



VA PROJECT NUMBER 621-24-701 (2409)
PROJECT NAME EHRM Infrastructure Upgrades –
Tier 3 DC Mountain Home, TN
SUBMITTAL Final Bid Documents
SUBJECT HVAC Design Narrative

HVAC Project Overview

Spur Design is providing professional A/E services to design a compliant and complete construction and activation of a new Electronic Health Record Modernization (EHRM) system at the James H Quillen VA Health Care Center – Mountain Home, TN. The mechanical design will involve adding new HVAC equipment to serve the new 100-kW MCR to ensure compliance with VA standards for a Tier 3 data center, as well as other areas deemed necessary for a complete project. The existing HVAC equipment serving the MCR has been determined to be undersized. The new MCR will also include new HVAC equipment for heat rejection.

Existing system description

The existing MCR is currently served by three existing computer room units (CRUs) and one temporary unit. AC-1 is an older chilled water unit, while AC-2 and AC-3 are newer direct expansion (DX) units. The temporary unit was added because AC-1, AC-2, and AC-3 were undersized.

The office and storage space that will be renovated to become the new MCR are currently served by two (2) VAV boxes.

Selective Demolition

All existing mechanical equipment serving the MCR is to be abandoned in place after completion and commissioning of the new MCR. The contractor will need to maintain operation of the MCR during demolition and construction of the new MCR.

The existing zone terminal units serving the new MCR space are to be demolished and capped back to the main. Abandoned ductwork and piping in the ceiling is to be removed from the space in the new MCR. The existing plumbing fixtures in the kitchenette and bathroom are to be demolished and capped back to the main.

Ultimate Design Capacity

Following the completion of the equipment layout and selection of design criteria–driven basis-of-design equipment, calculations identified a projected telecommunications load of 90 kW. To adequately support this load, the basis of design includes a 100 kW UPS system. The overall



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design has been coordinated across all disciplines around two 100 kW UPS systems to provide redundancy and ensure capacity for the 90 kW telecommunications load. The ultimate design capacity of the MCR will be 100 kW.

Proposed System Description

The new cooling system will include two direct-expansion (DX) computer room units (CRUs). Each unit will be sized to independently cool the entire space, ensuring N+1 redundancy. Under normal operating conditions, both units will run at half capacity. The condensing units and refrigerant recovery units for the CRUs will be placed on the roof plan East of the MCR, to minimize the risk of leaks into the MCR. CRUs will include electric heating coils. Outside air will be supplied to the CRUs to meet the pressure requirements outlined in the Design Manual. Any existing ductwork and piping within the MCR that cannot be relocated will be equipped with drain pans and leak detection sensors to mitigate and alarm potential leak hazards. Finally, a redundant chilled hydronic cooling coil can be incorporated into both CRUs if the VA prefers and the building chilled hydronic system has the necessary capacity. A ducted return connected to racks with chimneys will be utilized. The condensate will drain by gravity and piped into sanitary sewer piping below the MCR space.

Phasing

Refer to architectural and telecommunications narratives and plans for information on project phasing.

Commissioning

The HVAC system will be commissioned per Specification 01 91 00 General Commissioning Requirements.

Testing, Adjusting, and Balancing for HVAC

- Pre-testing will be required for all existing systems that are being modified or removed.
- Final testing of systems will be performed and reviewed during the commissioning functional performance testing of the systems.



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Seismic Requirements

Seismic controls will comply with VA Publication H-18-8 Seismic Design Requirements.

- Station No. 621, TN, 36.311 Lat. / -82.373 Long.; 0.34 S_s / 0.094 S₁;
Seismic Level (ML) Seismicity.

Applicable Codes and Standards

- IMC - International Mechanical Code – 2021 Edition
- NFPA – National Fire Protection Association - 90A, 96, 99, 101 – 2024 Editions
- VA HVAC Design Manual – March 1, 2024, Edition
- ISTS Version 4.0 – June 1, 2023, Edition
- ASHRAE Standard 170 – 2021 (Ventilation of Health Care Facilities) complete with amendments a-d.
- Facility Guidelines Institute (FGI) – 2022 Edition
- ASHRAE 90.1 – 2022 Energy Standard for Buildings Except Low Rise Residential Buildings.
- ASHRAE 62.1 - 2022 Ventilation for Acceptable Indoor Air Quality
- ASHRAE Handbook – HVAC Applications – 2023 Noise and Vibration Control
- Physical Security and Resiliency Design Manual – June 1, 2025, Revision

Outdoor Climate Conditions

ASHRAE Climate Zone 4A (Moist)

- Johnson City, TN, USA (Washington County)

ASHRAE Handbook – Tri-Cities, TN (WMO:723350)

- Heating: 12.8 °F Db (99.6% Db) [Per ASHRAE 2021].
- Cooling: 90.5 °F / 71.9 °F (0.4% Db / Wb) [Per ASHRAE 2021]
- 50-Year Extreme: 101.7 °F / -12.8 °F (Max Db / Min Db) [Per ASHRAE 2021]

VA HVAC Design Manual

- Heating: 12.9 °F Db (99.6% Db) [Per VA Design Manual].
- Cooling: 90.5 °F / 71.8 °F (0.4% Db / Wb) [Per VA Design Manual]



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- Annual Extreme Daily: 92.9 °F / 4.6 °F (Max Db / Min Db) [Per VA Design Manual]
- MSL Elevation: 1,526 ft [Per VA Design Manual]

Indoor Design Conditions and ventilation

- Per VA Room Data Sheets and related standards

Energy Supply

- Electrical – 460/3/60 is available. Equipment to be selected at 460/3/60.
- Heating – Existing heating hydronic capacity to be determined.
- Cooling – Existing cooling hydronic capacity to be determined.
- Steam – Steam capacity and quality available to be determined.

HVAC Load Analysis

- Carrier HAP 5.11
- Autodesk CFD 2024
- VA Room HVAC Output Summary

Controls

- All new controls system components shall be BACnet MSTP, BTL certified and compatible with the current Computrols ECC platform.
- Data Center controls to be compliant with ISTS 4.3.7.
- Controls contractor shall provide programming and graphics for all new and updated equipment included in this project.

End HVAC