

Healthcare Facility Building

Owner's Project Requirements – 2026 ASHRAE Region XIV Student Design Competition

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1. Introduction

The city of YOUR CHOICE is building a new healthcare facility building in the heart of the city (the city must be in the country where your university is). The healthcare facility building will consist of a three-story structure. The goal of the project is to provide local access to doctors and out-patient treatment locations.

2. The Project

As part of the project, new HVAC systems are to be designed for this healthcare facility. The building consists of clinical administrative support offices, exam rooms, waiting rooms, nurses' stations, clinical laboratory, operating rooms etc. along with numerous support spaces such as restrooms, utility rooms (mechanical, water, electrical, telecom, etc.) and storage rooms. Please refer to the attached drawings and additional requirements in the OPR.

3. Owner's Requirements

The design team shall make every effort to provide a safe and sustainable design, taking into account: energy efficiency, occupant health and safety, occupant comfort, functionality, future flexibility as well as maintainability and a 50-year service life.

General assumptions of the space conditions, including space temperature and humidity, should be made by the design team.

Expected Hours of Operations

1. Estimated hours of operation are:
 - a. 7am- 7pm Monday through Friday, 7am-12pm Saturday, Closed Sunday.

The design team shall select systems based on the lowest life cycle cost as well as the below goals of the Owner.

1. Design the system to meet ASHRAE standards as listed in the Codes and Standards section.
2. Strive to achieve reduced energy consumption and carbon footprint for a high-performance building that approaches a Net Zero Energy Building and/or Carbon Neutral Building. Carbon Neutral Building needs to be defined by the design team if it is used in the design.
3. Provide excellent indoor environmental quality that provides a comfortable and safe environment for all occupants.
4. Incorporate design attributes related to improved HVAC system performance, space utilization, acoustic qualities, interior style, and durability of finishes.
5. Meet the operation and maintenance needs for an easily serviceable, maintainable, and secure facility that has low utility and maintenance costs.
6. Design that meets the Owner's project budget.

7. Maintain thermal comfort in each space per ASHRAE Standard 55.
8. Provide ventilation to each space per ASHRAE Standard 62.1.
9. Provide acoustic controls per ASHRAE Handbooks (i.e. the Chapters on Noise and Vibration Control in HVAC Application, and Sound and Vibration in Fundamentals).
10. Operate the building at positive pressure to prevent unwanted infiltration.
11. Propose the optimum orientation to minimize energy consumption. Currently plan North is shown on the drawings.

4. Budget Considerations and Limitations

The approach to allocating resources for the HVAC systems is to examine life cycle costs, including capital investments, operating costs, maintenance costs, and employee productivity. The key values are

1. Assume the owner's mechanical budget of \$10,000,000 USD, equal to £7,877,800 or €9,233,400.
2. Life of the HVAC system: 30 years minimum
3. General inflation rate and rate of return as defined in the Utility and Service Life Overview.
4. Utility escalation rate as defined in the Utility and Service Life Overview.

5. Utility and Service Life Overview

Utility rate structures shall be expected to rise at the following rates of escalation:

- Electrical costs are expected to rise at the annual rate of 3.5%
- Natural Gas costs are expected to rise at the annual rate of 7%
- Water and Sewer costs are expected to rise at the annual rate of 3%

Building Service Life

The building is considered a "Long Life" service building and therefore is defined by ASHRAE Standard 189.1 (latest addition) to have an expected minimum service life of 50 years. All building decisions related to building composition, building structural elements, building systems, and building operation shall include a 50-year life cycle study as the building owner expects a sustainable approach to all building design, construction, and operational elements. Student teams shall include this basis with all building analysis. To complete the life cycle study, the building owner expects the following elements to be included with any analysis.

- General Inflation rate for future cost items (replacement items, maintenance and anticipated future costs) will be 3%
- Owner's Rate of Return for monetary decisions (this is to be used for bringing future costs back to present net worth dollars) will be 4%.

The Life Cycle Analysis shall illustrate a 50-year study and bring all costs back to a total present value sum for each alternative, so the building owner understands in present dollars which alternatives represent the best life cycle value.

6. Building Assumptions

It is assumed that the new building envelope construction and other building systems (e.g. lighting and plumbing) meet ASHRAE 90.1 requirements, while incorporating the owner's project requirements.

1. Compliment surrounding architecture.
2. Superior acoustic criteria in all spaces with minimal sound transmission from the adjacent spaces and low noise production from the HVAC systems.
3. Assume the building is standalone, and therefore the HVAC systems are not tied to any central or district energy systems.
4. Assume all the utilities are provided on site (e.g. electricity, natural gas, water and sewer).
5. Envelope and Electrical Assumptions

7. Codes and Standards

Codes as determined by the local Authority Having Jurisdiction (AHJ). Design teams should also utilize the following ASHRAE Standards in the project:

1. ASHRAE Standard 15 and 34
2. ASHRAE standard 55
3. ASHRAE Standard 62.1
4. ASHRAE Standard 90.1
5. ASHRAE Standard 170
6. ASHRAE Standard 189.1
7. ASHRAE Standard 241
8. ASHRAE Advanced Energy Design Guide for Achieving Zero Energy in Small to Medium Office Buildings

Use the latest available versions of all ASHRAE Standards and Handbooks.

8. References

<https://www.ashrae.org/technical-resources/standards-and-guidelines/read-only-versions-of-ashrae-standards>