



## DESIGN ANALYSIS REPORT

### Project:

Improve Mechanical & Plumbing Systems in Multiple Buildings  
VA Lake City Medical Center  
VA # 573A4-15-600  
MES # 2015 – 606

This project consists of the demolition, replacement, and installation of a variety of mechanical equipment, ductwork, and piping throughout Buildings 19, 38, and 64.

1. Code Study - Mechanical systems will be designed to the International Mechanical Code, ASHRAE 170, ASHRAE 90.1, ASHRAE 62.1, and the VA HVAC Design Manual for New, Replacement, Addition, and Renovation of Existing VA Facilities.

2. General Design Conditions:

- a. Outside Design Conditions
  - i. Summer: 96° F DB, 77° WB
  - ii. Winter: 31° F DB
- b. Indoor Design Conditions
  - i. Summer: 75° F DB, 50% RH
  - ii. Winter: 70° F DB

3. Ventilation Rates:

- a. Outside Air: Per VA HVAC Design Manual

4. HVAC Systems to be improved:

Building 19:

- Replacement of (3) air handlers with piping and insulation replacement
  - The air handlers in rooms B9-A, 103, and 116 will be replaced with new, like-kind, same sized air handlers. The air handlers will utilize the existing chilled and hot water. The piping within the rooms will be replaced with same sized piping and new insulation.
- Removal of (4) air handlers above kitchen/canteen ceiling
  - The (2) air handlers above the kitchen ceiling and the (2) air handlers above the canteen ceiling will be removed. The equipment will be removed and replaced in phases to minimize down-time and minimize cooling deficiencies. The chilled and hot water piping will be removed back to the isolation valves. The ductwork associated with the kitchen air handlers will be removed.

- Removal of (1) roof top unit above kitchen
  - The packaged DX roof top unit above the ceiling will be removed, and the opening in the roof will be capped. All associated ductwork will be removed.
- Installation of (3) air handlers on kitchen/canteen roof
  - Structural framing will be installed on the roof to support the new air handlers. The air handlers will be installed on the new framing. New ductwork will be installed from the new air handlers to throughout the kitchen and canteen. The air handlers will utilize the existing chilled water and hot water piping.
- Installation of dishwasher hood and exhaust fan
  - A new dishwasher exhaust hood will be installed above the dishwasher, as well as the exhaust ductwork and exhaust fan. This will help mitigate the excessive heat and humidity within the kitchen.
- Replacement of (15) fan coils
  - The (15) fan coils throughout Building 19 will be replaced. The fan coils will be replaced with like-kind, same sized equipment. The fan coils will utilize the existing chilled and hot water piping. The replacement of this equipment will be a part of the deduct alternate.

#### Building 38:

- Replacement of (2) air handlers with piping, duct, and insulation replacement
  - The air handlers AC-1 and AC-2 in the Building 38 attic will be replaced in phases. First, a temporary air handler will be installed in the attic. This air handler will utilize the existing ductwork and chilled water and steam piping. Next, AC-1 will be replaced with a new air handler. The new air handler will be of the same capacity as the existing, but with smaller dimensions. After installation of AC-1, the existing AC-2 will be replaced. The new air handler will be of the same capacity as the existing, but with smaller dimensions. Finally, when both AC-1 and AC-2 are operating and performing correctly, the temporary air handler will be removed.
- Removal of (1) window air conditioner and installation of (1) split system
  - The existing window air conditioner in the elevator machine room space will be removed. The wall opening will be patched to match the existing construction. A new split system will be installed, with the air handler on the wall, and the condensing unit on the roof.

#### Building 64:

- Replacement of entire steam station in room AB05B
  - A new steam station will be installed on the wall opposite of the existing station in room AB05B. The station will be of a different layout, but same capacity as the existing system. After connections have been made to the existing steam system, and the new station is operational, the existing steam station will be removed, in order to minimize any down time. A new pressure gauge panel will be installed on the inside of the room, just to the left of the entrance.
- Replacement of (2) air handlers in room BB26 with piping, duct, and insulation replacement
  - AC-6 and AC-7 serving the auditorium and chapel will be replaced. The new units will be of like kind and same size. The concrete pad under AC-6 will be enlarged to cover the base of the unit. The chilled water and steam piping will be replaced back to the isolation valves. Small portions of ductwork will be replaced to facilitate the equipment replacement.

- Removal of SPS suite fan coils above ceiling and associated ductwork and piping
  - The fan coil units above the Decontamination area ceiling will be removed after the new SPS air handler and ductwork is installed and operational. The chilled water piping will be removed back to the main piping.
- Replacement of SPS suite air handler
  - The SPS suite air handler, AC-1, will be replaced. The new air handler will have a ~10% larger capacity. The chilled water and steam piping within the mechanical room will be replaced.
- Replacement of SPS suite ductwork with the addition of (6) duct reheat coils
  - The supply and exhaust ductwork throughout the SPS suite will be replaced in three phases. The ductwork will be routed similar to the existing, but it will be larger in size to accommodate the increased capacity. Steam reheat coils will be added to the ductwork to allow for temperature zones throughout the SPS suite.
- Replacement of SPS suite exhaust fan
  - The exhaust fan on the roof of the mechanical room AB30 will be replaced with a new exhaust fan.
- Installation/removal of temporary SPS suite air handler
  - A temporary air handler will be installed on the roof of the SPS suite to minimize the downtime in the SPS suite area. Temporary shoring will be required under the air handler as support. The temporary air handler will utilize the existing chilled water and steam piping and will connect to the existing ductwork.
- Replacement of (2) air handlers in room AB18K
  - AC-12, AC-12DX, and CU-12DX will all be replaced with like-kind and same size equipment. The existing ductwork and chilled and hot water piping will be reused. The insulation on the piping will be replaced. The refrigerant piping will be replaced.
- Replacement of (1) air handler in room B118 and condensing unit on roof.
  - AC-7L and CU-7L will be replaced with like-kind and same size equipment. The existing ductwork will be reused. The refrigerant piping will be replaced.
- Replacement of (1) air handler in room AB18A and condensing unit on roof.
  - AC-AB18A and CU-AB18A will be replaced with like-kind and same size equipment. The existing ductwork will be reused. The refrigerant piping will be replaced. The replacement of this equipment will be a part of the deduct alternate.
- Removal of (1) 10 ton laboratory dx rooftop unit
  - The existing 10 ton dx air handler and associated ductwork will be removed. The openings left by the ductwork in the exterior walls will be filled to match the existing conditions.
- Replacement of laboratory air handler
  - The Laboratory air handler, AC-53, will be replaced. The new air handler will have a larger capacity. The chilled water and steam piping within the mechanical room will be replaced back to the main piping.
- Replacement of laboratory exhaust fan
  - The exhaust fan on the roof of the penthouse will be replaced with a new exhaust fan. The existing hole will be enlarged for the larger fan. Steel angle will be provided at the opening for additional support on the roof.
- Replacement of laboratory ductwork
  - The supply and exhaust ductwork throughout the Laboratory will be replaced. The ductwork will be routed similar to the existing, but it will be

larger in size to accommodate the increased capacity. Steam reheat coils will be added to the ductwork to allow for temperature zones throughout the Laboratory.

- Adjustments to AC-3 belt and fan
  - The interior of 64-AC-3 will be thoroughly cleaned, all filters will be replaced, the bearings will be lubricated, the belts will be replaced and realigned, and the sheave packages will be replaced with double the number of existing sheaves. The belts will be tensioned exactly as required by the manufacturer.
- Removal of AC-55 in penthouse and replacement with ductwork
  - The existing AC-55 and associated chilled water piping will be removed. The chilled water piping will be removed back to the main pipes. A new insulated duct will be installed in place of the air handler.
- Replacement of fan/filter 64-HV-013 in room AB05
  - The ventilation fan 64-HV-013 will be replaced with new fans and a new filter rack. The capacity will be the same, but the dimensions will differ due to the existing equipment no longer being manufactured. The replacement of this equipment will be a part of the deduct alternate.
- Installation of duct cooling coils in room AB05, with associated piping
  - New cooling coils will be added to the ductwork in room AB05. This will create more comfortable working conditions in the mechanical room, especially due to the heat generated from the steam piping. The chilled water piping for the cooling coils will tie into the existing main chilled water piping. The replacement of this equipment will be a part of the deduct alternate.
- Replacement of AC-4 and AC-11 on the roof of Building 64-2
  - The existing AC-4 and AC-11 will be replaced with like-kind and same sized equipment. The existing ductwork and piping will be reused, and the air handlers will tie into the ductwork and piping. The replacement of this equipment will be a part of the deduct alternate.

General:

- All architectural, structural, and electrical modifications will be completed as required for the above work
- All controls modifications will be completed as required to control/monitor new equipment and devices at the Building Automation System Front End
- Asbestos abatement will be completed as required for the above work
- Test & Balance of the new equipment, air flows, water flows, etc, will be completed for all of the above work
- Commissioning will be completed for all of the above work

END OF REPORT