

NEW FOUR STORY MIXED USE RESTAURANT, RETAIL, LODGING, AND OFFICE BUILDING

OWNER'S PROJECT REQUIREMENTS

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INTRODUCTION

A local jurisdiction (owner) has decided to build a new 70,000 square foot (6,500 square meter), four story mixed use complex north of Istanbul, Turkey near Arnavutkoy which is just south of the new international airport. The facility features retail and office spaces, a restaurant, and a hotel in support of the upcoming rapid growth in the area when the airport is completed in 2019.

THE PROJECT

The project involves building a new four-story restaurant, retail, lodging, and office building in Istanbul Turkey. The project will be conducted as a design/bid/build project with a design team, a general contractor and an independent commissioning authority.

The building will feature a kitchen area that will have two gas fryers, eight burner range with oven, two gas griddles, icemaker, two door reach in freezer and refrigerator, steam table and various plumbing items. Administrative offices, retail, dining, IT/computer room areas, break rooms, storage areas, and sleeping areas.

Typical building operating hours are 7am-10pm Monday through Friday and 8am-1pm on Saturday. There is typically full time staff, guests and shoppers in the building Monday- Sunday and only students and staff and guests for the lodging portion. The building is open 24/7 on a limited basis.

The building shall facilitate functions that accommodate the operations of the administrative staff including some individual private offices, cubicle spaces, meeting rooms, and shared spaces consisting of a reception area, storage and copier areas, small meeting and break areas, and larger meeting areas.

To achieve the objectives for low maintenance and operating costs, the owner has determined that the building exterior should or shall? Be designed to minimize and resist long term degradation from nature. Construction materials selected for the project should or shall? Be based on long term serviceability in the local climate.

The use of potable water for irrigation purposes beyond what is required for initial establishment of site vegetation is strictly prohibited. Indigenous and adapted plant species shall be selected to minimize watering, fertilization, and pest management requirements. Design and construction of the building should be done to minimize maintenance requirements.

The facility shall utilize daylighting to the maximum extent possible to minimize the installed lighting power density requirements.

OWNERS DIRECTIVES

Every effort should be made to provide a sustainable design considering energy efficiency, health and safety, occupant comfort, functionality, longevity, flexibility, serviceability, and

maintainability. Systems shall be selected based on the lowest possible life cycle cost that includes first cost of materials and long term operating costs, as well as other Owner goals.

- This project should use the latest innovative technologies and concepts to meet ASHRAE 189.1.
- Excellent indoor environmental quality that facilitate occupants’ use of the space by providing a comfortable and safe environment while avoiding the design attributes related to poor HVAC system performance, poor space utilization, poor acoustical qualities, inconsistent interior style, and low durability of finishes.
- Maximize usable lease space including and reduce the amount of space needed to provide the maximum ceiling height.
- Ability to meter individual spaces for energy usage and utility billing.
- Flexibility of design to accommodate lease changes.
- Operation and maintenance needs are for an easily serviceable, maintainable, and secure facility that has low utility and maintenance costs
- Provide a building which has the best life cycle cost for the applicable climate and the Owner’s budget

DESIGN REQUIREMENTS

The HVAC systems should be selected based upon the following design criteria:

| | Office & Administrative Support Spaces | Restaurant | Retail | Lodging |
|---------------------|---|---------------------------------|---|--------------------------------|
| Occupancy | 7 am - 6 pm Monday - Friday 8 am - 1 pm Saturday | 7 am - 10 pm Monday - Friday | 9 am – 10pm Monday – Saturday 11am-7pm Sunday | 24 hours/ day 7 Days / week |
| Interior Conditions | | | | |
| Summer | 73.4°F (23°C) DB/50%RH | 73.4°F (23°C) DB/50%RH | 73.4°F (23°C) DB/50%RH | 78.8°F (26°C) DB/55%RH |
| Winter | 70°F (21°C) DB | 70°F (21°C) DB | 70°F (21°C) DB | 73.4°F (23°C) DB |
| Sound | NC 35 | NC 30 | NC 30 | N/A |

Information Technology (IT) support spaces shall be maintained at 73.4°F (23°C) DB/50%RH 24 hours per day, 365 days per year.

Exterior design conditions should be based on the ASHRAE 2% criteria, heating 99%, evaporation 1% and dehumidification 1% for the climate of Istanbul Turkey.

Mechanical systems shall function seamlessly to deliver the performance levels needed to maintain space comfort within specifications set forth by ASHRAE Standard 55.

Energy Conservation: The building, including the envelope, HVAC systems, service water heating, power, and lighting systems shall meet the Mandatory Provisions and the Prescriptive Path requirements prescribed in ASHRAE Standard 189.1. Design Teams may also show compliance to ASHRAE 189.1 by meeting the Mandatory Provisions and the Performance Path requirements.

Cooling and Heating System Selection: Mechanical systems for the facility shall be selected based on a Life Cycle Cost Analysis (LCCA). Evaluation shall include a comparison of two or more system types based on the region, specific building design features and available energy sources. The final design shall include a short summary report discussing assumptions, calculations, results and interpretation of results for each system analyzed.

The design team may utilize any commonly accepted energy modeling software meeting the requirements of ASHRAE 90.1 Appendix G to provide whole building energy consumptions and comparisons. Provide reasonably detailed narratives and cost estimates for each system studied as part of the design analysis to include first costs, operations and maintenance costs, and replacement costs over a 50 year study period. Document all assumptions and escalation costs requires for a reasonable LCCA.

Indoor Air Quality: Indoor Air Quality: Follow the requirements of ASHRAE Standard 62.1. Use the default population guidelines in the standard for determining population and default ventilation rates. Discuss any measures for air treatment required to produce acceptable indoor air quality.

Space Specific Loading: HVAC zones shall be selected based on the occupancy for each space. Where possible, spaces of similar occupancy shall be considered a single zone. Spaces with varying occupant loads (i.e. Classrooms, Break Rooms, Conference Rooms, and Assembly Areas) shall be provided with individual zone equipment. Personnel loads for each space are based on the actual expected occupancy provided by the installation. Where occupancy loads are not provided, assume occupancy densities are estimated per ASHRAE Standard 62.1. Cooling and heating loads shall be calculated with tools developed to use the procedures outlined in ASHRAE Fundamentals. Develop and include in the design assumed values for miscellaneous plug loads to cover typical equipment not listed. If a space is shown on the drawings but not listed here, make assumptions and document them.

| Space Type | Miscellaneous Loads |
|-------------------------|---|
| Break and Vending Areas | Refrigerator Microwave/Coffee Vending Machine |
| | |
| Kitchen | Fryer – Gas, 8 Burner Range w/ Oven, Ice Maker with bin 2-Door Reach-In Freezer, 2-Door Reach-In Refrigerator, Gas Griddle (8), Steam Table |
| | |
| Computer Room | 4 typical racks of blade servers 2 typical racks of networking equipment |
| | |
| Conference | CPU/Monitor LCD TV 2 Projectors |
| | |
| Classrooms | Overhead projector One laptop per student |
| | |
| Mechanical/Electrical | Loads as per required equipment |
| | |
| Office, Individual | CPU/Monitor |
| | |
| Office, Executive | CPU/Monitor LCD TV |
| | |
| Office, Open Areas | CPU/Monitor per workstation/person One High volume copy machine |
| | |

| | |
|---------|---|
| Library | CPU/Monitor: 1 workstation for every 10 people 2 LCD TVs Copy machine |
|---------|---|

Environmental Requirements for Computer Server and Data Rooms: Maintain environmental conditions at the Class 1 and 2 Recommended Operating Environment. Maintain rooms under positive pressure relative to surrounding spaces. Design computer room air conditioning units specifically for telecommunications room applications. A complete air handling system shall provide ventilation, air filtration, cooling and dehumidification, humidification, and heating. The system shall be independent of other facility HVAC systems and shall be required year round.

Service hot water systems: Design any solar hot water systems in accordance with ASHRAE Handbook Series (appropriate Chapters), ASHRAE Standards 90.1, and 189.1. Size and place equipment so that it is easily accessible and removable for maintenance, repair, or replacement. Utilize solar hot water if life cycle cost effective and provide justification for including or not including the system.

Building Water Reduction: Reduce building potable water use by 30 percent from Baseline, using the Manufacturing Performance Requirements for Plumbing Fixtures from the Energy Policy Act of 1992.

BUDGET CONSIDERATIONS AND LIMITATIONS

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

- Assume the Owner's budget is 200 USD/ft² (2,153 USD/m²) for the renovation.
- Life of the building: 50 years
- Return on investment: 7%
- Inflation rate: 3%
- Utility escalation rate should be based on a 10 year trend for the utility provider (water, gas, etc.) in the area.

BUILDING ASSUMPTIONS

Every effort should be made to provide a sustainable design considering energy efficiency, health and safety, occupant comfort, functionality, longevity, flexibility, serviceability, and maintainability. Systems shall be selected based on the lowest possible life cycle cost that includes first cost of materials and long term operating costs, as well as low environmental impact. Assume building envelope construction as follows and all insulating values meet ASHRAE 189.1 minimum values listed in the standard. Owner's primary goals for the building:

* 24 Hour hotel operation.

* 7 day a week retail spaces operating from 7 AM until 10 PM Monday thru Saturday and 11am to 7pm Sunday.

* 6 day a week office spaces operating from 7 AM until 6 PM Monday thru Friday and 8am to 1pm Saturday.

* Synergy with surrounding architecture including red tile style roof.

* Exterior walls to be masonry mass wall construction.

* Ground floor to be concrete poured as slab on grade. Upper floors to be concrete with pan-type construction. Design teams to choose and justify the type of pan used.

* Double glazed, fixed windows, ½” air space, low emissivity coating on third surface, bronze tint.

* Superior acoustic criteria in office spaces, restaurant and sleeping rooms with minimal sound transmission from the adjacent spaces and low noise produced from HVAC systems.

* Assume utilities are available on site including Natural Gas (5 psig from main), Electrical Power (480V/3φ/50Hz) with expected kW demand required to connect, City Water (20 psig), and City Sewer if located within 5 miles of the new airport.

CODES AND STANDARDS

- Codes as determined by the local Authority Having Jurisdiction (AHJ)
 - ASHRAE Standards 15 and 34
 - ASHRAE Standard 55
 - ASHRAE Standard 62.1
 - ASHRAE Standard 90.1
 - ASHRAE Standard 129
 - ASHRAE Standard 154
 - ASHRAE Standard 189.1
 - ASHRAE Handbooks

Use the latest available versions of all ASHRAE documents.