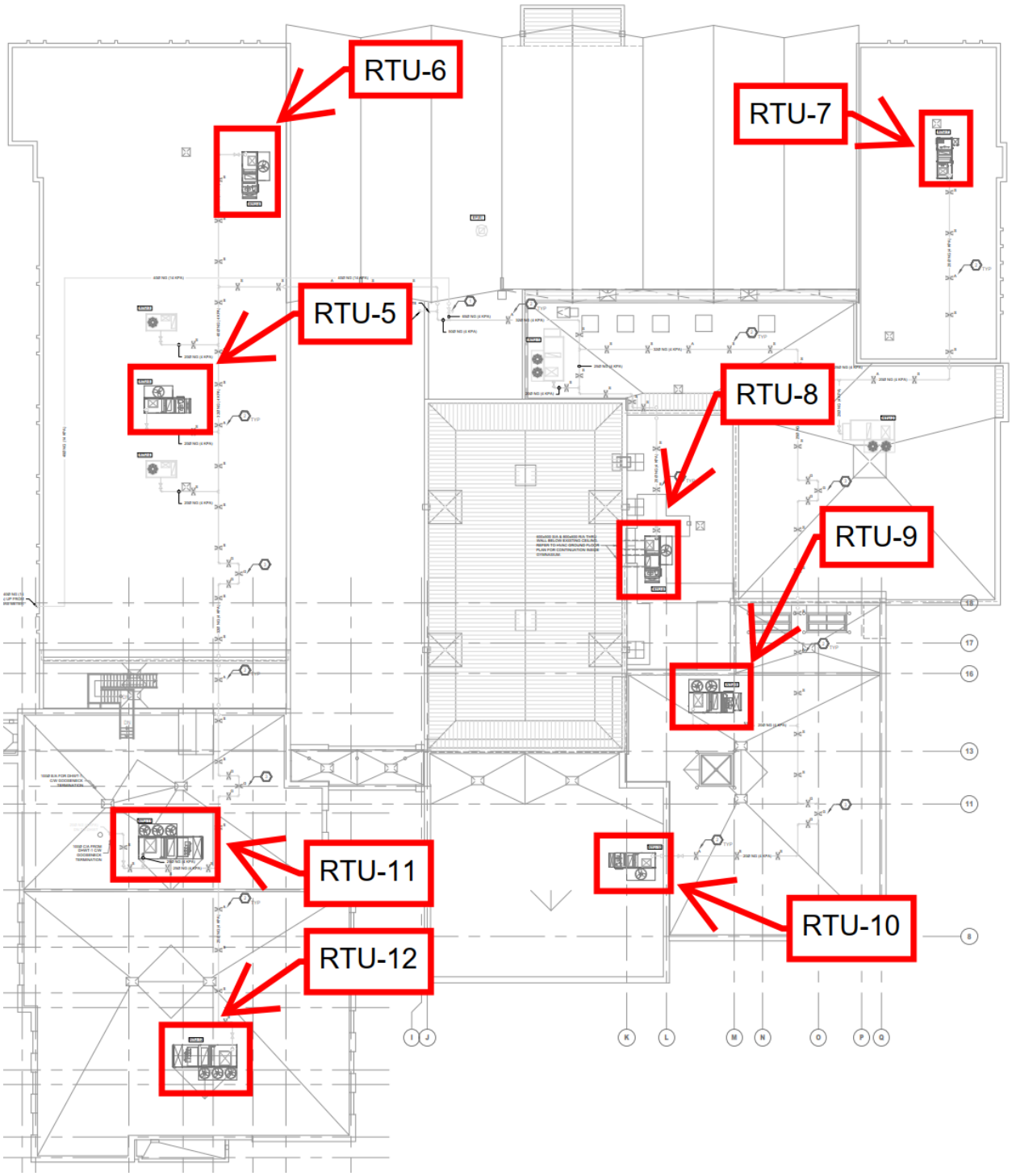


Figure 3.1 – Locations of Points of Reception for Stationary Noise Assessment

Specific equipment details and sound power levels are provided in **Table 3.2**.

Noise Source ID	Manufacturer	Model	Quantity	# of Fans	Sound Levels Used (dBA)
RTU-5 and RTU-6	AAON	RN-008-3-0-GBBC-V0-21-000-A	2	1	Return: 79 / Fan: 78
RTU-7	AAON	RQ-005-3-0-GBBC-V0-21-000-A	1	1	Return: 77 / Fan: 73
RTU-8	AAON	RN-008-3-0-GBBC-V0-21-000-A	1	1	Return: 81 / Fan: 78
RTU-9	AAON	RN-009-3-0-GBAC-V0-21-000-A	1	2	Return: 80 / Fan: 78
RTU-10	AAON	RN-008-3-0-GBBC-V0-21-000-A	1	1	Return: 81 / Fan: 85
RTU-11	AAON	RN-016-3-0-GBBC-V0-21-000-A	1	2	Return: 81 / Fan: 81
RTU-12	AAON	RN-016-3-0-GBBC-V0-21-000-A	1	2	Return: 81 / Fan: 88

Table 3.2 – Summary of Mechanical Equipment and Sound Levels in this Analysis

Detailed octave band sound power levels for each noise source are provided in **Table 3.3** and are based on manufacturer-provided data (see **Appendix B** for product sheets).

Noise Source ID and Noise Source	Octave Band Sound Power Levels (dB)								dBA
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
RTU-5 and RTU-6: Outdoor Air Inlet	84	84	80	76	73	71	68	63	79
RTU-5 and RTU-6: Condenser Fan	86	83	76	76	72	68	65	63	78
RTU-7: Outdoor Air Inlet	85	79	79	74	71	69	66	59	77
RTU-7: Condenser Fan	81	77	71	71	67	62	59	58	73
RTU-8: Outdoor Air Inlet	85	86	82	79	75	72	70	66	81
RTU-8: Condenser Fan	86	83	76	76	72	68	65	63	78
RTU-9: Outdoor Air Inlet	86	84	82	76	74	71	67	62	80
RTU-9: Condenser Fan	86	83	76	76	72	68	65	63	78
RTU-10: Outdoor Air Inlet	85	85	82	77	75	72	70	66	81
RTU-10: Condenser Fan	94	90	83	83	79	75	72	71	85
RTU-11: Outdoor Air Inlet	88	86	84	77	76	73	66	59	81
RTU-11: Condenser Fan	89	86	79	79	75	71	68	66	81
RTU-12: Outdoor Air Inlet	88	86	84	77	76	73	66	59	81
RTU-12: Condenser Fan	97	93	86	86	82	78	75	74	88

Table 3.3 – Octave Band Sound Power Levels of Noise Sources

3.3 Points of Reception

Points of reception (PORs) are designated to evaluate noise levels at both nearby residential locations and the plane of the windows of noise-sensitive classrooms within the school. Environmental PORs are located at the nearest residential homes and the parish, while school PORs are positioned at classroom windows, with heights derived from architectural drawings. This approach aligns with Ottawa's ENCG for assessing noise impacts. **Figure 3.2** illustrates the POR locations, and **Table 3.4** provides their heights, addresses, and applicable SPL limits.

POR Number	Height (m)	Address	POR Environment Type	Daytime Sound Pressure Level Limit (dBA)	Nighttime Sound Pressure Level Limit (dBA)
1	1.5	119 Royal York Street	Neighbouring Residential Property	50	45
2	4.5	86 Maitland Street			
3	1.5	65 Fortune Street			
4	4.5	71 Fortune Street			
5	4.5	79 Fortune Street			
6	4.5	St. Philip Parish	Church		N/A[1]
7	1.5	St. Philip: Classroom 133	Building Itself		
8	5.2	St. Philip: Classroom 209			

Note[1]: Nighttime limits do not apply to the parish and school PORs as the buildings are operational only during daytime hours.

Table 3.4 – POR Locations, Heights, and Applicable Sound Pressure Level Limits

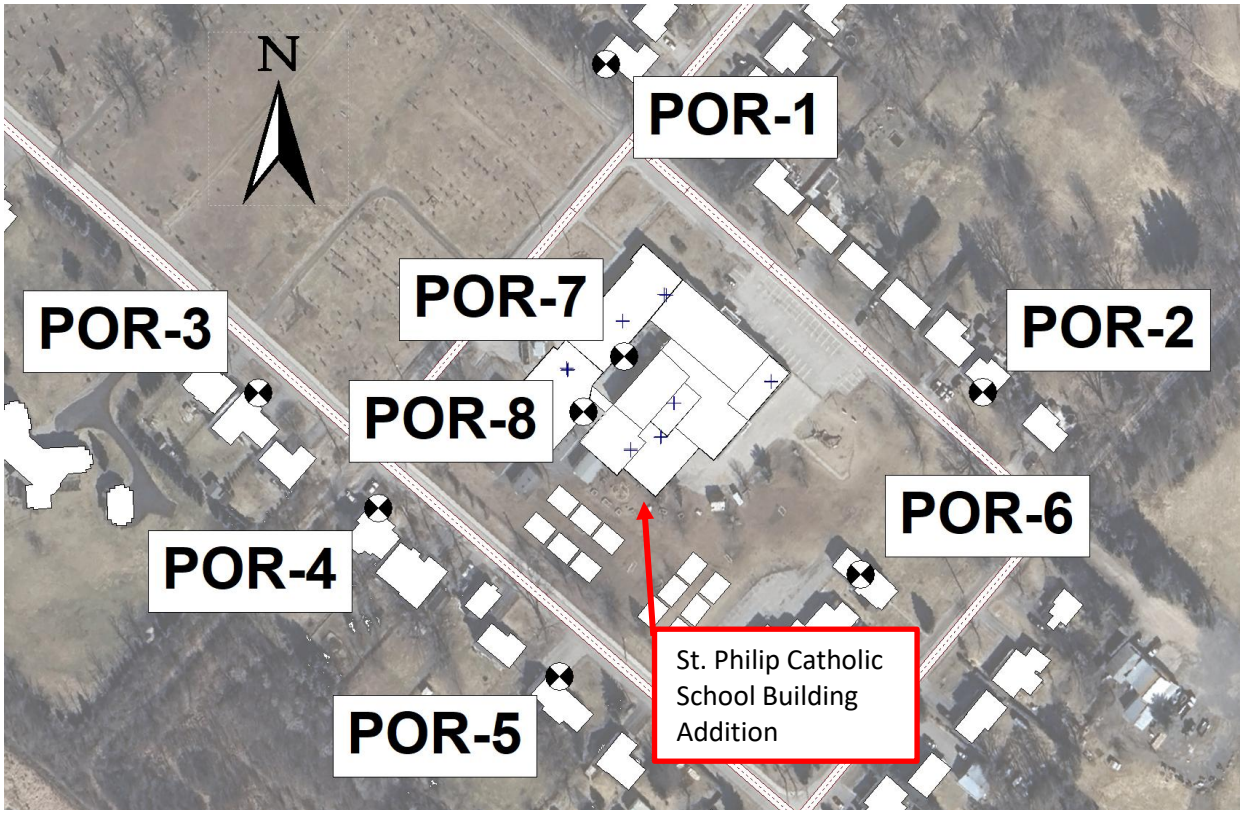


Figure 3.2 – Locations of PORs for Stationary Noise Assessment

3.4 Methodology Used in Environmental Noise Impact Calculation

The following sections describe the methodology and software used to model sound pressure levels at the PORs, accounting for source levels, distance, topography, barriers, and building geometry.

3.4.1 Procedure Used to Assess Noise Impact at Each Point of Reception

This environmental noise analysis was done using an environmental noise modeling software called CadnaA which references ISO 9613. CadnaA predicts environmental noise through calculations based on a 3D model which uses geometrical, landscape, and topographical data, combined with details of the proposed construction and the noise source power levels.

We created a 3D rendering of the neighbourhood around the building and placed the noise sources in the model at the appropriate locations and then applied the sound power levels described in this report. The colours on the ground and building represent the sound pressure level in that area. Sound power levels per octave band were entered into CadnaA at the source's location and the resulting sound pressure levels were calculated at the points of reception.

3.4.2 Other Parameters/Assumptions Used in Calculations

Table 3.5 describes the parameters used in the CadnaA model:

Parameter	Value/Condition
Ground Absorption	0 (Reflective Ground)
Building Reflections	On
Temperature (°C)	10
Relative Humidity (%)	70

Table 3.5 – Parameters used in CadnaA modelling

3.5 Environmental Noise Levels

This section evaluates predicted noise levels from rooftop equipment at designated PORs, including residential, parish, and school locations, as shown in **Figure 3.3**. The assessment assumes the equipment operates at 100% capacity at all times, representing the worst-case scenario. It compares impacts with and without mitigation, using the applicable limits: 50 dBA (daytime) and 45 dBA (nighttime) for residential PORs, and 50 dBA (daytime only, recommended) for parish and school PORs. The nighttime limit for residential PORs is applied because the assessment assumes the equipment runs at full capacity continuously, which maximizes potential noise output. Nighttime is when people are most sensitive to noise (e.g., during sleep), so the stricter 45 dBA limit demands compliance even under these conservative conditions.

3.5.1 Results with Current Selections

Figure 3.3 displays the noise grid at a height of 4.5 meters, assessing the impact on nearby residential homes from all rooftop systems operating simultaneously. Due to the mechanical equipment's location on the roof, the second floors of adjacent two-storey homes are likely to experience higher noise levels, prompting the noise grid to be set at 4.5 meters to illustrate the acoustic impact at this height. For residential PORs, the critical limit is 45 dBA at night (mandatory), while for parish and school PORs, the recommended limit is 50 dBA during the day. **Table 3.6** shows predicted Sound Pressure Levels (SPLs) without mitigation.

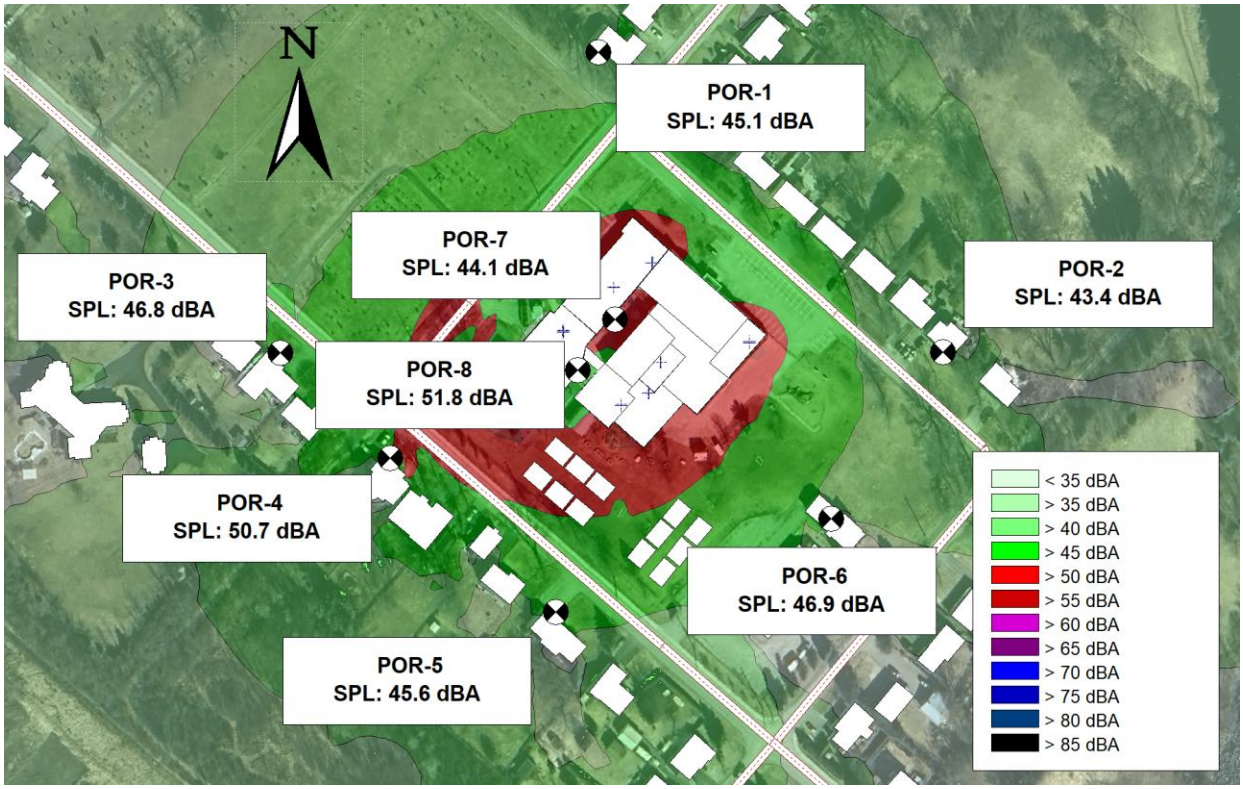


Figure 3.3 – Noise map at 4.5 m elevation with current equipment selections for daytime and nighttime operations.

ID	Predicted SPL (dBA)	Maximum SPL Limit (dBA)	Acoustic Compliance?
POR-1	45.1	45.0	No
POR-2	43.4		Yes
POR-3	46.8		No
POR-4	50.7		No
POR-5	45.6		No
POR-6	46.9	50.0	Yes
POR-7	44.1		Yes
POR-8	51.8		No

Table 3.6 – Predicted Sound Pressure Levels at PORs without Mitigation

The modelling indicates that the rooftop equipment exceeds Ottawa's ENCG limits at several residential PORs and the recommended limits at one school POR, necessitating mitigation. Recommended measures are outlined in **Section 3.5.2**, with their effectiveness demonstrated in **Figures 3.4 and 3.5**.

3.5.2 Results with Current Selection and Acoustic Mitigation Measures

To achieve the mandatory 45 dBA nighttime noise limit at residential Points of Reception (PORs) and the 50 dBA at the parish and school PORs, we recommend the following acoustic mitigation measures:

- **Fan Speed Percentage Limitation:** Reduce condenser fan speeds during day and night operations. Per the client, the units have a nighttime setback mode. Detailed octave band sound power levels for these settings are provided in **Table 3.7** and are based on manufacturer-provided data (see **Appendix B** for product sheets).
    - **Daytime:**
        - Reduce fan speeds at RTU-10 and RTU-12 to a maximum of 75%.
    - **Nighttime:**
        - Maintain RTU-10 fan speed at a maximum of 75%.
        - Lower fan speed at RTU-12 to a maximum of 50%.

Noise Source ID and Noise Source	Octave Band Sound Power Levels (dB)								dBA
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
RTU-10: Fan (Speed: 75%)	87	84	77	77	73	69	66	64	79
RTU-12: Fan (Speed: 75%)	90	87	80	80	76	72	69	67	82
RTU-12: Fan (Speed: 50%)	82	78	71	71	67	63	60	59	73

Table 3.7 – Octave Band Sound Power Levels of Relevant Condenser Fans at Reduced Speeds

With these measures in place, **Figure 3.4** and **Table 3.8** present updated SPLs for daytime operation, while **Figure 3.5** and **Table 3.9** show nighttime results.

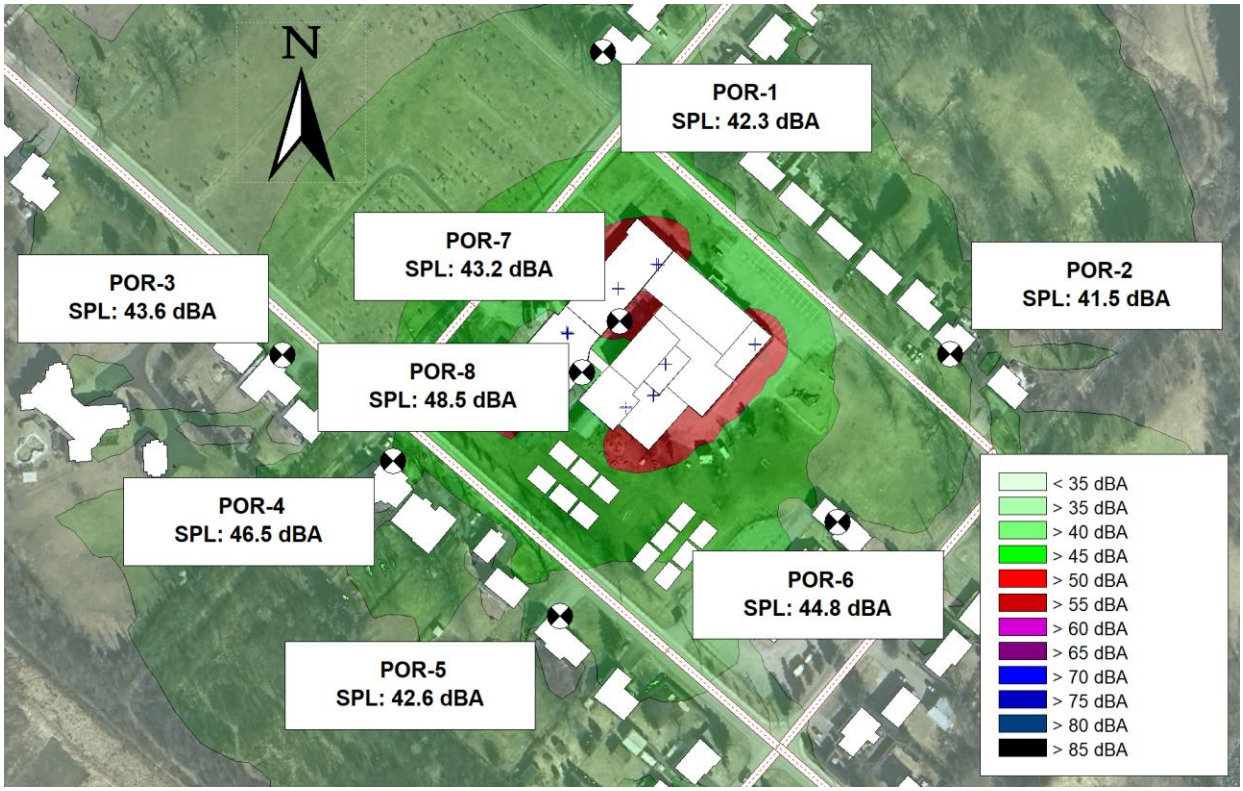


Figure 3.4 – Noise Contour Map at 4.5 m Elevation Showing Daytime Acoustic Mitigation Effects for Residential Points of Reception to Comply with Ottawa's ENCG

ID	Predicted SPL (dBA)	Maximum SPL Limit (dBA)	Daytime Acoustic Compliance?
POR-1	42.3	50.0 (Daytime Limit)	Yes
POR-2	41.5		Yes
POR-3	43.6		Yes
POR-4	46.5		Yes
POR-5	42.6		Yes
POR-6	44.8	50.0	Yes
POR-7	43.2		Yes
POR-8	48.5		Yes

Table 3.8 – Predicted Daytime Sound Pressure Levels at PORs with Mitigation

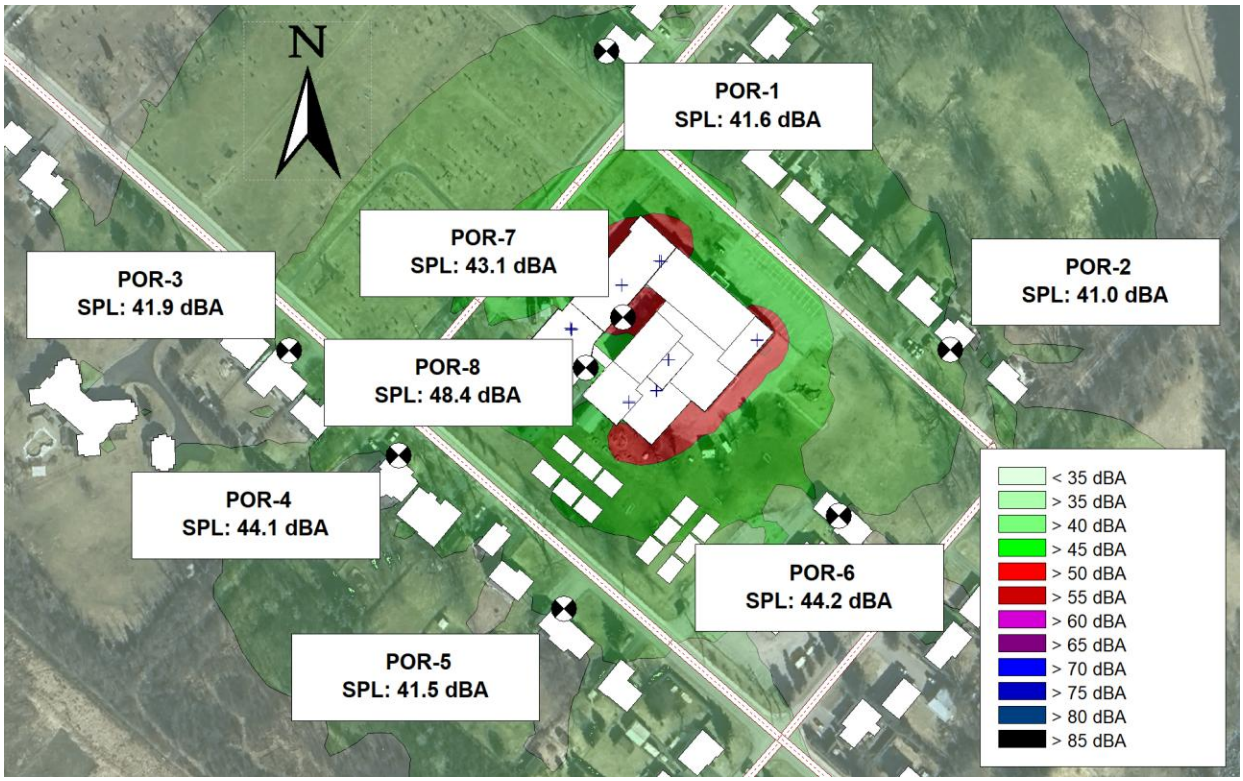


Figure 3.5 – Noise Contour Map at 4.5 m Elevation Showing Nighttime Acoustic Mitigation Effects for Residential Points of Reception to Comply with Ottawa's ENCG

ID	Predicted SPL (dBA)	Maximum SPL Limit (dBA)	Nighttime Acoustic Compliance?
POR-1	41.6	45.0 (Nighttime Limit)	Yes
POR-2	41.0		Yes
POR-3	41.9		Yes
POR-4	44.1		Yes
POR-5	41.5		Yes
POR-6	44.2	Not Applicable (N/A)	N/A
POR-7	43.1		N/A
POR-8	48.4		N/A

Table 3.9 – Predicted Nighttime Sound Pressure Levels at PORs with Mitigation

These measures are intended to achieve compliance with Ottawa's ENCG mandatory limits for residential areas. These measures also allow the parish and school PORs to meet our designated acoustic recommended limit.

4.0 Conclusion

We have completed a traffic noise impact study and an environmental noise assessment for the proposed addition to the St. Philip Catholic School located at 79 Maitland Street South in Richmond, Ontario.

For the traffic noise study (**Section 2.0**), the transportation noise sources considered for this project are Royal York Street and Fortune Street. The predicted daytime noise levels at the plane of window exceed 55 dBA but remain at or below 65 dBA, as outlined in **Section 2.9**. As a result, the classrooms in this addition must be designed with central air conditioning, as specified in **Section 2.10**.

The environmental noise assessment (**Section 3.0**) demonstrates that noise from rooftop mechanical and electrical equipment exceeds MECP NPC-300 limits of 50 dBA (day) and 45 dBA (night) for a Class 2 area. To achieve Ottawa's ENCG compliance, acoustic mitigation measures—including decreasing fan speeds for specific mechanical equipment—are detailed in **Section 3.5.2**.

If you have any questions or concerns regarding this report, please let us know.

Sincerely,

Tiffany-Rose Filler, M.Sc.,
Acoustic Consultant

Approved By:

Donald Buchan, P.Eng
Principal
Buchan Lawton Parent Ltd.

APPENDIX

APPENDIX A1 – ST. PHILIP CATHOLIC SCHOOL EXPANSION TIA SCOPING & FORECASTING REPORT DRAFT

APPENDIX A2 – STAMSON CALCULATION FOR POR A

APPENDIX A3 – STAMSON CALCULATION FOR POR B

APPENDIX B1 – PRODUCT ACOUSTIC DATA RTU-5 AND RTU-6

APPENDIX B2 – PRODUCT ACOUSTIC DATA FOR RTU-7

APPENDIX B3 – PRODUCT ACOUSTIC DATA FOR RTU-8

APPENDIX B4 – PRODUCT ACOUSTIC DATA FOR RTU-9

APPENDIX B5 – PRODUCT ACOUSTIC DATA FOR RTU-10

APPENDIX B6 – PRODUCT ACOUSTIC DATA FOR RTU-11 AND RTU-12

APPENDIX B7 – PRODUCT ACOUSTIC DATA FOR CONDENSER FANS FOR ALL RTUS

APPENDIX A1

St. Philip Catholic School Expansion Tia Scoping & Forecasting Report Draft

St. Philip Catholic School Expansion

TIA Scoping & Forecasting Report

Draft

February 2025

St. Philip Catholic School (OCSB)

TIA Scoping & Forecasting Report

prepared for:
Ottawa Catholic School Board
570 West Hunt Club Road
Ottawa, ON
K2G 3R4

prepared by:

PARSONS
1223 Michael Street North
Suite 100
Ottawa, ON K1J 7T2

February 14, 2025

479356-01000

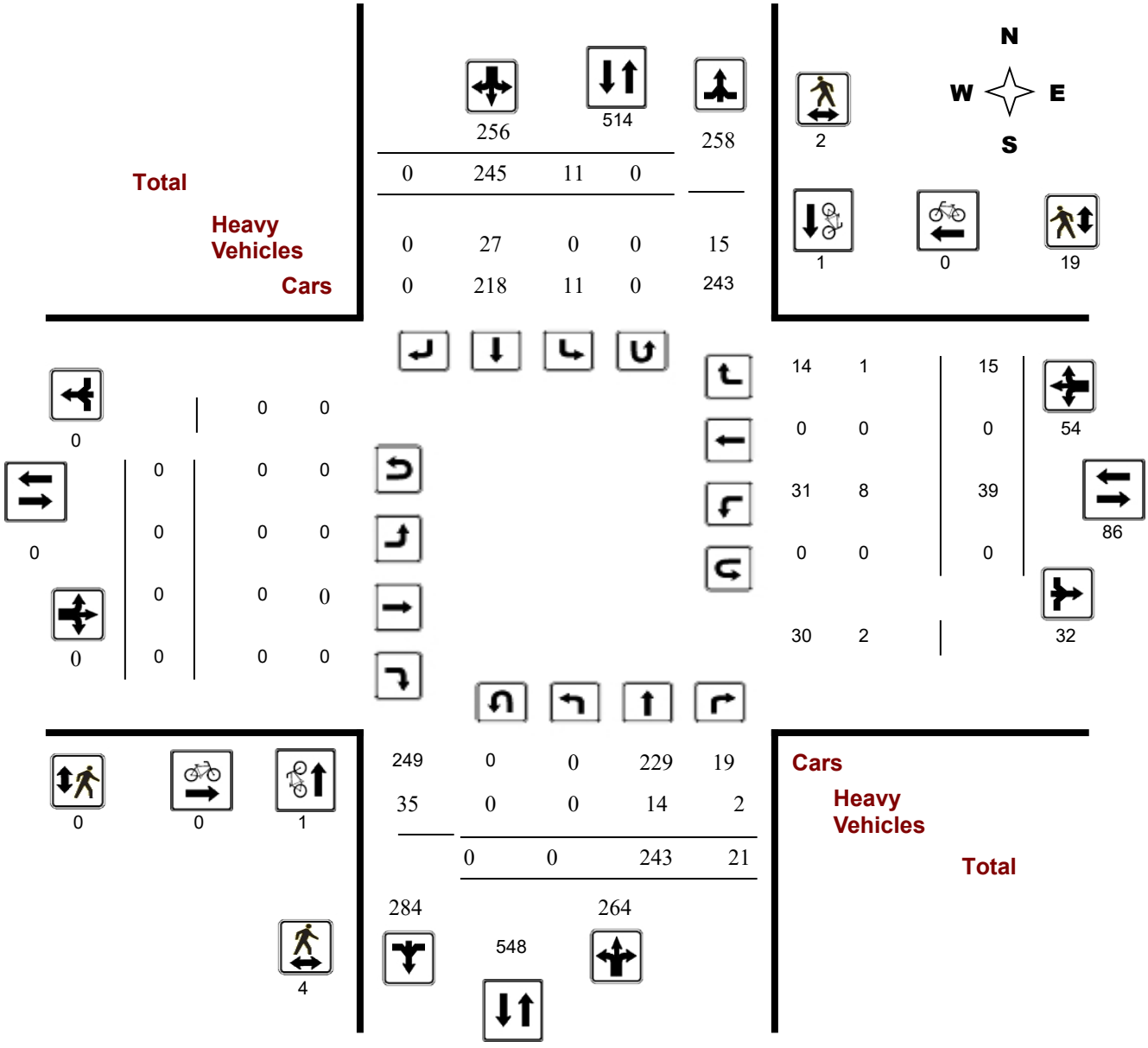
Transportation Services - Traffic Services

Turning Movement Count - Study Results

FORTUNE ST @ MARTIN ST

Survey Date: Tuesday, December 04, 2018
Start Time: 07:00
WO No: 38180
Device: Miovision

Full Study Diagram



APPENDIX A2: STAMSON Calculations for POR A

STAMSON 5.0 SUMMARY REPORT Date: 03-03-2025 112:44:51
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: philA.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Fortune St (day/night)

Car traffic volume : 10883/947 veh/TimePeriod
Medium truck volume : 542/47 veh/TimePeriod
Heavy truck volume : 542/47 veh/TimePeriod
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Fortune St (day/night)

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 29.00 / 29.00 m
Receiver height : 5.70 / 5.70 m
Topography : 3 (Elevated; no barrier)
Elevation : 0.00 m
Reference angle : 0.00

Road data, segment # 2: Royal York S (day/night)

Car traffic volume : 6477/563 veh/TimePeriod
Medium truck volume : 515/45 veh/TimePeriod
Heavy truck volume : 368/32 veh/TimePeriod
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Royal York S (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 44.00 / 44.00 m
Receiver height : 5.70 / 5.70 m
Topography : 3 (Elevated; no barrier)
Elevation : 0.00 m
Reference angle : 0.00

Result summary (day)

---

source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Fortune St	1.46	59.62	59.62
2.Royal York S	1.50	55.55	55.55
Total		61.06 dBA

Result summary (night)

---

source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Fortune St	1.46	52.02	52.02
2.Royal York S	1.50	47.95	47.95
Total		53.46 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.06
(NIGHT): 53.46

APPENDIX A3: STAMSON Calculations for POR B

STAMSON 5.0 SUMMARY REPORT Date: 03-03-2025 112:35:00
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: philB.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Fortune St (day/night)

Car traffic volume : 10883/947 veh/TimePeriod
Medium truck volume : 542/47 veh/TimePeriod
Heavy truck volume : 542/47 veh/TimePeriod
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: Fortune St (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 17.00 / 17.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Royal York S (day/night)

Car traffic volume : 6477/563 veh/TimePeriod
Medium truck volume : 515/45 veh/TimePeriod
Heavy truck volume : 368/32 veh/TimePeriod
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Royal York S (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 79.00 / 79.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Result summary (day)

---

source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Fortune St	1.46	64.95	64.95
2.Royal York S	1.50	47.51	47.51
Total		65.03 dBA

Result summary (night)

---

source height (m)	Road Leq (dBA)	Total Leq (dBA)
1.Fortune St	1.46	57.35	57.35
2.Royal York S	1.50	39.92	39.92
Total		57.43 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.03
(NIGHT): 57.43

APPENDIX B1

Product Acoustic Data For RTU-5 And RTU-6

Unit Rating

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 353.0

	A1	A2	A3	A4	A5		B1	B2	B3	B4	B5		1	2		3A	3B	3C	3D	3E		4A	4B	4C		5A	5B	5C	5D	5E		6A	6B	6C	6D	6E		7	8		9A	9B	9C
RNA-	**008**	**-A**	**-A**	**-4**	**-GJB**	**0A**	**-CB**	**2L**	**0**	**:**	**00**	**-**	**0**	**A**	**C**	**AG**	**-Q**	**AA**	**-**	**00**	**000**	**-A**	**BH**	**BG**	**-**	**EC**	**-**	**CB**	**0**															
K-	**00**	**-00**	**-A**	**-AN**	**0**	**-EB**	**-N**	**000**	**-00**	**-**	**000**	**-**	**A**	**00**	**BB**	**0-**	**G0**	**0A**	**A0**	**-**	**000**	**000**	**B**																					
	9D		10A	10B		11A	11B		12		13A	13B	13C		14	15		16A	16B	16C	16D		17A	17B		18A	18B	18C		19	20	21	22	23	24		25	26	27	28	29	30		31	32	33	34	35	36	37

Tag: RTU-6 Exist Classroms

Job Information

Job Name:	*WSP OCSB St Phillip Elementary School*
Job Number:	*Job 61*
Site Altitude:	*0 ft*
Refrigerant:	*R-454B*
Design System Charge (oz):	*678*

Static Pressure

External:	*1.50 in. w.g.*
Cooling Coil:	*0.39 in. w.g.*
Filters Clean:	*0.26 in. w.g.*
Dirt Allowance:	*0.35 in. w.g.*

Cooling Section

	Gross	Net
Equivalent Total Capacity:	*144.6 MBH*	*136.7 MBH*
Total Capacity:	*95.1 MBH*	*87.2 MBH*
Sensible Capacity:	*77.6 MBH*	*69.8 MBH*
Latent Capacity:	*17.4 MBH*	
HW Total Cooling Capacity:	*49.5 MBH*	
Mixed Air Temp (DB/WB):	*78.2 °F / 64.5 °F*	
Entering Air Temp (DB/WB):	*78.2 °F / 64.5 °F*	
Lv Air Temp (Coil) (DB/WB):	*53.2 °F / 53.1 °F*	
Lv Air Temp (Unit) (DB/WB):	*55.6 °F / 54.1 °F*	

Supply Air Fan:	*1 x RNA185D70 @ 2.76 BHP Ea.*
SA Fan RPM / Width:	*2196 RPM / 2.898 in*
SA Fan FEI:	*1.16*
Exhaust Air Fan:	*1 x RM150-RN @ 1.24 BHP Ea.*
EA Fan RPM / Width:	*1855 RPM / 5.160 in*
EA Fan FEI:	*1.11*
Evaporator Coil:	*8.8 ft² / 6 Rows / 14 FPI*
Evaporator Face Velocity:	*331.4 fpm*
Energy Recovery:	*1 x ERC-3019C*

Unit Information

Approx. Op./Ship Weights:	*1717 lbs / 1717 lbs (±5%)*
Ambient Temperature (DB/WB):	*95.0 °F / 75.0 °F*
Coil Filter FV / Qty:	*326.3 fpm / 4*
Min. Room Area/Height/Airflow**:	*636 ft² / 7 ft / 68796 SCFM*
Exhaust Airflow/ESP/TSP:	*2900 SCFM / 0.50 in. w.g. / 1.36 in. w.g.*
Supply Airflow/ESP:	*2900 SCFM / 1.50 in. w.g.*
Outside Airflow:	*1600 SCFM*
Return Temperature (DB/WB):	*75.0 °F / 62.0 °F*
Economizer:	*0.11 in. w.g.*
Heating:	*0.05 in. w.g.*
Cabinet:	*0.07 in. w.g.*
Energy Recovery:	*0.82 in. w.g.*
Total:	*3.55 in. w.g.*

Heating Section

Preheat Type:	*Std (No Preheat)*
Primary Heat Type:	*Heat pump is not operational at the current conditions.*
OA Temp (DB/WB):	*-13.0 °F / -13.0 °F*
RA Temp (DB/WB):	*72.0 °F / 54.0 °F*
Auxiliary Heating Type:	*Nat. Gas Heat*
Heating Airflow:	*2900 SCFM*
Total Capacity:	*121.5 MBH*
Entering Air Temp (DB/WB):	*56.9 °F / 45.6 °F*
Leaving Air Temp (DB/WB):	*95.4 °F / 61.5 °F*
Input:	*150 MBH*
Consumption:	*150.0 MBH*
Total Turndown Ratio:	*8.0:1*

Rating Information

Listing Model	*RN-008-3-0-GBBC-V0-21-000-A*
Cooling Capacity:	*94.0 MBH*
Cooling EER:	*11.37 BTU/h·W*
Cooling IEER:	*14.1 BTU/h·W*

**Rated in accordance with AHRI Standard 340/360 (I-P)*

Application EER @ Op. Conditions:	***12.9 BTU/h·W***
Application COP @ Op. Conditions:	***7.53 W/W***
Application COPH @ Op. Conditions:	***3.4 W/W***

Heating High Temp Capacity:	*85.0 MBH*
Heating High Temp COP:	*3.4 W/W*
Heating Low Temp Capacity:	*48.96 MBH*
Heating Low Temp COP:	*2.328 W/W*

Electrical Data

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 353.0

Circuit 1

Rating:	*575V/3Ø/60Hz*	*Minimum Circuit Amp:*	*23*
Unit FLA:	*20*	*Maximum Overcurrent:*	*30*
SCCR:	*5 KAIC*		

	Qty	HP	VAC	Phase	RPM	FLA	RLA
Compressor 1:	*1*		*575*	*3*			*10.9*
Condenser Fan:	*2*	*0.33*	*460*	*1*	*1100*	*1.6*	
Supply Fan:	*1*	*3.00*	*575*	*3*	*1760*	*3.9*	
Exhaust Fan:	*1*	*2.00*	*575*	*3*	*1760*	*2.7*	
Combustion:	*1*	*0.09*	*460*	*1*	*3000*	*0.7*	
Energy Recovery:	*1*	*0.05*	*230*	*1*	*1050*	*0.3*	

*Cabinet Sound Power Levels**

Octave Bands:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Discharge LW (dB):	*88*	*87*	*89*	*87*	*80*	*76*	*74*	*69*
Return LW (dB):	*84*	*84*	*80*	*76*	*73*	*71*	*68*	*63*

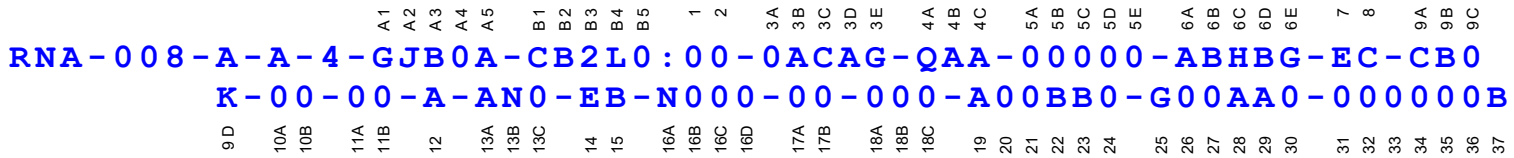
**Sound power levels are given for informational purposes only. The sound levels are not guaranteed.*

*****The minimum floor area for the Lower Flammability Limit (LFL) is calculated in accordance with UL60335-2-40 4th ed. (operating or storage).***

Performance Data Table

Outside Air		Mixed Air		Leaving Air		Heat Pump Capacity	Heat Pump Integrated Capacity	Heat Wheel Heating Capacity	Heating COP
DB °F	WB °F	DB °F	WB °F	DB °F	WB °F	MBH	MBH	MBH	W/W
62.0	56.2	70.4	54.5	105.7	67.2	111.1	111.1	-5.7	3.65
57.0	51.6	69.5	53.7	103.4	66.1	106.8	106.8	7.3	3.75
52.0	47.1	68.7	53.0	101.0	65.0	102.0	102.0	18.9	3.84
47.0	42.6	67.8	52.3	98.7	63.9	97.5	97.5	29.6	3.94
42.0	38.0	67.0	51.6	96.6	63.0	93.6	93.6	39.8	4.05
37.0	33.5	66.1	51.0	90.5	60.6	90.0	77.3	49.1	3.80
32.0	28.8	65.2	50.3	89.1	59.9	86.5	75.6	58.4	3.98
27.0	24.3	64.4	49.7	87.6	59.2	83.3	73.9	66.8	4.16
22.0	19.7	63.5	49.2	86.1	58.5	80.4	72.2	74.9	4.34
17.0	15.0	62.5	48.6	84.7	57.8	77.6	70.6	82.6	4.53
12.0	10.4	61.6	48.1	83.2	57.1	75.0	68.8	89.8	4.71
7.0	5.7	60.7	47.6	81.5	56.4	72.5	66.7	96.8	4.89
2.0	0.1	59.8	47.0	*	*	*	*	*	*

*Invalid operation point - Compressor operating outside of operating envelope
**Electric preheat is used to maintain the entering air temperature when applicable.



Tag: RTU-6 Exist Classroms

APPENDIX B2

Product Acoustic Data For RTU-7

Unit Rating

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 353.0

A1 A2 A3 A4 A5 B1 B2 B3 B4 B5 1 2 3A 3B 3C 3D 3E 4A 4B 4C 5A 5B 5C 5D 5E 6A 6B 6C 6D 6E 7 8 9A 9B 9C

RQA-005-A-A-4-GJB0A-CB1L0:00-0ADAF-QAJ-00000-AGHBE-EC-CB0

K-00-00-A-AN0-EB-N000-00-000-A00BB0-G00AA0-000000B

9D 10A 10B 11A 11B 12 13A 13B 13C 14 15 16A 16B 16C 16D 17A 17B 18A 18B 18C 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37

Tag: RTU-7
Kindergarten

Job Information

Job Name:	*WSP OCSB St Phillip Elementary School*
Job Number:	*Job 61*
Site Altitude:	*0 ft*
Refrigerant:	*R-454B*
Design System Charge (oz):	*563*

Static Pressure

External:	*1.50 in. w.g.*
Cooling Coil:	*0.38 in. w.g.*
Filters Clean:	*0.29 in. w.g.*
Dirt Allowance:	*0.35 in. w.g.*

Cooling Section

	Gross	Net
Equivalent Total Capacity:	*79.5 MBH*	*73.4 MBH*
Total Capacity:	*59.9 MBH*	*53.8 MBH*
Sensible Capacity:	*46.5 MBH*	*40.4 MBH*
Latent Capacity:	*13.4 MBH*	
HW Total Cooling Capacity:	*19.6 MBH*	
Mixed Air Temp (DB/WB):	*78.0 °F / 64.4 °F*	
Entering Air Temp (DB/WB):	*78.0 °F / 64.4 °F*	
Lv Air Temp (Coil) (DB/WB):	*51.8 °F / 51.7 °F*	
Lv Air Temp (Unit) (DB/WB):	*55.1 °F / 53.1 °F*	

Supply Air Fan:	*1 x RQ185 @ 1.95 BHP Ea.*
SA Fan RPM / Width:	*1917 RPM / 3.000 in*
SA Fan FEI:	*1.06*
Exhaust Air Fan:	*1 x RN150D70-RQ @ 0.66 BHP Ea.*
EA Fan RPM / Width:	*1786 RPM / 2.352 in*
EA Fan FEI:	*1.20*
Evaporator Coil:	*5.3 ft² / 6 Rows / 14 FPI*
Evaporator Face Velocity:	*314.3 fpm*
Energy Recovery:	*1 x ERC-2108*

Unit Information

Approx. Op./Ship Weights:	*1389 lbs / 1389 lbs (±5%)*
Ambient Temperature (DB/WB):	*95.0 °F / 75.0 °F*
Coil Filter FV / Qty:	*297.0 fpm / 2*
Min. Room Area/Height/Airflow**:	*528 ft² / 7 ft / 57127 SCFM*
Exhaust Airflow/ESP/TSP:	*1650 SCFM / 0.50 in. w.g. / 1.23 in. w.g.*
Supply Airflow/ESP:	*1650 SCFM / 1.50 in. w.g.*
Outside Airflow:	*720 SCFM*
Return Temperature (DB/WB):	*75.0 °F / 62.0 °F*
Economizer:	*0.07 in. w.g.*
Heating:	*0.23 in. w.g.*
Cabinet:	*0.02 in. w.g.*
Energy Recovery:	*0.82 in. w.g.*
Total:	*3.65 in. w.g.*

Heating Section

Preheat Type:	*Std (No Preheat)*
Primary Heat Type:	*Heat pump is not operational at the current conditions.*
OA Temp (DB/WB):	*-13.0 °F / -13.0 °F*
RA Temp (DB/WB):	*72.0 °F / 54.0 °F*
Auxiliary Heating Type:	*Nat. Gas Heat*
Heating Airflow:	*1650 SCFM*
Total Capacity:	*48.6 MBH*
Entering Air Temp (DB/WB):	*57.8 °F / 46.0 °F*
Leaving Air Temp (DB/WB):	*84.9 °F / 57.6 °F*
Input:	*60 MBH*
Consumption:	*60.0 MBH*
Total Turndown Ratio:	*10.0:1*

Rating Information

Listing Model	*RQ-005-3-0-GBBC-V0-21-000-A*
Cooling EER2:	*11.25 BTU/h·W*
Cooling SEER2:	*13.6 BTU/h·W*
**Rated in accordance with AHRI 210/240*	
Application EER @ Op. Conditions:	***10.9 BTU/h·W***
Application COP @ Op. Conditions:	***2.75 W/W***

Heating High Temp Capacity:	*57.0 MBH*
Heating HSPF2:	*7.5 BTU/h·W*
Heating High Temp COP2:	*3.45 W/W*

Electrical Data

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 353.0

Circuit 1

Rating:	*575V/3Ø/60Hz*	*Minimum Circuit Amp:*	*15*
Unit FLA:	*13*	*Maximum Overcurrent:*	*20*
SCCR:	*5 KAIC*		

	Qty	HP	VAC	Phase	RPM	FLA	RLA
Compressor 1:	*1*		*575*	*3*			*6.4*
Condenser Fan:	*2*	*0.33*	*460*	*1*	*1100*	*1.6*	
Supply Fan:	*1*	*2.00*	*575*	*3*	*1760*	*2.7*	
Exhaust Fan:	*1*	*1.00*	*575*	*3*	*1760*	*1.7*	
Combustion:	*1*	*0.09*	*460*	*1*	*3000*	*0.7*	
Energy Recovery:	*1*	*0.05*	*230*	*1*	*825*	*0.3*	

*Cabinet Sound Power Levels**

Octave Bands:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Discharge LW (dB):	*88*	*86*	*89*	*82*	*74*	*72*	*69*	*63*
Return LW (dB):	*85*	*79*	*79*	*74*	*71*	*69*	*66*	*59*

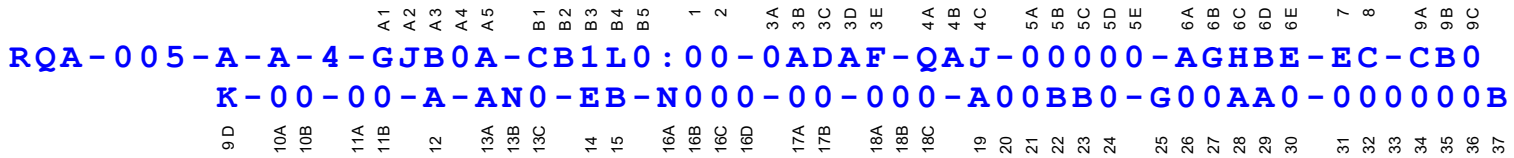
**Sound power levels are given for informational purposes only. The sound levels are not guaranteed.*

*****The minimum floor area for the Lower Flammability Limit (LFL) is calculated in accordance with UL60335-2-40 4th ed. (operating or storage).***

Performance Data Table

Outside Air		Mixed Air		Leaving Air		Heat Pump Capacity	Heat Pump Integrated Capacity	Heat Wheel Heating Capacity	Heating COP
DB °F	WB °F	DB °F	WB °F	DB °F	WB °F	MBH	MBH	MBH	W/W
62.0	56.2	70.4	54.6	108.7	68.1	68.5	68.5	-1.9	3.47
57.0	51.6	69.6	53.7	104.9	66.5	63.2	63.2	3.2	3.43
52.0	47.1	68.8	53.0	101.4	65.1	58.4	58.4	7.9	3.41
47.0	42.6	68.0	52.3	98.1	63.7	54.1	54.1	12.1	3.40
42.0	38.0	67.2	51.7	95.1	62.4	50.2	50.2	16.2	3.41
37.0	33.5	66.3	51.0	88.5	59.9	46.6	40.0	19.9	3.09
32.0	28.8	65.5	50.4	86.4	58.9	43.2	37.8	23.7	3.16
27.0	24.3	64.6	49.9	84.3	57.9	40.1	35.5	27.1	3.23
22.0	19.7	63.8	49.3	82.2	57.0	37.1	33.3	30.4	3.30
17.0	15.0	62.9	48.8	80.1	56.0	34.3	31.2	33.5	3.37
12.0	10.4	62.1	48.3	78.0	55.1	31.6	29.0	36.4	3.44
7.0	5.7	61.2	47.8	75.9	54.1	29.0	26.7	39.3	3.50
2.0	0.1	60.3	47.2	73.5	53.0	26.0	23.9	42.5	3.55

*Invalid operation point - Compressor operating outside of operating envelope
**Electric preheat is used to maintain the entering air temperature when applicable.



Tag: RTU-7
Kindergarten

APPENDIX B3

Product Acoustic Data For RTU-8

Unit Rating

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 353.0

A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	1	2	3A	3B	3C	3D	3E	4A	4B	4C	5A	5B	5C	5D	5E	6A	6B	6C	6D	6E	7	8	9A	9B	9C
R	N	A	-	0	0	8	-	A	-	A	-	4	-	G	J	B	0	A	-	C	B	1	L	0	:	0	0	-	0	A	C	A	H	-
Q	A	A	-	0	0	0	0	0	-	A	B	H	B	G	-	E	C	-	C	B	0													
K	-	0	0	-	E	0	-	A	-	A	N	0	-	E	B	-	N	0	0	0	-	0	0	-	0	0	0	-	A	0	0	B	B	0
-	G	0	0	A	A	0	-	0	0	0	0	0	B																					

9D	10A	10B	11A	11B	12	13A	13B	13C	14	15	16A	16B	16C	16D	17A	17B	18A	18B	18C	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37

Tag: RTU-8 Gym and Change Room

Job Information

Job Name:	*WSP OCSB St Phillip Elementary School*
Job Number:	*Job 61*
Site Altitude:	*0 ft*
Refrigerant:	*R-454B*
Design System Charge (oz):	*713*

Static Pressure

External:	*2.00 in. w.g.*
Cooling Coil:	*0.48 in. w.g.*
Filters Clean:	*0.35 in. w.g.*
Dirt Allowance:	*0.35 in. w.g.*
Reheat Coil:	*0.08 in. w.g.*

Cooling Section

	Gross	Net
Equivalent Total Capacity:	*128.1 MBH*	*119.1 MBH*
Total Capacity:	*95.1 MBH*	*86.1 MBH*
Sensible Capacity:	*83.6 MBH*	*74.7 MBH*
Latent Capacity:	*11.4 MBH*	
HW Total Cooling Capacity:	*33.0 MBH*	
Mixed Air Temp (DB/WB):	*76.1 °F / 63.0 °F*	
Entering Air Temp (DB/WB):	*76.1 °F / 63.0 °F*	
Lv Air Temp (Coil) (DB/WB):	*53.3 °F / 53.1 °F*	
Lv Air Temp (Unit) (DB/WB):	*55.7 °F / 54.1 °F*	

Supply Air Fan:	*1 x RNA185 @ 3.14 BHP Ea.*
SA Fan RPM / Width:	*2000 RPM / 4.140 in*
SA Fan FEI:	*1.22*
Exhaust Air Fan:	*1 x RM150-RN @ 1.51 BHP Ea.*
EA Fan RPM / Width:	*2028 RPM / 5.160 in*
EA Fan FEI:	*0.93*
Evaporator Coil:	*8.8 ft² / 6 Rows / 14 FPI*
Evaporator Face Velocity:	*388.6 fpm*
Energy Recovery:	*1 x ERC-3019C*

Unit Information

Approx. Op./Ship Weights:	*1733 lbs / 1733 lbs (±5%)*
Ambient Temperature (DB/WB):	*95.0 °F / 75.0 °F*
Coil Filter FV / Qty:	*382.5 fpm / 4*
Min. Room Area/Height/Airflow**:	*669 ft² / 7 ft / 72347 SCFM*
Exhaust Airflow/ESP/TSP:	*3400 SCFM / 0.50 in. w.g. / 1.16 in. w.g.*
Supply Airflow/ESP:	*3400 SCFM / 2.00 in. w.g.*
Outside Airflow:	*950 SCFM*
Return Temperature (DB/WB):	*75.0 °F / 62.0 °F*
Economizer:	*0.19 in. w.g.*
Heating:	*0.04 in. w.g.*
Cabinet:	*0.21 in. w.g.*
Energy Recovery:	*0.47 in. w.g.*
Total:	*3.70 in. w.g.*

Heating Section

Preheat Type:	*Std (No Preheat)*
Primary Heat Type:	*Heat pump is not operational at the current conditions.*
OA Temp (DB/WB):	*-13.0 °F / -13.0 °F*
RA Temp (DB/WB):	*72.0 °F / 54.0 °F*
Auxiliary Heating Type:	*Nat. Gas Heat*
Heating Airflow:	*3400 SCFM*
Total Capacity:	*72.9 MBH*
Entering Air Temp (DB/WB):	*66.4 °F / 51.0 °F*
Leaving Air Temp (DB/WB):	*86.1 °F / 58.9 °F*
Input:	*90 MBH*
Consumption:	*90.0 MBH*
Total Turndown Ratio:	*10.0:1*

Re-heat Coil:

Capacity:	*79.4 MBH*
Leaving Air Temp (DB/WB):	*75.0 °F / 61.5 °F*
Relative Humidity:	*46.3%*

Rating Information

Listing Model	*RN-008-3-0-GBBC-V0-21-000-A*
Cooling Capacity:	*94.0 MBH*
Cooling EER:	*11.37 BTU/h·W*
Cooling IEER:	*14.1 BTU/h·W*

**Rated in accordance with AHRI Standard 340/360 (I-P)*

Application EER @ Op. Conditions:	***10.7 BTU/h·W***
Application COP @ Op. Conditions:	***4.67 W/W***
Application COPH @ Op. Conditions:	***3.4 W/W***

Heating High Temp Capacity:	*85.0 MBH*
Heating High Temp COP:	*3.4 W/W*
Heating Low Temp Capacity:	*48.96 MBH*
Heating Low Temp COP:	*2.328 W/W*

Electrical Data

Circuit 1

Rating:	*575V/3Ø/60Hz*	*Minimum Circuit Amp:*	*25*
Unit FLA:	*22*	*Maximum Overcurrent:*	*35*
SCCR:	*5 KAIC*		

	Qty	HP	VAC	Phase	RPM	FLA	RLA
Compressor 1:	*1*		*575*	*3*			*10.9*
Condenser Fan:	*2*	*0.33*	*460*	*1*	*1100*	*1.6*	
Supply Fan:	*1*	*5.00*	*575*	*3*	*1760*	*6.1*	
Exhaust Fan:	*1*	*2.00*	*575*	*3*	*1760*	*2.7*	
Combustion:	*1*	*0.09*	*460*	*1*	*3000*	*0.7*	
Energy Recovery:	*1*	*0.05*	*230*	*1*	*1050*	*0.3*	

*Cabinet Sound Power Levels**

Octave Bands:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Discharge LW (dB):	*88*	*87*	*90*	*87*	*79*	*76*	*73*	*68*
Return LW (dB):	*85*	*86*	*82*	*79*	*75*	*72*	*70*	*66*

**Sound power levels are given for informational purposes only. The sound levels are not guaranteed.*

*****The minimum floor area for the Lower Flammability Limit (LFL) is calculated in accordance with UL60335-2-40 4th ed. (operating or storage).***

Performance Data Table

Outside Air		Mixed Air		Leaving Air		Heat Pump Capacity	Heat Pump Integrated Capacity	Heat Wheel Heating Capacity	Heating COP
DB °F	WB °F	DB °F	WB °F	DB °F	WB °F	MBH	MBH	MBH	W/W
62.0	56.2	71.4	54.2	102.0	65.4	112.4	112.4	-3.7	3.49
57.0	51.6	71.1	53.9	100.2	64.7	107.0	107.0	4.9	3.49
52.0	47.1	70.8	53.6	98.5	64.0	102.1	102.1	12.7	3.50
47.0	42.6	70.5	53.4	97.0	63.4	97.6	97.6	19.9	3.53
42.0	38.0	70.2	53.1	95.6	62.8	93.7	93.7	26.6	3.56
37.0	33.5	69.9	52.9	90.8	61.0	90.0	77.3	32.8	3.24
32.0	28.8	69.5	52.7	90.0	60.7	86.6	75.7	39.0	3.33
27.0	24.3	69.2	52.5	89.2	60.3	83.4	74.0	44.6	3.43
22.0	19.7	68.9	52.2	88.4	60.0	80.4	72.3	50.0	3.52
17.0	15.0	68.5	52.0	87.7	59.6	77.7	70.7	55.1	3.62
12.0	10.4	68.2	51.9	86.8	59.3	75.2	68.9	59.9	3.71
7.0	5.7	67.9	51.7	85.9	58.9	72.7	66.8	64.6	3.79
2.0	0.1	67.5	51.5	*	*	*	*	*	*

*Invalid operation point - Compressor operating outside of operating envelope
**Electric preheat is used to maintain the entering air temperature when applicable.

```
                                A1 A2 A3 A4 A5 B1 B2 B3 B4 B5  1  2  3A 3B 3C 3D 3E 4A 4B 4C  5A 5B 5C 5D 5E  6A 6B 6C 6D 6E  7  8  9A 9B 9C
RNA-008-A-A-4-GJB0A-CB1L0:00-0ACAH-QAA-00000-ABHBG-EC-CB0
K-00-E0-A-AN0-EB-N000-00-000-A00BB0-G00AA0-000000B
 9D 10A 10B 11A 11B 12 13A 13B 13C 14 15 16A 16B 16C 16D 17A 17B 18A 18B 18C 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37
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Tag: RTU-8 Gym and Change Room

APPENDIX B4

Product Acoustic Data For RTU-9

Unit Rating

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 353.0

A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	1	2	3A	3B	3C	3D	3E	4A	4B	4C	5A	5B	5C	5D	5E	6A	6B	6C	6D	6E	7	8	9A	9B	9C
R	N	A	-	0	0	9	-	B	-	A	-	4	-	G	J	A	0	C	-	C	B	1	L	0	:	0	0	-	0	A	C	A	H	-	Q	A	J	-	0	0	0	0	0	-	A	B	J	B	G	-	E	C	-	C	B	0
K	-	0	0	-	0	0	-	A	-	A	N	0	-	E	B	-	N	0	0	0	-	0	0	-	0	0	0	-	A	0	0	B	B	0	-	G	0	0	A	A	0	-	0	0	0	0	0	0	B												

9D	10A	10B	11A	11B	12	13A	13B	13C	14	15	16A	16B	16C	16D	17A	17B	18A	18B	18C	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37

Tag: RTU-9 New Admin KGarten & Multipurpose Rm

Job Information

Job Name:	*WSP OCSB St Phillip Elementary School*
Job Number:	*Job 61*
Site Altitude:	*0 ft*
Refrigerant:	*R-454B*
Design System Charge (oz):	*378 / 378*

Static Pressure

External:	*2.00 in. w.g.*
Cooling Coil:	*0.18 in. w.g.*
Filters Clean:	*0.23 in. w.g.*
Dirt Allowance:	*0.35 in. w.g.*

Cooling Section

	Gross	Net
Equivalent Total Capacity:	*135.5 MBH*	*125.1 MBH*
Total Capacity:	*101.4 MBH*	*91.0 MBH*
Sensible Capacity:	*94.9 MBH*	*84.5 MBH*
Latent Capacity:	*6.5 MBH*	
HW Total Cooling Capacity:	*34.1 MBH*	
Mixed Air Temp (DB/WB):	*75.8 °F / 62.7 °F*	
Entering Air Temp (DB/WB):	*75.8 °F / 62.7 °F*	
Lv Air Temp (Coil) (DB/WB):	*54.8 °F / 54.3 °F*	
Lv Air Temp (Unit) (DB/WB):	*57.0 °F / 55.2 °F*	

Supply Air Fan:	*1 x RN185 @ 3.66 BHP Ea.*
SA Fan RPM / Width:	*2153 RPM / 4.140 in*
SA Fan FEI:	*1.15*
Exhaust Air Fan:	*1 x RM185-RN @ 1.45 BHP Ea.*
EA Fan RPM / Width:	*1384 RPM / 6.290 in*
EA Fan FEI:	*1.26*
Evaporator Coil:	*14.6 ft² / 4 Rows / 14 FPI*
Evaporator Face Velocity:	*288.0 fpm*
Energy Recovery:	*1 x ERC-3623*

Unit Information

Approx. Op./Ship Weights:	*2330 lbs / 2330 lbs (±5%)*
Ambient Temperature (DB/WB):	*95.0 °F / 75.0 °F*
Coil Filter FV / Qty:	*302.4 fpm / 4*
Min. Room Area/Height/Airflow**:	*355 ft² / 7 ft / 38356 SCFM*
Exhaust Airflow/ESP/TSP:	*4200 SCFM / 0.50 in. w.g. / 1.29 in. w.g.*
Supply Airflow/ESP:	*4200 SCFM / 2.00 in. w.g.*
Outside Airflow:	*965 SCFM*
Return Temperature (DB/WB):	*75.0 °F / 62.0 °F*
Economizer:	*0.28 in. w.g.*
Heating:	*0.05 in. w.g.*
Cabinet:	*0.22 in. w.g.*
Energy Recovery:	*0.47 in. w.g.*
Total:	*3.32 in. w.g.*

Heating Section

Preheat Type:	*Std (No Preheat)*
Primary Heat Type:	*Heat pump is not operational at the current conditions.*
OA Temp (DB/WB):	*-13.0 °F / -13.0 °F*
RA Temp (DB/WB):	*72.0 °F / 54.0 °F*
Auxiliary Heating Type:	*Nat. Gas Heat*
Heating Airflow:	*4200 SCFM*
Total Capacity:	*158.0 MBH*
Entering Air Temp (DB/WB):	*68.2 °F / 51.9 °F*
Leaving Air Temp (DB/WB):	*102.7 °F / 64.9 °F*
Input:	*195 MBH*
Consumption:	*195.0 MBH*
Total Turndown Ratio:	*10.0:1*

Rating Information

Listing Model	*RN-009-3-0-GBAC-V0-21-000-A*
Cooling Capacity:	*96.0 MBH*
Cooling EER:	*12.74 BTU/h·W*
Cooling IEER:	*16.56 BTU/h·W*

**Rated in accordance with AHRI Standard 340/360 (I-P)*

Application EER @ Op. Conditions:	***11.3 BTU/h·W***
Application COP @ Op. Conditions:	***4.52 W/W***
Application COPH @ Op. Conditions:	***3.49 W/W***

Heating High Temp Capacity:	*86.0 MBH*
Heating High Temp COP:	*3.49 W/W*
Heating Low Temp Capacity:	*48.0 MBH*
Heating Low Temp COP:	*2.328 W/W*

Electrical Data

Unit Rating

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 353.0

Circuit 1

Rating:	*575V/3Ø/60Hz*	*Minimum Circuit Amp:*	*23*
Unit FLA:	*22*	*Maximum Overcurrent:*	*25*
SCCR:	*5 KAIC*		

	Qty	*HP*	*VAC*	*Phase*	*RPM*	*FLA*	*RLA*
Compressor 1:	*1*		*575*	*3*			*5.1*
Compressor 2:	*1*		*575*	*3*			*4.8*
Condenser Fan:	*2*	*0.33*	*460*	*1*	*1100*	*1.6*	
Supply Fan:	*1*	*5.00*	*575*	*3*	*1760*	*6.1*	
Exhaust Fan:	*1*	*2.00*	*575*	*3*	*1760*	*2.7*	
Combustion:	*1*	*0.09*	*460*	*1*	*3000*	*0.7*	
Energy Recovery:	*1*	*0.08*	*460*	*1*	*825*	*0.3*	

*Cabinet Sound Power Levels**

Octave Bands:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Discharge LW (dB):	*90*	*89*	*91*	*89*	*81*	*78*	*76*	*71*
Return LW (dB):	*86*	*84*	*82*	*76*	*74*	*71*	*67*	*62*

**Sound power levels are given for informational purposes only. The sound levels are not guaranteed.*

*****The minimum floor area for the Lower Flammability Limit (LFL) is calculated in accordance with UL60335-2-40 4th ed. (operating or storage).***

Performance Data Table

Outside Air		Mixed Air		Leaving Air		Heat Pump Capacity	Heat Pump Integrated Capacity	Heat Wheel Heating Capacity	Heating COP
DB ºF	WB ºF	DB ºF	WB ºF	DB ºF	WB ºF	MBH	MBH	MBH	W/W
62.0	56.2	71.6	54.2	95.1	63.0	106.8	106.8	-3.5	3.23
57.0	51.6	71.4	54.0	93.0	62.2	98.4	98.4	5.4	3.18
52.0	47.1	71.2	53.8	91.1	61.4	90.7	90.7	13.5	3.15
47.0	42.6	71.0	53.6	89.3	60.7	83.6	83.6	20.9	3.12
42.0	38.0	70.7	53.4	87.8	60.0	77.5	77.5	27.9	3.12
37.0	33.5	70.5	53.2	84.1	58.6	71.9	61.7	34.3	2.84
32.0	28.8	70.3	53.1	83.1	58.1	66.7	58.3	40.8	2.89
27.0	24.3	70.1	52.9	82.1	57.7	61.9	54.9	46.6	2.96
22.0	19.7	69.9	52.8	81.2	57.3	57.5	51.7	52.2	3.03
17.0	15.0	69.6	52.6	80.3	56.9	53.4	48.6	57.5	3.10
12.0	10.4	69.4	52.5	79.4	56.5	49.8	45.6	62.5	3.19
7.0	5.7	69.2	52.4	*	*	*	*	*	*
2.0	0.1	68.9	52.2	*	*	*	*	*	*

*Invalid operation point - Compressor operating outside of operating envelope
**Electric preheat is used to maintain the entering air temperature when applicable.

A1 A2 A3 A4 A5 B1 B2 B3 B4 B5 1 2 3A 3B 3C 3D 3E 4A 4B 4C 5A 5B 5C 5D 5E 6A 6B 6C 6D 6E 7 8 9A 9B 9C

RNA-009-B-A-4-GJA0C-CB1L0:00-0ACAH-QAJ-00000-ABJBG-EC-CB0
K-00-00-A-AN0-EB-N000-00-000-A00BB0-G00AA0-000000B

9D 10A 10B 11A 11B 12 13A 13B 13C 14 15 16A 16B 16C 16D 17A 17B 18A 18B 18C 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37

Tag: RTU-9 New Admin KGarten & Multipurpose Rm

APPENDIX B5

Product Acoustic Data For RTU-10

Unit Rating

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 353.0

A1 A2 A3 A4 A5 B1 B2 B3 B4 B5 1 2 3A 3B 3C 3D 3E 4A 4B 4C 5A 5B 5C 5D 5E 6A 6B 6C 6D 6E 7 8 9A 9B 9C

RNA-008-A-A-4-GJB0A-CB1L0:00-0ACAH-QAA-00000-ABHBG-EC-CB0
K-00-E0-A-AN0-EB-N000-00-000-A00BB0-G00AA0-000000B

9D 10A 10B 11A 11B 12 13A 13B 13C 14 15 16A 16B 16C 16D 17A 17B 18A 18B 18C 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37

Tag: RTU-10 Gym

Job Information

Job Name:	*WSP OCSB St Phillip Elementary School*
Job Number:	*Job 61*
Site Altitude:	*0 ft*
Refrigerant:	*R-454B*
Design System Charge (oz):	*713*

Unit Information

Approx. Op./Ship Weights:	*1733 lbs / 1733 lbs (±5%)*
Ambient Temperature (DB/WB):	*95.0 °F / 75.0 °F*
Coil Filter FV / Qty:	*371.3 fpm / 4*
Min. Room Area/Height/Airflow**:	*669 ft² / 7 ft / 72347 SCFM*
Exhaust Airflow/ESP/TSP:	*3300 SCFM / 0.50 in. w.g. / 1.09 in. w.g.*
Supply Airflow/ESP:	*3300 SCFM / 2.00 in. w.g.*
Outside Airflow:	*805 SCFM*
Return Temperature (DB/WB):	*75.0 °F / 62.0 °F*

Static Pressure

External:	*2.00 in. w.g.*	Economizer:	*0.19 in. w.g.*
Cooling Coil:	*0.46 in. w.g.*	Heating:	*0.04 in. w.g.*
Filters Clean:	*0.33 in. w.g.*	Cabinet:	*0.19 in. w.g.*
Dirt Allowance:	*0.35 in. w.g.*	Energy Recovery:	*0.40 in. w.g.*
Reheat Coil:	*0.07 in. w.g.*	Total:	*3.63 in. w.g.*

Cooling Section

	Gross	Net
Equivalent Total Capacity:	*123.1 MBH*	*114.6 MBH*
Total Capacity:	*94.6 MBH*	*86.1 MBH*
Sensible Capacity:	*82.1 MBH*	*73.6 MBH*
Latent Capacity:	*12.5 MBH*	
HW Total Cooling Capacity:	*28.5 MBH*	
Mixed Air Temp (DB/WB):	*75.9 °F / 62.8 °F*	
Entering Air Temp (DB/WB):	*75.9 °F / 62.8 °F*	
Lv Air Temp (Coil) (DB/WB):	*52.8 °F / 52.6 °F*	
Lv Air Temp (Unit) (DB/WB):	*55.1 °F / 53.6 °F*	
Supply Air Fan:	*1 x RNA185 @ 2.99 BHP Ea.*	
SA Fan RPM / Width:	*1969 RPM / 4.140 in*	
SA Fan FEI:	*1.23*	
Exhaust Air Fan:	*1 x RM150-RN @ 1.38 BHP Ea.*	
EA Fan RPM / Width:	*1968 RPM / 5.160 in*	
EA Fan FEI:	*0.95*	
Evaporator Coil:	*8.8 ft² / 6 Rows / 14 FPI*	
Evaporator Face Velocity:	*377.1 fpm*	
Energy Recovery:	*1 x ERC-3019C*	

Heating Section

Preheat Type:	*Std (No Preheat)*
Primary Heat Type:	*Heat pump is not operational at the current conditions.*
OA Temp (DB/WB):	*-13.0 °F / -13.0 °F*
RA Temp (DB/WB):	*72.0 °F / 54.0 °F*
Auxiliary Heating Type:	*Nat. Gas Heat*
Heating Airflow:	*3300 SCFM*
Total Capacity:	*72.9 MBH*
Entering Air Temp (DB/WB):	*67.6 °F / 51.6 °F*
Leaving Air Temp (DB/WB):	*87.9 °F / 59.7 °F*
Input:	*90 MBH*
Consumption:	*90.0 MBH*
Total Turndown Ratio:	*10.0:1*

Re-heat Coil:

Capacity:	*78.9 MBH*
Leaving Air Temp (DB/WB):	*75.0 °F / 61.2 °F*
Relative Humidity:	*45.4%*

Rating Information

Listing Model	*RN-008-3-0-GBBC-V0-21-000-A*
Cooling Capacity:	*94.0 MBH*
Cooling EER:	*11.37 BTU/h·W*
Cooling IEER:	*14.1 BTU/h·W*

**Rated in accordance with AHRI Standard 340/360 (I-P)*

Application EER @ Op. Conditions:	***10.5 BTU/h·W***
Application COP @ Op. Conditions:	***4.30 W/W***
Application COPH @ Op. Conditions:	***3.4 W/W***

Heating High Temp Capacity:	*85.0 MBH*
Heating High Temp COP:	*3.4 W/W*
Heating Low Temp Capacity:	*48.96 MBH*
Heating Low Temp COP:	*2.328 W/W*

Electrical Data

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 353.0

Circuit 1

Rating:	*575V/3Ø/60Hz*	*Minimum Circuit Amp:*	*25*
Unit FLA:	*22*	*Maximum Overcurrent:*	*35*
SCCR:	*5 KAIC*		

	Qty	HP	VAC	Phase	RPM	FLA	RLA
Compressor 1:	*1*		*575*	*3*			*10.9*
Condenser Fan:	*2*	*0.33*	*460*	*1*	*1100*	*1.6*	
Supply Fan:	*1*	*5.00*	*575*	*3*	*1760*	*6.1*	
Exhaust Fan:	*1*	*2.00*	*575*	*3*	*1760*	*2.7*	
Combustion:	*1*	*0.09*	*460*	*1*	*3000*	*0.7*	
Energy Recovery:	*1*	*0.05*	*230*	*1*	*1050*	*0.3*	

Cabinet Sound Power Levels*

Octave Bands:	63	125	250	500	1000	2000	4000	8000
Discharge LW (dB):	*88*	*87*	*89*	*87*	*78*	*76*	*73*	*68*
Return LW (dB):	*85*	*85*	*82*	*77*	*75*	*72*	*70*	*66*

**Sound power levels are given for informational purposes only. The sound levels are not guaranteed.*

*****The minimum floor area for the Lower Flammability Limit (LFL) is calculated in accordance with UL60335-2-40 4th ed. (operating or storage).***

Performance Data Table

Outside Air		Mixed Air		Leaving Air		Heat Pump Capacity	Heat Pump Integrated Capacity	Heat Wheel Heating Capacity	Heating COP
DB °F	WB °F	DB °F	WB °F	DB °F	WB °F	MBH	MBH	MBH	W/W
62.0	56.2	71.5	54.2	103.0	65.7	112.3	112.3	-3.2	3.51
57.0	51.6	71.3	53.9	101.3	65.0	107.0	107.0	4.3	3.49
52.0	47.1	71.1	53.7	99.6	64.3	102.1	102.1	11.0	3.49
47.0	42.6	70.8	53.5	98.1	63.7	97.6	97.6	17.2	3.50
42.0	38.0	70.6	53.3	96.8	63.2	93.7	93.7	23.1	3.52
37.0	33.5	70.3	53.1	91.9	61.5	90.0	77.3	28.4	3.18
32.0	28.8	70.1	52.9	91.2	61.1	86.6	75.7	33.8	3.26
27.0	24.3	69.8	52.8	90.5	60.8	83.4	74.0	38.6	3.33
22.0	19.7	69.5	52.6	89.7	60.5	80.5	72.3	43.3	3.41
17.0	15.0	69.3	52.5	89.0	60.2	77.7	70.7	47.7	3.49
12.0	10.4	69.0	52.3	88.3	59.9	75.2	69.0	51.8	3.57
7.0	5.7	68.7	52.2	87.4	59.5	72.7	66.9	55.9	3.63
2.0	0.1	68.5	52.0	*	*	*	*	*	*

*Invalid operation point - Compressor operating outside of operating envelope

**Electric preheat is used to maintain the entering air temperature when applicable.

APPENDIX B6

Product Acoustic Data For RTU-11 And RTU-12

Unit Rating

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 353.0

A1 A2 A3 A4 A5 B1 B2 B3 B4 B5 1 2 3A 3B 3C 3D 3E 4A 4B 4C 5A 5B 5C 5D 5E 6A 6B 6C 6D 6E 7 8 9A 9B 9C

RNA-016-C-A-4-GJB0C-CB1L0:00-0FFAH-QAJ-00000-ABLBH-EC-CB0
K-00-00-A-AN0-EB-N000-00-000-A00BB0-G00AA0-000000B

9D 10A 10B 11A 11B 12 13A 13B 13C 14 15 16A 16B 16C 16D 17A 17B 18A 18B 18C 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37

Tag: RTU-11 New Classrooms

Job Information

Job Name:	*WSP OCSB St Phillip Elementary School*
Job Number:	*Job 61*
Site Altitude:	*0 ft*
Refrigerant:	*R-454B*
Design System Charge (oz):	*308 / 308*

Unit Information

Approx. Op./Ship Weights:	*3738 lbs / 3738 lbs (±5%)*
Ambient Temperature (DB/WB):	*95.0 °F / 75.0 °F*
Coil Filter FV / Qty:	*249.6 fpm / 6*
Min. Room Area/Height/Airflow**:	*289 ft² / 7 ft / 31253 SCFM*
Exhaust Airflow/ESP/TSP:	*5200 SCFM / 0.50 in. w.g. / 1.29 in. w.g.*
Supply Airflow/ESP:	*5200 SCFM / 1.50 in. w.g.*
Outside Airflow:	*2570 SCFM*
Return Temperature (DB/WB):	*75.0 °F / 62.0 °F*

Static Pressure

External:	*1.50 in. w.g.*
Cooling Coil:	*0.24 in. w.g.*
Filters Clean:	*0.27 in. w.g.*
Dirt Allowance:	*0.35 in. w.g.*
Economizer:	*0.12 in. w.g.*
Heating:	*0.15 in. w.g.*
Cabinet:	*0.04 in. w.g.*
Energy Recovery:	*0.63 in. w.g.*
Total:	*3.30 in. w.g.*

Cooling Section

	Gross	Net
Equivalent Total Capacity:	*277.7 MBH*	*265.9 MBH*
Total Capacity:	*190.3 MBH*	*178.5 MBH*
Sensible Capacity:	*146.2 MBH*	*134.4 MBH*
Latent Capacity:	*44.1 MBH*	
HW Total Cooling Capacity:	*87.4 MBH*	
Mixed Air Temp (DB/WB):	*77.0 °F / 63.8 °F*	
Entering Air Temp (DB/WB):	*77.0 °F / 63.8 °F*	
Lv Air Temp (Coil) (DB/WB):	*50.8 °F / 50.7 °F*	
Lv Air Temp (Unit) (DB/WB):	*52.9 °F / 51.6 °F*	

Supply Air Fan:	*1 x 245D60 @ 4.14 BHP Ea.*
SA Fan RPM / Width:	*1593 RPM / 3.290 in*
SA Fan FEI:	*1.23*
Exhaust Air Fan:	*1 x RM220A-RN @ 2.56 BHP Ea.*
EA Fan RPM / Width:	*1245 RPM / 4.930 in*
EA Fan FEI:	*0.87*
Evaporator Coil:	*19.9 ft² / 6 Rows / 12 FPI*
Evaporator Face Velocity:	*261.8 fpm*
Energy Recovery:	*1 x ERC-5245*

Heating Section

Preheat Type:	*Std (No Preheat)*
Primary Heat Type:	*Heat pump is not operational at the current conditions.*
OA Temp (DB/WB):	*-13.0 °F / -13.0 °F*
RA Temp (DB/WB):	*72.0 °F / 54.0 °F*
Auxiliary Heating Type:	*Nat. Gas Heat*
Heating Airflow:	*5200 SCFM*
Total Capacity:	*218.7 MBH*
Entering Air Temp (DB/WB):	*62.4 °F / 48.6 °F*
Leaving Air Temp (DB/WB):	*101.1 °F / 63.7 °F*
Input:	*270 MBH*
Consumption:	*270.0 MBH*
Total Turndown Ratio:	*9.0:1*

Rating Information

Listing Model	*RN-016-3-0-GBBC-V0-21-000-A*
Cooling Capacity:	*182.0 MBH*
Cooling EER:	*11.27 BTU/h·W*
Cooling IEER:	*13.92 BTU/h·W*
Heating High Temp Capacity:	*164.0 MBH*
Heating High Temp COP:	*3.4 W/W*
Heating Low Temp Capacity:	*92.0 MBH*
Heating Low Temp COP:	*2.231 W/W*

**Rated in accordance with AHRI Standard 340/360 (I-P)*

Application EER @ Op. Conditions:	***13.4 BTU/h·W***
Application COP @ Op. Conditions:	***7.52 W/W***
Application COPH @ Op. Conditions:	***3.4 W/W***

Electrical Data

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 353.0

Circuit 1

Rating:	*575V/3Ø/60Hz*	*Minimum Circuit Amp:*	*39*
Unit FLA:	*36*	*Maximum Overcurrent:*	*45*
SCCR:	*5 KAIC*		

	Qty	*HP*	*VAC*	*Phase*	*RPM*	*FLA*	*RLA*
Compressor 1:	*1*		*575*	*3*			*10.9*
Compressor 2:	*1*		*575*	*3*			*9.2*
Condenser Fan:	*2*	*1.00*	*460*	*1*	*1100*	*3.6*	
Supply Fan:	*1*	*5.00*	*575*	*3*	*1760*	*6.1*	
Exhaust Fan:	*1*	*3.00*	*575*	*3*	*1760*	*3.9*	
Combustion:	*1*	*0.25*	*460*	*1*	*3200*	*0.9*	
Energy Recovery:	*1*	*0.17*	*460*	*1*	*1075*	*0.6*	

*Cabinet Sound Power Levels**

Octave Bands:	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Discharge LW (dB):	*94*	*93*	*94*	*99*	*96*	*95*	*91*	*84*
Return LW (dB):	*88*	*86*	*84*	*77*	*76*	*73*	*66*	*59*

**Sound power levels are given for informational purposes only. The sound levels are not guaranteed.*

*****The minimum floor area for the Lower Flammability Limit (LFL) is calculated in accordance with UL60335-2-40 4th ed. (operating or storage).***

Performance Data Table

Outside Air		Mixed Air		Leaving Air		Heat Pump Capacity	Heat Pump Integrated Capacity	Heat Wheel Heating Capacity	Heating COP
DB ºF	WB ºF	DB ºF	WB ºF	DB ºF	WB ºF	MBH	MBH	MBH	W/W
62.0	56.2	71.0	54.5	109.3	68.1	216.0	216.0	-8.9	3.32
57.0	51.6	70.5	53.9	106.5	66.9	203.0	203.0	14.0	3.36
52.0	47.1	69.9	53.4	103.8	65.8	191.0	191.0	34.6	3.42
47.0	42.6	69.4	52.9	101.2	64.8	179.4	179.4	53.6	3.47
42.0	38.0	68.9	52.5	98.7	63.7	168.4	168.4	71.6	3.54
37.0	33.5	68.3	52.0	92.3	61.4	158.0	135.7	88.0	3.28
32.0	28.8	67.8	51.6	90.7	60.6	148.4	129.7	104.6	3.40
27.0	24.3	67.2	51.2	88.9	59.9	138.9	123.2	119.6	3.52
22.0	19.7	66.6	50.9	87.2	59.1	129.9	116.7	133.9	3.63
17.0	15.0	66.0	50.5	85.5	58.4	121.2	110.3	147.7	3.75
12.0	10.4	65.5	50.2	83.7	57.7	113.2	103.8	160.5	3.86
7.0	5.7	64.9	49.8	82.0	57.0	106.3	97.8	173.0	3.97
2.0	0.1	64.3	49.4	*	*	*	*	*	*

*Invalid operation point - Compressor operating outside of operating envelope
**Electric preheat is used to maintain the entering air temperature when applicable.

A1 A2 A3 A4 A5 B1 B2 B3 B4 B5 1 2 3A 3B 3C 3D 3E 4A 4B 4C 5A 5B 5C 5D 5E 6A 6B 6C 6D 6E 7 8 9A 9B 9C

RNA-016-C-A-4-GJB0C-CB1L0:00-0FFAH-QAJ-00000-ABLBH-EC-CB0
K-00-00-A-AN0-EB-N000-00-000-A00BB0-G00AA0-000000B

9D 10A 10B 11A 11B 12 13A 13B 13C 14 15 16A 16B 16C 16D 17A 17B 18A 18B 18C 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37

Tag: RTU-11 New Classrooms

APPENDIX B7

Product Acoustic Data For Condenser Fans For All RTUs

AAON Standard Condenser Fan Radiated Sound Levels

Sound Pressure Level in a Hemispherical Free Field — Dist (ft) 15

		Fans	Dia	RPM	Sound Power Level									Sound Pressure Level								
					63	125	250	500	1000	2000	4000	8000	LwA	63	125	250	500	1000	2000	4000	8000	dBA
RQ 2 & 3 Ton RTU-7	Inlet	1	30	850	79	74	72	70	66	62	59	59	72	58	53	51	48	44	41	38	38	50
	Outlet				81	77	71	71	67	62	59	58	73	60	56	49	50	46	41	38	37	51
	Total				83	79	74	73	69	65	62	61	75	62	58	53	52	48	44	41	40	54
RQ 4-6 Ton & RN 6 & 7 Ton RTU-5, 6, 8, 9	Inlet	1	30	1085	85	79	77	*75*	*71*	*68*	*65*	*64*	77	63	58	56	54	50	46	44	43	56
	Outlet				86	83	76	*76*	*72*	*68*	*65*	*63*	78	65	62	55	55	51	46	44	42	57
	Total				89	84	80	79	75	71	68	67	80	67	63	58	57	53	49	47	46	59
RN 8 & 10 Ton RTU-10	Inlet	1	30	1085	92	86	85	82	78	75	72	71	84	71	65	63	61	57	54	51	50	63
	Outlet				94	90	83	83	79	75	72	71	85	72	69	62	62	58	54	51	49	64
	Total				96	91	87	86	82	78	75	74	88	75	70	66	65	60	57	54	53	66
RN 09 & 11 Ton RTU-11	Inlet	2	30	1085	88	82	80	78	74	71	68	67	80	66	61	59	57	53	49	47	46	59
	Outlet				89	86	79	79	75	71	68	66	81	68	65	58	58	54	49	47	45	60
	Total				92	87	83	82	78	74	71	70	83	70	66	61	60	56	52	50	49	62
RN 13-20 Ton RTU-12	Inlet	2	30	1085	95	89	88	85	81	78	75	74	87	74	68	66	64	60	57	54	53	66
	Outlet				97	93	86	86	82	78	75	74	88	75	72	65	65	61	57	54	52	67
	Total				99	94	90	89	85	81	78	77	91	78	73	69	68	63	60	57	56	69

Speed %			Fans	Dia	RPM	Sound Power Level 63	125	250	500	1000	2000	4000	8000	LwA
100%	RQ 2 & 3 Ton	Inlet	1	30	850	79	74	72	70	66	62	59	59	72
		Outlet				81	77	71	71	67	62	59	58	73
		Total				83	79	74	73	69	65	62	61	75
75%	RQ 2 & 3 Ton	Inlet	1	30	638	73	68	66	63	59	56	53	52	65
		Outlet				75	71	64	65	60	56	53	52	66
		Total				77	73	68	67	63	59	56	55	69
50%	RQ 2 & 3 Ton	Inlet	1	30	425	64	59	57	54	51	47	44	44	57
		Outlet				66	62	56	56	52	47	44	43	57
		Total				68	64	59	58	54	50	47	46	60
25%	RQ 2 & 3 Ton	Inlet	1	30	213	49	44	42	39	36	32	29	29	42
		Outlet				51	47	40	41	37	32	29	28	42
		Total				53	49	44	43	39	35	32	31	45

RTU-7

100%	RQ 4-6 RN 6 & 7 Ton	Inlet	1	30	1085	85	79	77	75	71	68	65	64	77
		Outlet				86	83	76	76	72	68	65	63	78
		Total				89	84	80	79	75	71	68	67	80
75%	RQ 4-6 RN 6 & 7 Ton	Inlet	1	30	814	78	73	71	69	65	61	58	58	71
		Outlet				80	77	70	70	66	61	58	57	72
		Total				82	78	73	72	68	64	61	61	74
50%	RQ 4-6 RN 6 & 7 Ton	Inlet	1	30	543	70	64	62	60	56	53	50	49	`
		Outlet				71	68	61	61	57	53	50	48	63
		Total				74	69	65	64	59	56	53	52	65
25%	RQ 4-6 RN 6 & 7 Ton	Inlet	1	30	271	54	49	47	45	41	37	35	34	47
		Outlet				56	53	46	46	42	38	35	33	48
		Total				59	54	50	48	44	41	38	37	50

RTU-5, 6, 8, 9

100%	RN 8 & 10 Ton	Inlet	1	30	1085	92	86	85	82	78	75	72	71	84
		Outlet				94	90	83	83	79	75	72	71	85
		Total				96	91	87	86	82	78	75	74	88
75%	RN 8 & 10 Ton	Inlet	1	30	814	86	80	78	76	72	68	66	65	78
		Outlet				87	84	77	77	73	69	66	64	79
		Total				90	85	81	80	75	72	69	68	81
50%	RN 8 & 10 Ton	Inlet	1	30	543	77	71	69	67	63	60	57	56	69
		Outlet				79	75	68	68	64	60	57	56	70
		Total				81	76	72	71	67	63	60	59	73
25%	RN 8 & 10 Ton	Inlet	1	30	271	62	56	54	52	48	45	42	41	54
		Outlet				64	60	53	53	49	45	42	41	55
		Total				66	61	57	56	52	48	45	44	58

RTU-10

100%	RN 9 & 11 Ton	Inlet	2	30	1085	88	82	80	78	74	71	68	67	80
		Outlet				89	86	79	79	75	71	68	66	81
		Total				92	87	83	82	78	74	71	70	83
75%	RN 9 & 11 Ton	Inlet	2	30	814	81	76	74	72	68	64	61	61	74
		Outlet				83	80	73	73	69	64	61	60	75
		Total				85	81	76	75	71	67	64	64	77
50%	RN 9 & 11 Ton	Inlet	2	30	407	66	61	59	57	53	49	46	46	59
		Outlet				68	64	58	58	54	49	46	45	60
		Total				70	66	61	60	56	52	49	48	62
25%	RN 9 & 11 Ton	Inlet	2	30	271	57	52	50	48	44	40	38	37	50
		Outlet				59	56	49	49	45	41	38	36	51
		Total				62	57	53	51	47	44	41	40	53

RTU-11

100%	RN 13-20 Ton	Inlet	2	30	1085	95	89	88	85	81	78	75	74	87
		Outlet				97	93	86	86	82	78	75	74	88
		Total				99	94	90	89	85	81	78	77	91
75%	RN 13-20 Ton	Inlet	2	30	814	89	83	81	79	75	71	69	68	81
		Outlet				90	87	80	80	76	72	69	67	82
		Total				93	88	84	83	78	75	72	71	84
50%	RN 13-20 Ton	Inlet	2	30	543	80	74	72	70	66	63	60	59	72
		Outlet				82	78	71	71	67	63	60	59	73
		Total				84	79	75	74	70	66	63	62	76
25%	RN 13-20 Ton	Inlet	2	30	271	65	59	57	55	51	48	45	44	57
		Outlet				67	63	56	56	52	48	45	44	58
		Total				69	64	60	59	55	51	48	47	61

RTU-12