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EASTERN CONNECTICUT STATE UNIVERSITY

CAMPUS TELECOMMUNICATIONS INFRASTRUCTURE DEVELOPMENT PLAN

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Document Summary

The campus network has grown from a single purpose system to a multipurpose utility supporting the daily activities of students, faculty and staff. The infrastructure underlying the utility must also grow to meet these new, widespread uses.

Clients increasingly expect technology to be readily available everywhere, reliable and scalable to their needs. They anticipate a computing utility that will provide processing speed (MIPS), bandwidth and software services on demand enabling the most efficient use of computing resources. Their focus is shifting away from extraordinary increases in computer hardware capability such as a 14,000 fold increase in Intel microprocessor speed over the past 30 years to systems that facilitate the integration of business practices providing flexibility and direct cost benefits.

Utility computing will require a carefully planned infrastructure. Without such availability, reliability and scalability will not be possible.

To this point the growth of the campus telecommunications infrastructure was based on the physical location of buildings and the type of activities and work undertaken therein. This growth pattern does not provide for flexibility of use and the easy implementation of new technologies.

This document is a first attempt to adapt new criteria to guide the development of the campus telecommunications infrastructure. The general goal is that of supporting a telecommunications utility that provides multifunctional, feature rich access to information throughout the campus. The utility will be easy to use independently of the particular accessing equipment. The enabling, underlying infrastructure will be reliable, secure and sufficiently robust to support many technology turns without itself requiring reconfiguration or replenishment.

Details in this document will change as the planning group responsible for its contents develops new strategies and recognizes new applications for an evolving campus telecommunications utility.

INTRODUCTION

Eastern's telecommunication network is now directly integrated into all significant aspects of the University's activities. It serves thousands of clients each day facilitating learning, teaching, research and the work of all support services as they enable the accomplishment of University goals. In recent years the system has accommodated new uses that now make it integral to campus security, direct credit and debt transactions, distance learning and even the regulation of building heating and cooling. It has transformed into a major campus utility that must be reliable, available at all times, easy to access, and absolutely secure. A campus telecommunications infrastructure plan is now a necessity to insure that this utility continues evolving to meet campus needs and incorporating new uses and client activities.

1. PLAN OBJECTIVES

Guide the deployment of a structured Voice, Video, Data, and Facility Services (VVDFS) system for campus use.

Provide the guidelines necessary to insure that new facilities and connections to the existing Campus Telecommunications Infrastructure (CTI) will be accomplished in a manner that will enhance the delivery and availability of campus telecomm services.

Supplement the CSU Telecommunication Standards to insure that new facilities and connections to the existing CTI will be accomplished in a manner appropriate to the specific architecture and telecommunication system characteristics implemented at Eastern Connecticut State University.

2. HOW TO USE THIS PLAN

This plan documents the major goals, methods and design for Eastern's telecommunication infrastructure. It is available to all agencies, consultants and contractors for use in the design and implementation of such facilities associated with new building construction and the renovation of existing campus facilities.

The plan should be referenced during the design phase of campus construction projects.

Plans for the telecommunication component of campus construction projects should be presented to the Campus Infrastructure Planning Group for their review and comments prior to finalization. Submit such to Walter Zincavage, ITS, Media 246

Members of the Campus Infrastructure Planning Group are available to assist in the telecom design phase. Contact Walter Zincavage, 860.465.4363

The Campus Infrastructure Planning Group developed and maintains this document.

General Process for Addressing Telecommunications Activities

The Telecommunications Director will implement a process for guiding campus work activities in this area. The director should be notified prior to undertaking any work on the campus telecommunication infrastructure. Appendix F details the process that will be followed to guide these activities on campus.

3. PLAN SCOPE

The following are considered part of the campus telecom infrastructure and, thus, are GOVERENED BY THIS PLAN:

- Inter and intra building conduits
- Telecommunications man holes
- All wiring and cable used to support telecommunications between and within buildings
- All active equipment that enables and controls signaling between and within buildings
- Satellite Dishes
- Telecommunications closets, head end facilities and similar areas

4. STANDARDS, REQUIREMENTS AND GUIDELINES INCORPORATED INTO THIS PLAN

All guidelines and requirements specified in the CSU Telecommunications Systems specification shall be considered to be minimum requirements for any project. This document will provide additional requirements to support systems and technologies that are considered unique to Eastern Connecticut State University.

Connecticut State University Standard Telecommunications Specifications Project manual Version 2.01.

ANSI/TIA/EIA Standards

T568B

Manufacturers Standards (as applicable)
SC Fiber Termination

All facility construction projects undertaken on Eastern's campus must follow the standards, requirements and guidelines presented in this plan.

5. GENERAL INFRASTRUCTURE RECOMMENDATIONS: CAMPUS TELECOMM CONDUIT DISTRIBUTION SYSTEM (CTCDS)

New connections to the existing CTI will be made on the basis of implementing the architecture detailed in this plan.

The campus CTI is defined in two forms, backbone and feeder. The backbone of the CTI are those conduits passing between manholes. The feeders of the CTI are those conduits passing between a manhole and a building. Should a section of CTI be utilized to feed a series of buildings that are cascaded, rules for both the feeder and backbone CTI shall apply cumulatively.

Topology: Circle With Mesh Interconnections

This is the basic topology Eastern will develop in its infrastructure to support telecommunication services.

This circle or loop configuration will be accomplished by adding a redundant backbone, running north-south on the eastern side of the campus, from the Facilities Building through the New Administration Building to the Library. There will also be a second road crossing for the backbone, from the J.E. Smith Library to the NAB. Once Shafer Hall is converted to a telecommunications hub, there will be a redundant path provided from the J.E. Smith Library to Shafer Hall. A new segment will also be installed from the Webb building, to the new science building and onto the High Rise residence hall area and then connecting to the south campus link.

See Appendix A for a map of the existing conduit system and a map showing planed additions to the system.

"Critical" Buildings, Dual Feeders

Some campus buildings in the campus telecommunications infrastructure are deemed "critical" in the sense that they provide multiple access paths to other areas. These additional paths provide the redundancy needed to maintain the availability and high reliability of the campus telecommunications network. Critical buildings are:

J.E. Smith Library	Webb Hall
Media Building	Administration Building
Facilities Building	Winthrop Hall (temporary designation)
New Science Building	New Police Station
Shafer Hall	Student Center / Sports Complex

For each new critical building and major renovation to an existing critical building, provide dual feeders, each consisting of the number of conduits required to service the building including spares or the minimum installation detailed below or whichever is greater. The building entrance of each of the two feeders shall be remote from each other.

For existing critical buildings, a 2nd telecommunications service entrance will be added at the earliest opportunity.

Minimum Conduit Installation for Every Facility

Six (6) conduits of four (4) inches in diameter are the minimum to be installed to service a facility. When facilities are designated 'critical' campus telecom hub points, additional conduits may be installed.

One half of the new backbone conduit and building feeder conduit shall be pre-fabricated with inner ducts equivalent to Carlon Multicell.

Spare empty feeder conduits equaling the total number of conduits that are utilized for a building shall be installed between the building and the servicing manhole, such that in all cases it is possible to replace all services to the building without first installing new conduits or removing old services.

Spare empty backbone conduits equaling the largest number of conduits required for any building supported by the CTI system shall be installed along all conduit paths utilized, such that in all cases it is possible to replace all services to any one building without first installing new conduits or removing old services.

Minimum Cable Installation for Every Facility

The minimum cable installation connecting a building to the campus telecommunications infrastructure will be:

200 pair Category 3 24 AWG copper wire
24 pair Single Mode Fiber
24 pair Multi Mode Fiber

Every new campus facility will be connected to the campus telecommunications infrastructure at the time of completion.

Every major facility renovation will include provisions to install or upgrade the facility's connection to the campus telecommunications infrastructure at least meeting this minimum standard.

The CSU Standard Telecommunications document contains additional information and specifications regarding this type of cabling which must be met.

Inside Plant

Conduit banks between floors will be stacked. Provide 50% spare conduits.

Conduits or cable trays will be installed between all telecommunications rooms on a floor, linking all rooms on a floor with fiber.

Conduit Assignments, Initial and Future Provisions

All use of empty or partially filled conduits will require approval of the Campus Infrastructure Planning Group. The CIPG will make assignments based on the timely submission of project plans and documentation related to the telecommunication support required for the facility.

Conduit Capacity Standard

All conduits will be deemed full at 40% of capacity per National Electrical Code.

Access Point Specifications (Manholes)

The manholes shall have a minimum inside dimensions of 6-foot Wide by 12-foot Long by 6.5-foot High. Manholes shall be waterproofed from the exterior and furnished with GFI power for a utility receptacle, a service light, an integral sump, power for a sump pump, and a 4-inch drainpipe, gravity pitched to the nearest storm basin.

See also Section 10 below for detailed manhole requirements.

Documenting the Campus Telecommunications Infrastructure System

All projects will provide as built documents of all changes, additions and modifications to the CTI System. These documents will include number and utilization of conduits, type and quantity of cable installed (or removed), location of endpoints of cables, cable endpoint labels and information regarding splicing, termination, and patching. Cable test results will also be documented.

All additions and changes to the infrastructure system will be incorporated into the campus utility drawings using the same software the agency uses to document facilities.

Cabling

Fiber cable and categories 3, 5E and 6 wire are used throughout the CTI system. See Sections 6 for further voice specifications and Section 8 for further networking specifications. Details of these specifications are available in the CSU Telecommunications Standards.

All copper cable systems must use termination, products and methods recommended by the manufacturer for the grade and type of cable.

General Telecommunications Service Level Drop Requirements

A Telecommunications drop consists of two voice and two data jacks installed in a quad box.

> Faculty and Administrative Offices will have a minimum of two telecomm drops per office. Additional drops will be added based on the square footage of the area as follows: one drop per every 100 square feet or portion thereof with a minimum of two drops per office. (e.g., 250 square feet = 3 drops)
>
> Residence Halls will have one drop per bed (occupant). Additionally, one drop

in common living areas. Areas such as staff offices will be configured following the guidelines for faculty and administrative offices.

Classrooms and Conference Rooms will have a minimum of one drop on each wall with two drops on the teaching station or display screen wall.

Labs, Assembly Rooms, Staging Areas and Entry Ways will require unique drop specifications. The Infrastructure Group will make recommendations for these areas.

Mechanical Spaces will have a minimum of one drop. Additional drops may be required based on facility usage.

The above are minimum requirements. Additional access points will be established on a per project basis.

6. Voice CTI Recommendations

Current Technology Summary

Eastern Connecticut State University's telecommunication system utilizes the Definity enterprise communications server (ECS) currently at release 11.0. We are a multi node environment and utilize a full range of features and options. ECSU is connected to our sister universities via the CSU central office. This topology provides for extended local calling as well as campus-to-campus extension dialing. A campus wide Octel messaging voice mail system is also in place.

There are 8 nodes located throughout the campus. The processor port network (PPN) is located in Winthrop Hall along with one expansion port network (EPN). There are six additional EPN's located in other core buildings. Currently Winthrop Hall, Webb Hall, Facilities Building, Smith Library, and Foster Building are core buildings. Core building for telecommunications will be defined as any building housing a PPN or an EPN. Core buildings must be interconnected via fiber optic cables.

Inter Building Recommendations

Outside Plant (OSP) twisted pair feeder cable will be rated at a minimum of TIA/EIA Category 3 standards. Lightning protection panels will provide a means to connect OSP with internal distribution cable.

Fiber Optic cable will meet standards of the active equipment located at end point(s).

Minimum cable quantities per facility

Minimum pair count per building will be assigned based on the scope of each project.

Intra Building Recommendations

Inter building voice cable used will have a minimum rating of TIA/EIA category 5e unshielded twisted pair (UTP). Specific projects may require higher standards.

All termination parts and methods will be consistent with CSU standards. The UTP cabling system shall be terminated based on the ANSI/TIA/EIA T568B standards The CIPG will approve layout of termination locations within the IDF's.

Proper selection and installation of cross-connect wire used between cross-connect blocks is essential to the overall performance of the voice network. Such cross-connect wire will meet the same rating as the cross-connect blocks.

Active Equipment Recommendations (both ends)

All active equipment installed will meet manufactures minimum standards and testing.

Telecomm Service Rooms Voice Support Requirements

Vioce cable is typically terminated in the same service room as data cabling. See Section 8 (Service Room Requirements) for space requirements.

Maintain proper room environments (heating and cooling).

Provide adequate wall space for growth.

Power: All telecommunications service rooms shall be connected to the Main Distribution Frame (MDF) room with dedicated electrical conduits, conductors, and enclosures necessary to provide a common power system for all devices that may be used to support the VVD equipment in the building. This system shall be capable of providing both 120V AC power, and 48VDC power as needed.

The common power system will be dedicated to supplying all VVD equipment contained within the facility. Therefore, pathways to feed power to all VVD equipment locations from a single source must be installed during construction.

Un-interruptible power with a run-time capacity of not less than four hours for all VVD equipment in the building shall be provided.

7. Video CTI Recommendations

Current Technology Summary

The video services currently provided at ECSU fall into two categories: Commercial cable television service and Proprietary (Direct feed) cable services.

Commercial cable television services are provided to all residential areas on campus on a cost per drop basis by Charter Communications Inc. The current distribution system consists of direct burial coaxial cable.

An additional commercial drop is provided to the ECSU Media Services headend facility for instructional purposes (redistribution to classrooms, lobby areas via the Proprietary cable network.

Current Service Level Categories

Faculty/Staff Offices = No video services
Dean/Director Offices = Commercial service
Conference Rooms = Commercial service
Common Areas (as designated for ECSU television-based information system, ViewPoint) = ECSU direct feed
Computer Labs = ECSU direct feed
Classrooms = ECSU direct feed
Residence Hall/Apartment Rooms = Commercial service

General Requirements for Video

As part of a bulk service contract and according to the service designation, the the Commercial video service provider shall furnish and install all material and labor required to design, install, test and maintain the video distribution system.

The system shall be designed to receive input both from the commercial video source as well as proprietary ECSU-based direct feeds.

It shall include all necessary amplifiers, transmitters, splitters, directional couplers, combiners, filters, taps, cable and outlets necessary for a complete and operational system.

Complete and descriptive system design and shop drawings indicating dimensions and compliance with the specifications herein to be provided.

The system shall have sufficient spare capacity to permit the addition of up to 25% more outlets.

No direct buried cable will be permitted. The University shall provide underground conduit for both new facilities as well as to upgrade existing, non-conforming infrastructure.

The system shall be installed to meet all manufacturer, federal communications commission and other regulatory requirements. These requirements include at minimum Carrier-to-Noise, Signal-to-Noise, composite Triple Beat, Composite Second Order, Hum, Cross Modulation, RF video level and RF Aural level requirements.

ECSU's "proprietary" direct feed system will originate from the video control room located in Media Building, Room 114, and will be carried on base band cabling to the equipment racks where it will be modulated using University provided equipment.

Inter Building Recommendations

Provide video services to each building over a conduit-based single mode fiber optical cable.

The contractor will install a fiber optic transmitter and in Media Services 114 (headend) and provide all patch cables between media and the buildings as required.

Optical splitters may be used to serve multiple buildings, but signal levels at each receiver must be no less than –3 dB at 1310 nm.

Transmitters should be specified to be 16 mW power.

Trunk levels entering any amplifier will be no lower than 10 db on any analog channel between 2 and 80.

The output of each amplifier shall be designed for 49 db at channel 80 and 42 db at channel 2.

Each amplifier will have all electronics for 5-50 Mhz return capability installed.

Intra Building Recommendations

Coaxial video distribution cable from each specified room drop to the IDF and MDF

Where specified two coax cable drops to be installed

At each video outlet location 15 db at channel 80 and 12 dB at channel 2 will be the maximum allowed output. The minimum level at any output is 4 dB at channel 80 and 1 dB at channel 2.

Service Rooms

Power: All service rooms shall be connected to the Main Distribution Frame (MDF) room with dedicated electrical conduits, conductors, and enclosures necessary to provide a common power system for all devices that may be used to support the equipment in the building. This system shall be capable of providing both 120V AC power, and 48VDC power as needed.

The common power system will be dedicated to supplying all VVD equipment contained within the facility. Therefore, pathways to feed power to all VVD equipment locations from a single source must be installed during construction.

8. Data CTI Recommendations

Current Technology Summary

ECSUs LAN is a completely standards based network; there are absolutely no proprietary protocols or products allowed in service. The backbone employs routed gigabit links between very high speed layer four switches and uses the OSPF routing protocol to manage redundant links. Connected to the backbone are individual VLANs comprised of an average of one class C IP subnet, which typically span one building. There are more than 30 VLANs on the CTI system. Within each building are one or more communications closets with 10/100 switches serving end stations. All core and edge switches in office or lab areas are multicast ready, and are capable of supporting QOS if the need arises.

All inter building cabling is fiber (single and multimode). Intra building cabling between IDFs and MDFs is also fiber (single and multimode).

The only supported protocol on the network is TCP/IP.

Wireless connectivity is being researched for deployment on campus. See below Section 9.

Inter Building Recommendations

Fiber optic cable requirements shall be determined cumulatively by role and location.

All buildings shall be connected with feeder cables characterized by a minimum of 24 pair each of single and multimode optical fiber.

Any building that is designated as "critical" shall have dual feeders as detailed in Section 5 above. These facilities will have additional strands each of single and multi-mode fiber running between the building and the campus demarcation point(s) for Voice and Video services. Typically the dual feeders will each contain the same type and amount of cable with appropriate changes as required.

Telecomm Service Rooms

These rooms are now being used as support space for several building systems including: Voice, Data, HVAC Control, Security Monitoring (video), Building Access, Emergency Communication Systems, Commercial and Campus Video Distribution and others. It is critical that telecomm service rooms be sized to accommodate these new systems. Some of these systems will locate servers and related active electrical equipment in the room. Adequate rack and floor space rack including reasonable growth space must be provided. It is also critical that these rooms be properly heated and cooled to enable such equipment to function.

No wall to wall dimension should be less than ten feet 4 inches (10'4") feet providing adequate space for wall mounted wire termination fields, rack mounted equipment and floor access space.

Section 10 (Service Room Recommendations) details the wall space required for facility systems housed in telecomm service rooms.

All Telecomm Service Rooms shall provide adequate space to allow for free standing racks, wall mounted racks, punch down fields, wire management devices.

Power: All telecommunications service rooms shall be connected to the Main Distribution Frame (MDF) room with dedicated electrical conduits, conductors, and enclosures necessary to provide a common power system for all devices that may be used to support the VVD equipment in the building. This system shall be capable of providing both 120V AC power, and 48VDC power as needed.

The common power system will be dedicated to supplying all VVD equipment contained within the facility. Therefore, pathways to feed power to all VVD equipment locations from a single source must be installed during construction.

Un-interruptible power with a run-time capacity of not less than four hours for all VVD equipment in the building shall be provided.

Maintain proper room environments (heating and cooling).

Provide adequate wall space for growth.

Common ground will be provided.

Sufficient rack space and power outlets will be provided in the service room to accommodate initial and subsequent equipment additions.

Climate control will be provided to maintain 'office level' temperature in the service room.

Sufficient racks must be provided so that no more than one half of any rack is utilized.

9. Wireless Networking

Current Technology Summary

This technology is not currently available on campus. Throughput considerations as well as security and low utilization projections have in the past resulted in a low priority being associated with this technology. New standards and improved communication rates are expected in the near future.

A project team is now investigating vendor offerings, security models, infrastructure requirements and application requirements. The team's goal is to identify a few locations on campus and select a vendor to pilot the technology on campus.

General Considerations

Wireless use will be driven by factors such as secure communications, student equipment selection and use and application needs.

Roaming connectivity has to be designed for our facility. An open campus environment presents challenges in this area as well as in the security area.

This technology will be increasingly used on campus over the foreseeable future. So the campus must develop effective plans to facilitate the success of this technology.

A Cautionary Note

The is a rapidly developing area of our infrastructure. The Planning Group encourages those working in this area to contact members to insure that the latest campus plans for the technology are available.

This section will be undergoing revision in the near future.

10. Facility Services Recommendations

Current Technology Summary

The Facility Systems on the Campus Telecommunications cables are:

Fire Alarm	Currently UTP, to be converted to MultiMode Fiber (four strands to bldg., two IN and two OUT)
Access Control	Campus IP Ethernet Network
Building Automation System(BAS)	Campus IP Ethernet Network
Security CCTV	Campus IP Ethernet Network
Data Acquisition (North Plant)	Unshielded Twisted Pairs (UTP) (four pair per bldg.)
Dial-out Modems	Dedicated UTP phone line

Termination

All facilities systems will be terminated per Per CSU Telecommunications Specifications – Version 2.01. All components used will meet or exceed these specifications.

Minimum Cable Quantities per Building for Facility Use

25 pair	Category 5, Unshielded Twisted Pair
12 Strands	MultiMode fiber

Active Equipment Recommendations (both ends)

All equipment connected via CTI system will meet the University's current operating system and networking system protocol requirements.

TCP/IP is the only supported protocol on the CTI system. All equipment connected to the system must use this protocol.

Equipment shall be covered by a service maintenance agreement that includes a regular update of the equipment software, firmware and security upgrades. Regular update of the software and equipment is required to maintain compatibility with the ECSU Standards and to assure that the equipment will function within ECSU's architecture.

All equipment will be set up and configured to be fully secure and upgraded to include all available security patches as of the installation day by the providor.

Intra Building Recommendations

Provide two 4-inch conduits between all building MDF and IDF rooms for the building Facilities Services.

Telecomm Service Rooms

A minimum wall space shall be provided for the installation of the active and passive equipment required for the various building Facility Systems. Where dedicated rooms are provided throughout the building for these systems, these rooms shall be sized to provide the minimum wall space as listed below. Where dedicated rooms are not

provided, the Telecom MDF and IDF rooms shall be sized to provide this additional wall space, above and beyond the minimum room size required for the voice/ data requirements, as specified in the CSU Telecommunications Specifications and herein. The Telecommunications Rooms are required to be air conditioned per the CSU telecommunications Guidelines. Where a separate room are used for these other Facility Systems, provide air conditioning for that room also. As required for specific installation. Provide 24-hour UPS backup either via a freestanding UPS unit and distribution panel or via self-contained battery system per device.

Fire Alarm Control Panel	10-feet wide x 8 feet high
Access Control	10-feet wide x 8-feet high; 1st eight doors 5-foot wide x 8-foot high, each additional eight doors
Building Automation System	10-foot wide x 8-foot high, plus 5-foot x 10-foot floor space for workstation
Security CCTV	5-foot x 5-foot floor space for rack
Data Acquisition (North Plant)	3-foot wide x 3-foot high
Dial-out Modem	3-foot wide x 3-foot high

Minimum Network Access Points

Provide a Data drop for each Facility System in each room containing active equipment for that system. There shall be a minimum of one (1) voice jack per Data drop. The cable and jacks shall be per CSU Telecommunication Specification – Version 2.01

Minimum cable quantities per facility

As required for specific building.

11. Satellite Dishes and Microwave Systems

Current Technology Summary

The University has two satellite arrays (downlinks) and a Telecommunications tower. The tower hosts links for several commercial and public providers.

Infrastructure Development

The Campus Telecommunications Infrastructure Planning Group provides direction for the development and use of these facilities. The planning group will review proposals regarding the use of these facilities.

12. Recommendations Regarding New and Existing Manholes and Access Points

Current Technology Summary

Many of the existing manholes are near capacity. In part this is a function of the presence of abandoned cable.

In some cases the manhole floods periodically (especially H and I).

The existing architecture does not allow for the implementation of a reliable, meshed campus telecommunications system.

The conduit paths between them are limited in number and availability.

Existing Manholes

Any existing manhole on campus that has new and/or additional conduit installed into it shall be modified as follows:

> Provide 120-volt power to the manhole. Install a GFI protected receptacle for tool power, a service light, and a standard receptacle for power to a sump pump. Install a 4-inch gravity drain from the Telecom Manhole to the nearest storm basin. Provide a sump pump to lift the water from the bottom of the manhole to the newly installed gravity drain.

Cleanup

The manhole shall be left completely clean of debris associated with the work just completed and from previous work.

New Manholes

The following additional manholes are required to create an infrastructure that will reliably support campus telecommunications:

> New conduit paths and additional manholes must be installed between MH2 and the Facilities building. This path will include feeders to a new police station, the new Child and Family Services Building, a future performing facility and a renovated Student Center.
>
> New conduit paths and additional manholes must be provided to support the new science building, upgrade service to the High Rise Residence Hall area, the new South residential village and the Shafer Hall area. This path should connect to the Smith Library completing a south campus loop.

13. Abandoned Cable

Any cable abandoned as the result of a new installation must be removed as part of the installation project.

Inter Building Abandoned Cable

Abandoned cable (current or past work) shall be mined out of the subject manhole back to the manholes upstream, downstream and feeder conduit into a building.

Intra Building Abandoned Cable

Abandoned cable (current or past work) shall be removed, including termination fixtures.

14. Campus Telecommunications Infrastructure Funding

All costs for the telecomm infrastructure required to bring signal to the new location and distribute it through out the facility will be included in the project budget.

Active equipment for both ends of the new link will be included in the project budget.

Appendix:

A. Contacts for Campus Infrastructure Planning Group

B. Campus Telecommunications Maps

1. Current Infrastructure

2. Planed Infrastructure Upgrade

3. CSU – Eastern Project / Funding Time Line

C. Data Network Upgrade Plan Summary

D. Facilities Master Campus Plan

E. Campus Video Standards Document

F. Telecommunications Related Project Guide

Appendix A

Contacts for The Campus Infrastructure Group

Primary Contact:	Walter Zincavage	ITS Department	860.465.4363
Group Members:	David Lebel	Facilities Department	
	NicK Messina	ITS Department, Media Services	
	David Bachand	ITS Department, Network Services	
	Steve Nelson	ITS Department, Voice Services	

Appendix C

Data Network Upgrade Plan Summary

The current LAN is a standards based high speed layer four routed network with redundant core links. This technology has served ECSU well for the past four years. Future upgrades will continue the work begun four years ago. We will:

- Bring redundant technology to the edge of the network in critical locations.
- Embrace wireless technology
- Keep costs closely in check.
- Retain our adherence to standards

An inner core network will be defined more narrowly as the core switches within the Maintenance, Media and Library buildings. Switches in these locations shall be capable of supporting 10 Gb/s links without blocking, switch at 96 MPPS or more, and support open standards such as OSPF, multicast control, VRRP, and QOS.

An outer core network will be defined broadly as all buildings other that the inner core that contain layer four switches in their MDF closet locations. Switches in these buildings shall be capable of supporting 1 Gb/s links without blocking, switch at 48MPPS or more and support open standards such as OSPF, multicast control, VRRP, and QOS.

Adjacent outer core locations will be connected to each other to form complexes of outer core locations with a rich mesh of inter-connecting links. All links between outer core switches shall run at 1 Gb/s. Each outer core complex shall be connected to at least two different inner core switches.

Switches within IDF closets in buildings deemed critical locations due to the nature of the building's use shall be connected to two separate outer core routers in an active-passive mode utilizing the VRRP protocol.

Switches within closets deemed non-critical shall continue to be the standard IGMP ready 10/100 technology in use today with single links.

Wireless technology will be implemented in a separate, secure VLAN defined expressly for the use of wireless technology. Authentication will be done via Radius protocol between the wireless access device and the client computer. Wireless service will be made available in locations requiring unfettered connection to the network. Some locations that merit wireless technology might be conference areas, break areas, and parking lots.

All new technology implementations will continue to be standards based. This philosophy helps Eastern insure a very cost-competitive network environment and open source choices for products.

Appendix F.

Telecommunications Related Project Guide

Notice of all activity involving the campus telecommunication infrastructure will be provide to the Telecommunications Director. The Director will proceed as follows:

A. A work order will be opened to accomplish the task if it will be done by campus IT Staff.

B. A project plan will be developed.

Effected Offices and Departments will be identified and will participate in the planning and review process.

Appropriate organizations will be notified and comments solicited.

C. Oversight for the project including the supervision of vendors working on campus will be established in conjunction with the Facilities Department.

D. The project will be evaluated using IT's Evaluation process.