

## DESIGN ENGINEER'S PUNCLIST

### Project Delivery Method:

Design-Build (D-B)  
Construction Management @ Risk (CM with GMP)  
Design-Bid-Build (D-B-B)

### Owner Team:

Government Agency  
Corporate Owner Representative  
Owner Representative (consultant)  
Project Manager of Capital Projects  
Facility Manager (in-house staff)  
Facility Manager (outsource staff)

### Project Delivery Team:

D-B Project Manager  
Integrated Project Delivery (IPD) Project Manager  
CM Project Manager  
Mechanical-Electrical D-B Coordinator  
Architect, Acoustical, Plumbing, Electrical, Structural, Fire Protection, and Security Consultants

### HVAC Project Team:

HVAC Supervisor (in-house staff)  
HVAC Supervisor (outsource staff)  
HVAC Technician (in-house staff)  
ATC Technician (outsource staff)  
Third-Party Testing, Adjusting, and Balancing (TAB) Technician

## OWNER'S BUILDING PROGRAM

### Application:

#### Project Type:

- Renovation
- Retrofit of the office and conference rooms HVAC systems with more energy-efficient equipment

#### References:

- 2020 ASHRAE Handbook – HVAC Systems and Equipment
- 2019 ASHRAE Handbook – HVAC Applications
- Refer to the "Codes and Standards" portion in the back of each ASHRAE Handbook for additional reference

#### Other References:

- ASHRAE GreenGuide: Design, Construction, and Operation of Sustainable Buildings
- ASHRAE Humidity Control Design Guide for Commercial & Institutional Buildings
- ASHRAE Indoor Air Quality Guide: Best Practice for Design, Construction, and Commissioning
- ASHRAE Design Guide for Dedicated Outdoor Air Systems (DOAS)
- ASHRAE Practical Guide to Seismic Restraints
- ASHRAE Standards 15 and 34 (Refrigeration)
- ASHRAE Standard 55 (Thermal Environmental Conditions for Human Occupancy)
- ASHRAE Standard 62.1 (IAQ)
- ASHRAE Standard 90.1 (Minimum Energy Standards)
- ASHRAE Standard 202 (Commissioning Process for Buildings and Systems)
- ASHRAE Guideline 0 (Commissioning Process)
- Design-Build Institute of America (DBIA)

## DESIGN INTENT DOCUMENT

- The HVAC system selection and design intent is based on the processed outlined in ASHRAE Handbook 2020, Chapter 1, "HVAC System Analysis and Selection" and includes the following:
  - Owner Building Program Goals and Additional Goals.
  - System constraints and constructability constraints.
  - The final system selection shall be decentralized HVAC air systems and terminal units with a variable refrigerant flow (VRF) system for individual room fan coil units (FCU) providing air conditioning and heating.
  - A DOAS rooftop unit with an energy recovery wheel to provide outdoor air ventilation to the new VRF FCUs.
- Automatic controls shall include temperature controls, equipment furnished controls, a BACnet interface, and existing BAS.
- Program and Project Goals:
  - Functional Goals: (refer to Chapter 1, 2020 Handbook).
  - Budget Goals: reduced operating cost based on energy conservation.
  - Timeline Goal(s): occupancy due date and the pre-purchased equipment delivery date.
  - Management Goals: Outsource mechanical and electrical services and mechanical, electrical operation, property, and maintenance management.
  - Available utilities include electricity for electrical and emergency power.

Retail Facilities, Chapter 2

Commercial & Public Buildings, Chapter 3

Places of Assembly, Chapter 5

Enclosed Vehicle Facilities, Chapter 16

#### Project Type:

New Construction  
Renovation  
Infrastructure (central heating, cooling, and/or cogeneration)  
Energy Audit and Retrofit

#### References:

2017 ASHRAE Handbook – Fundamentals  
2018 ASHRAE Handbook – Refrigeration  
2019 ASHRAE Handbook – HVAC Applications  
2020 ASHRAE Handbook – HVAC Systems and Equipment

#### Other References:

Cooling Technology Institute (cooling towers)  
ASHRAE GreenGuide: Design, Construction, and Operation of Sustainable Buildings  
ASHRAE Geothermal Heating and Cooling: Design of Ground-Source Heat Pump Systems  
ASHRAE Fundamentals of Design and Control of Central Chilled-Water Plants  
ASHRAE Humidity Control Design Guide for Commercial & Institutional Buildings  
ASHARE Guide for Buildings in Hot and Humid Climates

## DESIGN INTENT DOCUMENT

The HVAC system selection and design intent is based on the processed outlined in ASHRAE Handbook 2016, Chapter 1, "HVAC System Analysis and Selection"

Owner building program goals and additional goals

System constraints and constructability constraints

Finalized system selection shall be centralized HVAC air systems and remote heating and cooling plants

Specialized systems shall include general, toilet, and kitchen exhaust

Automatic controls shall include existing temperature controls and equipment-furnished controls

Existing VAV terminals; fan-powered terminals with electric heating coils; electric baseboard radiation; and registers, grilles, and diffusers (floor, wall, and ceiling).

## DESIGN CRITERIA DOCUMENT

The HVAC design criteria shall be in sync with the project delivery method and owner's building program.

The design criteria shall be based on ASHRAE 60.2 and federal energy code compliance for outdoor air temperature compliance.

Existing HVAC systems serving the renovated offices and conference rooms shall be removed, and a new VRF heating and air conditioning system shall be installed.

Utility shall be 480/3/60 electrical power to serve two DOAS units, each 75-ton unit is sized with the new automatic controls and shall be interfaced with the existing BAS system.

Air filters shall be prefilter MERV 7 and final filter MERV 15, serving the new DOAS unit and MERV-14 FCU filters.

The new automatic controls shall be interfaced with the existing BAS.

The low-velocity sheet metal distribution shall be reused.

Each office and conference room shall have its own programmable thermostat set at 68°F heating and 76° cooling in the occupied cycle and 60° heating and 76° unoccupied set points.