
FAU TREASURE COAST MASTER PLAN

UTILITIES ELEMENT (CHILLED WATER)

Goal 1

Develop an energy efficient, environmentally safe individual chilled water production system for each new facility added to the campus.

Objective 1A

The existing building is served by a 4-zone, split system heat pump.

Policy 1A-1

There is no existing steam or chilled water system service.

Policy 1A-2

There are no existing steam or chilled water systems to replace.

Policy 1A-3

There are no existing off campus steam or chilled water systems. There is no need for an off-campus steam or chilled water service.

Policy 1A-4

There is no need for a steam or chilled water system for the existing facility in the future.

Policy 1A-5

Replace any existing illegal refrigerants with the most environmentally safe refrigerants available.

Policy 1A-6

Replace HVAC equipment at the end of it's life with high efficiency rating equipment to minimize electrical consumption.

Policy 1A-7

Provide regular maintenance as recommended by the equipment manufacturers.

Policy 1A-8

The existing facility is too small, and too distant to ever need steam or chilled water systems by a future improvement.

FAU TREASURE COAST MASTER PLAN

Objective 1B

Develop an individual chiller plant for each new facility, to meet the immediate future capacity requirements, and to allow for a 10% future increase in system capacity. This will eliminate the need for phasing in a central energy plant.

Policy 1B-1

Where the load permits, provide either a minimum of two chillers to serve each facility, or two independent circuits on each single chiller. This will provide redundancy and good partial load characteristics.

Policy 1B-2

Investigate the advantages and disadvantages of air-cooled versus water cooled chillers for each facility.

Policy 1B-3

Develop two (2) economic chiller sizes, one to meet low load conditions during winter and one to meet large summer loads. Size larger chillers with reliability constraint to meet critical cooling loads with one chiller out of service to existing facilities.

Policy 1B-4

Develop cooling tower arrangement with cells matched for chiller module sizes to provide reliability constraint to meet critical cooling loads with one cooling tower cell out of service.

Policy 1B-5

Design chillers that utilize the most environmentally safe refrigerants available.

Policy 1B-6

Design chiller plant equipment with high efficiency ratings to minimize electrical consumption.

Policy 1B-7

Provide regular maintenance as recommended by the equipment manufacturers.

FAU TREASURE COAST MASTER PLAN

Policy 1B-8

Provide variable speed pumps for the chilled water distribution which will provide better energy conservation.

Policy 1B-9

Provide on site systems for chilled water and heating. Off site systems should not be considered.

Objective 1C

Develop an agreement to purchase chilled water from IRCC for future facilities. This would minimize maintenance efforts, and increase reliability.

Policy 1C-1

Investigate the availability of the IRCC campus chiller plant to provide chilled water to future FAU facilities, with suitable redundancy.

Policy 1C-2

The system does not currently extend to the future building sites. Therefore, there are no deficiencies in the system.

Policy 1C-3

Coordinate the purchase of chilled water from IRCC at the first expansion programming phase. Ensure that adequate time is allowed to expand the chiller plant, allowing it to provide service to the new facilities at start-up.

Policy 1C-4

Reach an agreement with IRCC on chilled water purchase prices, schedules, and reliability prior to the first expansion.

Policy 1C-5

Encourage IRCC to sell chilled water at a \$/ ton-hr rate, regardless of the time of day.

Policy 1C-6

Extend oversized chilled water mains with each expansion to serve the future facilities.

FAU TREASURE COAST MASTER PLAN

Policy 1C-7

Design tertiary pumping with variable frequency drives to minimize pump energy.

Goal 2

Provide electric resistive heating for all buildings. There is not sufficient demand to provide steam heating.

Objective 2A

Do not use electric heating for re-heating. Electric heating should be used for heating only.

Policy 2A-1

Each project shall study using reclaimed heat for reheating and humidity control.

Goal 3

There will be no fuels utilized other than electricity on this campus.

FAU TREASURE COAST MASTER PLAN

UTILITIES ELEMENT (ELECTRICAL SUB-ELEMENT)

Goal 1

Provide an electrical power source to meet the demand for lighting, heating and air conditioning, and equipment power to adequately service the buildings and structures.

Objective 1A

The existing building is fed by a FP&L pad mounted transformer located adjacent to the building. The transformer is fed by an FP&L underground line which is fed from an FP&L overhead line running along University Boulevard. The overhead line is 23 kV.

Policy 1A-1

The existing service is 120/240 single phase 3 wire.

Policy 1A-2

The existing service should be replaced at the end of it's useful life with oversized conductors to reduce energy losses.

Policy 1A-3

The existing campus is fed from an FP&L 23 kV overhead line located on University Boulevard.

Policy 1A-3

Future capacity can easily be provide to the site from the existing FP&L substation which is located between Peacock Street and I-95 and is less than 1 mile from the campus.

Policy 1A-4

Provide oversized copper conductors on all feeders over 100A to reduce the facilities energy consumption.

Policy 1A-5

Provide load shedding on all facilities that are large enough to have an emergency generator. Usually this will be on facilities that require emergency power for elevators.

FAU TREASURE COAST MASTER PLAN

Policy 1A-6

Provide energy efficient lighting. Utilize T-8 lamps and electronic ballasts where applicable. Minimize the use of incandescent lighting. Reduce lighting design levels where possible.

Objective 1B

Expand Florida Power and Light's (FPL'S) power grid to provide service to the campus and maintain a highly dependable source of power.

Policy 1A-1

Coordinate final design of on site power distribution with FPL to ensure that they can meet projected service demand consistent with the University's projected population and growth.

Policy 1A-2

Establish easements for installation of FPL underground cables coordinated with other utilities.

Policy 1A-3

Coordinate construction phasing with FPL to provide uninterrupted power consistent with the University's plans for growth and development.

Policy 1A-5

Upgrade the power service from 120/240 volt single phase to either 277/480 volt three phase or 120/208 volt three phase depending on the new building sizes and loads.

Policy 1A-6

The University shall adopt the following procedures to reduce energy consumption:

- Specify high efficiency air or water cooled chillers.
- Set a goal of 1 watt per square foot for lighting design criteria
- Limit the use of incandescent lighting
- Provide high set points (78 degrees) for air conditioning
- Provide low set points (68 degrees) for heating
- Monitor the energy management system monthly to optimize energy consumption
- Specify high resistant values for wall and roof insulation
- Provide thermal storage systems

FAU TREASURE COAST MASTER PLAN

Provide energy efficient lighting controls
Set a goal of 750sf per ton for air conditioning
Provide glass with a low U factor and high shading coefficient
Set a goal to eliminate or greatly reduce heating
Monitor air quality to reduce the requirement for outside air

Policy 1A-7

Future power needs of the University will be provided by the local power company. The local power company shall provide and maintain medium voltage distribution systems and pad mounted transformers for these future needs. The university must provide and maintain a right of way for the local power company to provide this distribution system. Space must be provided with each new facility for the power company's pad mounted transformer. It will be the University's responsibility to provide power from the pad mounted transformers to the individual facilities service entrance equipment.

Policy 1A-8

Electrical power shall be provide to the University from the local power company at 480 volts 3-phase, 4-wire or at 208 volts 3-phase, w-wire depending on the size and electrical load of the facility. The local power company shall provide and maintain the medium voltage distribution systems and pad mounted transformers. Metering will be provided by the local power company but the meter can must be provided and installed by the University's electrical contractors. The metering can should be installed within 15 wiring feet of the transformer.

Policy 1A-9

The university must provide a right of way for the local power company's distribution system. This master plan provides a right of way for future local power company distribution systems. As new buildings are being planned and designed, consideration must be given to the extension of the right of way for the local power company so that power is assured to the new facilities. Any modifications to the master plan must consider future facilities.

Establish the timing or phasing requirements for electric power supply improvements to meet future University needs.

FAU TREASURE COAST MASTER PLAN

UTILITIES ELEMENT (ELECTRICAL SUB-ELEMENT)

Goal 2

Provide an electrical distribution system sufficient to accommodate long range growth and development.

Objective 2A

Provide a medium voltage primary service Right of Way for Florida Power and Light to all campus buildings.

Policy 2A-2

Establish a policy to use FPL pad mounted transformers for ease of maintenance and replacement.

Policy 2A-3

Locate pad-mounted transformers outside buildings.

Policy 2A-4

Expand utility distribution along roadways and service roads for ease of repair and maintenance.

Policy 2A-5

Establish a policy to provide spare conduits for electrical distribution from switchgear and manholes to buildings and structures.

FAU TREASURE COAST MASTER PLAN

UTILITIES ELEMENT (TELECOMMUNICATIONS SUB-ELEMENT)

Goal 1

Provide modern telecommunications connections from the local Telephone Company to meet the demand for telephone, data, voice and video service to the University's buildings and structures.

Objective 1A

Expand Local Telephone Company's (LTC) service to the campus.

Policy 1A-1

Coordinate final design of on site distribution with LTC to ensure that they have sufficient capacity to meet projected service demand consistent with the University's projected population and growth.

Policy 1A-2

Establish easements for installation of LTC's underground cables coordinated with other utilities.

Policy 1A-3

Coordinate construction phasing with LTC'S to provide uninterrupted service consistent with the University's plans for growth and development.

Policy 1A-4

Provide fiber optic service to all the campus facilities.

Policy 1A-5

Develop the distribution system to allow the running of category 5 unshielded twisted pairs from the central switch to every IRM jack. Each building should be provided with space for a Satellite Distribution Frame (SDF).

Policy 1A-6

Assure future expansions will migrate toward newer emerging technologies.

Policy 1A-7

Coordinate final design with LTC to ensure that future expansions can utilize the university operated switch.

FAU TREASURE COAST MASTER PLAN

Policy 1A-8

Provide fiber optic and ISDN service to the campus from the LTC.

Goal 2

Develop a telecommunications distribution system sufficient to accommodate long range growth and development.

Objective 2A

Develop a telecommunications distribution network to accommodate high speed voice and data transfer on and off campus.

Policy 2A-1

Provide a system for a high speed fiber optic backbone.

Policy 2A-2

Develop a structured cabled network for intra building and inter building connectivity consistent with the University's projected population and growth.

Policy 2A-3

Assure future compatibility with new emerging technologies for distribution networks.

Policy 2A-4

Establish a manhole and duct-bank system that will provide access to remote locations to facilitate distant learning.

Policy 2A-5

Provide a distribution network that operates at high data transmission rates and simultaneously interfaces dissimilar topologies.

Policy 2A-6

Develop a manhole and duct-bank system that could handle campus wide data highway that provides connectivity to building automation systems. Each building should be connected to a manhole with 2-4" conduits for voice, 1-4" conduit for the LTC, and 2-2" conduits for data.

FAU TREASURE COAST MASTER PLAN

Policy 2A-7

Standardize the surge suppression required for telecommunications cables.

Objective 2B

To provide adequate facility capacity to meet future needs of the University.

Policy 2B-1

Size and locate the main telecommunications room with adequate room to accommodate the future expansion of the university. Provide space for battery backup for the telephone switch that will ultimately service the entire university.

Policy 2B-2

Size the manhole and duct-bank system to accommodate the final build out of the university. Partial installation of duct-bank can be made during the different phases of the build out but these installations should always consider the final build out.

Policy 2B-3

Provide adequate conduits from the telecommunications manholes to each of the buildings it serves.

Policy 2B-4

The following procedures shall be adopted to ensure that future telecommunications system capacity and capital improvements required to meet future University needs are provided when required, based on needs identified in other master plan elements:

- The telecommunications department shall be notified of all new facilities being planned;
- The telecommunications department shall be notified of all facilities modifications;
- The telephone company shall be notified of all new facilities being planned;
- The telephone company shall be notified of all facilities modifications;
- The capacity for future growth of the main telephone switch shall be evaluated yearly;
- The capacity for future growth of the data network shall be evaluated yearly;
- The capacity for future growth of the energy management system shall be evaluated yearly;

FAU TREASURE COAST MASTER PLAN

- The capacity for future growth of the fire alarm system shall be evaluated yearly;
- The capacity for future growth of the security system shall be evaluated yearly.

Policy 2B-5

The master plan indicates that all the buildings will be tied together via a telecommunications manhole and duct-bank system. As each additional facility is added to the campus, the telecommunications manhole and duct-bank system must be evaluated to determine if it must be extended to pick up the additional facility. The master plan for the telecommunications manhole and duct-bank system should be evaluated at each stage of the master plan. This would be in the years 2004 and 2009.

Objective 2C

To provide reconfigurable high- speed data and video paths between "Information Outlets" and central locations. The systems shall provide an organized and efficient means of data distribution to a large number of users.

Policy 2C-1

Fully review the data requirements of new structures and determine the impact on the duct-bank system and the existing data backbone and routing system.

Policy 2C-2

Provide an adequate number of single mode and multimode fiber optic cables based on current capacity and projected needs.

Objective 2D

Standardize the horizontal and vertical building cable and termination techniques, outlet configuration and communication room sizes for new buildings.

Policy 2D-1

Horizontal and vertical building cable and termination techniques shall comply with EIA/TIA 568 and 569 standards.

FAU TREASURE COAST MASTER PLAN

Policy 2D-2

The minimum communications room size at the Main Distribution Frame and Intermediate Distribution frames shall be based on the IRM communication specification. Dedicated communication (IRM) closets should be provided on each floor of every building.

Policy 2D-3

Vertical riser pair counts shall be based on floor square footage and/or occupancy count.

Policy 2D-4

Horizontal cable runs shall not exceed 100 meters and shall be at least 3-4 pair, 24 AWG, enhanced category 5 cable.

Policy 2D-5

Communication outlets shall be modular and contain at least two voice jacks (RJ-45) and two data jacks (RJ-45) which terminate cables on 110 style terminations.

Objective 2E

To provide for increasing demands of large bi-directional digital data transfers generated by the availability of multimedia applications and the growth of instructional television and video teleconferencing.

Policy 2E-1

Fully review the backbone transport capacity to determine if adequate bandwidth is available and to expand the bandwidth by the addition of fiber paths and/or a change in transport system protocols.

Objective 2F

Standardize the site fiber cable and building termination methods.

Policy 2F-1

Site fiber optic cables shall be duct rated 62.5/125 micron, multi-mode, or 8.3/125 micron single mode, loose tube type, terminated on rack mounted fiber optic distribution frames using "ST" style connectors.

FAU TREASURE COAST MASTER PLAN

Objective 2G

Standardize the horizontal and vertical building fiber optic data cable and termination techniques and outlet configuration.

Policy 2G-1

Vertical risers shall be multimode fiber configured in a star or collapsed backbone arrangement with all routing equipment in a central location. Riser fiber shall terminate on rack mounted fiber optic distribution frames using "ST" style connectors.

Policy 2G-2

Horizontal cable runs shall not exceed 100 meters and shall be at least 4 pair, 24 AWG, enhanced category 5 cables.

Category 5 cables shall terminate on category 5, RJ-45 modular patch panels.

Policy 2G-3

Data communications jacks shall share the same outlet as the voice jacks and contain modular RJ-45 jacks.

Objective 2H

To provide a central campus location for all the telecommunications services which are distributed throughout the campus.

Policy 2H-1

Provide space in a central location for the main electronic equipment for the following systems:

Telephone
Data
Cable TV

Policy 2H-2

Provide office and maintenance space for the following personnel and systems:

Telephone, Data, and Security

FAU TREASURE COAST MASTER PLAN

Goal 3

Standardize the site cable demarcation/termination method and the type of surge protection required.

Objective 3A

To provide a uniform method for terminating the University's voice and data cable and to provide surge protection on all incoming telecommunication cables.

Policy 3A-1

Ensure that the standards are maintained for placement of the demark point (first floor with outside entrance), the expected conduit entrance size and number of conduits, the type of termination (110), and the protection type (solid state, gas tube or carbon block) and clamping voltage.

Goal 4

Determine Voice/Data/Fire Alarm requirements for the housing portion of the project.

Objective 4A

Provide state of the art telecommunications services to the dormitory rooms in any housing buildings.

Policy 4A-1

Provide data communications outlets (voice, cable, and data) in all the dormitory rooms which are connected to the campus data network.

Policy 4A-2

Connect the housing to the campus wide fire alarm system.

Policy 4A-3

Housing shall be connected to the campus telephone switch.

Policy 4A-4

Connect fire alarm system to the local Police station.

FAU TREASURE COAST MASTER PLAN

Goal 5

To provide building HVAC, lighting, power and domestic water heating systems and central plant chiller, water, heating and electrical distribution systems which are designed for maximum energy efficiency consistent with appropriate long term life cycle costs.

Objective 5A

To ensure that new buildings and campus systems meet the energy efficiency standards required by the Board of Regents and appropriate codes and standards.

Policy 5A-1

For each new building or campus system project review the program documents for reference to the State University System Professional Services Guide and Cost Containment Guidelines for the State University System of Florida. These documents require life cycle cost assessment of alternate system designs by comparing first costs, operating and maintenance costs. These alternates should be reviewed with the Design Professional at the start of each design project and, following the review procedures in the Cost Containment Guidelines, should be checked/reviewed during the design process.

Policy 5A-2

For each building renovation, include a review of existing systems to determine if system energy efficiency standards meet those required in the State University system Professional Services Guide and Cost Containment Guidelines for the State University System of Florida. If the existing system does not provide this level of service, determine if upgrading the system will be cost effective and worthwhile.