MECHANICAL BASIS OF DESIGN: 17 MW DATA CENTER COOLING INFRASTRUCTURE

High-Efficiency Cooling Infrastructure Design

Project Title: Two storey Data Center
Location: 3110 S Service Rd, Burlington, ON L7N 3J3
Date: March 18, 2026

Optimal Engineering
7030 Woodbine Ave, Unit 500
Markham, L3R 6G2

Document Number: 26032033
Revision: 00
Date: March 18, 2026

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1.0 INTRODUCTION & ENGAGEMENT

Optimal Engineering has been formally retained by owner to provide professional engineering services and a comprehensive mechanical cooling strategy for the proposed 17 MW data center facility. This Brief Design Report (BDR) serves as the primary conceptual framework for the mechanical systems required to support high-density IT loads while ensuring industry-leading efficiency, operational reliability, and environmental stability.

The scope of this document encompasses the central chilled water plant, cooling distribution, air management strategies, and protective measures necessary to achieve a Tier III (N+1) level of availability. This report is intended to align the Owner's operational objectives with a technically feasible and economically sound engineering solution.

2.0 EXECUTIVE SUMMARY

The proposed mechanical cooling system for the data center is based on a modular air-cooled oil-free magnetic bearing chiller plant utilizing Smardt air-cooled centrifugal chillers or approved equivalent. The finalized cooling infrastructure has been developed to support an ultimate facility cooling demand of approximately 17 MW, while maintaining N+1 redundancy at the central cooling plant level.

The selected configuration eliminates the need for cooling towers and condenser water systems, thereby reducing water consumption, simplifying operations, and minimizing water treatment and Legionella-related risks. The system incorporates a glycol-based hydronic loop suitable for winter operation in Canadian climatic conditions.

The selected air-cooled chiller units each have a nominal capacity of approximately 1,580 kW (450 tons). A total of 12 chillers is installed, providing an overall installed capacity of approximately 18,960 kW. Under N+1 operation, 11 chillers provide approximately 17,380 kW, which exceeds the required design load of 17,000 kW, leaving approximately 380 kW spare capacity.

The chillers are equipped with oil-free magnetic bearing compressors, microchannel air-cooled condensers, and BACnet-compatible controls. The evaporator loop utilizes 45% propylene glycol for freeze protection. Detailed technical information is provided in Appendix 1 (Drawings) and Appendix 2 (Specifications).

3.0 DESIGN CRITERIA & STANDARDS

ASHRAE TC 9.9 (2023): Thermal Guidelines for Data Processing Environments

ASHRAE Standard 90.1-2022: Energy Standard for Buildings

ASHRAE Standard 15-2022: Safety Standard for Refrigeration Systems

National Building Code of Canada (NBC) 2020

CSA C22.1 Canadian Electrical Code

3.1 Environmental Parameters

Parameter	Design Range	Control Point
IT Equipment Inlet Temperature	18°C – 27°C	22°C ±2°C
Relative Humidity	8% – 60%	50% RH
Supply Air Temperature	18°C – 22°C	20°C
Return Air Temperature	35°C – 42°C	38°C
Chilled Water Supply	6°C – 10°C	6.7°C
Chilled Water Return	12°C – 18°C	12.2°C

4.0 COOLING LOAD PROFILE

Load Source	Heat Load (kW)	Notes
IT Equipment Load	15,500	Based on IT power draw
UPS & Electrical Losses	1,200	Switchgear and PDU losses
Lighting & Miscellaneous	150	LED lighting and support equipment
Envelope & Occupancy	150	Building gains and personnel
TOTAL COOLING CAPACITY	17,000	Total mechanical plant capacity

5.0 PROPOSED COOLING SYSTEM ARCHITECTURE

The finalized cooling plant consists of air-cooled oil-free centrifugal chillers, eliminating the need for cooling towers and condenser water systems.

Each chiller includes:

- Cooling Capacity: ~1,580 kW
- Electrical Input: ~463 kW
- Refrigerant: R513A
- Power Supply: 575V / 3 Phase / 60 Hz
- The evaporator system is designed for:
- Flow Rate: ~76 L/s (1212 GPM converted)
- Pressure Drop: ~149 kPa (21.6 psi converted)

The system utilizes constant flow operation due to glycol application.

5.1 FINAL COOLING PLANT SELECTION -AIR-COOLED CHILLER SYSTEM

5.1.1 General Description

The finalized cooling plant consists of modular air-cooled oil-free magnetic bearing centrifugal chillers as manufactured by Smardt or approved equivalent. This configuration replaces the earlier conceptual water-cooled system and eliminates the need for cooling towers, condenser water piping, and associated infrastructure.

Each chiller utilizes R513A refrigerant within an internal refrigeration circuit, while the building cooling distribution system is based on a 45% propylene glycol solution circulating through the evaporator loop.

This approach simplifies system operation, reduces water consumption, and improves reliability for mission-critical data center applications.

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5.1.2 System Configuration and Capacity

The cooling plant is designed to support a total cooling facility demand of approximately 17,000 kW (17 MW).

Each selected chiller has a nominal capacity of approximately:

1,580 kW (450 tons)

The system is configured as follows:

Total installed chillers: 12 units

Total installed capacity: 18,960 kW

Required operating capacity (N): 11 units

Available capacity under N condition: 17,380 kW

This configuration satisfies the design load while maintaining N+1 redundancy, with approximately 380 kW spare capacity under one-unit-out operation.

5.1.3 Hydronic System (Glycol Loop)

The cooling distribution system is based on a closed-loop glycol system circulating between the chillers and the indoor cooling equipment.

Key parameters:

- Fluid: 45% propylene glycol
- Supply Temperature: 6.7°C
- Return Temperature: 12.2°C
- Flow Rate: ~76 L/s
- Pressure Drop: ~149 kPa

The use of glycol provides freeze protection and ensures reliable operation during winter conditions. Constant flow operation is recommended to maintain system stability.

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5.1.4 Air-Cooled Heat Rejection

Each chiller is equipped with an integral air-cooled condenser section including:

- Microchannel condenser coils
- 24 axial fans per unit
- Design ambient temperature: 35°C

This configuration eliminates the need for cooling towers and condenser water systems, reducing maintenance requirements and simplifying plant operation.

5.1.5 Physical Arrangement and Installation

Based on manufacturer drawings:

- Length: 14.4 m
- Width: 2.33 m
- Height: ~2.9 m
- Clearance required: minimum 2.0 m on all sides
- Weight: ~15,400 kg (operating)

Each chiller is shipped in two sections and requires coordination for rigging, structural support, and installation. The chillers are intended for rooftop installation subject to structural coordination.

Refer to Appendix 1 – Manufacturer Drawings.

5.1.6 Controls and Integration

Each chiller is equipped with:

- Integrated controller with touchscreen interface
- BACnet TCP/IP communication

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- Electronic expansion valves
- Safety and monitoring devices

The chillers will be integrated into the Building Automation System (BAS) for:

- Sequencing and staging
- Alarm monitoring
- Load optimization
- Runtime equalization

5.1.7 Acoustic Performance

The selected air-cooled chillers have a manufacturer-rated sound pressure level of approximately 64 dBA at 10 m under full-load operation.

To ensure compliance with municipal noise requirements and to minimize impact on adjacent properties, the chillers will be enclosed with architectural acoustic screening. The screening will be designed in coordination with the architectural team and will consist of sound-attenuating panels arranged around the equipment, while maintaining adequate airflow clearance as required by the manufacturer.

The acoustic screening will be configured to provide effective noise attenuation without compromising equipment performance, maintenance access, or ventilation requirements. Based on preliminary assessment, the combination of equipment layout, distance attenuation, and architectural screening is expected to reduce the sound levels at the property line to within a target range of approximately 45–50 dBA.

Final acoustic performance and compliance will be confirmed during the detailed design stage through a comprehensive noise study, considering equipment operation scenarios, cumulative sound levels, site geometry, and surrounding environmental conditions. The design will comply with Ontario MECP NPC-300 environmental noise guidelines for stationary sources.

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5.1.8 Appendices Reference

Detailed technical information for the selected cooling equipment is provided in the appendices of this report.

Appendix 1 includes manufacturer drawings, dimensions, and installation requirements for the air-cooled chillers.

Appendix 2 includes technical specifications, performance data, and equipment schedules.

These documents form an integral part of this report and shall be used for reference during detailed design, coordination, and equipment installation.

5.1.9 Energy Efficiency and Incentive Considerations

The selected air-cooled chiller system utilizes oil-free magnetic bearing compressor technology, which offers high part-load efficiency and reduced energy consumption compared to conventional chiller systems.

Due to the high efficiency performance of the selected equipment, the system may be eligible for energy efficiency incentives or rebate programs offered by local utility providers and government agencies. Final eligibility and incentive amounts will be confirmed during the detailed design phase in coordination with the Owner and applicable energy programs.

The cooling system incorporates thermosyphon free cooling capability. When outdoor temperatures are sufficiently low, refrigerant circulates naturally between the evaporator and condenser.

During favorable ambient conditions, compressor operation can be reduced or even eliminated, significantly lowering energy consumption. In cold climates like Burlington, thermosyphon free cooling can provide a substantial portion of the annual cooling load. A detailed energy study will determine the exact percentage, but it is expected to operate for a large portion of the year, reducing reliance on mechanical cooling.

Operating principle:

- Refrigerant evaporates in the evaporator.
- Vapor rises naturally to the condenser.
- Outdoor air cools the condenser.
- Refrigerant condenses and returns to the evaporator.

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6.0 AIRFLOW MANAGEMENT STRATEGY

The data center cooling strategy is based on a high-efficiency in-row cooling architecture integrated with hot aisle containment, designed to support high-density IT equipment and optimize thermal performance.

Cooling is provided by InRow cooling units located directly within the server rows, positioned adjacent to IT racks. This configuration allows cooling air to be delivered close to the heat source, minimizing air mixing and improving cooling effectiveness.

The data halls are arranged with hot aisle containment, where hot exhaust air from IT equipment is confined within dedicated enclosed aisles. This prevents mixing of hot and cold air streams, allowing for higher return air temperatures and improved overall system efficiency.

Conditioned air is supplied from the InRow units directly into the cold aisle, passes through the IT equipment, and is discharged into the contained hot aisle. The contained hot air is then returned to the InRow units for cooling, creating a controlled and efficient airflow loop.

The InRow units are served by the centralized glycol-based cooling system generated by the air-cooled chiller plant described in Section 5.0.

This approach eliminates the need for traditional perimeter-based cooling systems such as CRAC units, and provides improved scalability, energy efficiency, and thermal control suitable for high-density computing environments.

The airflow management strategy is designed in accordance with ASHRAE TC 9.9 guidelines, ensuring that recommended temperature and environmental conditions for IT equipment are maintained under both normal and part-load operating conditions.

7.0 RELIABILITY & PROTECTIVE MEASURES

The cooling infrastructure has been developed to support reliable operation suitable for a mission-critical data center environment, while maintaining a simplified and water-efficient system architecture.

The central cooling plant consists of twelve (12) air-cooled chillers, each with a nominal capacity of approximately 1,580 kW, providing a total installed capacity of 18,960 kW. Based on the revised facility cooling demand of approximately 17 MW, the system is configured such

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that eleven (11) chillers operate under normal conditions, with one unit available as standby, thereby satisfying N+1 redundancy requirements.

This configuration ensures continuous cooling availability during maintenance activities or in the event of a single chiller failure.

The selected air-cooled system eliminates the need for cooling towers, condenser water piping, and water treatment systems, resulting in no process water consumption for heat rejection. This approach reduces operational complexity and removes risks associated with water-based systems, including freezing and Legionella exposure, while supporting sustainable and low-maintenance operation.

The cooling distribution system is based on a 45% propylene glycol solution, providing freeze protection and ensuring reliable performance under winter conditions.

8.0 Emergency Power and Operational Strategy:

The cooling system is designed to accommodate an emergency operating mode during loss of normal power. Under this condition, a portion of the cooling plant, along with associated pumps, controls, and selected air-handling equipment, may be connected to the emergency power system to maintain thermal protection of critical data center spaces.

The emergency cooling strategy is intended to operate at a reduced capacity, consistent with typical data center resilience approaches. This may involve prioritization of critical IT zones, while allowing non-critical areas to be reduced or temporarily offline during extended power outages.

The exact configuration of equipment connected to emergency power, including the number of chillers, pumps, and air-handling units, will be determined in coordination with the electrical design, generator capacity, and the Owner's operational requirements during the detailed design phase.

This staged and zoned approach ensures that, during a utility power interruption, the facility can maintain acceptable environmental conditions for critical systems, support ride-through operation, and enable controlled load management **without reliance on water-based backup cooling systems**.

Additional protective measures include leak detection systems, Building Automation System (BAS) integration for monitoring and alarms, and environmental monitoring systems integrated with the facility control infrastructure.

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9.0 LIMITATIONS & LEGAL DISCLAIMER

This report has been updated to reflect the current air-cooled chiller selection and revised 17 MW cooling demand based on the information available at the time of preparation. Final system design, including detailed piping layouts, structural coordination, electrical distribution, acoustic analysis, and control sequences, will be developed during the detailed design phase and shall be subject to review and approval by the Authority Having Jurisdiction.

10.0 SANITARY AND STORM WATER COORDINATION

The proposed mechanical cooling system is designed such that it does not require process water for heat rejection, as the air-cooled chiller plant operates without cooling towers or evaporative systems.

Accordingly, no continuous water discharge to municipal sanitary or storm systems is anticipated from the cooling process.

Any incidental drainage associated with mechanical equipment, including maintenance drainage, glycol system protection, or equipment relief, will be managed through dedicated drainage provisions in accordance with applicable codes and municipal requirements.

Where required, glycol-containing systems will be isolated from direct discharge to municipal sanitary systems. Appropriate measures, such as contained drainage, collection systems, or neutralization (if required), will be implemented to ensure that no contaminated fluids are discharged into the municipal infrastructure.

All sanitary and storm connections will be coordinated with the City during the detailed design phase to ensure full compliance with local bylaws and environmental requirements.

11.0 CONCLUSION & RECOMMENDATIONS

The finalized mechanical cooling system for the proposed data center is based on a modular air-cooled oil-free magnetic bearing chiller plant, designed to support a revised cooling demand of approximately 17 MW.

The selected configuration consists of twelve (12) chillers, each with a capacity of approximately 1,580 kW, providing a total installed capacity of 18,960 kW. Under N+1 operation, eleven units provide approximately 17,380 kW, which satisfies the design load

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while maintaining redundancy.

This air-cooled approach simplifies system infrastructure by eliminating cooling towers and condenser water systems, reduces water consumption, and enhances operational reliability.

The system is well suited for data center applications, offering high efficiency, modular scalability, and reduced maintenance requirements. Supporting documentation including manufacturer drawings and technical specifications are provided in Appendix 1 and Appendix 2. Also, the approximate location of the roof air cooled chiller provided as Appendix 3.

It is recommended that the project proceed to the detailed design phase, including final coordination of piping, structural support, electrical systems, controls integration, and acoustic compliance verification. The proposed system does not require process water for cooling operation, supporting sustainable and low-impact infrastructure.

END OF MECHANICAL DESIGN BRIEF

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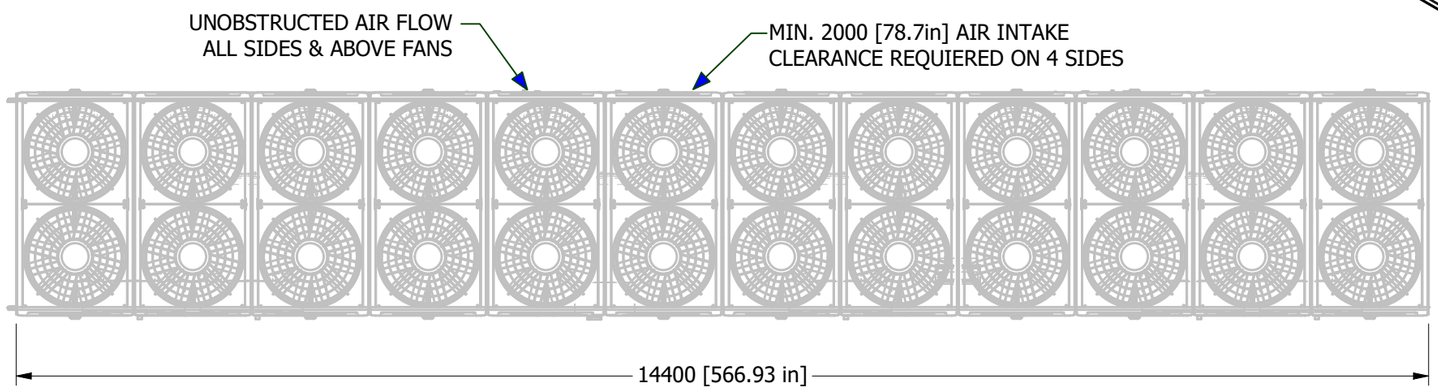
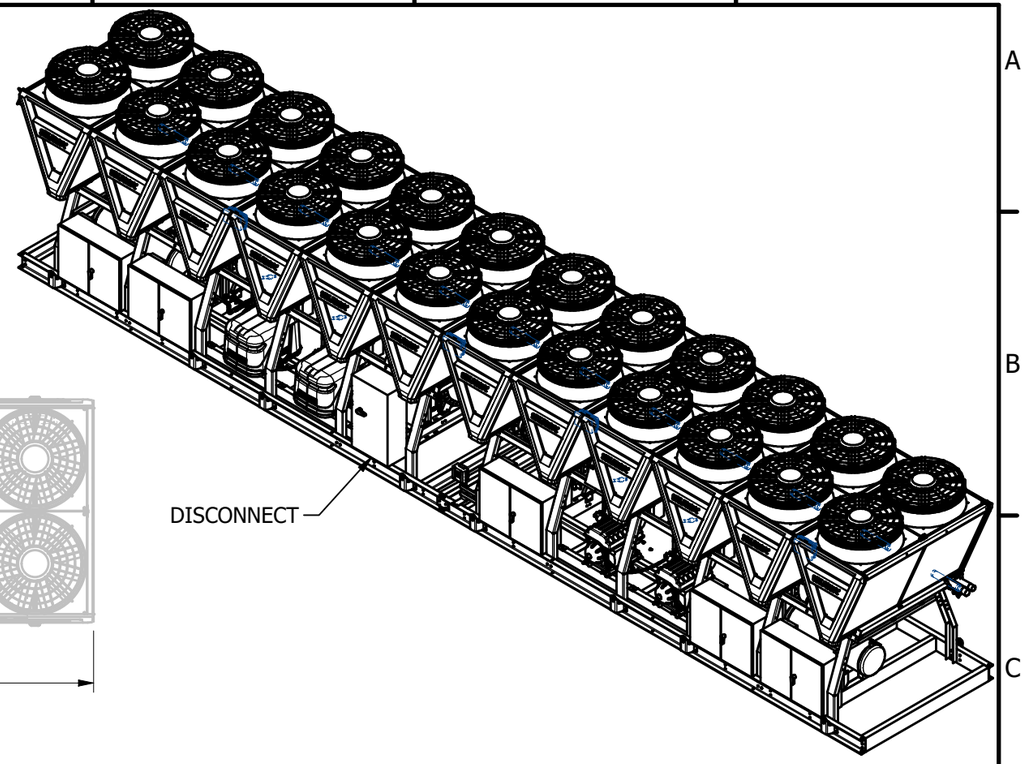
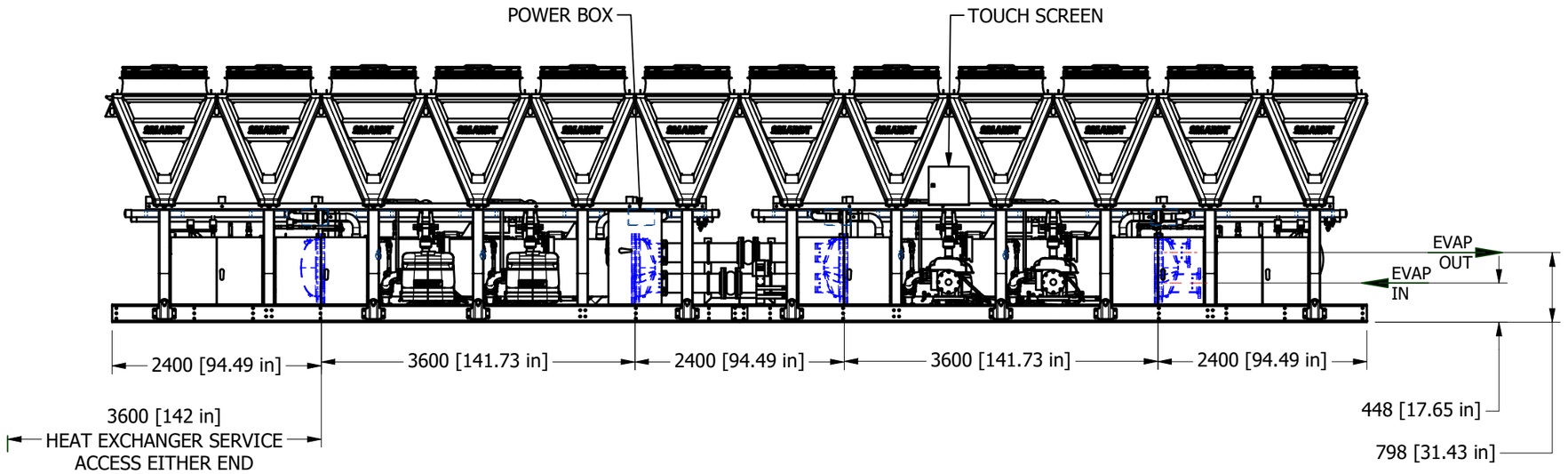
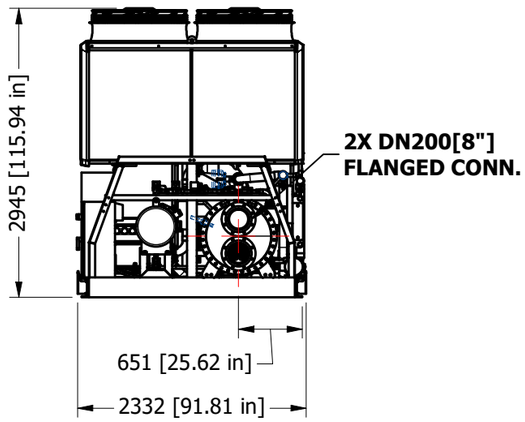
APPENDIX-1

This chiller will ship in 2 separate sections of 12 fans each .









APPROX. WEIGHT (lbs)		
EMPTY	CHARGE	OPERATION
31100	2324	34150

CREATE DATE: 7/11/2023

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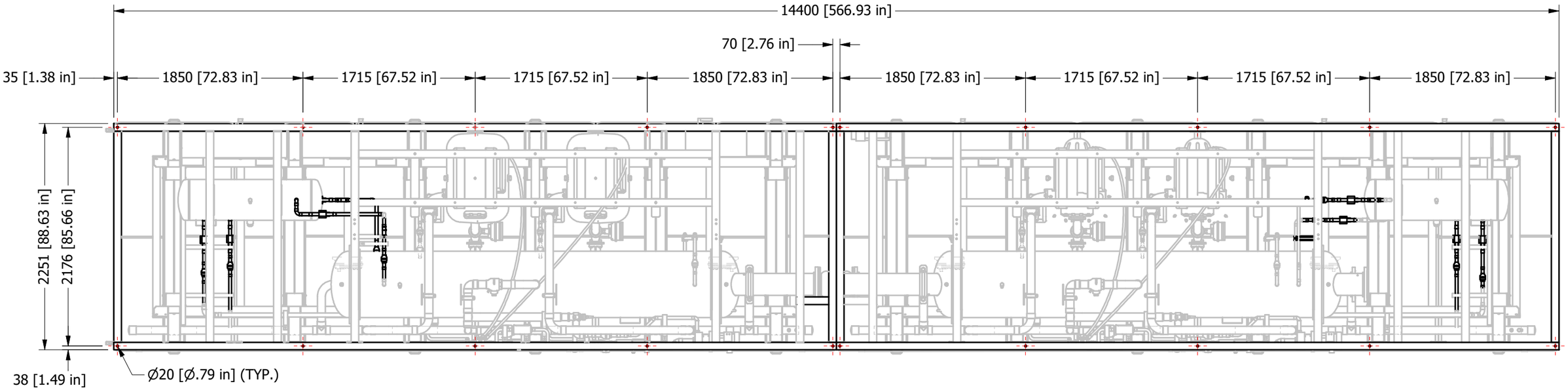

FOOT PRINT
BOTTOM VIEW

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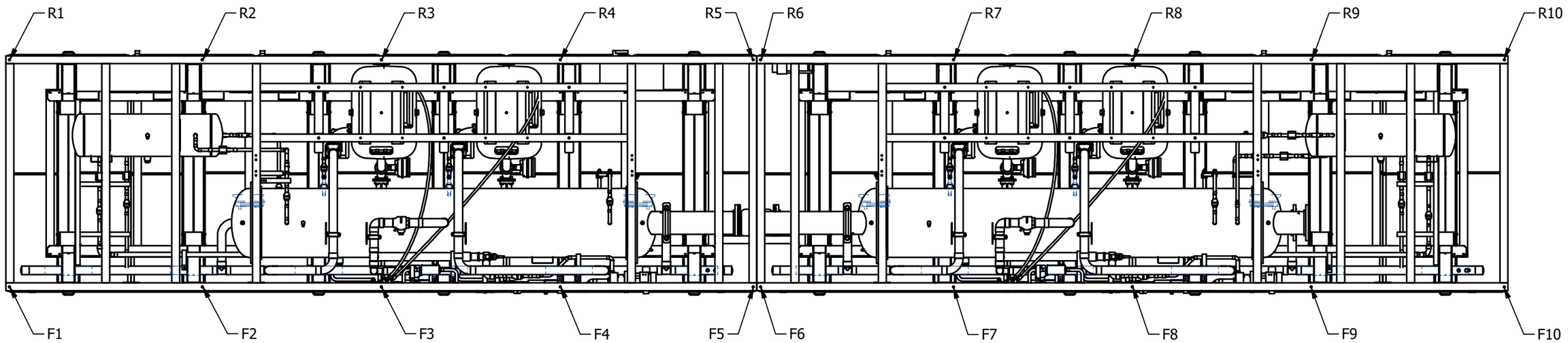

MOUNTING POINT LOADS

MOUNTING POINT LOAD LEFT SIDE (lbs)	
POINT	APPROX. LOAD
F1	80
F2	3941
F3	1546
F4	4222
F5	1283
R1	240
R2	1948
R3	1039
R4	1972
R5	804

MOUNTING POINT LOAD RIGHT SIDE (lbs)	
POINT	APPROX. LOAD
F6	1292
F7	4110
F8	1610
F9	3986
F10	72
R6	825
R7	1960
R8	1061
R9	1903
R10	255

APPROX. WEIGHT (lbs)		
EMPTY	CHARGE	OPERATION
31100	2324	34150

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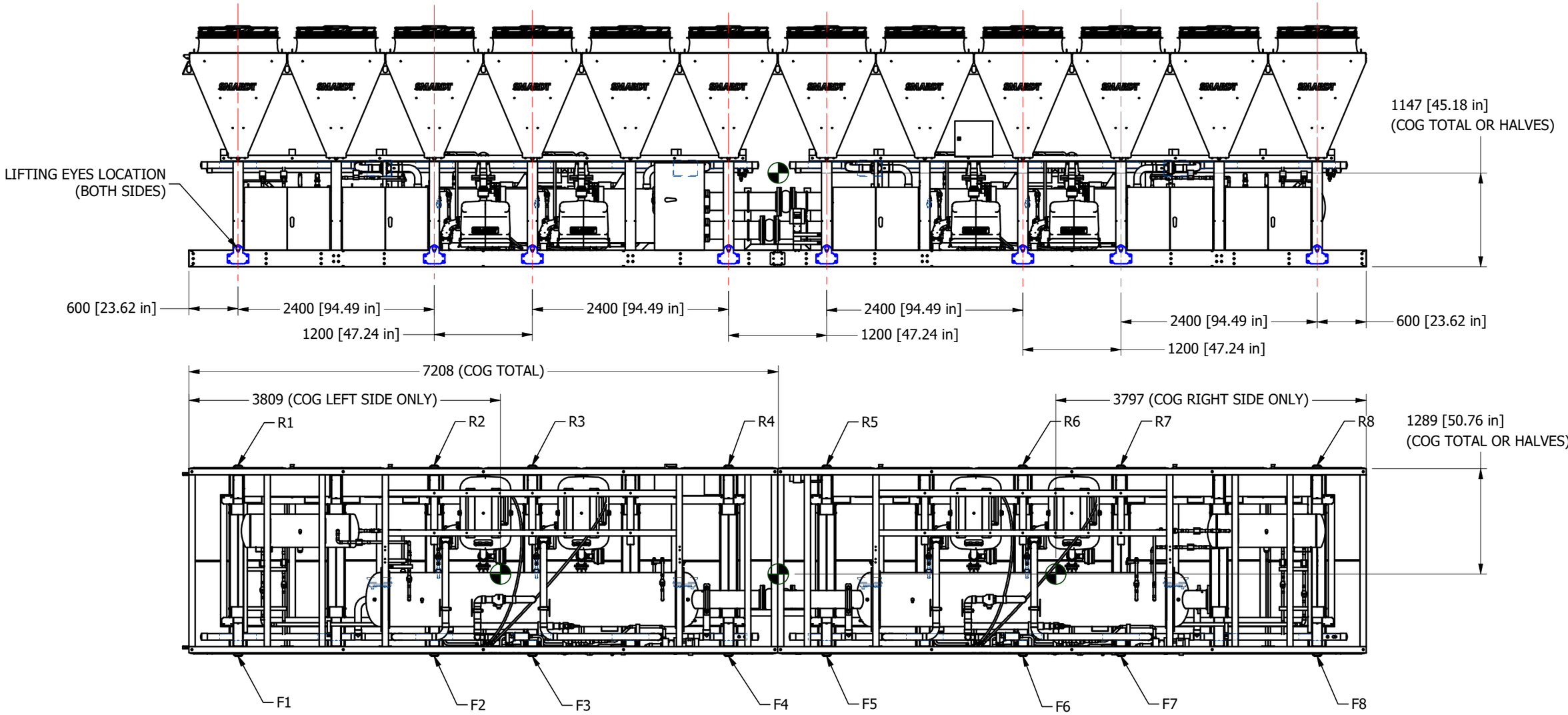

PICKING POINT LOADS

PICKING POINT LOAD LEFT SIDE (lbs)	
POINT	APPROX. LOAD
F1	1878
F2	2892
F3	1908
F4	2991
R1	1504
R2	2315
R3	1392
R4	1984

PICKING POINT LOAD RIGHT SIDE (lbs)	
POINT	APPROX. LOAD
F5	2934
F6	1864
F7	2981
F8	1888
R5	1994
R6	1384
R7	2312
R8	1505

NOTE: CHILLER SHOULD BE DISASSEMBLED IN TWO HALVES FOR LIFTING

APPROX. WEIGHT (lbs)		
EMPTY	CHARGE*	OPERATION
31100	2625	34450

*ACTUAL CHARGE: 2324lbs

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CHILLER MODEL NUMBER	DESCRIPTION
AD150.4E.F2AGUB.A024GX.E2D	**Air Cooled Chiller**

INCLUDED BY SMARDT:

- Oil-free centrifugal compressor(s)
- Chiller(s) to be shipped - Fully Assembled
- Chillers are ETL listed and certified to CSA C22.2 No.236
- Conforming to ANSI/UL 1995
- Power connection style: Single point power connection. Non-fused Disconnect Switch - Air Cooled
- Individual Breaker(s) or Non-fused disconnect(s) per compressor(s)
- Nema 3R Control enclosures – outdoor use
- Mechanical HP/LP switch
- ASME certified horizontal shell-and-tube heat exchangers
- Supporting baffles inside Standard EVAP tube sheets
- High efficiency enhanced tubes
- Evaporator Insulation: Standard 19 mm (3/4") Closed Cell Foam Insulation
- 1MPA (150psi) Evaporator Standard Water Box fitted with Evaporator Water Connection : Grooved Connection
- High performance Microchannel Coil condenser
- Fin and Sheet metal: Anticorrosive metal – 1000hr salt spray test in accordance with ASTM B117.
- Chilled water: IFM – Thermal Dispersion Switch
- Electronic expansion valve(s)
- Pressure relief valves on evaporator and Discharge Header
- Factory Startup: Certified Startup Agent
- Controller: Kiltech Controller with 12" Touch Screen
- Connectivity: BACNet HLI - TCP/IP
- 12/18 month standard parts and labor warranty
- Economizer: BPHE Economiser for each compressor

NOT INCLUDED BY SMARDT:

- Vibration isolation pad (not required by manufacturer)
- Rigging and providing access for equipment
- Piping from refrigerant pressure relief valves to outside.
- Grooved flange couplings
- Refrigerant monitor
- Seismic certification
- Performance test
- Sound test
- Harmonic or EMI Filters
- Extended warranties
- Any other item not mentioned above

APPENDIX-2

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CHILLER PERFORMANCE

UNIT TAG

Model	**AD150.4E.F2AGUB.A024GX.E2D**		**Compressor**			
S/N				**TTS350**		
Voltage	**575 V**		**RLA/Comp**	**144A**		
		MCA	**667 A**			
		Max fuse or CKT BKR	**800 A**	**Refrigerant**		
				Type	**R513A**	**Charge**
Nominal Capacity	**450 TonR**					
Design Pressure	**191PSI**				**Empty weight**	
	Evap					
Water flow	**1212 gpm**					
Pressure drop	**21.59 psi**					

Note:
A solid ground is needed and isolated or floating grounds are not recommended for these applications.

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AIR-COOLED CHILLER PERFORMANCE SPECIFICATION

*API version: AC23_11_0_BB_00 - March 16, 2026

Project Information	
Project:	Data Centre - Toronto
Issued By:	Larry Ekanthappa
Date Issued:	March 17, 2026

Chiller Information	
Chiller Model:	AD150.4E.F2AGUB.A024GM.E2D
Chiller Type:	Air-Cooled

Performance Options	
Smardt Cool	Yes
High SST Compressor:	No
Discharge Line Acoustic Wrap:	No
Fan Type:	Default Fan

Unit contains freeze protection liquids in the condenser or in the evaporator and is certified when rated per the Standard with water.

Design Conditions			
Chiller Water Supply Temp	44.00 °F	Design Capacity	450.0 TonR
Chiller Water Return Temp	54.00 °F	Average Efficiency	0.5101 kW/TonR
Ambient Dry Bulb	95.0 °F	Design Full Load Efficiency	1.028 kW/TonR
Ambient Wet Bulb	Not Specified		

Installation Information

Chiller Electrical Data		Environmental Information	
Electrical Input (V/Ph/Hz)	575/3/60	Type of Refrigerant	R513A
Power Input	462.6 kW	Refrigerant Charge	808 kg
Rated Load Amps (RLA)	522 A	Sound Power - Lw db(A)	95.1 dB(A)
Minimum Circuit Ampacity (MCA)	667 A	Sound Pressure - Lp(A) at 100% Load and 33.0 ft	64.0 dB(A)
Maximum Over Current Protection (MOCP)	800 A		

Design Data

Evaporator Information		Condenser Information	
Evaporator Passes	2	No. of Fans	24
Evaporator Fluid	Propylenglykol (45.0%)	Coil Type	Microchannel Coil
Evaporator Design Flow Rate	1212 gpm	Elevation above sea level	0.0 ft
Evaporator Design Pressure Drop	21.59 psi	External Static Pressure	0.00 in H2O
Evaporator Fouling Factor	0.000100 ft² °F/Btu	External Static Volume	0.00 cfm

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PRIMARY DESIGN CONDITION

[AD150.4E.F2AGUB.A024GM.E2D] 450 TonR Evap: 54.00/44.00 - Cond: 95.0 (10 load pts)

Load	Capacity (TonR)	Efficiency (kW/TonR)	Power (kW)	Evap PD (psi)	CHW Flow (gpm)	CHWR (°F)	CHWS (°F)	Amb DB (°F)	Sound Pressure (dB(A))
100	450.0	1.028	462.6	21.59	1212	54.00	44.00	95.0	64.00
90	405.0	0.8816	357.1	21.65	1212	53.00	44.00	89.0	63.80
80	360.0	0.7589	273.2	21.71	1212	52.00	44.00	83.0	63.30
70	315.0	0.6507	205.0	21.77	1212	51.00	44.00	77.0	62.00
60	270.0	0.5523	149.1	21.83	1212	50.00	44.00	71.0	60.40
50	225.0	0.4533	102.0	21.89	1212	49.00	44.00	65.0	58.50
40	180.0	0.4213	75.84	21.94	1212	48.00	44.00	65.0	56.70
30	135.0	0.3892	52.54	22.00	1212	47.00	44.00	65.0	53.40
20	90.00	0.3725	33.53	22.07	1212	46.00	44.00	65.0	49.90
10	45.00	0.3336	15.01	22.13	1212	45.00	44.00	65.0	45.60

Sound Data

Description	Global	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Lp(A) at 100% Load and 33.0 ft	64	40.0	42.3	48.6	55.5	60.6	57.9	53.0	51.1

AD150.4E.F2AGUB.A024GM.E2D | ID: f02a08e3-30a2-48be-86c1-f50a6e8e066f | *API version: AC23_11_0_BB_00 - March 16, 2026

AHRI PERFORMANCE REPORTS

[AD150.4E.F2AGUB.A024GM.E2D] 450 TonR NPLV.IP - 0.4900 kW/TonR

Load	Capacity (TonR)	Efficiency (kW/TonR)	Power (kW)	Evap PD (psi)	CHW Flow (gpm)	CHWR (°F)	CHWS (°F)	Amb DB (°F)	Sound Pressure (dB(A))
100	450.0	1.005	452.2	15.27	1123	54.00	44.00	95.0	64.10
75	337.0	0.6926	233.4	15.33	1123	51.49	44.00	80.0	62.60
50	225.0	0.4502	101.3	15.41	1123	49.00	44.00	65.0	58.60
25	112.0	0.2823	31.61	15.48	1123	46.49	44.00	55.0	52.50

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Sound Data

Description	Global	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Lp(A) at 100% Load and 33.0 ft	64.1	40.1	42.3	48.7	55.6	60.6	57.9	53.0	51.1

AD150.4E.F2AGUB.A024GM.E2D | ID: 3d7cd4d3-51fa-4605-969e-32e1941f0fed | *API version: AC23_11_0_BB_00 - March 16, 2026

[AD150.4E.F2AGUB.A024GM.E2D] 450 TonR IPLV.IP - 0.4831 kW/TonR

Load	Capacity (TonR)	Efficiency (kW/TonR)	Power (kW)	Evap PD (psi)	CHW Flow (gpm)	CHWR (°F)	CHWS (°F)	Amb DB (°F)	Sound Pressure (dB(A))
100	450.0	0.9940	447.3	12.22	1078	54.00	44.00	95.0	64.00
75	337.0	0.6847	230.8	12.26	1078	51.48	44.00	80.0	62.60
50	225.0	0.4439	99.88	12.31	1078	49.00	44.00	65.0	58.50
25	112.0	0.2772	31.04	12.35	1078	46.49	44.00	55.0	52.50

Sound Data

Description	Global	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Lp(A) at 100% Load and 33.0 ft	64	40.0	42.3	48.6	55.5	60.6	57.9	53.0	51.1

AD150.4E.F2AGUB.A024GM.E2D | ID: 896e368a-8524-4f0d-980c-847f2fa88dc1 | *API version: AC23_11_0_BB_00 - March 16, 2026

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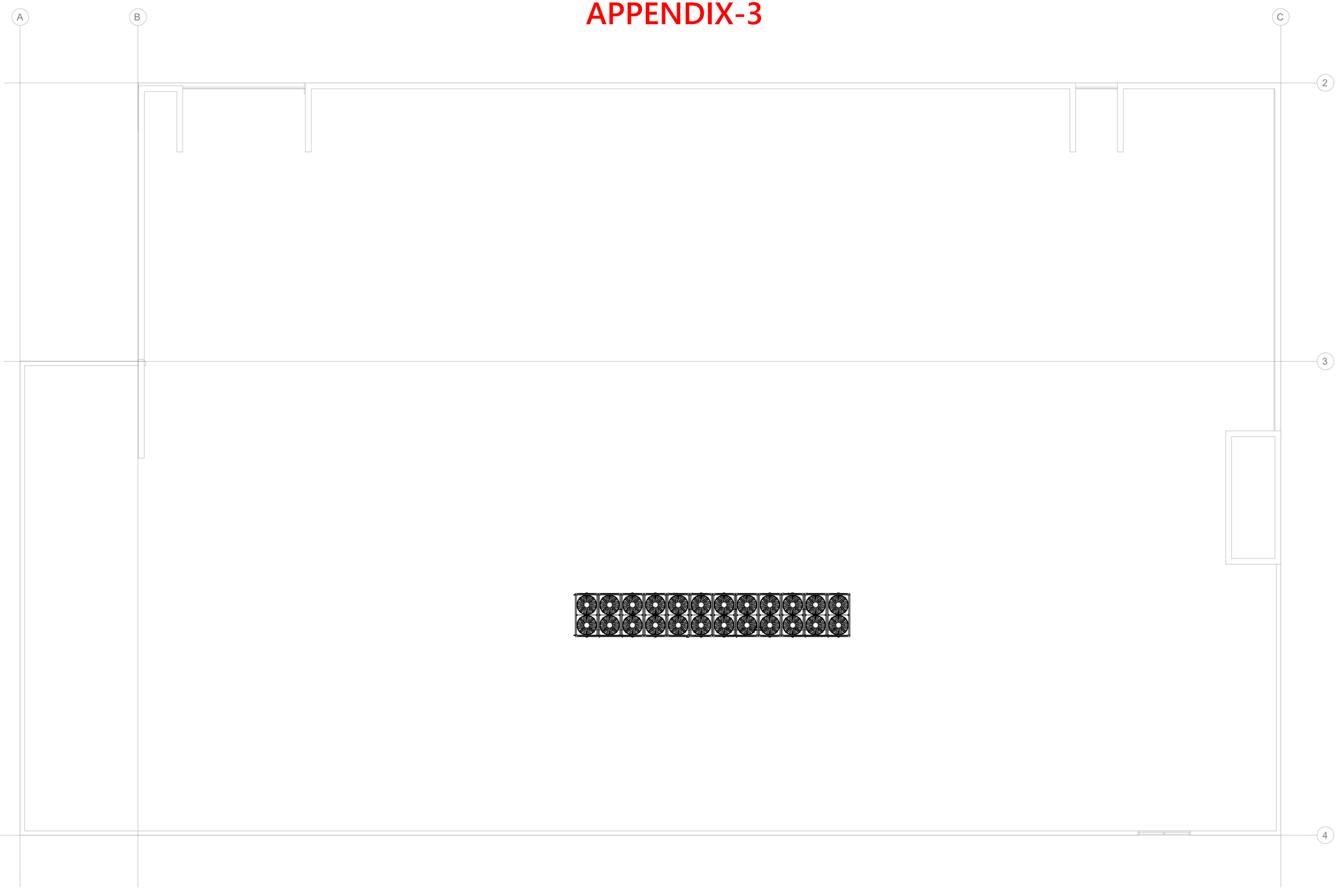
Notes

1. Constant flow is recommended when using propylene or ethylene glycol fluids.

APPENDIX-3



IMPORTANT NOTES:

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DRAWINGS ARE NOT TO BE SCALED; REFER TO ARCHITECTURAL DRAWINGS FOR ALL MEASUREMENTS.

LOCATION OF EQUIPMENT ARE APPROXIMATE AND MUST COORDINATED WITH OTHER TRADES, OWNER, BUILDER, AND ARCHITECT BEFORE INSTALLATION.

ALL DUCTWORK RUNNING IN UNHEATED SPACES SHALL BE INSULATED WITH MIN R-12.

FOR ROOMS WITHOUT RETURN GRILLE, INTERIOR DOORS SHALL BE UNDERCUT.

ALL DUCTWORK SHALL BE SEALED USING APPROVED DUCT SEALER.

ALL EQUIPMENT AND MATERIALS USED SHALL MEET THE REQUIREMENTS OF ONTARIO BUILDING CODE, ONTARIO ELECTRICAL SAFETY CODES, AND ALL OTHER APPLICABLE CODES AND STANDARDS.

ALL INSTALLATION TO COMPLY WITH ONTARIO BUILDING CODE AND ALL OTHER APPLICABLE CODES AND STANDARDS.

REVISION	DESCRIPTION	DATE

ARCHITECT

CUADRO arch ltd.

MECHANICAL ENGINEER

OPTIMAL ENGINEERING

OPTIMAL ENGINEERING INC
7030 WOODBINE AVE, UNIT 500
MARKHAM, L3R 6G2

INFO@OPTIMALENG.CA
WWW.OPTIMALENG.CA
(647) 948 4742

STAMP

TRUE NORTH

DRAWING TITLE:

PROPOSED ROOF
HVAC LAYOUT

PROJECT ADDRESS:

3110 S SERVICE ROAD,BURLINGTON

PROJECT NUMBER:	26032033
DESIGNED BY:	F.R.
CHECKED BY:	A.Y.

SCALE: 1/8"=1'

M-01