2020 - 2030
USF Master Plan Updates

Data Collection & Analysis

Element 7: General Infrastructure & Utilities

UNIVERSITY OF SOUTH FLORIDA

ST PETERSBURG CAMPUS

TABLE OF CONTENTS:

Appendix B Data Collection and Analysis (DCA)

Element 7 Infrastructure

Element 7A Utilities

Element 7:

St Petersburg Infrastructure

Element 7 General Infrastructure

The purpose of this element is to ensure the provision of adequate capacity for stormwater management, potable water, sanitary sewer and treatment, and solid waste facilities required to meet the future needs of the university. The General Infrastructure Element shall consist of a Stormwater Management Sub-Element, a Sanitary Sewer Sub-Element, a Potable Water Sub-Element, and a Solid Waste Sub-Element. Any work within the city right-of-way is required to be permitted by the City and must comply with City engineering standards.

Stormwater Management Sub-Element

(1) Purpose

The Stormwater Management goal for the USF St. Petersburg campus plan is to provide an adequate stormwater management system that accommodates future University stormwater needs while correcting existing facility deficiencies.

(2) 6C-21.207(1) Data Requirements

(A) An inventory of all public and private facilities and natural features provides stormwater management for the campus, including detention and retention structures, storm drainage pipe systems, natural stream channels, rivers, lakes, wetlands, etc.

The campus currently encompasses about 62.9 acres of land, including the peninsula that extends into Bayboro Harbor. There are twelve existing drainage basins within the campus boundaries. These drainage basins outfall to Bayboro Harbor via various pipes, including two box culverts through the campus property. There are eleven dry and two wet stormwater treatment pond (s) located within the campus. Each of these ponds is classified as an on-line system by SWFWMD.

(B) For facilities shared with the host community, a description of the facility's proportional capacity is required to meet existing University needs, including a description of any capacity that may have been previously allocated to the university by the host community.

The individual stormwater treatment facilities (detention ponds and future underground vaults) connect to the existing City stormwater system. The shared facilities are driven by the lot/block design.

The City of St. Petersburg has an updated stormwater system within Third Street South and Figure 9-a. This system varies in size from 12" to 48" RCP.

(C) Stormwater Management facility data

A physical inspection and survey of the storm sewer system in Basin B-12 (peninsula area) should be conducted to determine the facilities' actual physical condition and complete the facilities' mapping.

(3) Summary of Inventory Findings

Stormwater runoff is conveyed by the City's storm sewer piping network to Bayboro Harbor, which is located immediately south of the campus. The university's facilities must comply with the City of St. Petersburg and the Southwest Florida Water Management District (SWFWMD) stormwater quality and quantity regulations.

In addition to the storm sewer pipelines, the campus is served by eleven dry retention ponds and two wet detention ponds, which provide treatment for stormwater runoff. The proposed plan will eliminate some existing dry ponds, which may be relocated, reconfigured, or replaced by underground stormwater vaults. The projected stormwater treatment systems will be determined during design.

(4) 6C-21.207 (2) Analysis Requirements

(A) Facility capacity analysis, by geographic service area, indicating capacity surpluses and deficiencies for 1) Existing conditions, based on the facility design capacity and the current demand on facility capacity; and 2) The end of the planning time

frame, based on the projected demand at the current level of service standards for the facility, projected student populations, and land use distributions, and any available existing surplus facility capacity.
A treatment credit accounting system should be established for the campus.

(B) The general performance of existing stormwater management facilities, evaluating the adequacy of the facility's current level of service, the general condition and expected life of the facility, and the facility's impact upon adjacent natural resources.

As a condition of the SWFWMD permit, each stormwater system must be inspected by a Florida-registered professional engineer on an annual or biannual basis; and an inspection report submitted to the Tampa Service Office of SWFWMD. Inspection work is currently being performed under the direction of Facilities Services.

(C) An analysis of the problems and opportunities for stormwater management facility expansion or replacement meets the university's projected needs.

Due to the campus's city-block configuration and existing utilities within the rights-of-way, stormwater facilities may need to be accommodated through several solutions. Opportunities include integrating stormwater treatment into plaza areas and underground vaults. The incorporation of stormwater ponds within the proposed green space and park area along Bayboro Harbor should also be explored. Considering the city block layout of the campus, stormwater treatment should be addressed on a case-by-case basis. Since the campus discharges directly into Bayboro Harbor, a designated Outstanding Florida Waters (OFW), the required treatment volume must include 50% additional volume.

(D) Existing regulations and programs which govern land use and development of natural drainage features shall be analyzed, including the strengths and deficiencies of those programs and regulations in maintaining the functions of natural stormwater management features.

The University of South Florida and the City of St. Petersburg have executed an agreement governing future development within the USF St Petersburg campus. The Agreement intends to establish an orderly process by which the university will interface with the City in the coming years regarding its future development. The Agreement sets the scope of the university's future growth, the impacts of that development, the improvements necessary to accommodate future development, and fees for utility services. All campus development, as identified in the adopted USF St Petersburg Campus Master Plan, may proceed without further review by the City if it is consistent with the terms of the Agreement and the Campus Master Plan that was adopted in November 1995, amended in 1998, and 2002, and updated in 2004 and 2009.

All modifications to the stormwater management system at the USF St Petersburg campus will require reviewing by the City of St. Petersburg Engineering and the Southwest Florida Water Management District.

Potable and Reclaimed Water Sub-Element

(1) Purpose

The Potable Water goal for the USF St Petersburg campus plan is to provide an adequate potable water system that accommodates the future University potable water needs while correcting any existing facility deficiencies.

(2) 6C-21.207 (4) Data Requirements

(A) An inventory of existing potable water facilities on the campus (map, narrative) indicating location and sizes of primary distribution lines.

Since the 1995 Master Plan, reclaimed water and potable water systems have been expanded on campus. Two one-block loops have been completed east and west of Third Street South, between Fifth and Sixth Avenues South. An irrigation loop encompassing the main campus and the peninsula has also been completed. Several meters have been added to the systems. The potable water piping system is shown in Figure 7A-b.

There are currently no moratoriums for water (potable, fire, or reclaimed) service laterals. There is presently no moratorium on the extension of reclaim water mains.

(B) For facilities shared with the host community, a description of the facility's proportional capacity is required to meet existing university needs, including a description of any capacity that may have been previously allocated to the university by the host community.

The City of St. Petersburg provides potable water to the USF St Petersburg campus. In 2011, the City and USF entered into a Development Agreement where the City's level of service standard matched the 2005 per-capita demand of 125 gallons per day per capita (gdpc) on an Average Daily Flow (ADF) basis. The Agreement also set peaking factors for the Maximum Day Flow and Peak Hourly Flow of 1.25 and 2.10, respectively, and established a minimum pressure criterion of 20 psi.

The Development Agreement does not address fire flow demands. However, from discussions with the City Water Resources Department, the City requires a minimum of 1,000 gpm.

USF St Petersburg campus policy (Policy 7.5.1) for water mains to meet an average daily flow of 0.25 gpm/gross square foot of a building, a fire-flow demand of 3,000 gpm (for 4 hours), and maintain a minimum pressure of 40 psi. The St. Petersburg Fire Department determines fire flow requirements for individual buildings. Hydraulic modeling in 2006 verified that the Downtown trunk primary system would provide the year 2030 maximum day demand plus a 10.8 mgd fire demand with a minimum pressure of 35 PSIG. Fire flow rates available from mains <12" diameter will be less, dependent on location, and determined by individual fire hydrant flow testing.

Reclaimed water is available to the campus to reduce potable water demands. The City has recently updated its reclaimed water system, which the campus uses for irrigation. For these reasons, minimal improvements will be necessary since providing potable water to the campus rests with the City of St. Petersburg.

Maintenance of lines from the meters into the buildings is the responsibility of the university. Meters are variously owned and maintained by the university or by the City.

(C) Potable water facility data

The potable water facilities provided by the City of St. Petersburg, located within and near the campus, include the following:

- 16 & 12-inch trunk mains along 6th Avenue and First, Third, and Fourth Streets,
- 8 & 6-inch distribution mains along internal and perimeter streets,
- ¾ to 2-inch domestic service mains serving individual buildings and
- 6 & 8-inch diameter fire mains and fire hydrants throughout the campus.

Future potable, fire, and reclaimed water service laterals are expected; however, no new water distribution mains are anticipated.

(3) Summary of Inventory Findings

Through the Development Agreement between the City and USF, the City will provide additional capacity as needed for future expansion at the level of service standards cited in the Development Agreement.

(4) 6C-21.207 (5) Analysis Requirements

(A) Facility Capacity Analysis

The City water treatment facility's capacity is 68 million gallons per day. The current daily demand for potable water within the peninsula area and the main campus is 1.52 million gallons.

There are no identified deficiencies on campus. Future capacity is to be provided by the City, per the Development Agreement.

(B) The general performance of existing potable water facilities, evaluating the adequacy of the facility's current level of service, the general condition and expected life of the facility, and the facility's impact upon adjacent natural resources.

The St. Petersburg Fire Department determines fire flow requirements for individual buildings. Hydraulic monitoring in 2006 verified that the Downtown trunk primary system would provide the year 2030 maximum day demand plus a 10.8 mgd fire demand with a minimum pressure of

35 PSIG. Fire flow rates available from mains <12" diameter will be less, dependent on location, and determined by individual fire hydrant flow testing.

(C) An analysis of problems and opportunities for potable water facility expansion or replacement to meet projected needs of the university

All development proposed in this MP is approved by the City and accommodated in the Development Agreement.

(D) A description of the campus underground hydrology, including its potential for use as a potable water source.

Located between downtown St. Petersburg and Bayboro Harbor's urban framework, the underlying aquifer is not suitable for use as a potable water source due to the potential for saltwater intrusion. The City's reclaimed water system is used for irrigation for the same reason.

(E) An analysis of the existing local, state, and federal regulations governing potable water systems.

In preparing building plans and submitting local permits, the USF St Petersburg campus will include an application to the Florida Department of Environmental Protection (FDEP) for any extensions of the existing water system for 2-inch mains and larger. Providing potable water must comply with a series of regional, state, and federal regulations. For permitting a building with a water connection less than 2-inch in diameter, only the City will be involved. FDEP is responsible for ensuring compliance with the Florida Department of Environmental Protection (FDEP) regulations.

(4) Summary of Findings

Per the City's Development Agreement, future demands, including fire flows, accommodate the City.

Samitary Sewer Sub-Element

(1) Purpose

The Sanitary Sewer goal for the USF St Petersburg campus plan is to provide an adequate sanitary sewer collection system that accommodates the future University sanitary sewer needs while correcting any existing facility deficiencies.

(2) 6C-21.207 (7) Data Requirements

(A) An inventory of the existing sanitary sewer system on campus

The City of St. Petersburg owns and operates the sanitary collection system and provides treatment at the Southwest Water Reclamation Facility (SWWRF). Dames & Moore completed a Campus Sanitary Sewer Assessment Study based on the information addressed in this study. The sanitary sewer system is adequate to provide the required level of service for the campus over the study period.

(B) For facilities shared with the host community

The City's collection system conveys all campus-discharged wastes to the SWWRF. Those lines existing within the rights-of-way are owned and maintained by the City. Those lines remaining in abandoned rights-of-way continue to be owned and maintained by the City through easements. Those lines within the peninsula area are owned and maintained by the university.

(C) Sanitary Facilities Data

Facilities located within or near the campus are:

- gravity sewers along First Street and in alleys between 1st St. S. and 4th St. S. from 11th Ave. S. to 6th Ave. S and Seventh Avenue,
- force main in 1st S., 6th Ave. S., 3rd St. S and 11th Ave. S
- various 6 to 10-inch gravity sewers serving buildings.

(3) Summary of Inventory Findings

The condition of the City's overall collection system was the object of a comprehensive Sewer System Evaluation Study completed in March 1998. This report does not identify any critical areas of concern in the system's portion that serves the campus.

(4) 6C-21.207 (8) Analysis Requirements

(A) A facility capacity analysis, by geographic service area, indicating capacity surpluses and deficiencies for 1) existing conditions, based on the facility design capacity and the current demand on facility capacity; and 2) the end of the planning time frame, based on the projected demand at the current level of service standards for the facility, projected student populations, and land use distributions, and any available existing surplus facility capacity.

The Dames & Moore study found that the City's facilities are modern, well operated, and have sufficient capacity to accommodate the university's current quantity of raw wastes. The condition remains unchanged.

(B) The general performance of existing sanitary sewer facilities, evaluating the adequacy of the facility's current level of service, the general condition and expected life of the facility, and the facility's impact upon adjacent natural resources.

The SWWRF has a permitted capacity of 20 MGD and can adequately handle future developments at USFSP. The City has established the following level of service standards for sanitary sewer:

SWWRF___161 gallons per person per day.

(C) Analysis of problems and opportunities for sanitary sewer facility expansion or replacement to meet projected needs of the university

The university will continue to contribute a relatively small proportion of the City's three main sewers' overall capacity within and near the campus. It will not be necessary for the City to install additional sewers to serve future buildings. There has been no change in this condition.

(D) An analysis of the existing local, state, and federal regulations governing sanitary sewer collection and treatment systems.

In addition to previous requirements, the University and the City have entered into a Development Agreement intended to govern the campus's future development.

The FDEP regulates the SWWRF. Sewer main and connections will require a DEP permit. Upon applying for appropriate permits with the City, the applicant must submit anticipated wastewater requirements. Several regulations govern wastewater treatment and their facilities. In summary, the City is governed by the Federal Water Pollution Control Act, which the US Environmental Protection Agency (EPA) implemented at the Federal level. The FDEP is responsible at the State level.

Solid Waste Sub-Element

(1) Purpose

The Solid Waste goal for the USF St Petersburg campus plan is to provide future University solid waste collection and disposal requirements in a safe, cost-effective, environmentally sound, and aesthetically satisfactory manner.

(2) 6C-21.207 (10) Data Requirements

(A) An inventory of the existing solid waste collection and disposal systems on the campus (map, narrative), including facilities for the storage and disposal of hazardous and medical wastes.

Located on the campus are thirteen solid waste receptacles, totaling a capacity of 93 cubic yards. The Marine Science Laboratories, located on the peninsula, and Children's Research Institute are generators of hazardous waste. The dumpsters, which the City of St. Petersburg maintains, collect the solid waste only three times a week. Environment Health & Safety, USF Tampa has the hazardous waste picked up every month by The Environmental Quality Company.

(B) The amount of the solid waste generated by the university

The university currently produces approximately 9,580 cubic yards per year of solid waste plus 2000 – 3000 cubic yards per year of recyclable solid wastes

(C) For facilities shared with the host community, a description of the facility's proportional capacity is required to meet existing university needs, including a description of any capacity that may have been previously allocated to the university by the host community.

The City, through its Comprehensive Land Use Plan, has implemented a concurrency management system. Through its permitting procedures, the City monitors the solid waste generated or anticipated on an annual basis. This monitoring helps determine whether the expansion of disposal facilities needs addressing; however, as indicated, there appear to be no immediate limitations regarding solid waste disposal regarding the USF St Petersburg campus Master Plan or development agreement.

(D) Operation responsibility, demand, capacity, and service

The City of St. Petersburg is responsible for collecting solid waste on the USF St Petersburg campus. The solid waste, which is collected two to four times a week, is separated. The burnable waste is transported to the Pinellas County Refuse to Energy Incinerator located in Pinellas Park. The non-burnable, non-recyclable, solid waste is transported to the Pinellas County landfill. The City of St. Petersburg has mandated a 10 percent recycling of all solid waste, which the university has exceeded. Hazardous wastes are disposed of according to all federal, state, and local regulations.

The Marine Science Laboratory is a generator of the hazardous waste transferred once weekly, including any chemical, nuclear and other materials, by Health and Safety. The disposal location information has not been provided. Any contaminated engine oil or fuel oil is transported monthly to a disposal unit in Tampa. Hazardous wastes are disposed of according to all federal, state, and local regulations.

(3) 6C-21.207 (11) Analysis Requirements

(A) Facility Capacity Analysis,

The solid waste, which is collected two to four times a week, is separated. The burnable type waste is transported to the Pinellas County refuse-to-energy incinerator located in Pinellas Park. The non-burnable recyclable solid waste is transported to the Pinellas County landfill. In 2007, the City of St. Petersburg adopted a level of service of 1.304 tons per person per year for solid waste disposal. In 2007, the demand for solid waste service was 0.97 tons per person per year.

The university currently produces 9,580 cubic yards per year of solid waste plus 2000 – 3000 cubic yards per year of recyclable solid wastes.

The City of St. Petersburg's current comprehensive plan indicates a level of service of 1.304 tons per person and an expectation that the City can accommodate expected solid waste disposal needs through 2025. The City aims to increase its recycling capacity to 25% of solid waste and work with Pinellas County to maintain county-wide recycling at 30%.

(B) The general performance of existing collection and disposal facilities, evaluating the adequacy of the facility's current level of service, the general condition and expected life of the facility, and the facility's impact upon adjacent natural resources.

Solid waste for the campus is collected two to four times a week and separated. This program appears to be acceptable to the general performance of solid waste collection. According to the City's Comprehensive Plan, the solid waste collection system and refuse-to-energy facilities can accommodate the university's expansion.

The university has modified the existing solid waste collection locations for more straightforward service and avoided potential pedestrian conflicts.
The university has established a unified screening program for solid waste collection locations.
The university is satisfied with its services.

(C) An analysis of the problems and opportunities for solid waste collection and disposal facility expansion or replacement to meet the projected needs of the university

The Downtown's geometric block pattern for the master plan establishes convenient service corridors to the buildings by utilizing existing alleys as service corridors and pedestrian walkways in off-peak hours. Opportunities to separate existing service areas from major pedestrian and access points should be considered to develop individual architectural building programs.

Procedures to reduce University-generated solid waste and increasing recycling and re-use programs are continuously being improved.

.

(D) An analysis of the existing local, state, and federal regulations governing solid waste collection and disposal systems

In 1976, the US Congress adopted the Resource Conservation and Recovery Act (RCRA) to address the issues associated with hazardous waste management. The RCRA requires that states develop and implement their hazardous waste programs. As a result of this adoption, various regulations have been implemented from one federal agency to another, causing increasing complexity. Shipper, carriers, and disposers have to comply with regulations under RCRA, the Florida Department of Transportation, the Hazardous Material Transportation Act, and the EPA Clean Water Act. The Toxic Substance Control Act, the Clean Air Act, Comprehensive Environmental Response Compensation and Liability Act (SUPERFUND), and the Occupational, Safety, and Health Act.

In 1980, the Florida legislature adopted Hazardous Waste Guidelines in conjunction with the EPA regulations. In 1985, the Florida legislature adopted a "Right to Know Law," advising employees that employers are required to tell employees of any chemicals or hazardous waste in the workplace. This law also requires companies to inform the local fire department of these hazardous materials to be located within the facility.

The university should establish a level of service of 0.015 cubic yards per square foot annually for solid waste collection, based on the 1995 Master Plan. This has been accomplished.

(E) An assessment of opportunities or available and practical technologies for reduction, recycling, and re-use of solid waste generated by the university

There are three basic approaches to recycling. They are as follows:

- Removing recyclable materials before they are discarded into solid waste containers to be picked up.
- Removing recyclable materials from the mixed sold waste at a central processing facility.
- Removing recyclable materials after incineration.

Recovery of contamination recyclable materials based on material contamination, public participation, and program decisions. Generally, public participation and recycling programs are more effective than drop-off centers.

(F) An analysis of the terms of any agreements for the collection and disposal of University-generated solid waste, including allocated capacity and service duration. Identify any future limitations on university development resulting from these factors.

Per the Development Agreement between the University and the City of St. Petersburg, the City provides solid waste collection and disposal services to the USF St Petersburg campus. Located on the campus are thirteen solid waste receptacles with a total capacity of 93 cubic yards. Solid waste is collected three times weekly. The City reviews each master plan update and any new University developments, and any capacity issues that would arise at that time.

Element 7A:

St Petersburg Utilities

Element 7A Utilities

Hot Water and Chilled Water Sub-Element

(1) Purpose

This sub-element aims to ensure adequate hot water and chilled water to meet future University needs.

(2) Data Requirements for Hot and Chilled Water

(A) Inventory of Existing Hot Water (2 Pipes for Hot Water) Distribution Systems

The central hot water system serving all buildings on campus has been deleted. Individual boilers have been provided at each building or building cluster to operate the heating and potable hot water requirements.

The campus buildings utilize distributed hot water systems and electric heat.

Data A Chilled Water Inventory of Existing Chilled Water Facilities

The available chilled water capacity at the present configuration is 4,000 tons, with two (2) 1,000-ton water cooled chillers installed in 1998 and two (2) 1,000-ton water-cooled chillers established in 2006/2007. The two chillers that were installed in 1998 were rebuilt in 2021, extending their useful life by an additional five years. Water is circulated through each chiller by a dedicated constant-volume primary chilled water pump. The primary chilled water pumps for chillers 1 and 2 are sized at 2,200 GPM and 45' of the head (40 HP each). The primary chilled water pumps for chillers 3 and 4 are sized at 1,840 GPM and 42.6' of the head (25 HP each). The 2006/2007 chiller addition was configured to reflect a move toward higher differential supply/return temperatures to reduce flow rates and resultant energy costs. The fourth chiller provides the plant with a 100% firm redundancy considering a 3,000-ton load.

The condenser water system located in the Central Utility Plant (CUP) consists of four (4) 1,000 ton rated cooling towers. There are four condenser water pumps, one dedicated to each chiller using standard supply/return headers. The condenser pumps are all rated at 2,500 GPM and 60' of the head (60 HP each). The filter media in all towers was replaced in 2021, thereby greatly extending the useful life if the towers.

The existing chilled water distribution system consists of three variable volumes 4,000 GPM @ 130' (200 HP each) chilled water circulating pumps and underground piping. A variable speed drive controls each pump. The main chilled water piping is sixteen inches (16") from the CUP. The recently installed underground chilled water piping north (1994), west (1999), and south (2001) of the CUP is in good condition. The east loop pumping distribution system can pump up to 5,000 GPM efficiently (<8 fps), which could be increased to 5,600 GPM (9 fps) under peak conditions. This equates to a maximum of 3,000 tons of cooling during peak conditions.

The site chilled water distribution system was recently (2006/2007) configured to support an east loop (in place) with provisions made to include a future west loop. Only the east loop is in place.

There is adequate redundancy in the system. See Tables 10-C2 to 10-C5 for a listing of the significant cooling equipment.

(B) Summary of Inventory Findings

- All buildings are supplied hot water from independent boilers or use electric heat. The hot water piping coming from the CUP has been abandoned. The chilled water piping in those areas has been replaced. The hot water piping has been phased out with the installation of independent decentralized boilers.
- The heating system arrangement provides no firm capacity.
- Chilled water is produced at the CUP and is distributed via underground piping to most of the campus buildings for cooling. The chilled water system has previously experienced low-temperature differentials, potentially impacting future chiller plant pumping and cooling capacity. A complete central energy management system exists to take advantage of energy and operating saving measures.

(2) Analysis Requirements for Hot and Chilled Water

(A) Facility Capacity Analysis

All future buildings should be provided with local hot water boilers or electric heat. Electric heat offers the lowest first cost, while the local boiler configuration provides the lowest life cycle cost.

The available chilled water capacity of 4,000 tons at the CUP will meet the current and the proposed cooling loads. Pumping and distribution capacity can accommodate up to 3,000 tons. For the USF St Petersburg campus to use the full 4,000-tons of main plant cooling capacity, the west loop will have to be developed. The underground piping structure to the south portion of the campus has been modified to accommodate the campus growth.

(B) General Performance of Existing Hot and Chilled Water Facilities

The heating system appears to be operating near optimum condition. The existing hot water system capacity meets the current load but lacks any firm redundancy.

The existing chiller arrangement with secondary pumping configuration allows energy conservation opportunities, especially as the remaining campus buildings are connected to the central energy management system. Building HVAC systems are renovated and connected to the central chilled water system.

The existing chilled water facilities are operating near their optimum performance, but improvements to increase the system chilled water temperature differential from 8-10 degrees (current) to 15 degrees (design standard) should be considered. The goal is to design all future buildings and air handling units with a 15 degree supply/return water temperature differential. However, a 13-degree differential should be the expected best performance achievable for the short term due to the number of 10-degree differential AHUs present. The chillers, pumps, and towers can support a 15-degree differential.

(C) Assessment of Technologies to Reduce University Energy Consumption

The central hot water heating plant has been phased out to take advantage of more energy-efficient local heating plants and electric heat, whichever proves to be the most energy-efficient based upon a life cycle cost analysis.

The long-range plan design includes utilizing the primary/secondary system with variable speed secondary loop pumps to provide part load energy savings coupled with integrated building control strategies. The installation of two-way coil control valves has set the stage for reduced pumping requirements. Future renovations should continue to install 2-way valves and integrated energy management controls. Future equipment shall be selected for a 15-degree water temperature differential. Since no apparent design standard for pressure available and pressure drops across a building exists, it is strongly suggested a building pressure drop standard be developed for use as new buildings are designed.

The underground chilled water piping has been extended and now connects the peninsula facilities to the CUP, which provides substantial energy cost savings.
Variable speed drives have been installed on the cooling tower fans. High-efficiency motors are utilized for the CUP equipment.

The use of airside heat recovery (by enthalpy wheels, etc.) should be considered with future HVAC systems to minimize cooling and heating plant peaks.

Element 2: Electrical Power and Other Fuels Sub-Element

(1) Purpose

This sub-element aims to ensure adequate electrical power and other fuel (natural gas) supplies to meet future needs.

(2) Data Requirements for Electrical Power and Other Fuels

Electrical Data A: Inventory of Existing Electrical Power Distribution System

Electrical service to the USF St Petersburg campus is provided by Duke Energy (DE). DE delivers power to the campus through two methods: a) direct secondary service to buildings from existing DE-owned distribution and b) through a primary metered high voltage campus loop system also owned by DE. In the campus's primary metered loop portion, DE owns and maintains the primary distribution system cables and transformers, switchgear, and some manholes that serve the various buildings. The conduit and other manholes are installed, owned and

maintained by the USF St Petersburg campus. Other buildings on the campus are operated directly from PES facilities from the public thoroughfares.

The campus is served from DE at 12.47 kV. Service is from the utility grid; however, the closest generating plants are the Bartow, Hines, and Crystal River Complexes. There are presently nine transformers on the primary metered loop that serves various buildings. Transformers range in size from 500 kVA to 1500 kVA. Primary metered loop service conductors are three number 1/0 aluminum 15 kV cables for the area. The other buildings on campus are served from 19 transformers ranging in size from 20 to 750 kVA.

DE has a 12,406 kVA capacity at present to serve the entire campus. The capacity for just the primary metered loop service portion of the campus is 6,700 kVA. DE has no immediate plans to increase the service capacity. The service capacity provided by DE is increased as the load is increased/added on campus.

Electrical Data A **Inventory of Existing Electrical Power Distribution System**

Gas Data B **Inventory of Existing Natural Gas Distribution System**

Natural gas lines are located underground and vary in size from 1½ inch to 6 inches in the campus's vicinity. There are 14 accounts, and each meter represents an account. Natural gas is supplied to the USF St Petersburg campus by TECO People's Gas.
Natural gas is used for service water heating, space heating, reheat, laboratory activities, and cooking. Substantial users are Residence Hall One, Osprey Hall, Children's Research Institute, Coquina Hall, and the Campus Activity Center.

Fuel Data C **Inventory of Other Fuel Storage or Distribution Facilities on Campus**

There are Ten emergency generators located on the campus and listed below:

- Knight Research Center- 600kW Diesel
- Davis Hall, Bayboro Hall, Coquina Hall, Central Utility Plant- 350 kW (located at CUP) Diesel
- Peter Rudy Wallace Florida Center for Teachers- 40 kW Diesel
- Children's Research Institute - 500 kW Diesel
- Fifth Ave. South Parking Facility -_100 kW Natural Gas
- Residence Hall One - 125 kW Natural Gas
- Science Technology and General Academic Facility - 125 kW Natural Gas
- Davis Hall Information Technology - 100 kW Natural Gas
- College of Business – 250 kW Natural Gas
- Osprey Hall – 250 kW Natural Gas

At each diesel generator location, there is a double-wall aboveground fuel storage tank of varying capacities. No other fuel storage distribution facilities were identified on campus.

(3) Analysis Requirements for Electrical Power and Other Fuels

Electrical Analysis A **Performance of Existing Electrical Power and Other Fuel Facilities**

An existing electrical distribution system for the campus combines a loop system and direct service connection to the utility system. The electrical distribution system performs well, and no significant problems were reported regarding PES reliability or quality.
Power quality is being addressed by installing transient voltage surge suppression equipment at each building's main services throughout the campus.

Parking Lot Site lighting is leased from DE. This is a very cost-effective method for this type of system. DE provides maintenance.
The existing natural gas distribution system is performing well, and no problems were reported.

Future construction plans show that several portions of the campus will require that the Facilities Planning and Construction Services department conduct extensive coordination and negotiations with the serving utilities regarding relocation or vacation of existing overhead and underground utilities. The associated facilities charges for these activities can be very high.

Electrical Analysis (B) Facility Capacity Analysis

Electrical facility analysis is based on the following growth factors:

- Capacity requirements are 2.9 watts per square foot of gross building area.
- Energy requirements are 16.8 kWh per square foot of gross building area.
- Operating cost increases are $.10 per square foot of gross building area.

Natural gas facility analysis is based on the following growth factors:

- Capacity requirements are not helpful to be calculated as a campus due to the mix of electric and gas-fueled heat.
- Energy requirements are .21 therms per square foot of gross building area.
- Operating cost increases are $.23 per square foot of gross building area.

There is adequate electrical service capacity to the campus to accommodate the 5-year program by extending the existing PES primary distribution system and the use of individual service extension to new buildings.

There is adequate natural gas service capacity to accommodate the five-year program by direct service extensions from the existing distribution system.

Electrical Analysis (C). Assessment of Opportunities or Technologies to Reduce University Energy Consumption

The following should be considered for the existing and new building lighting systems:

- Use of LED exit lights.
- Use of LED lighting for all interior lights.
- Use of infrared and ultrasonic motion sensors for control of interior lighting.
- Use of LED lighting for exterior lighting.

The following should be considered for natural gas equipment:

- Purchase energy-efficient cooking appliances
- Purchase high-efficiency condensing boilers.
- Continue to investigate long-term gas purchases with wellhead providers.
- Consider using Life Cycle Costing Analyses for heating/gas use on new and renovated buildings.

Sub element 3: Telecommunications Sub-Element

(1) Purpose

The purpose of this sub-element is to ensure the provision of adequate cable capacities and distribution facilities for telecommunications systems required to meet current and future needs.

Data Requirements for Telecommunications

Telecom Data (A) Inventory of Existing Telecommunications System(s):

The local operating company is Verizon Communications Company. An underground system of conduits, owned and maintained by USF, provides telecommunications cabling to the campus buildings.

Cabling: USF has many single-mode fiber optic cables for high-speed data and video services. Horizontal wiring within buildings is Category 6 for higher-speed data network applications. Improvements have included rebuilding the main telephone room and Main Data Distribution Facility (MDF) in Davis Hall. The capacity for additional expansion is limited. Future planning should consist of an auxiliary wiring center's provisions at another location in proximity with planned growth to minimize extensive infrastructure improvements. This facility also provides data services for All Children's Hospital.

Telecom Data (B) Inventory of Electromagnetic Fields

Radio: There are radio broadcast systems on campus.

Microwave: There are microwave transmission/reception facilities on campus. These will be updated, and others will be added or deleted as required. All microwave equipment under the Federal Communications Commission's jurisdiction is required, upon licensing, to demonstrate that electromagnetic fields radiating from the equipment will not adversely affect the environment.

Satellite Transmission/Reception: Many satellite transmission/reception facilities on campus are used by the marine science programs. These will be updated, and others will be added or deleted as required.

There are no other inventories or studies of electromagnetic field generators on campus.

Telecom Data (C). Inventory of Electromagnetic Fields (if any) Emanating from any Telecommunications Transmitter that Poses a hazard to Persons or Equipment.

None were identified

Analysis Requirements for Telecommunications

Telecom Analysis (A). General Performance of Existing Telecommunication Systems

USF St Petersburg campus has implemented a campus-wide ethernet and voice-over IP (data network-based) telephony system. All telephone systems now operate off the same lines as the computer/digital data networks.

Telecom Analysis (B). Facility Capacity Analysis

Currently, the telecommunications system is operating using Single Mode Fiber from FPF for all new buildings

The underground conduit was added with the last site chilled water piping upgrade. Exact changes cannot be projected without an additional detailed study of conduit fill and cable types in place in the existing infrastructure.

Telecom Analysis (C) Potential Electromagnetic Hazards and Analysis of Mitigation Measures

Due to the apparent number of electromagnetic field generators on campus, electromagnetic hazards could be an issue; however, no inventories or previous studies were available to validate this possibility.

The USF St Petersburg campus plan recommended preparing to implement a high-speed integrated voice/data/video campus backbone. This would potentially consist of using 50-micron multi-mode fiber rated at 10 GB speeds in place of 62.5-micron backbone fiber runs. For longer distances, the use of 10GB single-mode fiber should be planned.

To support implementing the imminent high-speed video to the desktop, future horizontal distribution runs (and any renovated areas) should use the CAT6 wiring instead of currently used CAT5e cabling.

Table 10 C-2 Chilled Water System Equipment – Main Plant

Chiller	Type	Refrigerant Type	Rated Tons	GPM	Delta T Deg. F	Year Mfr.
1	Trane/Centri.	R-123	1,000	2200	11	1995
2	Trane/Centri.	R-123	1,000	2200	11	1995
3	Trane/Centri.	R-123	1,000	1840	13	2006
4	Trane/Centri.	R-123	1,000	1840	13	2006
Total Actual Capacity			**4,000**	**Tons (nominal)**		

Note: Chillers #1 & #2 were rebuilt in 2021.

Table 10 C-3 Chilled Water Pumps – Main Plant

Pump No.	Type	GPM	TDH (FT)	HP	Year Mfr.	MFR	Notes
Pchwp-1	Centrifugal	2,200	45	40	1995	B&G	Constant speed
Pchwp-2	Centrifugal	2,200	45	40	1995	B&G	Constant speed
Pchwp-3	Centrifugal	1,840	42.6	25	2006	Armstrong	Constant speed
Pchwp-4	Centrifugal	1,840	42.6	25	2006	Armstrong	Constant speed
Schwp-1	Centrifugal	4,000	130	200	2006	Weinman	Variable frequency drive

Schwp-2	Centrifugal	4,000	130	200	2006	Weinman	Variable frequency drive
Schwp-3	Centrifugal	4,000	130	200	2006	Weinman	Variable frequency drive
SCHWP Total Capacity		**12,000**	**GPM**				

Table 10 C-4 Condenser Pumps – Main Plant

Pump No.	Type	GPM	TDH (ft)	HP	Year Mfr.	MFR
Cwp-1	Centrifugal	3,000	60	60	1995	B&G
Cwp -2	Centrifugal	3,000	60	60	1995	B&G
Cwp -3	Centrifugal	2,500	61	60	2006	Armstrong
Cwp -4	Centrifugal	2,500	61	60	2006	Armstrong
Total GPM		**11,000**				

Table 10 C-5 Cooling Towers – Main Plant

CLG Tower No.	Manu	Fan No.	HP per Fan	CAP Nom. Tons	Year Mfr.	Notes
CT-1	B.A.C.	1	75	1,000	2006	VFD
CT -2	B.A.C.	1	75	1,000	2006	VFD
CT -3	B.A.C.	1	75	1,000	2006	VFD
CT -4	B.A.C.	1	75	1,000	2006	VFD
Total Capacity				**4,000**	**Nom Tons**	

Note: All four cooling towers were rebuilt in 2021.