

# Attachment B – Technical Building Profiles for Quadplex Buildings and Health Centers

## I. STOUT CENTER FOR CRIMINAL JUSTICE, 1301 Filbert St.

### A. Site Description, SCCJ

#### 1. General

- a. The SCCJ site is bound by Arch Street on the north, Filbert Street on the south, Juniper Street on the west and 13th Street on the east. The entire site consists of 1.265 acres, with a building footprint of 55,150 sf. and 8,200 s.f. of paved surfaces. Access to the main entrance is thru Filbert Street, with two secondary entrances located at the southeast corner of 13th Street and the southwest corner of Juniper Street. An enclosed fenced-in parking area of approximately 24,000 sf. is located north, between SCCJ and Arch Street. The entire site consists of 1.265 acres, of which approximately 55,150 sf. are occupied by structure, and 8,200 sf. are paved surfaces.

#### 2. Access

- a. Entrance to the SCCJ site is from Main Entrance, Filbert Street (south side). There are two secondary entrances for pedestrian access to the building by way of southeast corner of Thirteenth Street and southwest corner of Juniper Street.

#### 3. Site Lighting

- a. Walkways are lighted by 175-watt metal halide light fixtures mounted on decorative metal poles. Pole height ranges from twelve feet to thirty five feet. There are tree upright fixtures lighted by 100-watt metal halide flush mounted to tree grates.

#### 4. Site Utilities

- a. The site is serviced by public water and sanitary sewer supplied by the City of Philadelphia. Gas is supplied and maintained by the Philadelphia Gas Works.
- b. Water: Single loop fire/domestic water
- c. Electric: Dual feed 13.2 KV power from PECO Energy Company

#### 5. Landscape

- a. Extensive landscaping is located at the areas of greatest public contact with the new facility (Filbert Street and Thirteenth Street). The Stout Center for Criminal Justice entrance is landscaped with shade trees in tree grates. Trees frame the main entrance, Filbert Street (south side). There are a number of flowering trees in this area that serve as a buffer.

#### 6. Parking

- a. The asphalt paved parking lot is located on the north side of SCCJ, bound by 13th Street on the east and Arch Street on the north. Entrance to the parking lot is accessed through a double vinyl coated gate, located at 13th Street. The parking lot is enclosed by an 8'-0" high vinyl coated chain link fence. At the perimeter of the fence is a 12' 0"-wide concrete walk on the east side and a 18' 0"-wide concrete walk on the north side. The total asphalt paved parking lot is 23,920 s.f.

### B. Building Narrative Description, SCCJ

1. The SCCJ building gross building area of 600,000 square feet is approximate. The City functions and departmental tasks provided by SCCJ include, but are not limited to the following:
  - a. 65 (sixty-five) Courtroom Arenas
    - i. 48 (forty-eight) Common Pleas Courtrooms

- ii.* 14 (fourteen) Municipal Court Courtrooms
- iii.* 3 (three) Preliminary Arraignment/Private Complaint Courtrooms;
- iv.* 24/7 operations for the Arraignment Support Unit

- b.* 3 (three) Special Trial Courtrooms;
- c.* Inmate holding and Jury rooms adjacent to the Courtrooms;
- d.* Public Waiting Spaces;
- e.* Main Public Lobby, and secure inmate entry/staging areas;
- f.* Criminal Justice Operations including:
  - i.* City Court System Administration
  - ii.* City Clerk of Quarter Sessions
  - iii.* City Court of Common Pleas
  - iv.* City District Attorney
  - v.* City Public Defender
  - vi.* City Sheriff
  - vii.* City Central files for all the functions described above.

2. Housed in 39,515 square feet of mechanical rooms, basement, subbasement, and rooftop penthouse, these systems and equipment include, but are not limited to:

- a.* Vertical transportation system consisting of 16 elevators and 4 escalators.
- b.* A state-of-the-art, ultra efficient centrifugal chilled water system (3,000 ton capacity), interconnected underground to the Municipal Services Building, and City Hall. System includes chilled and condenser water pumps, cooling tower chemical treatment system and other auxiliaries.
- c.* A gas-fired boiler plant provides hot water for building heating systems. A separate piping and pumping system is used to distribute this output to equipment requiring hot water.
- d.* A central computer controlled, fully instrumented digital energy monitoring and control system.
  - e.* A fully computerized automatic temperature control system, designed to provide specified levels of ventilation and smoke evacuation in the event of fire.
  - f.* Miscellaneous HVAC systems include computer room air conditioning, cabinet heaters, fan coil units, perimeter finned tube radiation, elevator room conditioning and general ventilation systems.
  - g.* A quadruplex domestic water pumping system, with a total of 105 horsepower, boosts City water to the required pressure at the top floor.
  - h.* 25 variable air volume air handling systems providing 375,000 cubic feet per minute to distribution systems and variable air volume shutoff and variable air volume fan powered terminal units.
  - i.* 40 fan systems providing return air and exhaust functions.
  - j.* A wet pipe sprinkler system provides coverage for all areas of the building through the use of 200 horsepower fire pump provides adequate pressure for this system, and is served by two separate 8" fire water City services.
  - k.* Dual feed high tension electric power utility service.
  - l.* Double ended electrical substations 3,000 kilovolt amp/2,250 kilovolt amp, respectively, and associated distribution panels with motor control centers.
  - m.* Single 2,250 kilovolt amp substation for mechanical services.

- n. 1,600 ampere vertical distribution bus ducts.
- o. 1,200-kilowatt emergency back-up power generator and distribution systems. A buried dual containment fuel oil tank with leak detection systems is provided for storing diesel fuel for the generator.
- p. Advanced communication, security, fire alarm, and fire suppression systems.

### **C. Description of Mechanical Systems, SCCJ**

#### **1. HVAC General Systems Description**

- a. Of the total 574,915 square feet total enclosed structure, approximately 535,400 square feet are air conditioned, the remainder is heated and ventilated.
- b. Chilled water is generated by “Trane” variable-speed centrifugal chillers. Hot water is generated by “Weil-McLain” gas-fired hot water boilers. Above equipment located in the penthouse mechanical room.
- c. The hot and chilled water piping system provides cooling and heating capacity to air handling units throughout the building.

#### **2. Hot Water System**

- a. Three gas-fired boilers provide the hot water source to the variable speed pumping distribution loop.
- b. The boilers are designed with dual fuel burners, allowing operation on either natural gas or no. 2 fuel oil. Steam serves as the primary backup for heating in the event of a natural gas service interruption.
- c. Fuel oil is stored in a direct burial underground storage tank. The tank is a dual wall fiberglass tank with a 15,000-gallon capacity. A duplex fuel oil pump set draws from the tank and supplies oil to the 275-gallon day tank, located in the penthouse.
- d. Chemical treatment of the heating hot water is introduced through a chemical shot feeder tied in across the hot water pumps.

#### **3. Chilled Water System**

- a. Two chillers provide the chilled water source to the chilled water distribution loop. Each chiller is rated at 1,500 tons capacity.
- b. Primary chilled water loop included six pumps; each pump sized to match chiller requirements. Two primary pumps have VFDs, and the others provide constant volume water flow through the chillers and delivers their output to the secondary site distribution loop variable speed pumping stations.
- c. Chemical treatment is introduced through a chemical shot feeder tied in across the hot water pumps.

#### **4. Cooling Tower System**

- a. Four cooling tower cells provided on the roof with each cell capacity of 1,875 tons. Two cells equipped with electric sump heaters and electric heat tracing for the associated piping.
- b. The cooling tower cells are cross flow, induced draft design. Water distribution is through distribution header/pipe with longitudinal pipe laterals and low-pressure plastic spray nozzles distributing over PVC fill.
- c. Chemical treatment of the towers is provided by automatic chemical treatment system providing biocide, acid and blowdown control.

## 5. Fuel Oil System

- a.* Fuel oil for chiller/heaters stored in underground 15,000-gallon fiberglass double wall storage tank. A duplex fuel oil package pump set (700 gph) draws from the storage tank and supplies oil to package 275 gallon day tank located in the penthouse. Each chiller/heater provided with pump, which draws oil from day tank, pumps thru the burner and return access oil to the day tank. Fuel oil train provided with each chiller/heater, as required by NFPA.
- b.* Fuel oil for emergency generator stored in 2,500-gallon underground fiberglass double wall storage tank. A duplex fuel oil package pump set (275 gph) draws from the storage tank and supplies oil to package 100-gallon day tank located in penthouse.

## 6. Air Handling Systems

- a.* Units are of two basic types; those that have cooling and heating coils, and those that have a cooling coil only.
- b.* Air handling units included the following components: multi-blade air foil type fan, low leakage type outside and return air dampers, 2-inch disposable filters, hot and chilled water coil sections and filter/mixing box section.
- c.* Heat recovery units HE/SB-1 and HE/SB-2 interconnected with exhaust fan EF/SB-1 and air handling unit AHU/SB-1 to extract heat from exhaust air and preheat outdoor air for 100% OA unit AHU/SB-1.

## 7. Fan Coil Units

- a.* Two fan coil units located in the sub-basement provide heating and cooling for Sheriff's Security Offices.
  - b.* Fan coil unit, located in the Basement, provides cooling for elevator machine room.
- c.* Fan coil unit, located on 1st floor, provides heating and cooling for Sheriff's Security Office overlooking garage.

## 8. Ductwork and Distribution

- a.* Supply and return air distribution systems are provided by sheetmetal ductwork with connections to grille, register or diffuser. The closest 30 feet of supply and return duct to the unit fan is acoustically lined. All other supply and return air duct is insulated.
- b.* The air distribution system has variable air volume (VAV) zone thermal control. VAV boxes are two types: shut-off and fan-powered.
- c.* In addition to air conditioning equipment, sheetmetal duct is provided for ventilation supply and exhaust systems.

## 9. Ventilation Systems

- a.* Temperature control ventilation systems are provided for mechanical room, electrical rooms and similar spaces. The ventilation consists of either matched supply and exhaust fans or exhaust fans with intake louvers.
- b.* Fume/contamination control for toilet areas, dressing rooms, etc., is provided by exhaust fans for that space.
- c.* Smoke control is incorporated into the air handling systems and entails, in general, setting the air handling units and dampers in appropriate operation and controlling numerous smoke and smoke/fire dampers within the distribution ductwork.

## 10. Heating Systems

- a.* Space heating for most areas is provided by the air handling units serving that space. Where this is not the case or supplemental heating is required, heat is provided by unit heaters.
- b.* Unit heaters are as follows:
  - i.* Hot water, propeller - 10 units.
  - ii.* Hot water, cabinet - 13 units.

#### **11. Automatic Temperature Controls/Building Automation System**

- a.* A direct digital control system is provided to control the following systems:
  - i.* Absorption chillers and associated pumps.
  - ii.* Heating coil pumps.
  - iii.* Variable speed chilled and hot water pumps.
  - iv.* Fin-tube radiation system.
  - v.* Return and exhaust fans.
  - vi.* VAV control boxes.
  - vii.* Air Handling Units.
  - viii.* Building smoke control.
  - ix.* Monitoring of the domestic hot water system and chilled water distribution to MSB.
- b.* System is a distributed control system with a web-based central supervisory and monitoring operator interface.

#### **12. Domestic Water System (Hot & Cold)**

- a.* Two separate 6" water service from City of Philadelphia water main is provided in the basement. A backflow preventer station is provided at building service entrance. Each incoming water service consists of one (1) 6" backflow preventer, water meter and associated valves.
- b.* One (1) triplex, variable-speed booster pump with VFDs is provided for distribution of domestic water thru the building.
- c.* Five (5) hot water heaters with 82-gallon storage capacity are provided. The heaters provide hot water for distribution to toilet rooms and detention cells. In addition, nine (9) instantaneous water heaters with 1 gph recovery provided for local usage in the toilet rooms.
- d.* Domestic hot water supply piping equipped with self-regulating heating cable installed below the insulation to maintain hot water temperature.

#### **13. Combined Sanitary/Storm Drainage System**

- a.* The building sanitary drainage system consists of drainage from water closets, urinals, lavatories, sinks, showers, mop receptors, drinking fountains, and floor drains.
- b.* Duplex sewage ejection station provided in sub-basement discharges sanitary drainage from sub-basement and basement floor to building drain.
- c.* The Storm Water System consists of roof drains, rainwater conductors, cleanouts, area drains and piping system, above and below floor, for approximately 40,000 square feet of building roof area.

#### **14. Plumbing Fixtures**

- a.* The modular 304ss combys type plumbing fixtures are provided in the detention cells of the building and the institutional and personnel use type including handicapped plumbing fixtures are provided in the rest of the building.
- b.* The building plumbing fixtures include the following:
  - i.* Combination lavatory/toilet, 304SS fixtures including handicapped.
  - ii.* Plumbing fixtures including handicapped.
  - iii.* Finished and rough brass plumbing fittings.
  - iv.* Vitreous china plumbing fixtures.
  - v.* Trim for water closet bowls, tanks, and urinals.

- vi.* Drinking fountain and self-contained, mechanically refrigerated drinking water coolers.
- vii.* Faucet washers and drain assemblies for plumbing sinks.
- viii.* Flush valves for water closet and urinals.
- ix.* Support for off-the-floor plumbing fixtures.

**15. Natural Gas System**

- a.* The natural gas system consists of meter station, gas booster pumps (1-running, 1 stand-by), associated valves and distribution piping to the chillers located in the penthouse.
- b.* Each chiller provided with main and pilot gas train as required by NFPA.

**16. Fire Protection Piping System**

- a.* The building fire protection piping system consists of pipe, fittings, valves and connections for sprinkler systems, pre-action, and dry sprinkler systems.
- b.* Two separate 8" fire water services from City of Philadelphia water main is provided in the basement. A backflow preventer station is provided at building service entrance. Each incoming water service consists of one (1) 8" backflow preventer, with associated valves.

**17. Wet Standpipe System**

- a.* A wet standpipe system delivers water to connection with fire department valve on 2nd thru 11th floors.
- b.* The system originates from 8" fire main located in the basement.
- c.* A 200 horsepower electric fire pump, located in sub-basement mechanical room, is provided to develop the required system pressure. The pump is horizontal split case type equipped with circulating relief valve, ball drip valve and fire pump controller. A jockey pump is provided to maintain system pressure during normal (non-fire) operation.

**18. Sprinkler Systems**

- a.* The entire facility is covered by either a wet pipe, dry pipe or pre-action system. Each system contains the appropriate equipment and appurtenant devices as follows:
  - i.* Concealed flush type sprinkler head.
  - ii.* Standard upright sprinkler heads.
  - iii.* Standard pendent sprinkler heads.
  - iv.* Pendent automatic on-off flow control sprinkler heads.
  - v.* Alarm valve.
  - vi.* Pre-action flow control system.
  - vii.* Electric alarm gong.
  - viii.* Water flow switch.
  - ix.* Monitor switch.
  - x.* Fire department connections.
  - xi.* Air compressors for dry pipe and pre-action systems. (One compressor located in sub-basement, one in garage and one on third floor).

**19. Compressed Air Systems**

- a.* Package compressed air system provides compressed air for pneumatic actuators located in penthouse. System consists of duplex compressor, dryer, storage tank and controls.

**D. Description of Electrical Systems, SCCJ**

**1.** This section of the specification is not all inclusive, and is based on original construction documents. Arrange a site visit to become familiar with all conditions affecting the work scope, and construction conditions.

**2. Primary Distribution**

- a.* Primary service for the facility is supplied by PECO Energy via two normally energized 13.2 kVAC underground utility service lines. The service entrance terminates in a PECO-approved switch gear line up of metal clad vacuum circuit breakers located in the building basement. The 13.2 kVAC switch gear contains the provisions for: utility metering; a primary selective transfer scheme; spaces for the installation of future circuit breakers; and circuit breakers required for distribution at 13.2 kVAC. Three active circuit breakers provide power to two double ended substations and three unit substations, all located in the penthouse, except one single ended substation located in the basement. The double-ended substations have secondary tie circuit breakers. All power transformers associated with the substations have primary disconnect switches to allow isolation of units fed on the same 13.2 kVAC circuit breaker.

### 3. Secondary Distribution

- a.* Secondary distribution is provided at 480/277 VAC from five substations as follows:
  - i.* SS-1 - Double ended 1500/2250 kVA, located in penthouse, provides general lighting and power to floors 2 through 14 by way of two plug-in busways, and to the penthouse; it also provides life safety emergency lighting for floors 2 through penthouse using Automatic Transfer Switch ATS #5.
  - ii.* SS-2 -Single ended 1500/2250 kVA, located in penthouse, provides power to half of the air conditioning systems and, through the emergency power ATS #7, half of the heating power.
  - iii.* SS-3 -Single ended 1500/2250 kVA, located in penthouse, provides power to half of the air conditioning systems and, through the emergency power ATS #8, half of the heating power.
  - iv.* SS-4 -Single ended 1500/2250 kVA, located in basement, provides general lighting and power for sub-basement, basement and first floor; and through emergency ATS #6 life safety and air handling for these same floors.
  - v.* SS-5 -Double ended 2000/3000 kVA, located in penthouse, provides through emergency ATS #1 and plug in busway power for heating and air handling floors 9 to penthouse; through emergency ATS #2 and plug in busway power for heating and air handling floors 2 to 8; and through emergency ATS's #3 and #4 power for elevators.

### 4. Equipment and Motor Loads

- a.* All major equipment loads and motors are serviced at 480-volt, three-phase from distribution and power panels located near the load. Each floor has a dedicated motor control center (MCC) which incorporates the necessary starters and controls. The penthouse, where most of the heating and air conditioning equipment is located, is serviced by five MCC's. Smaller motors and equipment are serviced at 120 or 208 volts via local step-down transformers and distribution panels.

### 5. Lighting

- a.* General fluorescent and high intensity lighting requirements are serviced at 480/277 VAC from lighting panels located in secure electrical rooms or closets. As a general rule, each floor is serviced by one 225A panel fed from a circuit breaker connected to the plug-in busway. Various lighting fixtures are utilized as required to provide the most efficient lighting for the space. Outdoor and main lobby lighting is based on metal halide lamps. With small exceptions, all other areas use a combination of fluorescent lay-in fixtures, fluorescent cove lights and compact fluorescent down lights. Lighting level control is provided in court rooms with incandescent down lights fed at 120 VAC. Critical areas, both in sub-basement and in selected rooms associated with the court proceedings, are provided with enclosed security type fixtures. Most fluorescent lamps are energy efficient T-8 type and most ballasts are electronic. Public areas are provided with local switching and secure areas are switched with key operated switches or switching panels having controlled access and/or guard control.

## 6. Site Lighting

- a. Pole-mounted metal halide lamps installed as follows: 7 units along 13th Street; 10 units along Filbert Street; and 6 units along Juniper Street. In addition, on all three sides are installed uplight flood lights in the tree gratings.

## 7. General Purpose Receptacles and Power Requirements

- a. General power is provided by three-phase, dry-type step down transformers which provide 208/120 VAC power to local panels for branch circuit distribution to general purpose receptacles and small power loads. Typically, each floor is supported by two 75 kVA transformers, fed from the floor lighting panel, and the associated 225A distribution panels; and one 30 kVA transformer, fed from a plug-in circuit breaker, and the associated 100A distribution panel.

## 8. Emergency Power and Lighting

- a. Emergency power and lighting is provided by one 1200 kW, 480/277 VAC diesel generator installed in the penthouse. A 480/277 VAC three-phase, four-wire distribution switchboard supports one feeder dedicated to the fire pump, and one feeder connected to the main emergency distribution panel. The latter connects to automatic transfer switches assigned as follows:
  - i. ATS #1 Air handling and heating floors 9 through penthouse.
  - ii. ATS #2 Air handling and heating floors 2 through 8.
  - iii. ATS #3 Elevators.
  - iv. ATS #4 Elevators.
  - v. ATS #5 Life safety lighting floors 2 through penthouse.
  - vi. ATS #6 Life safety lighting, air handling and heating for sub-basement, basement and first floor.
  - vii. ATS #7 Half of major heating equipment located in the penthouse.
  - viii. ATS #8 Half of major heating equipment located in the penthouse.

## 9. Lightning Protection System

- a. All rooftop equipment, steel parapet railings and the building steel is connected to a "Master Label" lightning protection system.

## 10. Fire Detection and Alarm System

- a. Automatic smoke, photoelectric, and heat detection devices, manual pull stations, water flow, and tamper switches are provided throughout the structure. Tamper and alarm signaling devices alert the central station. By means of a digital full duplex multiplex communication system, activation of any device initiates communication with various addressable devices, annunciation, local and remote computer functions, smoke control devices, and the central station. The system has selective voice paging and two way fire fighter communication.

## **II. MUNICIPAL SERVICES BUILDING, 1401 JFK Blvd.**

### **A. Site Description, MSB**

#### 1. General

- a. The MSB site consists of an area bound by 15th Street on the West, Arch Street on the North, Broad Street on the East and JFK Boulevard on the South; the area is approximately 3.2 acres. The building and a surrounding terrace occupy approximately 22,464 s.f., with a paved plaza of 79,400 sf. The landscape (trees and planting area) are located on the West, North and East sides.

#### 2. Access

- a. Main entrance to MSB is from JFK Boulevard (south side). Access is also located on the West and North sides. Handicap drop-off area is accessible on the North side at the canopy entrance located on Arch Street.



3. Parking

- a. Public parking is below grade, at the JFK Plaza located West of the MSB.

4. Landscape

- a. Large shade trees have been preserved along 15th Street, Arch Street and Broad Street. Mulched bed of shrubs and paving areas have been installed at the West side (Broad Street).

**B. Building Narrative Description, MSB**

1. The Municipal Services Building total gross building area of 500,000 square feet is approximate. The City functions and department tasks provided by the Municipal Services Building include, but are not limited to the following:

- a. Electronic Signal Repeater System for Citywide Radio Communications, Streets Department and the Parking Authority whose signals are received by penthouse equipment, and then repeated for reception throughout the City. Utilities provided by the MSB are the OM&S responsibility of this project;
- b. Archival Storage of all City contracts related to real estate leases, and financial control. Computerized Communication HUB for the City Streets Department, affecting centralized automatic traffic control. Utilities provided by the MSB are the OM&S responsibility of this project;
- c. The City Revenue Department Offices charged with cash receipts, safe keeping, and security related thereto;
- d. Water Revenue Department charged with cash receipts, safe keeping, record keeping, and security related thereto;
- e. City Licenses and Inspections, charged with processing of permit payments, permit and citation record keeping, and security related thereto;

*f.* Not Used

*g.* Critical City operations involving:

- i.* Central, Municipal Services Local Area Network System;
- ii.* The overall City Personnel Department, including related records and vital statistics;
- iii.* Key Administrative Management Offices, required for Citywide functional operations:
  - a Managing Director's Offices responsible for general oversight,
  - b City Controller's office,
  - c Finance Director

2. Housed in 45,000 square feet of mechanical rooms, sub-basement, and rooftop penthouse, systems and equipment include, but are not limited to:

- a. Vertical transportation system consisting of 12 high speed passenger elevators, one of which is dedicated as a freight elevator, and 2 escalators.
- b. A storm water system consisting of roof drains, rainwater conductors, cleanouts, area drains and piping system serving 40,000 square feet of building roof areas.
- c. Not Used
- d. Heating hot water system consisting of three 200 horsepower gas-fired boilers, associated pumps and accessories.
- e. Perimeter heating and cooling induction system with over 1,800 individual floor-mounted units; supplemental cooling for LAN rooms.
- f.* Three gas-fired domestic hot water boilers.
- g.* A fully computerized automatic Direct Digital Control system, designed to provide specified levels of ventilation, and smoke evacuation in the event of fire.
- h.* Wet pipe fire protection system with 150 horsepower electric fire pump.
- i.* Dual feed high tension electric power utility service.
- j.* Dedicated 2666 kilovolt amp double ended substation to mechanical equipment and associated distribution panels and motor control centers.

- k.* 450 kilowatt emergency power generator and distribution, including dedicated system for Transit Police Equipment.
- l.* Fire alarm and telecommunication networks.
- m.* Lighting and convenience power 2,000 kilovolt amp double ended substation and associated distribution.
- n.* Automated light control.

***C. Description of Mechanical Systems, MSB***

***1. HVAC General Systems Description***

- a.* Of the total 500,000 square feet total enclosed structure, approximately 383,200 square feet are air conditioned, the remainder is heated and ventilated.
- b.* Hot water boilers are located in the penthouse. The utilities are distributed in a chilled and hot water piping system.
- c.* The piping system provides cooling and heating capacity to air conditioning equipment throughout the building. This equipment provides the heating and air conditioning for all areas except ventilated spaces.

***2. Hot Water System***

- a.* Three hot water boilers provide the hot water source to the distribution loop. Each boiler is rated at 3,360 MBH output.
- b.* The boilers are steel watertube design with dual fuel burners, allowing operation on either natural gas or no. 2 fuel oil. The boiler burner has an integral forced draft fan.
- c.* Primary hot water pumps provide the flow in the primary hot water loop. This circuit provides constant water flow through the boilers and delivers their output to the secondary distribution loop.
- d.* Plate and frame hot water to hot water heat exchanger located in the basement with associated pumps provides hot water to radiation system.
- e.* Chemical treatment is introduced through a chemical shot feeder tied in across the primary hot water pumps and injection pump/tank package.

***3. Fuel Oil System***

- a.* Fuel oil for boilers stored in above ground, 5,000-gallon storage tank located in the basement. A duplex fuel oil package pump set draws from the storage tank and supplies oil to vertical day tank located in the penthouse. Each boiler provided with pump, which draws oil from vertical day tank, pumps thru the burner and return access oil to the day tank. Fuel oil train provided with each boiler, as required by NFPA.
- b.* Fuel oil for emergency generator stored in 275-gallon tank with rupture basin located in the basement emergency generator room. 150-gallon day tank/pump package with rupture basin draws from 275-gallon tank based on oil level in the day tank. Emergency generator fuel oil pump draws oil from day tank and pumps to emergency generator with rupture basin engine with access oil returned back to day tank.

***4. Chilled Water System***

- a.* Chilled water supplied via chilled water distribution piping system from SCCJ chilled water plant.
- b.* The piping is arranged so that transport loop pumps can distribute chilled water delivered from SCCJ.

***5. Dual Temperature Water System***

- a.* The dual temperature system is the secondary distribution system for both the hot and chiller water systems. These systems capacities are distributed to induction units.
- b.* Pumps P-1A, P-1B, P-2A, P-2B, P-3A, P-3B, P-4A and P-4B each have constant speed and provide dual temperature water distribution to four zones.
- c.* The hot and chilled water systems have a three-way blending valve to control flow into the dual temperature system. The control as to which system feeds to the dual temperature system is based on outside air temperature.

## 6. Cooling Tower System

- a.* Condenser water pump CTP-5 serves emergency generator cooling system and interlocked with emergency generator and respective cooling tower isolation valve.
- b.* Chemical treatment of the towers is provided by a chemical treatment system providing biocide, acid and blowdown control.

## 7. Air Handling Systems

- a.* Units are of two basic types: build-up type and package type.
- b.* There are 18 build-up units with 100% economizer cycle and change over based on outdoor temperature and humidity which have centrifugal belt driven supply and return air fans, return/outside air mixing box with operable dampers, prefilter and final filter assembly spray-type chilled water cooling coil and hot water heating coil.
- c.* There are 2 package units which have centrifugal belt driven supply fans, disposable filters, chilled water cooling and hot water heating coils, draw through, 3,000 CFM, 100% outside air.
- d.* Smoke control is incorporated into the air handling systems and entails, in general, setting the air handling units supply, return and exhaust fans and dampers in appropriate operating and controlling numerous smoke and smoke/fire dampers within the distribution ductwork.
- e.* Main Air Handling Units

### *i.* Fan/AHU Location Description

- ii.* S-1 Penthouse Serves interior flrs.1 through 16
- iii.* S-2 Penthouse Serves interior of flrs 1 through 16
- iv.* S-3A Penthouse Serves west perimeter of 1 through 16
- v.* S-3B Penthouse Serves north perimeter of flrs.1 through 16
- vi.* S-4A Penthouse Serves east perimeter of 1 through 16
- vii.* S-4B Penthouse Serves south perimeter of 1 through 16
- viii.* S-5 Penthouse Serves interior flrs. 1 through 16
- ix.* S-6 Penthouse Serves interior flrs. 1 through 16
- x.* S-7 Penthouse Serves high rise elevator machine room
- xi.* S-8 Penthouse Serves 7th floor elevator machine room
- xii.* S-9 Basement Serves public access southeast
- xiii.* S-10A Basement Serves public access southwest
- xiv.* S-10B Basement Serves public access core
- xv.* S-11 Basement Serves chiller room mechanical area
- xvi.* S-12 Basement Serves public access northeast
- xvii.* S-13A Basement Serves lobby area
- xviii.* S-13B Basement Serves basement
- xix.* S-15 Basement Serves basement transformer room
- xx.* R-1 Penthouse Serves flrs. 1 through 16
- xxi.* R-2 Penthouse Serves flrs. 1 through 16
- xxii.* R-3 Penthouse Serves flrs. 1 through 16
- xxiii.* R-4 Penthouse Serves flrs. 1 through 16
- xxiv.* R-5 Basement Serves public access area southeast
- xxv.* R-6 Basement Serves public core and southwest
- xxvi.* R-7 Basement Serves public access core northeast and northwest

- xxvii.* R-8 Basement Serves 1st flr. Computer-Administration Area
- xxviii.* AHU C-1 Penthouse Serves 16th floor, Room 1673 west
- xxix.* AHU C-2 Penthouse Serves 16th floor, Room 1673 east0
- xxx.* NOTE: S – SUPPLY
- xxxi.* R - RETURN

#### **8. Auxiliary Support Air Conditioning Units**

- a.* There are three units serving LAN Data Room, 1 unit serving MOIS Communication Control Room and three units serving concourse. Units are 5-Ton “Liebert” water cooled, utilizing condenser water.
- b.* There are two units on the 7th floor and one unit serving Room 380. Units are “Liebert” air cooled.
- c.* Basement print room served by “coldwave” air conditioning unit.

#### **9. Heating System**

- a.* Space heating for most areas is provided by the air handling unit serving that space, perimeter fin tube radiation units, perimeter induction units, hot water ceiling coils, hot water reheat (booster) coils and electric duct heating coils. Where this is not the case or supplemental heating is required, heat is provided by unit heaters.
- b.* Unit heaters are as follows:
  - i.* Hot water unit heaters for penthouse heating.
  - ii.* Hot water cabinet unit heaters for public access level.

#### **10. Automatic Temperature Controls/Building Management System**

- a.* A direct digital control system is provided to control the following systems:
  - i.* Hot water boilers and associated pumps.
  - ii.* Chillers and associated pumps.
  - iii.* Chilled water transport loop pumps.
  - iv.* Cooling towers and associated pumps.
  - v.* Hot water system.
  - vi.* Dual temperature system.
  - vii.* Air handling units.
  - viii.* Reheat (booster) hot water coils.
  - ix.* Secondary hot/chilled water system.
  - x.* Duct heating coils.
  - xi.* Monitoring of the domestic hot water system.
- b.* System is a distributed control system with a web-based central supervisory and monitoring operator interface.

#### **11. Domestic Water System (Hot & Cold)**

- a.* Two separate 8" water services from City of Philadelphia water main is provided in the basement. A backflow preventer station is provided at building service entrance. Each incoming water service consists of one (1) 6" backflow preventer and water meter and one (1) 4" backflow preventer and water meter, with associated valves.
- b.* One (1) TRIPLEX package constant pressure pump set with demand.
- c.* Domestic hot and cold water mixing valves producing 105 degree F hot water for the toilet rooms tempered water - heat traced. Typical concourse level through 16th floor.
- d.* One (1) main electrical hot water heater with 700 gallon storage and 90 KW are provided in the basement mechanical room. One (1) electric immersion heater, 30KW, with associated pumps are provided in the basement mezzanine.

#### **12. Purge Liquid Recovery System**

- a.* Purge liquid recovery systems provided for hot water, chilled water and condenser water systems. Recovery system designed to capture and separate solids for easy handling and returning purged liquid back into the system.

### **13. Sanitary Drainage System**

- a.* The building sanitary drainage system consists of drainage from water closets, urinals, lavatories, sinks, showers, mop receptors, drinking fountains, and floor drains.
- b.* Two (2) sump pump sets, located in the basement. Each set consists of two pumps. **14.**

### **Storm Water System**

- a.* The Storm Water System consists of roof drains, rain water conductors, cleanouts, catch basins, area drains and piping system, above and below floor, for approximately 20,000 square feet of building roof area.

### **15. Plumbing Fixtures**

- a.* Building plumbing fixtures include the following:
  - i.* Plumbing fixtures including handicapped.
  - ii.* Finished and rough brass plumbing fittings.
  - iii.* Vitreous china plumbing fixtures.
  - iv.* Trim for water closet bowls, tanks, and urinals.
  - v.* Drinking fountain and self-contained, mechanically refrigerated drinking water coolers.
  - vi.* Faucet washers and drain assemblies for plumbing sinks.
  - vii.* Flush valves for water closet and urinals.

### **16. Natural Gas System**

- a.* The natural gas system consists of meter station, gas booster pumps (1-running, 1-stand-by), associated valves, eclipse heat processor and distribution piping to the boilers, located in penthouse.
- b.* Each boiler provided with main and pilot gas train as required by NFPA.

### **17. Fire Protection Piping System**

- a.* The building fire protection piping system consists of pipe, fittings, valves and connections for sprinkler systems and dry standpipe system.
- b.* Two separate 6" fire water services from City of Philadelphia water main is provided in the basement. A backflow preventer station is provided at building service entrance. Each incoming water service consists of one (1) 6" backflow preventer, with associated valves.

### **18. Dry Standpipe System**

- a.* Dry standpipe system consists of the following:
  - i.* Four dry pipe connections on each floor.
  - ii.* Air compressor and dryer located in basement.

### **19. Sprinkler Systems**

- a.* The entire building is covered by sprinkler system which contains the appropriate equipment and appurtenant devices as follows:
  - i.* A 100 horsepower electric fire pump, located in the basement, is provided to develop the required system pressure. The pump is 500 gpm at 170 psi, 2 stage, horizontal split case type equipped with circulating relief valve, ball drip valve and fire pump controller. A jockey pump is provided to maintain system pressure during normal (non-fire) operation.
  - ii.* Concealed flush type sprinkler head.
  - iii.* Standard upright sprinkler heads.

- iv.* Standard pendent sprinkler heads.
- v.* Pendent automatic on-off flow control sprinkler heads.
- vi.* Alarm valve.
- vii.* Electric alarm gong.
- viii.* Water flow switch.
- ix.* Monitor switch.
- x.* Fire department connections.

## **20. Compressed Air System**

- a.* The compressed air system provides compressed air for the penthouse ATC System. The system consists of two compressors, refrigerant air dryer and associated components located in the penthouse.
- b.* Package compressed air system, located in the basement provides compressed air for the basement ATC system.
- c.* Package compressed air system with wall-mounted dryer provides compressed air for dry standpipe fire protection system. The above system is located in the basement.

### **D. Description of Electrical Systems, MSB**

This section of the specification is not all inclusive, and is based on original construction documents. Arrange a site visit to become familiar with all conditions affecting the work scope, and construction conditions.

#### **1. Primary Distribution**

- a.* The building has a dual 13.2 kVAC service from PECO. The 13.2 kVAC switch gear contains the provisions for utility metering, a primary selective transfer scheme, as well as provisions for the installation of additional circuit breakers and the circuit breakers required for distribution at 13.2 kVAC. Each service line supplies one 2000/2666 kVA transformer connected to one end of a double ended 480VAC Substation "A"; and one 1500/2000 kVA transformer connected to one end of a double ended 480/277VAC substation "B".

#### **2. Secondary Distribution**

- a.* The 480VAC, three-phase, three-wire Substation "A" is dedicated to building mechanical services and the elevators. The original design provides three wire feeders for the elevators panels (by way of automatic transfer switches), for the chillers, and for power distribution to mechanical equipment by way of distribution Motor Control Centers (MCC) and Power Distribution Panels. One feeder provides power to JFK Plaza. Each half of this Switchboard is also connected to power factor correction capacitor banks.
- b.* The 480/277VAC, three-phase, four-wire Substation "B" is dedicated to lighting and convenience power distribution. One 400A feeder connected to a centrally located Main Distribution Panel is provided for each group of three floors. A typical Main Distribution Panel provides lighting to its own floor, subfeeds lighting panels on the floors above and below, and subfeeds each one of the three floors with 208/120VAC convenience power by way of 75 kVA transformers.

#### **3. Equipment and Motor Loads**

- a.* All major equipment loads and motors are located in the basement or in the building penthouse. Service to major equipment is provided at 480 volt, 3 phase from motor control centers (MCC), distribution and power panels. Smaller motors and equipment are serviced at 120 or 208 volts via local step-down transformers and distribution panels.

#### **4. Lighting**

- a.* General fluorescent and high-intensity lighting requirements are serviced at 480/277 VAC from lighting panels located in secure electrical rooms or closets. As a general rule, every three floors are serviced by one 400A panel. Various lighting fixtures are utilized as

required to provide the most efficient lighting for the space. Outdoor lighting is based on metal halide lamps. With few, minor exceptions, all other areas use a combination of fluorescent lay-in fixtures, and compact fluorescent down lights. Most fluorescent lamps are energy efficient T-8 type and most ballasts are electronic. Interior light switching is provided by remote computer control by way of dedicated relay panels and contactors.

#### 5. Site Lighting

- a. Site lighting occurs at the Plaza Level and consists of 11 six lamp, pole-mounted clusters (fixtures type "FM"): four units at the front entrance, each supplemented by a floodlight installed on top of the pole for flag lighting; five units installed along Broad Street side; and two units installed on the Arch Street side.
- b. Plaza lighting is supplemented by fluorescent step lights and rail lights.

#### 6. General Purpose Receptacles and Power Requirements

- a. General power is provided by three-phase, dry type step-down transformers which provide 208/120 VAC power to local panels for branch circuit distribution to general purpose receptacles and small power loads. Typically, each floor is supported by one 75 kVA transformer, fed from the 480VAC lighting panel, and the associated 225A distribution panel.

#### 7. Emergency Power and Lighting

- a. Emergency power and lighting is provided by one 600 kW, 480/277VAC diesel generator installed in the basement. A 480/277VAC three phase, four-wire distribution switchboard supports the automatic transfer switches assigned as follows:
  - i. ATS #1 Penthouse EE-MCC-1, for heating equipment.
  - ii. ATS #4 & #5 Penthouse elevators.
  - iii. ATS #6 7th floor elevators.
  - iv. ATS #7 Life safety panel "A", which also supports miscellaneous house pumps.
  - v. Fire Pump ATS

#### 8. Lightning Protection System

- a. All rooftop equipment, steel parapet railings and the building steel is connected to a "Master Label" lightning protection system.

#### 9. Fire Detection and Alarm System

- a. Automatic smoke, photoelectric, and heat detection devices, manual pull stations, water flow, and tamper switches are provided throughout the structure. Tamper and alarm signaling devices alert the central station. By means of a digital full duplex multiplex communication system, activation of any device initiates communication with various addressable devices, annunciation, local and remote computer functions, smoke control devices, and the central station. The system has selective voice paging and two way fire fighter communication.

### **III. HEALTH CENTER 5, 1900 N. 20<sup>th</sup> Street**

#### **A. Site Description, Health Center 5**

- 1. General
  - a. The Health Center 5 site is bound by W. Berks Street on the south, N. Woodstock Street on the west and N. 20<sup>th</sup> Street on the east. The entire site consists of 1.30 acres, with a building floor area of 36,260 sf and 9,200 sf of paved surfaces including 11 parking spaces.
- 2. Access
  - a. Access to the main entrance is through N. 20<sup>th</sup> Street, with secondary entrances on N. Woodstock Street and W. Berks Street.
- 3. Site Lighting
  - a. The building perimeter is lit by wall-mounted and soffit-mounted fixtures.

4. Site Utilities
  - a. The site is serviced by public water and sanitary sewer supplied by the City of Philadelphia. Gas is supplied and maintained by the Philadelphia Gas Works.
  - b. Electric: Single feed 13.2 KV power from PECO Energy Company
5. Landscape
  - a. Landscaping includes two shade trees each on W. Berks Street and N. 20<sup>th</sup> Street, and three interior courtyards near the waiting areas and areas of greatest public contact.
6. Parking
  - a. The asphalt paved parking lot is located on the west side of Health Center 5. Entrance to the parking lot is accessed thru a rolling chain link gate located on N. Woodstock Street. The parking lot is enclosed by an 8'-0" high chain link fence.

**B. Building Narrative Description, Health Center 5**

1. The Health Center 5 building has an approximate gross building area of 36,260 square feet. It is a single-story building with north and south wings. City health centers are operated by the Department of Public Health and provide a full range of primary medical and support services to registered patients.
2. Major mechanical equipment is located in the main boiler room, air handler room, and on the rooftop. These systems and equipment include, but are not limited to:
  - a. An air-cooled chiller (120 ton capacity) located on the roof with two constant-speed 3 HP chilled water pumps and other auxiliaries.
  - b. A gas-fired boiler plant (2,860 MBH capacity) that provides hot water for building heating systems with two constant-speed 2 HP hot water pumps and other auxiliaries.
  - c. A multi-zone air handler with a hot water coil, a chilled water coil, and a 15 HP supply air fan serving nine thermal zones in the south wing.
  - d. Four single-zone packaged rooftop units (15 tons each, 60 tons total capacity) with electric resistance heating coils serving the building's north wing and zone-level hot water reheat coils.
  - e. A fully computerized building automation system, designed for automatic scheduling, temperature, and ventilation control.
  - f. Miscellaneous HVAC systems include exhaust fans and perimeter finned tube radiation.
  - g. Two sump pump stations, each with duplex 1.5 HP pumps, to keep the basement dry as the facility is situated above an underground stream and will flood if not pumped out.
3. Major electrical equipment is located in the main electrical room. The original electric service room, circa 1962, provided the building with a 2300V, 2 $\phi$ , 3W primary service that transformed to 120/240V, 2 $\phi$ , 5W secondary to the building. Around 1976, the service was replaced and upgraded with a 13.2KV service by PECO. This primary service was located in the adjacent "Storage Room" and became a second electric room to accommodate the new electrical service equipment and emergency generator. The systems and equipment in these rooms include, but are not limited to:
  - a. Single feed medium voltage electric power utility service.
  - b. Single ended 13.2KV, 750 KVA electrical substation with 2000A main switch secondary and distribution section by Federal Pacific.
  - c. Building distribution panels.
  - d. 15 KW emergency back-up power generator and distribution system.
  - e. ASCO 7000 Automatic Transfer Switch with Isolation Bypass.

**C. Description of Mechanical Systems, Health Center 5**

1. HVAC General Systems Description
  - a. With the exception of mechanical rooms, the entire building is heated, cooled, and ventilated.
  - b. Chilled water is generated by a 120-ton McQuay air-cooled scroll chiller located on the roof of the south wing. Hot water is generated by a 2,860 MBH Weil-McLain gas-fired hot



- water boiler located in the boiler room.
- c. The hot and chilled water piping system provides cooling and heating to a multi-zone air handler and perimeter fin-tube convectors.
  - d. Four Trane rooftop units with electric heat serve the building's north wing.
2. Hot Water System
    - a. A 2,860 MBH Weil-McLain gas-fired boiler provides hot water to the constant-speed pumping distribution loop. This boiler is in poor condition and has reached the end of its service life. A second boiler located in the boiler room is defunct.
    - b. Two 2 HP pumps operate in staged fashion to circulate hot water through the building. These pumps are constant-speed.
    - c. There is currently no active water treatment.
  3. Chilled Water System
    - a. A McQuay air-cooled scroll chiller provides the chilled water source to the chilled water distribution loop. The chiller is rated at 120 tons capacity. The chiller has two refrigerant circuits and one of the circuits is out of order. It is 15 years old and generally in poor condition. A temporary chiller is required to handle peak summer loads.
    - b. Two 3 HP pumps operate in staged fashion to circulate chilled water through the building. These pumps are constant-speed.
    - c. There is currently no active water treatment.
  4. Air Handling Systems
    - a. A multi-zone air handler serves the building's south wing with nine zone dampers. The unit has a hot water heating coil and chilled water cooling coil. The chilled water coil has no control valve. The 15 HP supply fan is constant-speed. Outside air and return air dampers are operated manually based on comfort complaints.
    - b. A small single-zone air handler serves certain offices. The unit has a hot water heating coil and chilled water cooling coil. The chilled water coil has no control valve.
    - c. Four Trane rooftop units with electric heat provide heating and cooling to the north wing. These units are eight years and in good condition. Each unit has a 15-ton capacity. The rooftop units operate as single-zone units with duct-mounted hot water reheat coils.
  5. Ductwork and Distribution
    - a. Supply and return air distribution systems are provided by sheetmetal ductwork with connections to grille, register or diffuser. The air handlers have interior acoustic insulation that is in poor condition and deteriorating. All other supply and return air duct is insulated.
  6. Perimeter Heating Systems
    - a. Hot water fin-tube convectors line the perimeter of the building and add supplemental heat whenever the boiler is enabled.
  7. Domestic Hot Water System
    - a. Domestic hot water is generated by a Bradford-White gas-fired storage water heater with 75-gallon storage capacity and 76 MBH input. This unit is 15 years old.
  8. Natural Gas System
    - a. The natural gas system consists of meter station and associated valves and distribution piping to the boilers and domestic water heater located in the boiler room.

**D. Description of Electrical Systems, Health Center 5**

1. This section of the specification is not all inclusive, and is based on original construction documents. Arrange a site visit to become familiar with all conditions affecting the work scope, and construction conditions.
2. Primary Distribution
  - a. Primary service for the facility is supplied by PECO Energy via a single energized 13.2kV AC underground utility service. The service entrance terminates in a PECO approved switch gear line up located in the building basement. The 13.2kV AC switch gear is by Federal Pacific and serves a 750KVA, 13.2-208/120V, 3 $\phi$ , 4W transformer.
3. Secondary Distribution

- a. Secondary distribution is provided at 208/120V VAC from a 2000A main switch distribution section by Federal Pacific.
  - b. This main distribution section refeeds the buildings lighting and appliance panels (A, B, C, D) throughout.
4. Equipment and Motor Loads
  - a. A portion of the equipment loads and motors are serviced at the original 120/240 volt, 2 $\phi$ , from the original "MDP" distribution and power panels. A 208-240/120V, 3 $\phi$ -2 $\phi$ . 300KVA transformer is fed from the new substation to serve this original panel. Panel MDP served panels PP-1, PP-2, PP-3, & PP-4 in the Boiler and Mechanical Rooms.
5. Lighting
  - a. General fluorescent lighting requirements are serviced at 120VAC from lighting panels located throughout. Various lighting fixtures are utilized as required to provide the most efficient lighting for the space. Most areas use a combination of fluorescent lay-in fixtures, fluorescent surface mounted wraparound, and compact fluorescent down lights. Most fluorescent lamps are energy efficient T-8 type and most ballasts are electronic. Public areas are provided with local switching and secure areas are switched with key operated switches or switching panels having controlled access and/or guard control.
6. General Purpose Receptacles and Power Requirements
  - a. General power is provided by 208/120VAC local panels for branch circuit distribution to general purpose receptacles and small power loads.
7. Emergency Power and Lighting
  - a. Emergency power and lighting is provided by one 15 kW, 208/120 VAC diesel generator installed in the basement electrical room. An 80A ASCO Automatic Transfer Switch serves the fire alarm panel, as well as a 208/120 VAC three phase, four wire distribution panel that serves life safety lighting.
8. Lightning Protection System
  - a. A lightning protection system does not exist.