DESIGN ENGINEER'S PUNCHLIST

Project Delivery Method:
Design-Build (D-B)
Integrated Project Delivery (IPD)
Construction Management @ Risk (CM) with Guaranteed Maximum Price (GMP)
Design-Bid-Build (D-B-B)

Owner Team:
Hospital President
Building Program Committee
Owner Representative (consultant)
Project Manager of Capital Projects
Facility Manager (in-house staff)

Project Delivery Team:
D-B Project Manager
D-B-B Project Manager
Equipment Manufacturer Technician
HVAC D-B Engineer
Architect, Acoustical, Plumbing, Electrical, Structural, Fire Protection, and Security Consultants

HVAC Project Team:
HVAC Supervisor (in-house staff)
Automatic Temperature Control (ATC) Technician Subcontractor
Building Automation System (BAS) Technician (in-house staff)
Third-Party Commissioning Consultant (CxC)
Third-Party Testing, Adjusting, & Balancing (TAB) Technician
Energy Engineering Consultant (EEC)
Infection Control Consultant (IC)

Application 2019 ASHRAE Handbook
Places of Assembly, Chapter 5
Healthcare Facilities, Chapter 9
Clean Space/Rooms, Chapter 19
Environmental Control, Chapter 25

Systems 2020 ASHRAE Handbook
Air-Handling and Distribution, Chapter 4
In-Room Terminal Systems, Chapter 5
Air Cleaners for Particulate Contaminants, Chapter 29
Cleaning and Air-Pollution Control, Chapter 30

Project Type:
New Construction
Infrastructure Improvements
Energy Audit & Retrofit
Facility Audit & Capital Project Master Planning

References:
2017 ASHRAE Handbook – Fundamentals
2018 ASHRAE Handbook – Refrigeration
Refer to the Codes and Standards Section Located in the Back of Each ASHRAE Handbook
ASHRAE Standard 170 (Ventilation of Healthcare Facilities)
ASHRAE Standard 202 (Commissioning Process for Buildings & Systems)
ASHRAE Guideline 0 (Commissioning Process)

DESIGN INTENT DOCUMENT (DID)

- The HVAC System Selection and Design Intent Is Based on the Process Outlined in ASHRAE Handbook 2020, Chapter 1, "HVAC System Analysis and Selection" and Includes the Following:
  - Owner's Building Program Goals and Additional Goals
  - System Constraints and Constructability Constraints
  - Finalized Air Filter MERV Rating and Unit Sizes
- Program and Project Goals:
  - Functional Goals (Refer to 2020 Handbook, Chapter 1)
  - Budget Goals: First Cost, Operating Cost, and Life Cycle Cost
  - Timeline Goals: Phased Construction Date Throughout Hospital
  - Management Goals: Air Filtration and IAQ Management
  - Outsource Mechanical and Electrical Services, Service Contract, Filter Manufacturer Contract, and Capital Projects Management
  - Other Goals: Environmental and Net-Zero Energy
- Existing Conditions:
  - Central Air Systems
  - General Exhaust and Toilet Exhaust

- Air Conditioning System(s):
  - Air-Cooled Chiller Chilled Water and Computer Room Air Conditioning (CRAC) Unit
- Outdoor Air Ventilation System(s):
  - Minimum Air-Side Economizer, and 100% Outside Air Systems
- Central Air Systems:
  - Supply Air Systems: Single-Duct, Single-Zone; Single-Duct Multiple Zones with Terminal Units; Dual-Duct, Dual Fan; Rooftop; Underfloor Air Distribution (UFAD); and Primary-Secondary, Constant Volume, and Variable Air Volume (VAV)
  - Return Air (RA) Systems and Ceiling Plenum Return
- Air Filters and Distribution:
  - Pre-Filter, Final Filter, After Filter, HEPA Filter, and Fan-Power HEPA Filter Unit with a MERV Rating Based on the Area Served
- Supply Air Fans:
  - Add a Variable Frequency Drive (VFD) to Re-Engineered Existing Central Air Systems with Filter Differential Pressure Drop Control Setpoints

DESIGN CRITERIA DOCUMENT

- The HVAC Design Criteria shall be in sync with:
  - Project Delivery Method
  - The Owner's Project Requirements
  - From This Updating of the P&P Manual, the Existing Central Air-Handling Systems will Be Rebalanced and Retro-Commissioned after Enhanced Filter MERV-Rated Filters Replace Existing Filters
- The Design Criteria Shall Be Based on:
  - ASHRAE 90.1 and State Energy Code Compliance for Outdoor Air Temperature Compliance.
  - ASHRAE Standard 170, "Ventilation of Healthcare Facilities"
  - ASHRAE Standard 202, "Commissioning Process for Buildings and Systems"
  - ASHRAE Guideline 0, "Commissioning Process"
  - The New Utility Shall Be 480/3/60 Electrical Power to Serve Central Air Systems with the New Automatic Controls Shall Be Interfaced with the Existing BAS system
  - Retrofitted All Central Air Systems with New VFD
- Conceptual/Schematic Phase General Notes:
  - D-B HVAC Design Engineer Shall Provide System Flow Diagrams with Each HVAC System Along with ATC Sequences of Operation
  - The In-House BAS Technician will Update Existing Safeties and Alarms Associated with Occupant Comfort, IAQ, and Area Space Pressure Controls Working with the Third-Party CxC and Third-Party TAB Technician
  - The Facility Manager Shall have the O&M Technicians Trained to Accommodate P&P Changes as they Affect the HVAC System Occupant Comfort and IAQ, Changing of Filters, etc.

- ANSWERS MARKED IN BLUE -

Project Delivery Method:
Design-Build (D-B)
Integrated Project Delivery (IPD)