

## UTILITY INFRASTRUCTURE

A complete utility infrastructure analysis for the Downtown Campus is included in a separate volume of the plan identified as the Appendix. The following summarizes these improvements in written form.

### ELECTRICAL SYSTEMS

The Downtown Central Academic Block is served by a 600A CPS Energy Switchgear located on the South Frio Street frontage of the property that delivers power at 13.2kV nominal. The two CPS Medium voltage switches provide for a single loop through the main campus that is split in the Durango Building.

Each of the Frio Street, Buena Vista Street, and Durango Buildings is served by single-ended unit substations that deliver secondary power at 480 volts. There is a separate substation that provides 4160 volt power to the central plant located in the Buena Vista Street Building. Feeders are 500 MCM and 1/0 cabling in 5" and 6" conduit systems.

The Monterey Building is located on the Monterey Block and is served by a separate overhead to underground service that also serves adjacent buildings that are not currently proposed to remain as a part of the Downtown Campus Master Plan. As a result, designers should consult the planned feeder routing shown in the Appendix for proposed phasing and routing to new structures on the Monterey Block and adjust as necessary to the actual design of the new structures. Design standards shall be similar to those on the Main Campus.

Peak demand on the Monterey Block was observed at 1827 kVA in September of 2006. Proposed growth

in the Master Plan can be accommodated with upgrades to the existing cable and switch plant on the campus. The existing substation equipment may accommodate planned growth of the campus square footage; however, designers should exercise caution in growth of substation equipment associated with the expansion of the central plant. Expansion of the plant is projected to add 1600 to 1800 kVA of additional load to the plant. As such, a new substation will need to be added to accommodate the plant growth. New expansion of the electrical cable plant should include an upgrade to the medium voltage switches to allow for a primary selective secondary radial arrangement at all of the substations as shown in the Appendix Volume.

### PLUMBING SYSTEMS

#### Domestic Water

Domestic water supply for the Downtown Campus is provided by the San Antonio Water System (SAWS) and is distributed throughout the campus. There are no anticipated difficulties for future connections to the existing water system to serve future development of the campus.

The peak domestic water flow rates were estimated for the existing Downtown Campus and for the future building expansions by determining the minimum number of fixtures required by the 2006 edition of the Uniform Plumbing Code (UPC) for the occupancy type. The UPC was also used to determine the total number for fixture units for the various occupancies. The peak water flow rates were estimated by converting the total number of fixture units to gallons per minute through the use of the Hunters Curve.

The peak water flow rate is estimated to increase by 40% for Phase 1 expansions to 281% for Phase 4 expansions. A total peak flow rate increase of 1055 GPM is estimated.

San Antonio water has traditionally been "hard" with approximately 20 grains per gallon hardness. It is recommended that all water be softened to lessen plumbing fixture and water heating equipment maintenance.

#### Sanitary Sewer

The Downtown Campus's sanitary sewer is connected to the SAWS sanitary sewer system. There are no anticipated design issues with the existing system that would impede future growth of the campus. The sanitary waste peak flow rates were estimated in the same manner as the peak domestic water flow rates. The sanitary waste peak flow rate is estimated to increase by 39% for Phase 1 expansions to 284% for Phase 4 expansions. An estimated total sanitary sewer peak flow rate increase of 1080 GPM is estimated.

#### Storm Drain

The Downtown Campus and the HemisFair Park Campus rely on the city's drainage systems for these downtown areas which have historically performed adequately.

### MECHANICAL SYSTEMS

Thermal Energy Plant 1 is located in the underground service area of the Downtown Campus and provides chilled water for cooling and hot water for heating. The plant has three chillers with a total capacity of 2300 tons and firm capacity of 1300 tons. The plant

also has two 250 boiler horsepower (bhp) hot water boilers with a total capacity of 500 bhp and a firm capacity of 250 bhp.

The thermal requirements of buildings in the Monterey Block will be met by a new Thermal Energy Plant constructed during Phase 1 in the same block. Thermal Energy Plant 2 will be designed to provide thermal requirements for existing and future construction in the Monterey Block. Chilled water load is projected to be approximately 1200 tons and a heating load of approximately 2500 lb/h of steam, or the hot water equivalent.

Thermal requirements of new buildings in the Central Academic Block and Cattleman Square Block will be met by expanding Thermal Energy Plant 1 during Phase 3. Phases 3 and 4 will add approximately 2800 tons of chilled water load and approximately 4,800 lb/h of steam, or the hot water equivalent, of heating load. Additional information about the anticipated loads and proposed distribution can be found in the Appendix Volume.

### NATURAL GAS SYSTEM

Natural gas is available to all campuses. Currently there are no anticipated or reported deficiencies or supply issues with the gas lines which would limit future expansion needs.

#### FIGURE 2

*Downtown Campus, Intramural / Recreational Sports Courts in Long Range Plan (Phase 4)*

#### FIGURE 3

*Downtown Campus, Aerial Axonometric View of Proposed Intramural / Recreational Sports Courts*