10 utilities

CHILLED WATER

GOAL 1: To provide efficient, reliable, chilled water service to all buildings on campus via district energy distribution system

The FAU Boca campus consists of central loop plants, and dedicated housing/ athletics plants at various locations. A breakdown of the plant capacities is as follows:

Building 5:

- Two (2) 1500-ton Trane Centrifugal (approximately 7 years old)
- One (1) 1500-ton Trane Centrifugal (approximately 23 years old)
- One (1) 1280-ton Trane Centrifugal (approximately 27 years old)

Satellite Plant:

- Two (2) 750-ton York water cooled centrifugal (approximately 20 years old)
- One (1) 1500-ton Trane Centrifugal (approximately 15 years old)

Building 67: (Not connected to loop)

- One (1) 300-ton Trane water cooled centrifugal (approximately 4 years old)

Building 38: (Not connected to loop)

- One (1) 300-ton Trane water cooled centrifugal (approximately 2 years old)

The engineering and utilities (E&U) loops consist of the main building 5 distribution and the satellite plant distribution loops. These plants serve the majority of the buildings on campus with the exception of the housing facilities.

Proposed facility growth to year 2028 indicates a potential increase in chilled water demand of approximately 6000 tons, including housing which is estimated at 2,000,000 sq-ft. Without the housing component the proposed facility growth is approximately 1800 tons.

Objective 1A: Provide adequate chilled water capacity and redundancy for existing and future needs.

- **Policy 1A-1:** The current net connected load should not exceed the plants ability to provide cooling to the campus in the event of a chiller failure (N+1 redundancy). The current net load with 20% diversity is approximately 3200-tons, which is within the limits of this policy.
- **Policy 1A-2:** Increase total available plant capacity to accommodate future growth. The proposed facility growth to year 2028 with 20% diversity is approximately 5000-tons.

Objective 1B: Provide adequate chilled water capacity and redundancy for existing and future needs.

- **Policy 1B-1:** Connect Satellite and building 5 plants near the intersection of university drive FAU boulevard. This loop connection will increase the available capacity and satisfy the requirements of policy 1A-2.

GOAL 2: Extend chilled water to the Henderson School.

Objective 2A: Provide the Henderson School with a reliable and constant cooling source while eliminating excess maintenance and lowering life cycle cost.

- **Policy 2A-1:** Provide extension of the main chilled water loop across East University for service to Henderson School. Chilled water would route below grade from the main loop over to the existing chiller plant and connect to the buildings existing primary pumps.

GOAL 3: To provide efficient operation and maintenance of building systems through a centralized intelligent building automation system.

Objective 3A: Develop a state of the art building automation platform that includes integration of work order management and other enhancements to improve the efficiency of campus operations.

- **Policy 3A-1:** Upgrade building automation systems so they integrate with work order management systems.
- **Policy 3A-2:** Upgrade building automation systems so they include automatic fault detection, trending of key performance indicators, and alarm management.

GOAL 4: Independent housing chiller plants.

Objective 4A: Maintain the current independent operations of stand-alone chiller plants that serve the student housing facilities.

- **Policy 4A-1:** Continue to provide independent, reliable, and efficient cooling plants for the housing facilities on campus through third party operations providers.

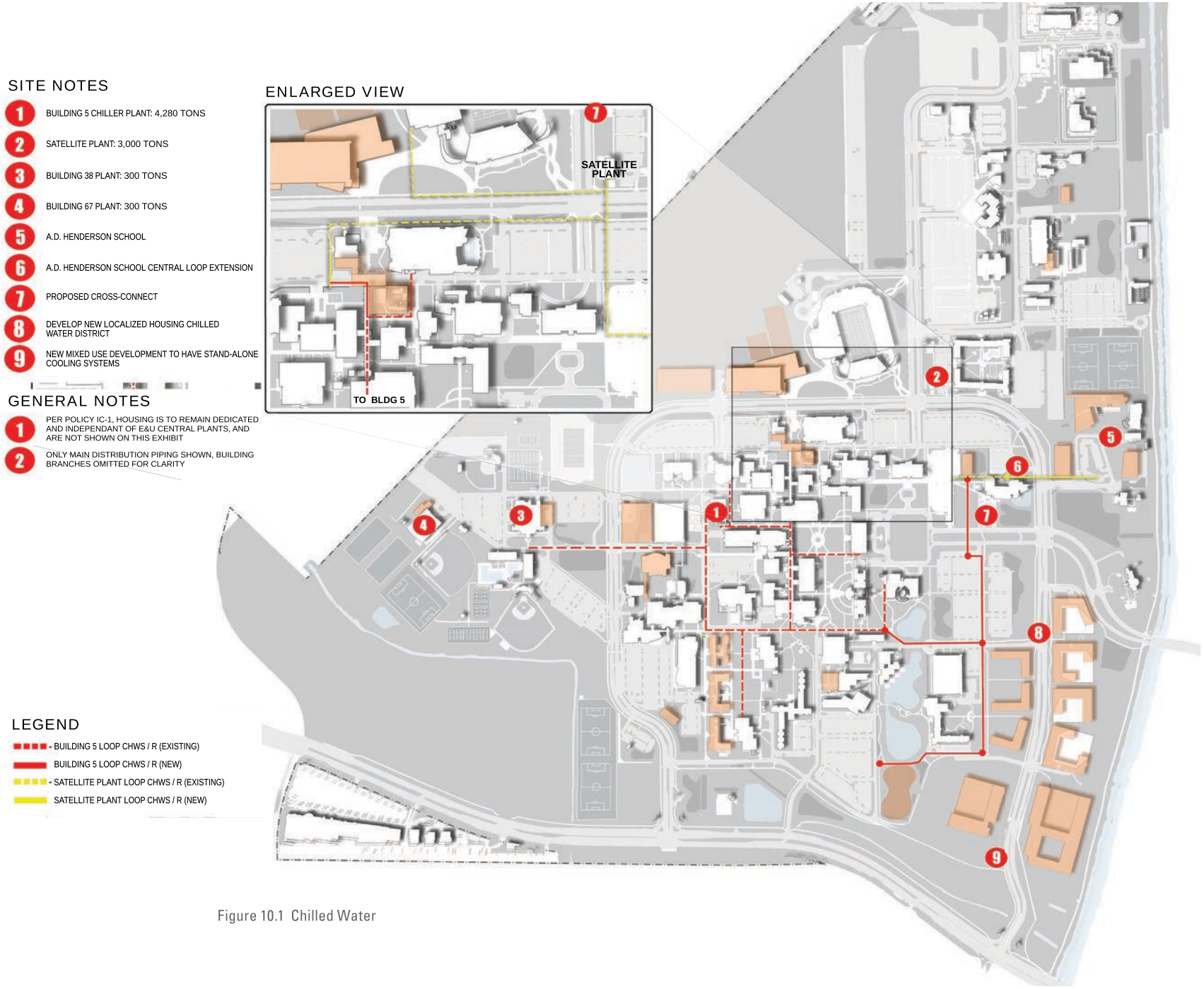


Figure 10.1 Chilled Water

ELECTRICAL POWER

GOAL 1: It is the goal to provide cost effective, efficient, and reliable electric power to meet the needs of the existing and future campus facilities.

Boca Campus Electrical Distribution

The Boca campus is primary metered at the FP&L substation on campus property at Glades Road. Distribution within the campus is owned by FAU and operated and maintained by the FAU Engineering & Utilities division. This arrangement has served the campus well and the broad goal stated above includes the expectation that the campus primary power system will be expanded over time to supply the electric needs of future campus facilities.

Objective 1A: Update and expand the campus 15kV primary power distribution network to improve capacity, serviceability and overall reliability.

- **Policy 1A-1:** Develop capital renewal projects to gradually replace all obsolete switchgear and PILC 15kV cables with newer switchgear and cable technologies.
- **Policy 1A-2:** Develop capital renewal projects to add more sectionalizing capability to the 15kV network to reduce the need to shut down large areas of campus when performing system maintenance.
- **Policy 1A-3:** Maintain demand loads on primary feeders to within 50% of their rated capacity to allow for redundancy and flexibility in feeder switching during routine maintenance operations.
- **Policy 1A-4:** Develop additional primary feeder capacity over time in conjunction with planned growth of campus facilities. This includes expansion of service to the eastern region of campus to interconnect with housing facilities and the Henderson School.
- **Policy 1A-5:** Develop capital renewal projects to improve the life span of the existing utility tunnels that are utilized for electrical distribution. Resolve water intrusion issues and remove cables that have been taken out of service.

Objective 1B: Provide standby power generation capability on the campus to serve as a redundant power source for critical building loads.

- **Policy 1B-1:** Evaluate opportunities to reduce the number of individual building level standby generators and provide a more centralized approach to providing back up power
- **Policy 1B-2:** Evaluate opportunities with FP&L to provide centralized power generation capability on the campus to serve as a redundant power source and allow for peak-shaving to reduce electrical demand charges.

Objective 1C: Optimize the efficiency of building level electrical systems through the application of modern technologies and through standardization of components.

- **Policy 1C-1**: Develop capital renewal projects to gradually replace antiquated lighting fixtures across the campus with new solid state LED high efficiency fixtures and provide automatic controls.
- **Policy 1C-2:** Develop campus standards for major electrical products that are installed within new buildings to improve consistency and allow for more efficient operations and maintenance.
- **Policy 1C-3:** Continue use of standardized digital electrical submeters within each building to allow for monitoring of building power consumption. Expand integration of these meters with the campus-wide building automation system to allow for remote monitoring, trending and reporting.

GOAL 2: It is the goal to meet the electrical demands for the campus with sustainably derived energy.

Objective 2A: Explore renewable energy purchase agreements with FP&L and other utilities to reduce the reliance on energy generated from fossil fuels.

- **Policy 2A-1:** Evaluate campus-wide long term solar power purchase agreements to derive up to 50% of the campus energy supply from off-campus solar power installations.
- **Policy 2A-2:** On new building projects and major building renovations, evaluate long term solar power purchase agreements to derive up to 50% of the building level energy supply from off-campus solar power installations.

Objective 2B: Explore opportunities to integrate solar power and other alternative energy sources in to the design of new projects on the campus.

- **Policy 2B-1:** Evaluate the feasibility and life cycle cost for adding solar power on each new building so that a minimum of 10% of the building energy is derived from the building level solar installation.
- **Policy 2B-2:** Evaluate the feasibility and life cycle cost for integrating solar power with new parking structures and covered walkways.

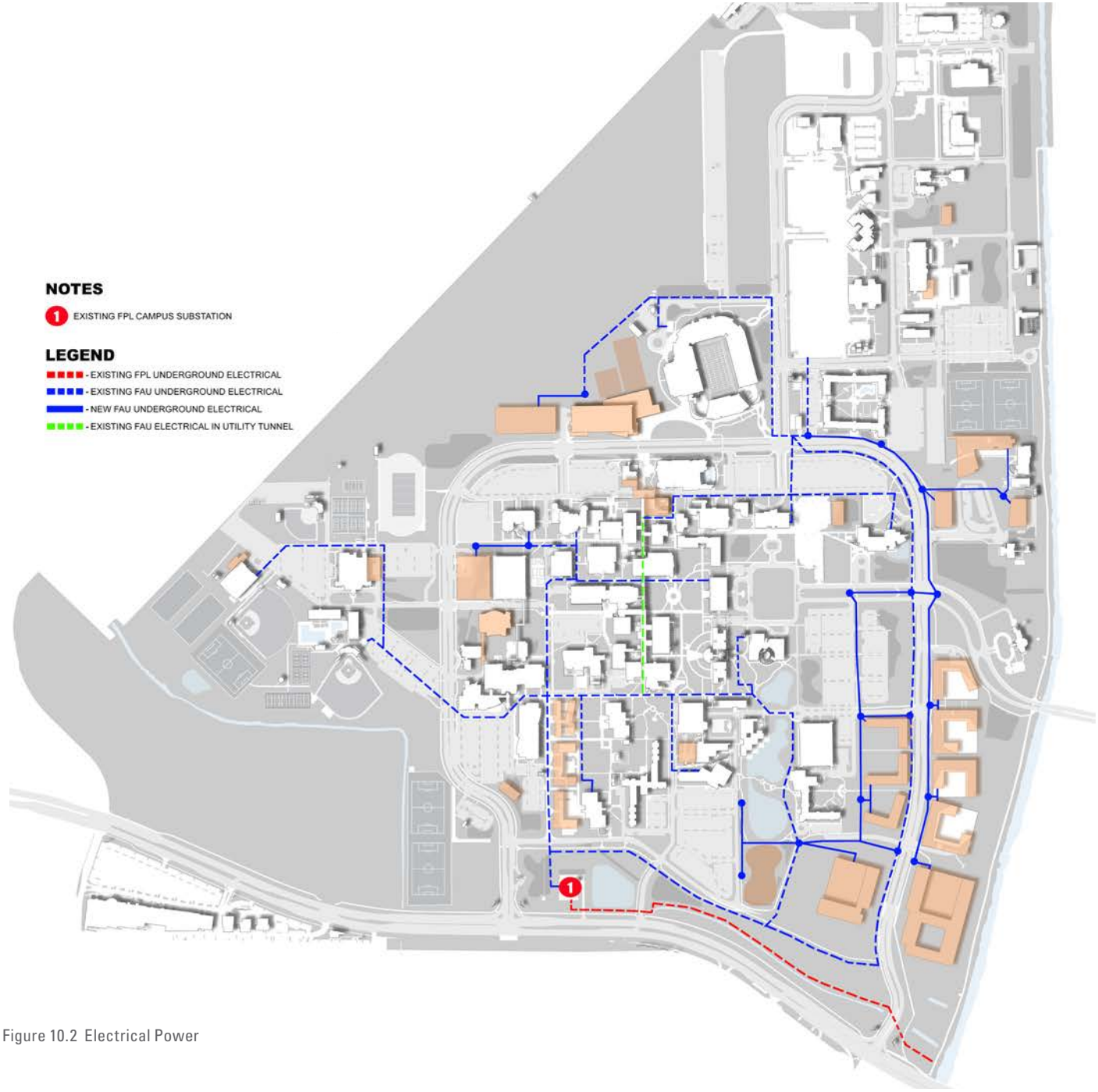


Figure 10.2 Electrical Power

TELECOMMUNICATIONS

GOAL 1: Maintain appropriate levels of network service to existing buildings and ensure new buildings meet levels of service required by current campus standards.

Boca Campus Communications Infrastructure

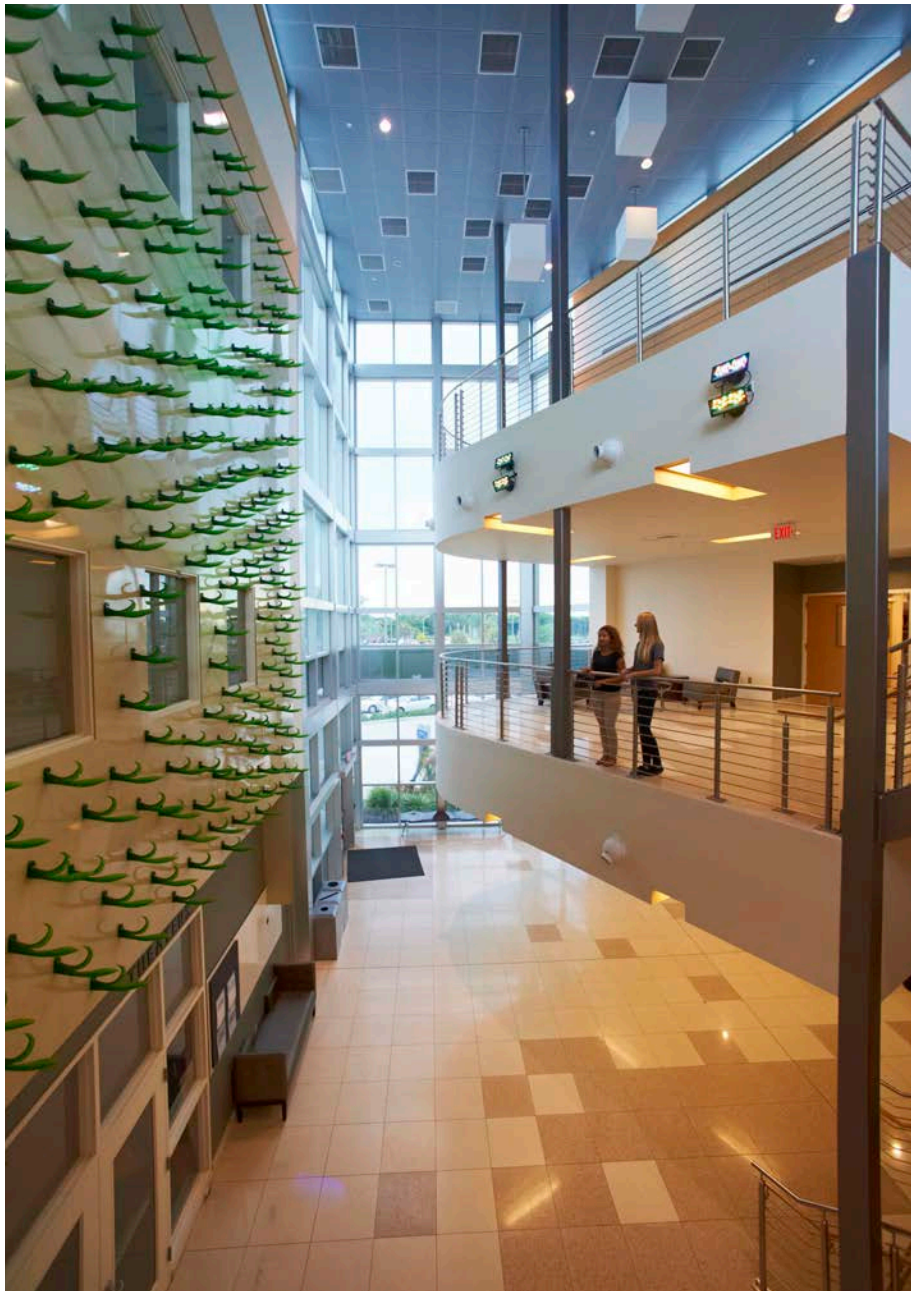
The Boca campus has a core data center in building 22, a secondary data center in building 96 and a hub for telephone connectivity in building 5. Current campus distribution consists of a main network service tunnel that runs north-south adjacent to the core data center and a system of duct banks containing 4" conduit. Each building requires a connection to the primary and secondary data centers as well as adjacent buildings with single mode fiber.

Objective 1A: Expand the campus local area network infrastructure to accommodate new construction.

- **Policy 1A-1:** Evaluate opportunities to update existing building backbone and horizontal cabling infrastructure to meet or exceed current campus standards.
- **Policy 1A-2:** Explore the opportunity to add a new secondary data center to the southern end of the Boca campus to prepare for future construction of the Campus Gateway.
- **Policy 1A-3:** Evaluate the feasibility of cleaning and revitalizing the existing campus main-network service tunnel.
- **Policy 1A-4:** Extend the existing communications duct bank to southeast corner of campus for new development.
- **Policy 1A-5:** Coordinate the requirements and projects of the Master Plan to AT&T and Comcast so they may tailor their services to accommodate the Boca Campus needs.

Objective 1B: Design and install voice, data and video transport systems that prepare the campus for future growth and for the adoption of newer technologies.

- **Policy 1B-1:** Develop campus standards for wirelessly connected devices how they impact the campus network bandwidth.
- **Policy 1B-2:** Develop campus standards for emergency responder radio enhancement systems, cellular distributed antenna systems and campus mass notifications systems.



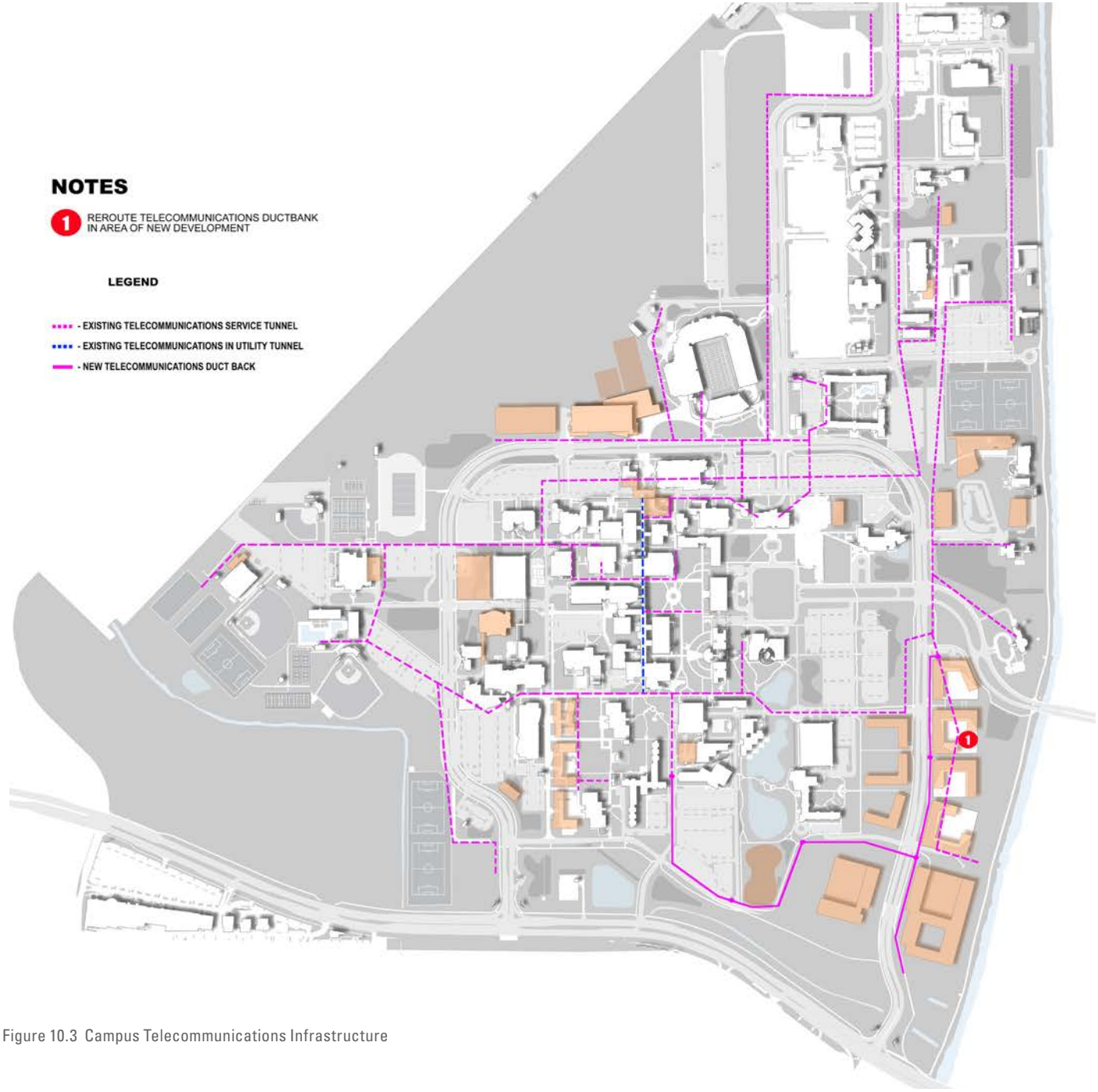


Figure 10.3 Campus Telecommunications Infrastructure