



MECHANICAL AND ELECTRICAL DESIGN NARRATIVE FOR BROOKS CITY BASE MEDICAL OFFICE BUILDING

I. MECHANICAL (Heating, Ventilation and Air Conditioning (HVAC))

A. Building

1. Based on a nominal programming building square footage of 40,000 SF, it is estimated that the proposed Brooks 2-story shell Medical Office Building will require a total capacity of 225 Tons of cooling and 2,800 MBH of heating. The unfinished leasable Tenant space will not be provided with air conditioning, as part of this shell building design. Tenant specific HVAC requirements are not known. The estimated cooling for the Lobby Areas, Corridors, and common spaces is estimated at 28 Tons of cooling.

B. Systems

1. The Building systems will be modeled to refine the heating and cooling load required to condition the Level 1 and Level 2 common corridors, entry and elevator lobby spaces, restrooms, and supporting spaces. The energy model will be critical for optimized energy performance. Careful selection of heating, ventilating, and/or air conditioning (HVAC) equipment will also provide outdoor air delivery, pollutant source control, and thermal comfort. Heating and cooling systems for Tenant lease spaces are anticipated to be provided by the Tenant, as part of their independent finish out package(s).
2. The basis of design for the proposed building HVAC system is a combination of constant volume Direct Expansion (DX)- split and packaged rooftop mounted unit (RTU) systems. Split systems will utilize ceiling plenum mounted indoor Fan Coil Units (FCU) with electric heat, coupled with matched outdoor, roof mounted, condensing units. Packaged systems will utilize a packaged outdoor air handler with electric heat, and supply/return ductwork to serve respective space. Level 2 Lobby and Corridor spaces will be served with SZ/CAV (Single Zone/Constant Air Volume) packaged RTU. Level 1 Lobby and corridor spaces will be served by split systems. In a SZ/CAV system, the FCU/RTU will constantly deliver conditioned air to the space at constant temperature (typically 55 deg F cooling / 90 deg F heating) to provide space temperature control. With this option, future Tenants will be expected to provide single zone CV (Constant Volume) DX systems to meet the specific Tenant heating and cooling loads. Level 1 Tenants shall provide DX split systems with fan coils suspended from the Level 2 finished floor structure and roof mounted outdoor condensing units. Level 2 Tenants shall provide packaged RTUs. Ductwork and HVAC accessories serving Tenant lease space shall be Tenant furnished. Outside air shall be introduced via the Lobby and Corridor units in amounts sufficient to offset minimum base building exhaust air quantities prescribed in applicable codes and to maintain a slightly positive building pressure. Tenant furnished HVAC systems shall provide the components necessary to maintain a neutral pressure relationship between the Tenant's space and all adjacent spaces.
3. The exhaust system will exhaust from the Level 1 and Level 2 common restrooms and custodial closets and will be routed up to the roof via galvanized sheet metal ductwork. Exhaust fans shall be spun-aluminum roof mounted ventilators. Air shall be exhausted from toilet rooms, janitors' closets, etc. at minimum amounts as prescribed in applicable codes. Balancing and control dampers of the exhaust system shall fail open in event of failure. Exhaust systems required for future Tenant finish out shall be Tenant provided and ducted to the exterior of the building or through the roof for Level 1 and Level 2, respectively.
4. Cooling Coil Condensate "Fin Water" from the various air handlers shall be sent to a common collection

point to be utilized in an environmentally responsible manner and comply with local codes. Equipment drainage piping shall be ASTM B306-13, type DWV copper drainage tube, cold drawn temper. Fittings shall be ASME B16.23, cast copper or ASME B16.29 wrought copper, solder joint fittings. Condensate piping shall be properly insulated.

5. The air distribution system shall be galvanized sheet metal with pressure class, seal, reinforcement, and support per SMACNA standards.

C. Spaces / Zones

1. Electric Unit Heaters (UH) will be provided in the unoccupied lease spaces and building fire riser room to serve as freeze protection.
2. Elevator Equipment Rooms, electrical rooms, and base building telecom spaces will be cooled by wall-mounted, dedicated 24 hours operational ductless split DX systems, sized to accommodate the equipment load density. Outdoor condensing units will be located on the roof of the building.

D. Deliverables

1. All mechanical equipment will be located and scheduled on the drawings. Additional information will be provided in the specifications.

E. Building Management System

1. The Medical Office building shall be provided with a Trane Tracer Summit micro-processor based direct digital control (DDC) building automation/energy management system (BMS), or equivalent. This system shall provide energy management controls and monitoring in all spaces, in addition to reporting to a central Brooks City Base monitoring system. A high level of control and functionality should be provided by an integrated building control system. The monitoring of the complete system is anticipated by the centralized facility management system providing graphical displays and analysis tools, centralized alarm reporting, real time status and custom reports, automatic system-wide emergency responses and maximized energy savings. Network communications requirements will be coordinated with the Medical Office building Facilities Management Department. The Building Automation System should utilize distributed processing for speed, stability, and system reliability. The distributed controllers will be networked to share information.

F. Codes

1. The project will be designed to meet the following:
 - 2015 International Building Code including local amendments
 - 2015 International Mechanical Code including local amendments
 - 2015 International Plumbing Code including local amendments
 - 2015 International Energy Conservation Code including local amendments
 - NFPA Standards
 - ASHRAE Standards and outdoor design requirements for San Antonio, TX.
 - SMACNA Duct Construction Standards.

G. Conditions

1. The outdoor design conditions for San Antonio, Texas will be used as described below:
 - a. Latitude 30.28 degrees North
 - b. Longitude 97.68 degrees West
 - c. Elevation 495 feet
 - d. Summer Dry Bulb Temperature 99.7 degrees F. (ASHRAE 0.4%)

- e. Summer Wet Bulb Temperature
 Mean Coincident with DB 78.0 degrees F (ASHRAE 0.4%)
- f. Dehumidification Dewpoint
 Temperature 76.8 degrees F (ASHRAE 0.4%)
- g. Winter Dry Bulb Temperature 20.0 degrees F

2. The inside design conditions based on 2007 ASHRAE Application general design criteria are as follows:

a. Summer:	Temperature (F-DB)	Humidity (% RH)
1) Corridors	75	50±5
2) IT Equipment Rooms	72±2	50±5
3) M/E Equipment Rooms	75	--
4) Lobby Areas	75	50±5
5) Storage/Utility Rooms	78	--

b. Winter:	Temperature (F-DB)	Humidity (% RH)
1) Corridors	70	50±5
2) IT Equipment Rooms	72±2	50±5
3) M/E Equipment Rooms	70	--
4) Lobby Areas	70	50±5
5) Storage/Utility Rooms	70	--

II. PLUMBING

A. Systems

1. The plumbing piping system will provide domestic water and sewer services to water closets, urinals, lavatories, mop sinks, showers, and other desired specific fixtures as located by the architect plans. Toilet room fixtures will be wall hung and will conform with ADA/ABA guidelines where applicable. One (1) 2-1/2" inch domestic water line and one (1) 6 inch sanitary main are anticipated for the Office Building.
2. Domestic Hot Water will consist of two (2) electrical domestic water heaters, storage tank type. The first will serve lavatories in the group Toilet Rooms; this heater will be located in the ceiling plenum of Level 2 with close proximity to the group Toilet Rooms. The second water heater will serve the Custodial Closets mop sinks and will be supported from the wall within the Level 1 Custodial Closet, above the sink. Both water heater systems will provide tempered water, through a thermostatic mixing valve, to lavatories and sinks.
3. The design will provide a pressure reducing zone backflow preventer within the building at the main cold water entry to the building. Based on recent fire flow pressure test result, a domestic water booster pump is not anticipated. Pressure reducing valves shall be provided at branch piping take-offs from the main cold water riser for each floor, where required. The design shall provide thermostatic mixing valves for maximum hot water temperature of 110 degrees F (adj.) to all lavatories.
4. All cold and hot water lines must be protected from winter freezing by insulation or heating. Domestic water piping shall be copper tube conforming to ASTM B88 Type 'L' hard temper tubing and wrought copper solder-joint ASME B16.18 fittings for above ground pipe sizes 2-1/2" inches or smaller. For buried piping and domestic water entrances, provide Type 'K' soft temper tubing with brazed joints and wrought copper ASME B16.22 fittings. Water piping shall be sized to limit water velocities in cold water piping between 5 and 6 feet-per-second. The maximum velocity in hot water piping shall be limited to 4 feet-per-second. Water hammer arrestors will be provided on water lines connected to flush valves and to groups of plumbing fixtures. Isolation valves will be provided to isolate a group of plumbing fixtures in each toilet room and trap primers will be provided and connected to each floor drain. Sewer vents will be distributed

the full length of the restrooms and connected to all fixtures.

5. The elevator sump pump discharge system will be in compliance with the Texas department of Regulations and the City of San Antonio, TX. Elevator are anticipated to be traction type and will not require hydraulic fluid interceptors.
6. The design goal is to tie as many vents together with pipe above ceiling to minimize the number of vent through roof penetrations. Sanitary waste and vent piping underground will be service-weight cast iron hub and spigot with neoprene gaskets and sanitary waste and vent piping aboveground will be service-weight cast iron pipe with hub-less connections. New fixtures, faucets and valves will be provided. The plumbing designer will coordinate the sanitary sewer connections and domestic water connection point 5 feet outside the building with the civil engineer. Faucets, lavatories, urinals and water closets will be specified as low-flow in order to reduce domestic water use according to code requirements.
7. The plumbing design will incorporate wall hydrants at 200 feet separation on the first floor exterior walls for reach by a 100 foot hose. Natural Gas service is not anticipated for the Office Building.

B. Deliverables

1. All plumbing equipment will be located and scheduled on the drawings. Additional information will be provided in the specifications.

III. FIRE PROTECTION

A. Systems

1. The building will be provided a wet pipe fire sprinkler system for complete coverage of the building interior. Based on the results of a recent fire flow test, a fire pump and jockey pump system are not anticipated. The plumbing designer will coordinate the water connection point 5 feet outside the building with the civil engineer. A backflow preventer will be provided by the civil engineer. An 6 inch fire protection line is anticipated for the Office Building.
2. Design of the fire protection system will be the performance specification type, to include general fire protection information on the Plumbing drawing sheets instructing the contractor to design-build a completed, approved, working fire sprinkler system. The drawing will show the hazard level for coverage at all locations, and include general requirements and basic design data such as flow test pressure at the nearest fire hydrant. Design will also include a performance specification section for contractor designer to follow. The fire protection is anticipated to provide
3. Stairwells shall be equipped with fire protection standpipe and drain pipe risers, per the requirements of the applicable codes and standards.

IV. ELECTRICAL

A. Building

1. A primary underground electrical service is provided via a proposed underground duct bank extension from the location of an existing manhole located across the site along Inner Circle Road. A 1600 ampere secondary service with voltage of 480Y/277V, 3-phase, 4-wire is proposed for the Phase I building. This service capacity is based upon a watt per square foot load of 25 watts for future tenants and includes building house loads such as HVAC equipment, Elevators, lighting and power in the shell office building. The single pad mount transformer design requires final approval from CPS Energy. CPS Energy provides pad mount transformers based upon their sizing requirements and is normally referenced to their historical load information on office buildings.
2. Primary service conductors will be provided by CPSE and installed in a contractor provided, primary encased duct bank to feed the radial feed pad mount transformer. The primary duct bank will consist of five (5) 4" PVC schedule 40 conduits. A primary duct bank will extend to the transformer location. Manholes, if necessary, will be provided in the primary duct bank routing per CPS Energy standards. The entire

proposed primary duct bank service with manholes, pad mount transformer and tap box will require final approval from CPS Energy. A secondary service from the CPS Energy transformer will extend to the building via an underground concrete encased secondary duct bank. Service voltage at the transformer as proposed, is 480Y/277V, 3-phase, 4-wire to the building.

3. The main switchboard 'MSA' is proposed for serving the Building House loads and future tenant loads. The Main Switchboard 'MSA' will be located in the main electrical/meter room at the first floor. The switchboard 'MSA' will then feed a 1600A bussed gutter to provide connection service points for house meter and tenant meters and associated disconnects.
4. House loads connected at 480 volts will connect to a CPS Energy metered 480V Main House Panel. Other 120V or 208V loads will connect to a House Panel rated for 400A, 208Y/120V, 3-phase, 4-wire. The 208V panelboards for house loads will be served from a step-down dry type transformer fed from the 480V main Building house panelboard. The building house loads consists of the following:
 - a) Building Elevators (traction type) and associated 120V branch circuits for elevator cab lighting.
 - b) Building exterior parking lot and building mounted lighting.
 - c) Building interior lighting in the core spaces, corridors, lobby, etc. and controls.
 - d) Electric water heating equipment and associated recirculation pumps for toilet rooms.
 - e) Air conditioning and heating equipment for lobby, corridors, toilet rooms stairwells, storage rooms, MDF/IDF and other utility rooms for the building systems,
 - f) Exhaust fans and Outside Air units for ventilation requirements.
 - g) Fire Alarm System panel branch circuit.
 - h) Telephone, CATV and other special system equipment.
 - i) General purpose receptacles throughout the building in core areas.
 - j) Card access system branch circuit power.

Air conditioning equipment with electric heating will be fed from the 480V panelboard. The 480V panelboard will serve the building interior and exterior Lighting. A dry type transformer fed from the 480V house panel will be provided to supply all 208Y/120V branch circuit panel loads. The house loads as described above shall be fed from the 208Y/120V panelboard.

The 'Main Switchboard MSA' and bussed gutter will be provided in accordance with CPSE standards and satisfy the owner's requirements for serving all the proposed tenant loads for office type spaces in the shell building.

5. 2" empty conduits with pull-cords routed from the bussed trough will be provided to allow the tenant to install their power supply to Tenant spaces. A typical tenant's power supply mounted above the bussed service trough will consist of the following:
 - a) Main Disconnect Switch, Non-fusible for meter disconnect.*
 - b) Tenant's self-contained meter per CPS Energy Standards.
 - c) Tenant's Main disconnect switch or circuit breaker in enclosure for tenant's overcurrent protection.

*Note: Required per CPS Energy 2012 Standards.

A 1600 ampere 100% rated overcurrent device (un-metered) is proposed to serve the bussed gutter to be located in the main electrical and meter room. The bussed gutter will be provided for multiple tenants in the shell medical office building. It is anticipated that up to eight (8) future tenants may occupy the tenant leasable spaces in the shell building.

B. Spaces / Zones

1. Power within the building will be distributed by means of the service entrance rated, 1,600A, 480/277V 3-

phase, 4-wire switchboard located in the main electrical/meter room. The main electrical and meter room is to be located on the east end of the shell Medical Office building to provide a shorter length to the proposed CPS Energy pad mount transformer. The Switchboard will be equipped with an integral multi-function metering and transient voltage surge protection device unit (SPD). Switchboard construction will be individually mounted main device and group mounted feeder devices. Line and load connection will be front accessible only. Sufficient working clearance will be provided for maintenance staff access.

- a. The main electrical room will be provided with one (1) 36" door with direct access to the exterior for equipment installation/removal. The 36" exit door will be provided with panic hardware for emergency egress in accordance with NEC requirements.

2. General Purpose Receptacles:

- a. Power for general purpose receptacles will be distributed above the ceiling in conduit throughout the building, quantity in accordance with the National Electric Code. Junction boxes will be located above the nearest accessible ceiling near all possible connection points.
 - 1) A GFCI receptacle will be provided for the landscape irrigation controller power supply. This location requires coordination with the Landscape Architect to determine if only one dedicated branch circuit is required for a controller. The controller location may be located outside the building or inside a main Fire or Electrical room.
 - 2) Exterior GFCI duplex receptacles with while-in-use covers will be provided at locations to accommodate grounds maintenance.
 - 3) Custodial closets will contain one GFCI duplex receptacle.
 - 4) Corridors will be provided with 20-ampere receptacle outlets on dedicated circuit(s) for custodial personnel use located so no point on any corridor floor is more than 25 feet from a duplex receptacle.
 - 5) Public Toilet Rooms:
 - a) One (1) general purpose GFCI duplex receptacle for maintenance use.
 - 6) Mechanical and Electrical Rooms:
 - a) Two (2) duplex receptacles connected to a dedicated circuit for maintenance use.
 - 7) Storage Rooms:
 - a) One (1) general purpose receptacle on wall adjacent to the door.
 - 8) Elevator Equipment: (Elevator shaft location)
 - a) One (1) GFCI duplex receptacle will be located in the elevator pit per NFPA 72 and ANSI Elevator codes.
 - 9) Main Electrical or Mechanical Rooms:
 - a) Two (2) general purpose receptacles on walls adjacent to door locations.

3. MDF/IDF (IT) Rooms:

- a) Two (2) incoming 4" PVC conduits with pull-cords from 5'-0" outside the building are proposed and are to terminate at the MDF Room. These empty conduits will be routed underground and below slab into the MDF room. The MDF room will be provided with plywood backboards (min. 8 ft) on one wall for termination of the incoming main telephone service. A telephone system provider or ATT is to provide the telephone service cabling installed in the 4" PVC conduits. The contractor is to provide the punchdown blocks for telephone service to the building. All empty conduits will be provided with pullstrings. Pull boxes for the telephone service conduits will be provided where conduit bends exceed three (3) 90 degree elbows. A quadruplex receptacle connected to a dedicated branch circuit will be provided at the terminal backboard for telephone system power. A grounding electrode

conductor will be terminated at the backboard and connected to the main service entrance ground.

- b) Empty 2" rigid conduits for the tenant's phone service shall extend from the MDF room along the building corridor and terminate with a conduit bushing for future extension by the tenant's phone installer/provided. Empty conduits will be provided with pull-cords. Each possible tenant space will have a 2" empty conduit for telecommunications service.
- c) Two (2) 4" rigid conduits from the MDF Room will be provided and route overhead to the IDF Room. The conduits will terminate overhead above a plywood backboard for the ATT telephone service. Similar to the MDF Room, one wall of the room will be provided with a minimum of plywood backboards (min. 8 ft.) on one wall for termination of the incoming main telephone service. A quadruplex receptacle connected to a dedicated branch circuit will be provided at the terminal backboard for telephone system power. A grounding electrode conductor will be terminated at the backboard and connected to the main service entrance ground.
- d) Empty 2" rigid conduits for the tenant's phone service shall extend from the IDF room along the building corridor and terminate with a conduit bushing for future extension by the tenant's phone installer/provided. Empty conduits will be provided with pull-cords. Each possible tenant space will have a 2" empty conduit for telecommunications service.

4. CATV Equipment

- a) One (1) incoming 4" PVC conduit with pull-cords from beyond the building are planned to be provided and will terminate at the MDF Room. The empty conduits will be routed below slab and into the MDF room. The MDF room will be provided with a plywood backboard (min. 4 ft) on one wall for termination of the incoming main telephone service. A CATV system provider selected by the owner shall provide the Cable TV Service cabling installed in the 4" PVC conduit. The CATV system provider will provide the splitter equipment to provide CATV service to each tenant that requires service. A quadruplex receptacle connected to a dedicated branch circuit will be provided at the terminal backboard for CATV system power. A grounding electrode conductor will be terminated at the backboard and connected to the service entrance grounding.
- b) Empty 1" rigid conduits for the tenant's Cable TV service shall extend from the MDF room along the building corridor and terminate with a conduit bushing for future extension by the tenant's Cable TV installer/provided. Empty conduits will be provided with pull-cords. Each possible tenant space will have a 1" empty conduit for Cable TV service.
- c) One (1) 4" rigid conduit from the MDF Room will be provided and routed overhead to the IDF Room. The conduit shall terminate overhead above a plywood backboard for the CATV service. The contractor will provide a minimum 4' x 4' plywood backboard on one wall for termination of the incoming Cable TV service. A quadruplex receptacle connected to a dedicated branch circuit will be provided at the terminal backboard for CATV system power. A grounding electrode conductor will be terminated at the backboard and connected to the service entrance grounding.
- d) Empty 1" rigid conduits for the tenant's Cable TV service shall extend from the MDF room along the building corridor and terminate with a conduit bushing for future extension by the tenant's Cable TV installer/provided. Empty conduits will be provided with pull-cords. Each possible tenant space will have a 1" empty conduit for Cable TV service.

5. Lighting:

- a. Lighting will be provided by a variety of lighting fixtures, but mainly LED type lighting fixtures. LED fixtures are recommended and required to satisfy the IECC 2015 requirements. Emergency light will be

provided for paths of egress as well as rooms with mechanical, MDF/IDF rooms or electrical rooms. Emergency lighting will be supplied via individual battery packs included with lighting fixtures and emergency exit signage. As an option to individual batteries in lighting fixtures, Central battery inverter unit equipment may be provided to provide a better design for emergency egress and exit signage lighting. The emergency exit signage will need to be connected to unswitched branch circuits at the 480/277V lighting panelboard.

- b. Lighting design shall comply with IESNA standards, IECC 2015 and Information bulletin 221 using the prescriptive method. A lighting power density budget will need to be satisfied per IECC 2015. IESNA recommended foot candle levels will be used for interior spaces. Task lighting fixtures at individual workstations in the open office areas will be included in order to achieve necessary individual control of workspace lighting for LEED requirements.
 - 1) Public Restrooms:
 - a) Lighting fixtures to be cove light fixtures with 3500K LED lamps. 6" recessed downlights with 3500K LED lamps shall also be used.
 - b) Lighting shall be controlled by the lighting control panel for daytime, normal business hour, operation of light fixtures through the building energy management system. Cove lighting shall be connected through an astronomic time switch for "after business hours use" only. Ceiling mounted occupancy sensors to control remaining fixtures during after business hours use based on area occupancy.
 - c) Average lighting levels will be approximately 20 foot-candles.
 - 2) Mechanical and Electrical Rooms:
 - a) Lighting to be a 4' specification grade LED linear strip fixture with wire guards.
 - b) Lighting will be controlled by a local wall mounted toggle switch. No occupancy sensors are recommended for safety reasons.
 - c) Average lighting levels will be 25 to 35 foot-candles.
 - 3) Storage Rooms:
 - a) Lighting to be a 4 ft linear LED fixture with direct downward distribution and utilize an acrylic lens with 3500K LED lamps.
 - b) Lighting will be controlled by a local wall mounted vacancy sensor.
 - c) Average lighting levels will be 15 to 25 foot-candles.
 - 4) MDF/IDF Rooms:
 - a) Lighting shall be provided to consist of a 4 ft. linear specification grade strip fixture with LED lamps and a wire guard.
 - b) Lighting will be controlled by a local wall mounted toggle switch. Lighting shall not to be connected to the building management system to allow for service and maintenance during non-business hours for serviceability.
 - c) Average lighting levels will be 45 to 55 foot-candles.
 - 5) Corridors and Public Lobbies:
 - a) Lighting fixtures shall be a 2'x2' or 2'x4' recessed prismatic acrylic lensed fixtures and #12 pattern and average minimum thickness lens of 0.125" with 3500K LED lamps.
 - b) Lighting will be controlled by a lighting control panel for daytime, normal business hour, operation of light fixtures through building management system. Minimum night lighting to be provided in these areas through selective lighting fixtures. Override "ON" timed control switches to be provided for after business hours operation of lighting fixtures (ie: for

housekeeping).

- c) Average lighting levels will be approximately 20 foot-candles.
- 6) Custodial Closets:
 - a) Lighting to be a 4' specification grade strip fixture with wire guard.
 - b) Lighting will be controlled by a local wall mounted toggle switch. Lighting is not connected to the building management system.
 - c) Average lighting levels will be 25 to 35 foot-candles.
- 7) Stairwell Lighting:
 - a) Lighting fixtures shall consist of a 4 ft. wall mounted stairwell fixture with integral occupancy sensor. Lamps shall be 3500K LED.
 - b) Wall mounted stairwell fixtures shall be on 24 hours a day. Wall mounted fixtures to be controlled by integral occupancy sensor and dim to 10% light output when area is not in use and provide full output upon detection of occupancy by sensor.
 - c) Average lighting levels will be 15 to 20 foot-candles.
- 8) Exterior Wall and Landscape Lighting:
 - a) Wall mounted fixture to be a full cut-off, die cast wall sconce with a smooth lens and dark bronze finish. Provided with compact fluorescent lamps and battery packs, as required, for emergency egress lighting.
 - b) Landscape lighting to include:
 - (1) Direct burial, cast bronze floodlight fixture with spot optics and grout masked for landscaped areas.
 - (2) Direct burial, cast floodlight with spot optics, slip resistant and low temperature lens for pathway areas.
 - (3) Recessed LED wall mounted step lights for exterior stairs.
 - c) Landscape lighting will be controlled by photocell controls through the lighting control system.
 - d) Exterior wall mounted lighting will be controlled by photocell controls through the building lighting control will be provided with emergency power at points of emergency egress.
 - e) Building exterior lighting will be provided with Dark Sky compliant fixtures and any accessories necessary to minimize light trespass.
 - f) Fixture layout will provide an average light level of 1 foot-candle maintained for site security camera operation with a minimum of 5 foot-candles at building entrances.
 - g) Lighting levels at path of egress per NFPA 101A shall be 1 foot-candle minimum.
- 9) Exterior Parking Lot Lighting:
 - a) Lighting to be exterior Architectural type LED pole mounted lighting. The exterior parking lot lighting will be connected and controlled by the exterior lighting control panel with an astronomic time switch and photocell on controls in accordance with IECC 2015. The exterior poles will be mounted to concrete footings that extend a minimum of 30" above grade for protection from vehicles.
 - b) Average lighting levels for the parking areas will be from 2 to 5 foot-candles.

C. Systems

1. Due to building size, the International Energy Conservation Code (IECC) will require automatic lighting control device shut off of lighting in areas exceeding 250 square feet. This will be done via a lighting control panel, occupancy sensors, and astronomical time switch system and a photocell interface connected through the building management system. Daylight harvesting will be used where applicable to comply. All exterior parking lot lighting will be controlled by the astronomical time switch with photocell for "on" operation. IECC 2015 compliance requires that all exterior lighting controlled by a lighting control panel with functions described.
2. A Card access system if required by the owner will require installation of empty conduits at exterior door locations. The empty conduits installed with a backbox for an access system device will be installed per the owner's requirements for card access system to allow tenant's access beyond normal business hours. Empty conduits will be provided from a Card Access system panel and routed above accessible ceilings. Low voltage cabling can be installed by the Card Access system installer and may be extended above accessible ceilings to the card access device locations. All empty conduits shall be provided with pull-cords.

V. FIRE ALARM

A. Spaces / Zones

1. Manual pull-stations will be installed within 5ft of exit doorways at each exit on each floor as per code. Manual pull-stations will be mounted at a minimum height of 42" and a maximum height of 48" as per ADA standards.
2. Audible/Visual notification appliances will be provided to meet or exceed the minimum audible and visual notification characteristics as required by applicable codes and statutes. Notification appliances will be installed at a maximum height of 80" above finished floor or at the ceiling as permitted by applicable codes and statutes. All audible appliances will be voice signaling capable.
3. Automatic smoke detection will be provided in the public spaces, lobbies, corridors, lounges and stairwells. Heat detectors will be provided in janitor closets and store rooms. Refer to item 6 below in this section for requirements per NFPA 72, Section 21.5 for elevator recall, elevator shaft detection, elevator equipment room smoke/heat detection and lobby smoke detection devices.
4. Duct type smoke detectors will be provided in air distribution systems as required by NFPA 90A codes and statutes.
5. Water flow and tamper switches provided by Division 23 will be monitored by the fire alarm system installed at the main alarm valves and fire sprinkler piping.
6. Fire alarm system devices such as first and alternate floor elevator recall relays shall be provided per ANSI Elevator codes and NFPA 72. A smoke detector in the lobbies at each floor level shall be provided. A smoke detector in the elevator shaft shall be provided and a smoke detector in the Elevator Equipment room will be provided. The elevator recall relays will be provided with monitor modules to interface to the non-addressable devices and connect to the fire alarm system. A heat detector shall be provided in the elevator equipment room and it shall have a lower temperature setting and higher sensitivity than compared to the fire sprinkler head located in the room.

B. Central Reporting Station

1. Fire Alarm system shall be a manual, addressable system with a connection to a Central Reporting Station for monitoring the Fire Sprinkler supervisory service in the building. The Central Reporting Station shall be provided by the Contractor for a minimum of one year and after one year the owner will be required to obtain the Central Reporting Station service per NFPA 72.

VI. SPECIAL SYSTEMS

A. Systems

1. Back boxes will be provided for all devices as noted on drawings by other divisions. New conduit will be provided from each back box location complete with pullstring to the cable tray. Devices and low smoke cabling will be furnished and installed under another division.
2. Cable tray, conduits and outlet boxes for data, security, information systems and the like shall be provided to locations above accessible ceilings. Cable, system hardware, devices and peripherals will be provided under another division.

VII. LIGHTNING PROTECTION

A. Systems

1. A complete Class II lightning protection system will be provided. The system will be designed and installed by certified personnel to comply with the UL master label requirements or LPI certification.

APPLICABLE CODES

NFPA-70, 2014 National Electric Code

NFPA-72, 2016 National Fire Alarm Code

NFPA-90A, 2015 Standard for the Installation of Air-Conditioning and Ventilation Systems

NFPA-101, 2015 Life Safety Code

NFPA-780, 2017 Standard for the Installation of Lightning Protection Systems

2015 International Building Code

2015 International Fire Code

2015 International Energy Conservation Code

City of San Antonio Chapter 10 latest edition

IESNA Standards

BDA - Prototype Office Bldg.

NEC 2011 CNG Bldg Shell Space Summary.xls

7/27/2016

ELECTRICAL PRELIMINARY LOAD ANALYSIS									
BASED ON WATTS/SQ. FOOT FOR OFFICE SHELL BUILDING (TENANT LOADS)									
BLDG. 1ST FLR S.F. =		34978		1ST FLR =		28721	TENANT SPACE		
BLDG. 2ND FLR S.F. =		34416		2ND FLR =		29101	TENANT SPACE		
SYSTEM VOLTAGE - 480Y/277V, 3 PHASE, 4 WIRE + GND.									
LOAD DESCRIPTION	LOAD TYPE	SQ FEET	ESTIMATED VA/SF	ESTIMATED TOTAL KVA	DEMAND FACTOR	SEE NOTE	EST. VA/SF DEMAND LOAD		
							KVA	AMPERES	
GP RECEPTACLES	0	57822	1.00	57.8	33.91	1	33.91	41	
LIGHTING	1	57822	3.50	202.4	1.25	2, 3	253.0	304	
EQUIPMENT	2	57822	0.25	14.5	1.00		14.5	17	
MOTORS	3	57822	0.50	28.9	1.00		28.9	35	
COMPUTERS	4	58202	1.00	58.2	1.00		58.2	70	
ELECTRIC HEATING	5	57822	7.50	433.7	1.00		433.7	522	
AIR CONDITIONING	6	57822	6.50	375.8	1.00		0.0	0	
KITCHEN EQUIPMENT	7	57822	0.20	11.6	0.65	5	7.5	9	
ELEVATORS	8	0	0.0	0.0	1.00	6	0.0	0	
LARGEST MOTOR	9	0	0.0	0.0	1.25	7	0.0	0	
TOTAL VA/SF =			20.45						
N.E.C. DEMAND LOAD								829.6	998
SERVICE ENTRANCE DESIGN								997.0	1200
SPARE CAPACITY							16.8%	167.4	202

NOTES:

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|-------------------------|-------------------------|
| 1. PER NEC TABLE 220.44 | 5. PER NEC TABLE 220.56 |
| 2. PER NEC 215.2(a)(1) | 6. PER NEC TABLE 620.14 |
| 3. PER NEC TABLE 220.12 | 7. PER NEC 430.24 |
| 4. PER NEC 220.60 | |

CNG ENGINEERING PLLC

BDA - Prototype Office Bldg.

NEC 2011 CNG Bldg Shell Space Summary.xls

7/27/2016

ELECTRICAL PRELIMINARY LOAD ANALYSIS									
BASED ON WATTS/SQ. FOOT FOR OFFICE SHELL BUILDING									
BLDG. 1ST FLR S.F. =		34978		1ST FLR =		6257	CORE SPACE		
BLDG. 2ND FLR S.F. =		34416		2ND FLR =		6257	CORE SPACE		
SYSTEM VOLTAGE - 480Y/277V, 3 PHASE, 4 WIRE + GND.									
LOAD DESCRIPTION	LOAD TYPE	SQ FEET	ESTIMATED VA/SF	ESTIMATED TOTAL KVA	DEMAND FACTOR	SEE NOTE	EST. VA/SF DEMAND LOAD		
							KVA	AMPERES	
GP RECEPTACLES	0	12514	0.50	6.3	12.51	1	6.26	8	
LIGHTING	1	12514	3.50	43.8	1.25	2, 3	54.7	68	
EQUIPMENT	2	12514	0.00	0.0	1.00		0.0	0	
MOTORS	3	12514	1.00	12.5	1.00		12.5	15	
COMPUTERS	4	12514	0.00	0.0	1.00		0.0	0	
ELECTRIC HEATING	5	12514	7.50	93.9	1.00		93.9	113	
AIR CONDITIONING	6	12514	6.50	81.3	1.00		0.0	0	
KITCHEN EQUIPMENT	7	12514	0.00	0.0	0.65	5	0.0	0	
ELEVATORS	8	-	-	32.0	1.00	6	32.0	38	
LARGEST MOTOR	9	-	-	4.5	1.25	7	5.6	7	
TOTAL VA/SF =									
N.E.C. DEMAND LOAD								205.0	247
SERVICE ENTRANCE DESIGN								300.0	361
SPARE CAPACITY							31.7%	95.0	114

NOTES:

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|-------------------------|-------------------------|
| 1. PER NEC TABLE 220.44 | 5. PER NEC TABLE 220.56 |
| 2. PER NEC 215.2(a)(1) | 6. PER NEC TABLE 620.14 |
| 3. PER NEC TABLE 220.12 | 7. PER NEC 430.24 |
| 4. PER NEC 220.60 | |

CNG ENGINEERING PLLC

BDA - Prototype Office Bldg.

NEC 2011 CNG Bldg Shell Space Summary.xls

7/25/2016

ELECTRICAL PRELIMINARY LOAD ANALYSIS									
BASED ON WATTS/SQ. FOOT FOR A SINGLE OFFICE TENANT (TENANT LOADS)									
BLDG. 1ST FLR S.F. =		34978	TENANT 1 =		4786	TENANT SPACE			
BLDG. 2ND FLR S.F. =		34416	(OF 12)						
SYSTEM VOLTAGE - 480Y/277V, 3 PHASE, 4 WIRE + GND.									
LOAD DESCRIPTION	LOAD TYPE	SQ FEET	ESTIMATED VA/SF	ESTIMATED TOTAL KVA	DEMAND FACTOR	SEE NOTE	EST. VA/SF DEMAND LOAD		
							KVA	AMPERES	
GP RECEPTACLES	0	4786	1.00	4.8	4.79	1	4.79	6	
LIGHTING	1	4786	3.50	16.8	1.25	2, 3	20.9	25	
EQUIPMENT	2	4786	0.25	1.2	1.00		1.2	1	
MOTORS	3	4786	0.50	2.4	1.00		2.4	3	
COMPUTERS	4	4786	1.00	4.8	1.00		4.8	6	
ELECTRIC HEATING	5	4786	7.50	35.9	1.00		35.9	43	
AIR CONDITIONING	6	4786	6.50	31.1	1.00		0.0	0	
KITCHEN EQUIPMENT	7	4786	0.20	1.0	0.65	5	0.6	1	
ELEVATORS	8	0	0.0	0.0	1.00	6	0.0	0	
LARGEST MOTOR	9	0	0.0	0.0	1.25	7	0.0	0	
TOTAL VA/SF =			20.45						
N.E.C. DEMAND LOAD								70.6	85
SERVICE ENTRANCE DESIGN								100.0	120
SPARE CAPACITY								29.4	35
								29.4%	

NOTES:

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|-------------------------|-------------------------|
| 1. PER NEC TABLE 220.44 | 5. PER NEC TABLE 220.56 |
| 2. PER NEC 215.2(a)(1) | 6. PER NEC TABLE 620.14 |
| 3. PER NEC TABLE 220.12 | 7. PER NEC 430.24 |
| 4. PER NEC 220.60 | |

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End of Narrative