MERCED COUNTY UNIVERSITY COMMUNITY PLAN
POLICY DISCUSSION PAPER

Natural Gas, Electrical, and Telecommunications/Digital Utilities

For CPAC Discussion: May 10, 2001

I. INTRODUCTION AND SETTING

This report provides a preliminary set of goals, objectives and policies for inclusion in the Utilities Element of the Merced County University Community Plan (UCP). This element describes the set of goals and corresponding policies that will guide development of the utility infrastructure for natural gas, electrical and telecommunications/digital utilities for the UCP area. In addition, these goals encourage the use of alternative energy supplies and energy conservation that will support the UCP's goal of sustainable development. Many of the policies described herein may overlap with policies in other UCP elements.

This paper is presented for discussion purposes only. A brief discussion of the policy setting and existing infrastructure for natural gas, electrical and communication facilities of the Utilities Element is provided in Section I. Section II provides specific goals, objectives, and policies for the UCP.

POLICY SETTING

The supply of power for an area no longer involves simply plugging into the existing electrical transmission network and extending the natural gas lines. Implementation of the UCP will involve decisions as to which electrical supplier and alternative energy sources to use; the extent of dependency upon electrical and natural gas; and the degree that energy demand can be reduced through conservation and energy efficient buildings.

The telecommunications and digital industries have experienced phenomenal growth in the past decade, both in the number of services provided and dependency upon those services. The businesses and residents of the UCP area will expect and require the most current telecommunication and digital services. Because of the rapidly changing technology of these two industries, implementation of the UCP will involve decisions as to how best to provide a telecommunication/digital network that can serve both the immediate and future needs of the occupants of the UCP area. Because telecommunications require above ground facilities, policies will be required to ensure that these facilities blend into the natural and built environment to the extent possible.

The decisions for the provision of energy and communication facilities to the University Community Plan area will present a number of challenges and opportunities from environmental, land use and financial policy perspectives.

BACKGROUND

Electricity: There are two possible providers of electricity for the UCP area: PG&E and the Merced Irrigation District (MID). Either PG&E or MID would need to expand their transmission infrastructure in order to serve the UCP area. PG&E has existing lines that terminate near the UCP area. (See Figure 1) MID currently serves portions of the City of Merced with underground lines tied into an 115KV transmission line; but has no facilities near the Plan area. (See Figure 2) In either case, transmission facilities, such as power lines and substations would be required to serve the UCP area. Costs would be incurred for the extension of infrastructure with either supplier.

Gas: It is anticipated that PG&E would provide natural gas service to the UCP area. Currently PG&E owns natural gas infrastructure in Merced County, including the City of Merced. There is an 8-inch gas line near, and parallel to, Highway 99 and a 6-inch gas line near, and parallel to, Highway 140. Lines to serve the City extend from these two pipelines. (See Figure 3)

Telecommunications/Digital Utilities: It is anticipated that Pacific Bell would be the service provider for telephone because there are currently no other available telephone companies that serve the UCP area. Pacific Bell provides service to Merced County through a combination of above- and below-ground cables. In accordance with State law, all lines occurring in new developments must be installed underground. Pacific Bell and Sprint provides the digital utilities to the Merced area. Cellular telephone service is provided by Cellular One, GTE and Pacific Bell Wireless.

Wireless communication systems are the newest form of telecommunication infrastructure and create new planning issues that will need to be addressed in the UCP. These systems currently involve cellular phone service, Enhanced Specialized Mobile Radio (ESMR), Personal Communication Services (PCS) and paging systems. There are several companies that provide wireless communication services in the Merced area. There are currently three general types of transmitting and receiving antennas used in the wireless communications technology. These include whip antennas, panel antennas and dish antennas. Whip and panel antennas are used to transmit and receive radio waves carrying conversation signals, while dish antennas provide the link between the central computer switching system and the various antennas used through the mobile conversation.

Cellular Systems

The required density of cellular towers depends upon the surrounding topography and the system's capacity to handle calls. Cellular tower sites in rural areas generally have a radius of between five and eight miles, and cell sites in urban areas typically have a radius of between two and five miles.

ESMR Systems

Like the cellular system, ESMR uses cell sites with radii between two and eight miles. Whip and panel antennas on poles and buildings are used.

PCS Systems and Paging Systems

It is expected that PCS systems and paging companies will need forty to fifty transmitters for each five to seven mile radius in order to provide service. PCS systems employ whip and panel antennas on poles and buildings. Instead of constructing their own facilities, paging companies typically rent space at existing communication facilities, known as multi-user sites.

Antennas

Antenna structures are typically accompanied by equipment buildings or boxes. Cellular and ESMR equipment buildings are generally less than 12-feet by 24-feet. PCS equipment facilities are self-contained weatherproof cabinets about the size of a vending machine. Some providers propose an integration of antennas with light poles, while others attach their facilities to buildings or other structures. Building mounted antennas are unnoticeable if they are hidden from view on the roof or painted to match the color and texture of the building. Lattice towers are the least common type of antenna, range from 60 to 200 feet in height, and generally accommodate a variety of uses. They are found where great height is needed and where multiple microwave antennas are required. Although they can accommodate many users they pose serious visual impacts.

Merced County General Plan: The Merced County Year 2000 General Plan (General Plan) contains policies that address the provision of energy supply in the County. The General Plan serves as the local "constitution" for the physical development of the County, and, therefore, serves as the basis for development decision-making. The UCP would be required by law to adhere to the policies contained in the General Plan.

> Goal-3 An adequate system for transmission and distribution of energy, water and information.
>
> > Policy-1 Electrical, gas, crude oil and communication transmission and distribution lines should parallel major roads or rail systems.

Policy-2 New transmission and distribution lines shall be encouraged within existing utility easements and rights of way.

Policy-3 Electrical interference to adjacent land uses shall be considered in the placement of electrical and other transmission facilities.

Implementation:

1) Encourage joint use utility easements throughout the County.

3) Coordinate with the Federal Communications Commission to ensure the proper placement of communications lines and towers.

4) Obtain utility easements on individual parcels at the subdivision map approval stage to provide adequate area for installations of improvements, including sewer, water, cable television and telephone lines.

II. GOALS AND POLICIES

This section outlines the goals, objectives and associated policies that should be considered as part of the supply of electricity, natural gas, and telecommunications/digital information services. These strategies can help ensure that reliable, cost effective and environmentally sound energy and communication systems are supplied to the University Community Plan area.

For each broad goal, several objectives have been identified and for each objective, several policies have been recommended. If necessary, a discussion of the policies and their strengths and weaknesses is provided.

GOAL 1: DEVELOP AN ENERGY SERVICES PLAN

In the past, Pacific Gas & Electric (PG&E) would have been the defacto provider of electricity and natural gas to the UCP area and development would have been powered solely by electricity and natural gas. The restructuring of the electricity market in 1996 not only expanded the choices of providers of electrical power, but the impacts resulting from changes in energy supply and reliability emphasize the necessity for using diverse and alternative sources for the supply of energy. Therefore, policies that address the provision of energy to the UCP area should not focus solely on electricity and natural gas. Alternate, renewable sources of energy, such as technologies that allow a building to provide a portion of its own energy needs (e.g. solar and fuel cells), should be considered. In addition, if the UCP is to be responsive to the advantages of the 21st century, flexibility should be built into the energy systems to take advantage of future technological advances.

Most importantly, the UCP should ensure that measures to reduce energy demand and encourage conservation are implemented. Energy that does not need to be produced costs nothing and has no environmental consequences.

OBJECTIVE: DEVELOP AN OVERALL ENERGY PLAN FOR THE UCP AREA

Development of an overall energy plan would necessarily require that the energy supply for the UCP site be considered as a single system. This holistic approach to an energy system would reveal opportunities for downsizing, combining or eliminating some building energy systems.

Policy: Require an Energy Services Plan of the entire UCP site.

In applying long-term planning and priorities to the energy systems, a coordinated approach can be developed for the supply of energy to the UCP area. This prevents a piecemeal approach to energy design, with overall energy conservation becoming a hit or miss proposition.

Advantages: Ensures that energy efficiency measures will be implemented.

Cost savings in both energy infrastructure construction and future utility costs can be realized from this approach.

Disadvantages: Future technological advances would need to be integrated into the plan and the funding opportunity may not exist to upgrade the plan.

The infrastructure needs of future technology may be difficult to work into the energy system established by the plan.

A coordinated approach requires a fairly definite plan in order for the UCP to include probable energy requirements for each of the uses.

Policy: The Energy Services Plan should be flexible and able to take advantage of future technology advances.

Advantages: Acknowledges that advances will be made in the sources and provision of energy supply systems and encourages the UCP to take advantage of these advances.

Allows the UCP to maintain a market advantage by ensuring that the UCP is able to provide the sources and types of energy systems desired by future occupants of the site.

Disadvantages: Future technological advances would need to be integrated into the plan and the funding opportunity may not exist to update the plan.

Infrastructure needs of future technology may be difficult to work into the infrastructure established by the plan.

Policy: Require that the design of the energy systems for each Specific Plan produce either (1) an energy budget or (2) complies with prescriptive standards that implement measures. Either of these measures should be required to result in a 15-percent reduction in total energy use over the current performance standard contained in Title 24, Part 6. This requirement can be implemented through a Best Practices program.

To ease implementation, the Best Practice program should be structured as an extension of the State standards, rather than a new format or compliance method. The buildings would include a base set of mandatory efficiency measures. In addition, an energy budget would require that the building must also be designed to consume no more energy than specified in the energy budget. The owner would have the option as to which measures to install or use to meet the energy budget. The prescriptive approach would require that specific measures be installed in addition to the base set of measures. The specific measures can be those that the California Energy Commission has determined will result in the building meeting an energy budget.

The program could include a tighter energy budget, such as a specified percent reduction in total energy use (15%) over the current performance standard and/or more efficient prescriptive measures, such as more insulation, solar water heating, and use of energy efficient appliances. The Best Practice program should have reasonable payback periods (4- 7 years or less).

The program should require proposed large-scale commercial and business development to provide a comprehensive energy use evaluation. The evaluation could be provided through a technical assistance program, a utility, or private consultants certified by Merced County. developers should then be required to include the cost-effective measures recommended in the evaluation (e.g., any measure with a payback period of seven years or less). A tracking and monitoring program would assure that promised efficiency measures are actually installed and operate correctly.

Advantages: Provides flexibility to developers for the provision of the most cost effective and appropriate energy systems.

Ensures that energy conservation measures will be implemented.

Requires greater energy efficiency that could result in operational cost savings.

Disadvantages: Because of the more stringent energy conservation requirements, this approach could add to the cost of development. Costs may be higher if contractors are unable to find a local supplier for the building materials, appliances, fixtures and equipment necessary in order to achieve the goals of the Best Practices program.

A drawback of the energy budget approach is that compliance is met by using a computer program to determine whether the building meets its energy budget. This computer program may not be available to the agency responsible for enforcement of the standards.

Installation can be checked by building inspectors; however, another program may be necessary to assure proper operation in subsequent years. The responsibility and funding opportunity for subsequent checks of the system would be difficult to establish without an organization similar to a Homeowners' Association.

OBJECTIVE: DEVELOP A RELIABLE AND DIVERSIFIED ENERGY SYSTEM

The dependence on the adequacy and reliability of the energy sources has economic and environmental consequences. Therefore, University Community planning efforts should focus on creating reliable energy infrastructures that support UCP's goal of sustainable development.

Policy: Encourage a diversified supply of energy for the UCP area that does not depend solely upon electrical and natural gas for energy supplies, but rather relies on renewable sources of energy such as solar and wind.

Advantages: A diversified source of energy would prevent the UCP from being overly dependent upon a major source for energy supply; therefore, the Plan area would be less affected by temporary shortages in energy supply ("brownouts").

Disadvantages: Would add to cost of development for purchase or lease of sites.

Policy: Consider sites adjacent to UCP for areas that could be used for energy generation (e.g., solar collectors or wind mills).

Advantages: Allows UCP to use the most appropriate sites to generate power from alternate energy sources.

The policy would encourage alternate sources of energy supply for the UCP area that allow buildings to supply a portion of their own energy needs (e.g. fuel cells or solar energy).

Disadvantages: This policy may deter potential builders unfamiliar with alternative energy sources and concerned about their viability in a market dominated by “plug into the electrical socket” buildings. The approach may also add to the cost of development; however, outside funding sources and rebates may be available to partially offset the added costs. Labor and supply costs may be higher if the builders are unable to find local supplies and talent familiar with construction of the alternative energy sources.

Operational costs may be higher if specialized training is required for the operation and maintenance of the alternative energy sources.

Policy: Encourage a diversified supply of energy for the UCP area that uses traditional forms of energy, electricity and natural gas, when they are the best solution.

Advantages: Makes the best use of the traditional forms of energy supply that are readily available.

Contractors, engineers and architects are comfortable with the design and construction of electric and natural gas facilities.

Disadvantages: None

Policy: Encourage the use of energy resources that use smaller, decentralized energy supply sources, which are less expensive, more flexible and quicker to deploy.

Advantages: The policy would support infrastructure solutions that allow for incremental investment rather than large up-front costs.

The policy would encourage alternate sources of energy supply for the UCP area that allow buildings to supply a portion of their own energy needs (e.g. fuel cells or solar energy).

Disadvantages: This policy may deter potential builders unfamiliar with alternative energy sources and concerned about their viability in a market dominated by "plug into the electrical socket" buildings. The approach may also add to the cost of development; however, outside funding sources and rebates may be available to partially offset the added costs. Labor and supply costs may be higher if the builders are unable to find local supplies and talent familiar with construction of the alternative energy sources.

Operational costs may be higher if specialized training is required for the operation and maintenance of the alternative energy sources.

Policy: Set aside areas of the UCP site and adjacent properties for development as sites for energy generation (e.g., solar collector panels and wind farms) that would be compatible with adjacent uses.

Advantages: Would allow UCP to optimize the opportunities for generation of energy by alternative sources (e.g., solar and wind).

Disadvantages: There could be costs involved for purchase or lease of sites.

OBJECTIVE: APPLY SUSTAINABILITY PRINCIPLES IN THE DEVELOPMENT OF AN ENERGY PLAN

The UCP should consider environmental objectives and tradeoffs in decision making about the design and operation of energy supply systems. By matching tasks with the appropriate type of energy source and then using that energy as efficiently and cost-effectively as possible can lead to significant cost and energy supply savings. The more efficient use of energy coupled with the use of cost effective renewable sources, such as sun, wind, and biomass, can provide affordable and sustainable energy options.

In a typical town, 70 to 80 cents of every dollar spent on energy immediately leaves the local economy. Finding ways to reduce these costs begins a series of local economic benefit through conservation and lower energy costs.[1]

Policy: Encourage the development of shared utility systems (e.g., centralized heating, air conditioning and ventilation systems could be used to serve more than one building).

This policy would take advantage of the Energy Services Plan and the mix of uses within the UCP. For example, centralized heating, ventilation, and air conditioning (HVAC) systems could be used in the Town Center and Business Center.

Policy: Emphasize natural versus mechanical energy systems and those that depend upon, or facilitate the use of, non-fossil energy sources (e.g. solar, wind, geothermal wells, fuel cell technology, and cogeneration).

Policy: Develop an "end use/least cost" approach to the supply of energy, which considers the price of obtaining the supply rather than the energy supply itself.

This approach asks, "What tasks require energy, how much and what kinds of energy is needed for the task, and what is least expensive way to supply that energy?" People do not want a kilowatt-hour of electricity,

[1] Alice Hubbard and Clay Fong, *The Community Energy Workbook*, 1995.

but rather the end use, such as lighting, that the kilowatt provides. Therefore, it is the price of obtaining the energy supply, rather than the energy supply itself, that matters in this approach to the supply of energy.

Advantages: These three policies would incorporate the consideration of consumption levels, waste and conservation of natural resources into the decision making process for energy systems.

The policies would encourage alternative sources of energy supply for the UCP.

The policies would significantly reduce the energy consumption of UCP and reduce the loss of non-renewable resources.

Disadvantages: These policies may deter potential builders unfamiliar with energy conservation measures in energy systems and concerned about their viability in a market dominated by "plug into the electrical socket" buildings.

Renewable energy technologies are relatively expensive; however, if energy conservation and efficiency measures are enacted, smaller and less expensive facilities can be used.

GOAL 2: PROMOTE INNOVATION IN CONSTRUCTION AND DESIGN THAT WILL REDUCE ENERGY USEAGE

Due to the size and mix of uses within the UCP area, there is an opportunity to creatively use alternative energy systems that could result in lower energy consumption than through conventional systems (e.g., a centralized HVAC system, based on an alternative energy source, could be used for both the Town Center and Business Center). The public utilities, to include water, wastewater and street lighting, and streetlights, also provide opportunities to creatively use alternate energy systems (e.g., use waste heat from wastewater treatment for cogenerating electricity to run the plant).

OBJECTIVE: REDUCED ENERGY CONSUMPTION THROUGH MORE ENERGY EFFICIENT DEVELOPMENT

This objective requires innovation in the design and construction of buildings and implementation of the concept that buildings are “systems”. For example, lighting choices will influence the costs of cooling a building, and thereby influence the amount of power consumption. The siting, construction and operation of the buildings and residences within the UCP area play a role in the amount of energy resources used. Through the use of an integrative design it is possible to achieve large efficiency gains more cost effectively than small ones.

Policy: Encourage the use of building materials that incorporate recycled and sustainable materials by requiring that construction in the Specific Plans use a certain percentage of such materials.

Policy: Require buildings to exceed state energy efficiency standards by 15-percent.

Policy: Require energy efficient appliances, fixtures and systems (e.g., HVAC) in all buildings and residences.

Advantages: These policies could be implemented by the Best Practices program.

A diversified source of energy would prevent the UCP from being overly dependent upon a major source for energy supply and; therefore, the Plan area would be less affected by temporary shortages in energy supply ("brownouts").

A long-term savings in the amount of nonrenewable resources would result from implementation of these policies.

A long-term savings in utility costs would result from implementation of these policies.

Disadvantages: These policies may deter potential builders unfamiliar with energy conservation measures in energy systems and concerned about their viability in a market dominated by "plug into the electrical socket" buildings.

Renewable energy technologies are relatively expensive, but if energy conservation and efficiency measures are enacted, smaller and less expensive facilities can be used.

OBJECTIVE: OPTIMIZE PASSIVE ENERGY DESIGN IN BUILDINGS

Many features of passive energy design, such as proper orientation of buildings, maximizing southern exposure and proper window placement result in significant energy savings.

Policy: Require all new subdivisions to maximize, to the extent feasible, proper orientation of lots with regard to solar utilization. Require easements on subdivision and parcel maps to protect solar access for individual lots.

Policy: Require developers to properly design all structures to take fullest advantage of solar use in heating and cooling. Incorporate design elements that support natural heating and cooling of buildings (e.g.,

overhangs, ventilation by open windows, and courtyards, require the use light colored materials for roofs and walls to reduce energy needs for cooling).

Policy: Design and mass buildings and architectural forms provide protection from heat, cold and wind and thereby reduce energy use.

Policy: Integrate landscape and water elements with building design to provide relief from heat (e.g., plant trees that provide a broad canopy for shade. Require that shade trees be planted on the eastern, western and southern exposures of buildings to reduce cooling costs).

Policy: Set requirements for window area and placement in buildings to ensure maximum natural light without causing a significant heat gain.

Advantages: These policies would encourage the implementation of passive energy designs in buildings within the UCP.

Unlike mechanical systems that need maintenance and can become obsolete, passive energy designs are permanent and require no further effort once they are installed.

The energy savings of these systems are realized throughout the life of the building. These systems involve little or no extra cost to developers; yet provide a reduction in energy usage and a corresponding lifetime savings in utility costs for the owners of the building.

Passive energy systems can also reduce construction costs (e.g. if the central air conditioning system of a building can be eliminated or replaced with a single room air conditioner, as a result of passive solar design).

Disadvantages: These policies may deter potential builders unfamiliar with alternative energy sources and concerned about their viability in a market dominated by "plug into the electrical socket" buildings. The approach may also add to the cost of development; however, outside funding sources and rebates may be available to partially offset the added costs. Labor and supply costs may be higher if the builders are unable to find local supplies and talent familiar with construction of smaller, decentralized facilities.

OBJECTIVE: VISUALLY INTEGRATE THE ENERGY SYSTEMS INTO THE BUILT ENVIRONMENT

The master planning requirements of an Energy Services Plan provide an opportunity to integrate the energy systems into the built environment so that they become unobtrusive.

Policy: Require that energy systems be visually integrated into the built environment to the extent possible.

Policy: Discourage the use of above ground wiring.

Policy: Screen utility facilities, such as electrical substations, with dense vegetation or architectural features.

Advantages: Would give the UCP control over the appearance of the energy supply facilitates to ensure that they blend into the natural and built environment to the extent possible.

An unobtrusive energy system allows the UCP to maintain a market advantage by helping to ensure a visually pleasing environment.

Disadvantages: None.

GOAL 3: DEVELOP A TELECOMMUNICATION/DIGITAL UTILITIES ACTION PLAN

OBJECTIVE: DEVELOP AN OVERALL TELECOMMUNICATION/DIGITAL UTILITY PLAN FOR THE UCP AREA

Through the application of long-term planning and priorities to the communication and information systems, a coordinated approach can be developed for the supply of these services to the UCP area. This holistic approach would take advantage of the large area and mix of uses of the UCP and would lessen the impacts resulting from numerous providers trying to gain market share. Because of the rapidly changing nature of the industry, it is imperative that the UCP develop flexible policies for the accommodation of communication facilities.

Policy: Require a Telecommunication/Digital Utility Services Plan of the entire UCP site to establish policies for the provision of telecommunications and digital utilities to the UCP area that can remain flexible and take advantage of future technology advances.

Advantages: Acknowledges that advances will be made in the types and provision of communication and information systems and encourages the UCP to take advantage of these advances.

Allows the UCP to maintain a market advantage by ensuring the UCP is able to provide the types of systems desired by future occupants of the site.

Disadvantages: Future technological advances would need to be integrated into the plan and the funding opportunity may not exist to update the plan.

Infrastructure needs of future technology may be difficult to work into the infrastructure established by the plan.

A coordinated approach requires a fairly definite plan for the UCP area in order to include probable communication and information facilities requirements for each of the uses.

OBJECTIVE: VISUALLY INTEGRATE THE TELECOMMUNICATION/DIGITAL UTILITIES INTO THE BUILT ENVIRONMENT

Due to the size and mixed uses within the Plan area, the UCP has an opportunity to creatively integrate the telecommunication facilities into the built environment. Because of the number of different types and commercial providers of wireless communication, there is the potential for numerous facilities in the UCP area. Providers are prompted to increase their number of transmission sites in order to gain coverage and calling capacity, and the resulting market share. Therefore, flexibility of design and combination of facilities should be a priority. Unlike ground-wired telecommunications, wireless communications require numerous antennas to be mounted at various heights throughout the landscape. In order to site them at the necessary height, these antennas are sometimes mounted on towers, poles, tall buildings, or other structures, resulting in concerns about the visual impact of these facilities. Creative design measures can be utilized to hide these facilities, such as housing communication equipment in an architecturally integrated tower in a shopping area or roof top antennas screened with a wall.

Policy: Develop design guidelines for wireless communication systems to visually integrate the systems into the built environment and encourage the use of sites and antennas by multiple providers.

A master plan of communication sites would not be practical. The industry is primarily market driven and the technology is changing rapidly. Therefore, the number and locations of, and allowed antenna types on the sites, cannot be preplanned. The UCP would be better served by developing a set of guidelines for wireless communication systems. The guidelines should include such measures as: encourage design measures to screen facilities by integrating them with buildings and other structures; require that panel antennas be painted to match the building or structure; where technically feasible, minimize the effect of the location of facilities in visually-sensitive areas, such as residential communities and open spaces; encourage telecommunication providers to co-locate facilities on a single site; and locate antennas on other community facility structures such as on utility poles.

Advantages: Would give the UCP control over the appearance of the antennas and other facilitates to ensure that they blend into the natural and built environment to the extent possible.

The use of facilities by multiple providers would reduce the number of sites and antennas.

An unobtrusive wireless communication system allows the UCP to maintain a market advantage by helping to ensure that the UCP has a visually pleasing environment.

Disadvantages: None.

GOAL 4: CREATE A SENSE OF COMMUNITY

OBJECTIVE: DEVELOP A DIGITAL SYSTEM THAT CREATES A SENSE OF COMMUNITY

A voice, data and video communications network could be developed that serves the residential, commercial, educational, utility, and civic needs of the UCP. The network could link the residences, schools, offices, and businesses and provide on-line series such as e-mail, discussion (chat groups), bulletin board series and access to the Internet. The system could also link the University to the Community Plan area. The goal of the system would be to facilitate the sense of community and help shape it by allowing residents to electronically communicate with one another, the University, UCP businesses and merchants, and the world.

Policy: Develop a digital system that connects all areas of the UCP area and connects the UCP area to the University Campus.

Advantages: The technology exists and is readily accessible. Using today's technology, the entire network can consist of telephone and cable TV services. No extra infrastructure would be necessary.

Disadvantages: The system requires staff and funds to instruct businesses and residents in the use of the system and to maintain and upgrade the equipment for the Local Area Network (LAN), which is the main computer that would tie together the system.. A funding opportunity may not exist.

The system would become obsolete as new technology becomes available.

The system would add to the cost of development.

Policy: Require new homes and businesses to either be wired with fiber-optic cables or with wiring conduits with easy access and adequate capacity to allow for efficient retrofitting.

Advantages: Ensures that the UCP can utilize the benefits of fiber optic technology.

Allows the UCP to maintain a market advantage by ensuring the UCP is able to provide the types of systems desired by future occupants of the site.

Disadvantages: The system would add to the cost of development.