# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Purpose and Intent</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Development Determinants</td>
<td>3</td>
</tr>
<tr>
<td>2. Development Requirements and Concepts</td>
<td>15</td>
</tr>
<tr>
<td>3. Master Plan Elements</td>
<td>22</td>
</tr>
<tr>
<td>Land Use and Development Phasing</td>
<td>23</td>
</tr>
<tr>
<td>Circulation (Streets, Parking, Bus)</td>
<td>27</td>
</tr>
<tr>
<td>Utilities</td>
<td>29</td>
</tr>
<tr>
<td>Security and Safety</td>
<td>38</td>
</tr>
<tr>
<td>Communications</td>
<td>40</td>
</tr>
<tr>
<td>Open Space and Amenities</td>
<td>42</td>
</tr>
<tr>
<td>4. Development Costs</td>
<td>67</td>
</tr>
<tr>
<td>5. Management and Operations</td>
<td>70</td>
</tr>
</tbody>
</table>

**Appendices**

A - Proposed Development Covenants & Restrictions
B - Proposed Landscape Standards
<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Development Determinants</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Visual/Image Analysis</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>Ultimate Land Use &amp; Development</td>
<td>24</td>
</tr>
<tr>
<td>4</td>
<td>Phase I Land Use &amp; Development</td>
<td>26</td>
</tr>
<tr>
<td>5</td>
<td>Water &amp; Wastewater</td>
<td>33</td>
</tr>
<tr>
<td>6</td>
<td>Lighting &amp; Electrical</td>
<td>35</td>
</tr>
<tr>
<td>7</td>
<td>Storm Drainage</td>
<td>37</td>
</tr>
<tr>
<td>8</td>
<td>Open Space &amp; Amenities</td>
<td>43</td>
</tr>
<tr>
<td>9</td>
<td>Walkways &amp; Trails</td>
<td>44</td>
</tr>
</tbody>
</table>
PURPOSE AND INTENT

Texas A&M has a long history of cooperative research projects with private enterprise. The University's reputation, location, facilities, and research faculty and staff combine to present a major opportunity to develop a nationally prominent research park. The proposed Texas A&M University Research Park will be located on approximately 434 acres west of the main campus in College Station, Texas.

The basic purposes of the Texas A&M Research Park shall be:

a. To utilize the resources of Texas A&M University, and The Texas A&M University System and its other component parts, to assist in expanding and strengthening research and development capabilities of the State of Texas.

b. To enhance the quality and productivity of research activities at Texas A&M University and other parts of The Texas A&M University System, and to accelerate the dissemination of new knowledge and the transfer of new technologies to the public and private sectors of our state and nation.

c. To establish a closer working relationship between the research capabilities of Texas A&M and selected industrial and commercial entities which themselves are engaged in research activities compatible with the purposes of Texas A&M University and with other components of the System.

d. To facilitate the movement of recently trained graduates of Texas A&M University into demanding positions in private industry and government at all levels.

To accomplish these purposes, the preparation of a master plan for the Research Park has been commissioned by the University. Parcels ready for development will be prepared and leased on a long-term basis to corporate tenants who meet Research Park criteria.

The Research Park has been planned and developed to create a quality setting conducive to high productivity and employee satisfaction. Site amenities such as landscaping, hike and bike trails, and passive recreation areas have been included in the planning. The Research Park's relationship to the developing West Campus and the Main Campus has been captured to physically and functionally link these two areas.
Chapter 1. Development Determinants focuses on off-site and on-site factors which have a direct bearing on the eventual form of the Park. Physical and man-made features such as topography, land form characteristics, aesthetic opportunities, and utilities are discussed as they impact on the planning and development of the overall site.

Chapter 2. Development Requirements and Concepts serves to establish demand side requirements of potential corporate Park tenants. Development assumptions and design parameters identify the infrastructure demands of the Park.

Chapter 3. Master Plan Elements describes principal master plan components including land use, circulation, open space/amenities/landscape guidelines, security/safety, utilities and others.

Chapter 4. Development Costs provides preliminary development cost estimates for Phase I, later phases and total Park development.

Chapter 5. Management and Operations describes a procedure for organizing the Park program, the responsibilities of the Park Director, initial period Park activities, absorption period activities and the development review process including application of the Covenants and Restrictions.

Appendix A contains a proposed copy of the covenants and deed restrictions.
Appendix B contains a proposed copy of the landscape standards.
1. **DEVELOPMENT DETERMINANTS**

**Regional Setting**

The Bryan/College Station area is located near the center of the Houston/San Antonio/Dallas growth triangle.

In 1980, the Bryan-College Station Standard Metropolitan Statistical Area (SMSA) was the fastest growing SMSA (by percentage) in Texas and sixth fastest in the nation. The 1980 population of 93,500 represents a 61.4 percent increase over the 1970 population of 58,000. The Bryan-College Station SMSA has been projected by the Bureau of Business Research in Austin to continue to grow to 146,000 by 1990 and 172,000 by the year 2000.

While most of the tenants for the Park will not come from the expansion or growth of local industry, the dynamic area population growth and associated development of the area creates a positive business image attractive to corporations seeking to relocate or to establish new facilities.

The specific location of the 434-acre Research Park site within the Bryan-College Station area presents a great advantage. The site is strategically positioned on the western edge of the campus only minutes from Easterwood Airport, and adjacent to the Highway 2818 bypass. While the Park site is less than one mile from the main A&M campus area, it is separated by enough undeveloped land that it can be viewed as a distinct facility with its own identity.

**Circulation and Access** - Existing access to the main portion of the study area is presently from University Drive (FM 60) near the Poultry Science Center and from Jersey Street (FM 2347) near the Swine Science Center. Access is possible from the West Bypass (FM 2818), however, no existing road from the tract connects to the West Bypass. Access to the expansion tract (north of the main tract) is from University Drive.

All of these perimeter roads are state highways and are maintained by the State Department of Highways and Public Transportation (SDHPT). University Drive (FM 60) is a 5-lane urban highway consisting of 2-lanes in each direction of travel with a flush median for a left-turn lane. This highway configuration extends from Wellborn Rd. (FM 2154) to west of West Bypass (FM 2818).

West Bypass (FM 2818) is a 4-lane divided road at its intersection with University Drive. The bypass transitions into 2-lane undivided highway sections north of Jersey Street (FM 2347) and south of F&B Road.

Jersey Street (FM 2347) is a 2-lane undivided roadway from West Bypass to Wellborn Road. Jersey Street east of Wellborn Street is a 4-lane divided urban street.
SDHPT has no near term plans to improve any of the adjacent highways. Proposed "safety" improvements are considered by SDHPT for segments of the West Bypass north of University Drive and south of Jersey Street. These improvements include the construction of a 5-lane roadway with a flush median for a left-turn lane.

The lack of improvement plans for the section of the West Bypass adjacent to the study area is due to the current low volume of traffic and the undeveloped nature of the adjoining lands. SDHPT representatives, however, feel that with the development of a research park on the tract, roadway improvements could be justified on the perimeter roads.

SDHPT's long-range scheme for the West Bypass is to construct a 4-lane divided controlled-access facility with frontage roads. This type of facility would extend the entire length of the West Bypass from its northern intersection with Highway 6 to Wellborn Road.

The number of future access points to the West Bypass should be limited, however, future potential access points to University Drive and Jersey Street could be more numerous.

Airport Proximity and Implications - The Park's close proximity to Easterwood Airport is an attractive marketing point to the potential tenant who would be literally only minutes from a general aviation airport, however, it also poses physical limitations which are related most significantly to associated building and height restrictions and to a lesser extent-aircraft noise.

The present runway configuration and operation impact the Park on the approaches to RW22 and RW16. The "clear zone" for both of these runways extend into the Park. FAA regulations generally restrict the establishment of any structures in these clear zones (with the exception of aeronautical equipment such as approach lights). Approximately 5.6 acres of Park property at the northeast corner of the University Drive and FM 2818 intersection would be limited as such, as would 21.4 acres east of FM 2818 in the central part of the Park. Exhibit 1 shows the extent of these limitations. The exhibit also indicates the maximum height of obstructions permitted within the clear zones and at other locations. Restrictions are shown in both feet above the runway end elevations, and in feet above MSL (mean sea level).

The RW16 clear zone extends into the high-visibility view of the Park along University. While lease of this land for building development is not desirable, open space uses and Park entry markers would likely be acceptable, but would require FAA review and approval.
Exhibit 1
Development Determinants

- Arox. 100 Year Floodplain
- Existing Streets
- Ground Slopes Over 10%
- Ground Slopes 5% to 10%
- Maximum Height of Structures (Above Runway Elevation - 320' MSL)

Student Activity Center
Proposed Intramural Fields

Boosy Engineers, Inc.
Engineers and Planners

Texas A&M University Research Park
College Station, Texas
Height restrictions outside of the clear zone impose lesser though significant limitations on development in the northwest corner and expansion areas of the Park. As shown on Exhibit 1, the 50 foot height limit (assuming a 320' MSL ground elevation), would restrict structures from one to three floors (depending on exact location and ground elevation) within a narrow wedge shaped area at the intersection of University Drive and FM 2818. The 50 to 100 foot height limit extends over a much broader area under the RW16 approach. More than 50 percent of the Park expansion site is expected to be limited to structures of three to seven floors. The 100 to 150 foot height restricted area under RW16 would limit building heights from seven to eleven floors -- again depending on the exact location and ground elevation of the parcel.

At present, the RW22 clear zone presents a greater limitation involving approximately 21.4 acres. While this restriction could pose a major constraint on initial Park development, RW 4/22 is proposed to be shortened from its present 5150 foot length to 3000 foot length. The "Easterwood Airport Master Plan" (1979) does not specify a date for this runway shortening, however, this cross-wind runway is the least used of the three runways. Shortening of this runway will need to be scheduled prior to Phase II development. This will totally remove this clear zone restriction from the Park as well as essentially all other height restrictions (below 150') under this runway approach within the Park. This runway could remain operational during Phase I development, but would impose some interim limitations of 50 feet to structure heights on several parcels.

Aircraft noise could present another potential limitation on the development of the Park. Analysis of the number and type of aircraft operations projected for Easterwood suggested that there would be no off-airport areas exposed to NEF 35 contour, the "zone of greatest effect", in which noise could disrupt outdoor and even indoor activities.

The NEF 30 contour (forecasted for 1998) would encompass only a narrow band of the Park along FM 2818 south of University Drive. (See Exhibit 1.) Land use within the area according to the FAA should be reserved for activities that can tolerate a high level of sound exposure such as agriculture, industrial, and commercial uses. Sound sensitive uses such as residential, schools, offices, hospitals, and like activities, should not be constructed in this area.

Land within the NEF 25 contour is exposed to noticeable aircraft noise, but is considered suitable for residential, commercial, and industrial uses. The western portion of the Park expansion area, and a narrow strip of land at the northwestern corner of the Park will be exposed to this noise contour. While most Park tenants within this zone should not be disturbed by this aircraft noise, the future park tenant architects may wish to incorporate special noise attenuation techniques into structures in this area.
Surrounding Land Use Pattern - The location of the Park site should present no compatibility problems with adjoining land development. The eastern boundary of the Park adjoins the Equine Science Center which is primarily open space. University plans call for the relocation of the Equine center and the development of intramural fields. Such recreational use should be highly compatible with the Park. The recreation users will be concentrated in off-peak traffic hours, thereby not adding to traffic congestion during day-time Park hours.

The property across Jersey Street to the south of the Park includes the site of the Chancellor's residence. Since the residence is set back from the street, and since the Park will be developed in an attractive manner, no conflict is envisioned.

The western boundary of the Park is FM 2818 and Easterwood Airport. The Park should present no compatibility problems with the airport if the previously described obstruction height limits are respected within the Park.

The expansion area is separated by the wide right-of-way of the west bypass (FM 2818) from the scattered urban development to the west. The property to the north and east is undeveloped -- generally used for grazing.

The small out parcels along University Drive may present the only potential land use compatibility concerns. However, limiting the character of the development within the expansion area through establishing bulk standards should minimize any problems of blocking light and air circulation to the residences located within the out parcels. A buffer strip defining minimum building set backs from these out parcels would further reduce the chance of any land use compatibility problems perceived or real.

Development Controls - While the entire Park site is located within the city limits, the development on University land is not subject to the jurisdiction of the city of College Station. As state-owned University land, the property is also exempt from city zoning laws, subdivision regulations and building codes, thereby allowing maximum flexibility in site layout and land uses. Buildings within the project, however, will need to meet the Southern Building Code, as well as specialized codes related to plumbing, electrical systems, and life safety.

Because of the absence of any development controls, the Park should develop and administer a solid set of private development standards and lease restrictions to ensure an attractive and cohesive project. A set of Park controls is included in a later section of this report.
Surrounding and Approach Views - The topographic and vegetative character of the Park site and surrounding area offers a variety of interesting views into the site. The majority of the main Park site is highly visible from surrounding roads to a depth of 400 to 1,000 feet into the site. The southwest corner is highly visible from the northbound lanes of FM 2818, and once the soil stockpiles are removed will afford a similar exposure from the southbound lanes. Exhibit 2 illustrates the various views, vistas, and images.

Views from FM 2818 (north of University Drive) toward the main site are interrupted by University Drive and a depressed section of FM 2818. Views into the expansion site are limited by dense vegetation.

Views into the site from FM 2818 between Jersey Street and University Drive are segmented by intermittent stands of trees. The majority of these trees occur along the drainage way within the highway right-of-way. (It could be anticipated that most of these would be removed should any improvement to the drainage be made.)

A large portion of the southwest corner of the site is visible from Jersey Street. One’s view of the ground plane is terminated at the ridge line with the treeline of the drainage ravine visible on the horizon. A highly aesthetic setting occurs near the drainage outfall on Jersey Street. This is a low meadow surrounded by the ravine tree line and the ridge line (approximately 3 acres).

Views from University Drive into the main site are interrupted by scattered groupings of trees. Views into the northern expansion area are very restricted by the dense vegetation.

Views from the site to the surrounding area are somewhat limited. Major University structures (Kyle Field and Rudder Tower) and the airport control tower are the main off-site elements visible from the majority of the site.

Project Site Characteristics

Drainage & Topography - The gently sloping nature of both the main and northern expansion tract in the Park suggests good storm water runoff for most of the site. The drainageways are well-defined and potential flooding should be limited to areas adjacent to these existing channels. No channelization or other drainage improvements are evident within these two major drainways. The water courses meander frequently and fallen trees and other vegetation appear to restrict water flow in some instances.

The 100-year flood plain as reflected on current Flood Insurance Administration maps, is shown on Exhibit 1. It is important to note that this flood plain was delineated based upon the development that existed at the time of the map’s preparation. Development of the Park may have a significant effect on the extent of future flooding for the following reasons:
Exhibit 2
Visual/Image Analysis

- Obstructed View
- Views/Orientation Into Site
- Houses
- Spatial Areas: Contained Views
- Primary Visual Amenities
- Secondary Visual Amenities
- Negative Elements
- Overhead Utilities

Boosy Engineers, Inc.,
Engineers and Planners

Texas A&M University
Research Park
College Station, Texas
a. The installation of an efficient storm sewer system will result in a higher peak rate of storm water runoff from the Park site. This increased flow will result in a higher water surface elevation in the creeks and a wider flood plain. The position of the Park site in the upper portion of the White Creek Watershed will magnify the effect of the increased runoff.

b. In addition to the increased water depth resulting from increased flows, an additional depth increase (and, therefore, flood plain width increase) may result from the backup of water at culverts downstream of the site. These culverts, which run under Jersey Street and FM 2818, were designed to carry flows from the site under unimproved conditions. The increased flows resulting from the Park development will probably exceed the capacities of the culverts and the resulting backwater will increase water depths through the site.

The increased flow rates will also increase water depths south of the site, although the effect diminishes at points further downstream. The increased flow rates will have a negligible effect on the water depth of the Brazos River downstream from the White's Creek outfall.

In a few cases, the existing topography does pose development limitations as shown on Exhibit 1. The areas with natural slopes in excess of 10% are considered unsuitable for development. While modern technology and engineering could allow structures and streets on these steeper slopes, the costs of such development would be generally prohibitive. Substantial earthwork would be required for most development, though this land is quite suited to passive recreation uses such as walking, biking trails, picnic areas and natural preserves. These steeply sloped areas are also generally heavily vegetated suggesting that they can additionally serve as buffers between different uses or phases of development.

Land with natural ground slopes of five to ten percent are moderately suitable for development. These ground slopes are significant enough, however, to require special cut and fill and/or foundation design (particularly for larger structures). While development on this moderately sloping land is possible, the higher costs suggest that it should be avoided in favor of more level land.

In summary, the vast majority of land within both the main and northern expansion tracts exhibit slopes of less than five percent. This land lends itself easiest to development and would have minimal need for costly earthwork (cut and fill). This land is also located generally above the 100-year flood plain - thereby further reducing development costs.
Soils - The predominant soil series on the site is the Tabor series. Run-off is slow and internal drainage ranges from slow to lacking. An exception to these characteristics within this series is demonstrated on the Tabor gravelly loamy sand which, exhibits medium run-off. Tabor soils also present a problem through high shrink/swell potentials, structural weakness and large sodium sulphate concentrations which causes soil to become corrosive and highly conductive, especially during wet periods.

In summary, soil conditions exhibit limited porosity and permeability which suggests limiting building coverage, honoring and expanding drainage system, and exploiting selected drainage points to form lakes and detention ponds.

Ecology - The site is located in the Post Oak Savannah vegetative region of Texas. Vegetative characteristics of the site consist of uplands covered by forbs and grasses interspersed by wooded bottomlands. Predominant trees along the bottomlands were Hackberry, Black Willow, Water Oak, and various other oaks. Uplands are used primarily as pastureland and are subject to disturbance due to grazing by cattle.

The site is typical of much of the surrounding region and is inhabited by fauna commonly found in Brazos County. No unusual species were noted during a walk-through of the site.

No endangered or threatened species are known to occur on the site. While Brazos County has been indicated as a potential habitat area for American alligators and within the periphery of the migration route for Whooping Cranes, the Park site does not provide suitable habitats for either of these species.

Utilities Systems and Capacities - Utilities exist within the generally undeveloped site for several reasons. First, utilities were constructed to serve the Poultry and Swine Science Centers which currently occupy portions of the Park site. Second, utilities were extended from the main campus area through or around the Park site to Easterwood Airport and related facilities. Finally, the location of the now abandoned sewage treatment plant on Disposal Plant Road and the new plant located south of the Park site resulted in sanitary sewer trunk lines being routed across or near the site. The following is a summary of existing utilities as they relate to the proposed Park:

Water Supply & Distribution

Domestic water for use on the campus is produced at a well field west of the campus and pumped to the F&B pump station at the corner of F&B Road and Wellborn. The F&B pump station actually consists of two booster pump stations with a total pumping capacity of approximately 17 million gallons per day and two 2-million gallon ground storage tanks. Water from this facility is pumped into 16-inch and 18-inch diameter supply mains which parallel the Southern Pacific Railroad.
A 6-inch diameter water main runs along University Drive from the 18-inch diameter supply main along the Southern Pacific railroad. This 6-inch main serves the Poultry Science Center and Easterwood Airport, including the fireman training and nuclear areas. This main loops back along Jersey Street to serve the Swine and Equine Science Centers as well as other facilities before again connecting to the 18-inch supply main along the railroad.

An engineering study prepared in 1980 showed that this line was not adequate to serve Easterwood Airport and its related facilities. The study included recommendations to construct a 24-inch diameter main along University Drive to FM 2818 and a 16-inch diameter main continuing along FM 2818 to the airport facilities and back to the main near Wellborn Road. Development of the Park will intensify the need for these new lines.

Sanitary Sewage Collection and Treatment

The old sewage treatment plant on the western boundary of the Park site was once the terminating point for sewage trunk lines serving the campus. Abandonment of this plant and the construction of a new plant south of the project site have resulted in construction of new lines such that two distinct sewage trunk line systems now exist through the Park.

The first system consists of a 10-inch sewer which crosses the railroad from the main campus area and joins an 18-inch sewer from the west campus area. An 18-inch sewer continues from this junction to the southeast, approximately parallel with the northeastern boundary of the Park site. This sewer joins a 24-inch sewer at Jersey Street. The 24-inch sewer then continues southwest along Jersey Street and across property south of Jersey Street to the new sewage treatment plant.

The second trunk line system consists of a 10-inch and 12-inch sewer from the USDA Toxicology Area, an 8-inch sewer from the Poultry Center, and a 10-inch and 15-inch sewer that also serves parts of the Toxicology Area and the Poultry Center, as well as the Veterinary Park Area. These sewers join at the site of the abandoned sewage treatment plant and then continue as an 18-inch sewer to the new plant.

The new plant has a capacity of approximately four million gallons per day (average daily flow). University staff confirmed that the plant now operates at or near capacity due to the recent growth in student population. Plant expansion will therefore likely be needed to serve the ultimate development of the Park. Early development, however, could be served from existing lines without immediate need for plant expansion.
Natural Gas Distribution

A 3-inch gas line runs along University Drive from a 4-inch line along Agronomy Road to the Poultry Science Center. These lines are inadequate to serve the Park and efforts to coordinate a more adequate system will need to be explored if natural gas is viewed to be a necessary energy alternative.

Electrical Distribution

Initially, electrical service to the Park would best be provided by a 12.5 kV feeder extension from an existing on-campus substation. It is anticipated that such an extension could be made to the existing West Campus Switching Station. It will be necessary to conduct a study of the Park's initial load requirements vs. the capacity available in the existing system before a definite power source can be determined, however.

Predominant Land Uses/Structural Conditions - The main tract now serves two primary uses: agricultural research in the form of the Swine and Poultry Science Centers. Secondary uses include cattle grazing, small isolated experiment stations for grass analysis, and storage of miscellaneous equipment including boats and nets from the wildlife and fisheries department. Also located on the tract is a combustible solvents waste storage facility at the site of the abandoned waste treatment plant.

The Swine Science Center and the Poultry Science Center present the only significant relocation problem. This study assumes that both facilities can be moved in the short term (less than 2 years), though immediate relocation may not be possible - pending selection of new sites. The demolition of the abandoned sewage treatment plant facilities presents another significant cost item and will involve leveling of some rather substantial concrete structures and tanks. The marginal appearance of these facilities dictate that they should be removed early in Park development.

Aesthetic Opportunities and Limitations - The project site has a significant amount of aesthetic appeal. Most significant are the lush stands of trees along the drainage ravines and throughout the expansion site. Mature stands of Post Oak in grassy meadows also offer attractive vignettes. Any development in or near these areas will need to occur in a very sensitive manner to maintain their vitality.

The existing trees along with the gently rolling terrain offer a significant degree of spatial definition at ground level. This begins to segment the site into cells ranging from six to 60 acres. This spatial effect will be reduced to three or four areas when viewed from multi-story structures. Although this spatial effect is enjoyable, it also creates the need for unifying elements between spatial areas.
Several features exist that exhibit negative qualities when considered in association with the proposed development. Although well maintained, the character of the swine and poultry facilities impacts negatively on the Park image and their early removal should be scheduled. Likewise the view of the abandoned sewage treatment facility is undesirable, and its early removal should be considered. Visual obtrusions of a secondary nature include the above ground sections of sewer lines and overhead power lines.

Due to aesthetic and practical considerations, it will be desirable to re-route the existing 12.5 kV overhead line feeding the airport. This line presently runs diagonally across the southeast portion of the proposed Research Park site. Unless relocated, the line could hinder construction and detract from the Park's image.
2. **DEVELOPMENT REQUIREMENTS AND CONCEPTS**

Demand for land within the Research Park has been classified into two general types: (1) "Permanent Uses" representing corporate users who would construct their own facilities on leased Park land; and (2) "Park Facilities and Research Activities" which could include users such as Park administration and a possible conference center. The potential and demand requirements for each type of user is highlighted below.

**Permanent Uses**

To develop a successful University Research Park the project must be developed to closely meet the basic physical and socio-economic requirements of potential corporate research tenants.

Initial tenant includes a 60,000 square foot research and care repository facility for the Ocean Drilling Program (ODP). This facility will be the international headquarters for this program which includes program administration, management of core retrieval cruise operations, scientific research, cruise and research publications, along with curatorial storage of core samples for future research. A total of 130 staff members will be employed at this facility. Because the drilling program represents an international effort, scientists and dignitaries from the U.S. and other nations will visit the facility frequently for research and participation in program advisory panel meetings.

Another initial tenant includes a 54,000 square foot new system administration building. This facility will be the headquarters for the Texas A&M University System administrative staff housing the Chancellor and his immediate staff. Deputy Vice Chancellor and Vice Chancellors, and their administrative staff, including the Vice Chancellor for the research park. A total of approximately 200 staff members will be employed in this facility. Because this is to be the headquarters for a statewide institution involved in state, national and international programs, dignitaries from the state, U.S. and other nations will visit the facility frequently. Parking will be provided for approximately 160 vehicles.

While it is beyond the scope of this study to undertake original research or analysis of the market for research park property, an examination of other market studies reveals the following:

a. High-tech defense oriented research facilities may be the best candidates for park tenants since this industry is projected to grow even faster than the computer/electronics industry. (Source: "Market Analysis - Proposed College Station High Technology Park" Oct. 1982). Special high security areas may be needed for such defense research.
b. Other industry types projected to have higher than average increases in Research & Development expenditures for 1983 include: electrical machinery, chemical industry, and petroleum and instruments industry. (Source: Houston Chronicle May 22, 1983). Proximity to the airport suggests care will need to be taken to prevent electronics research that might interfere with aeronautical operations.

c. Lot size requirements for corporate tenants could be as small as three acres, but would more frequently be in the five, ten, or 20 acre category. Generally, rectangular lots are preferred by corporate planners. Lot depths in excess of 500 feet become difficult to market since most office research users will not need such depth for their building sites.

d. Quality of life is the most important site selection criteria for "Basic Research Centers" with greatest emphasis on climate, aesthetics, and the physical environment. (Source: "Development of High technology Industries in New York State", Oct. 1982).

**Park Facilities and Research Activities**

In addition to private corporate users, and the previously described users, the following additional Park and University uses should be considered for the site.

a. A possible Conference Center may be included on a five to seven acre site. The facility might contain meeting rooms, overnight housing accommodations with up to 60 rooms, and offer food services. A possible variation of the conference center is the proposed "Management Education Center". It could contain at least 55,000 square feet in building floor space and include 60 two-room suites, classroom space, two dining rooms, an executive exercise room, a lounge, and parking area for 70 to 100 autos.

b. Park Grounds Maintenance Facility will likely be needed on the site. Reuse of the Swine Center Building should be considered as a potential location. The grounds maintenance can be handled either under a contract with the University or through a private maintenance firm.

**Development Requirements**

In programming the anticipated development, the consultant and University officials established the following development assumptions and requirements.

**Land/Building Criteria**

* Total Land Area: 434 Ac
* Total Net Leasable Land: 270 Ac
* Maximum Floor/Area Ratio: 0.5  
(Building Floor Area (sq. ft.))/Lot Area (sq. ft.)

* Maximum Impervious Lot Coverage: 0.6  
(Building footprint + parking and drives, (sq. ft.))/Lot Area (sq. ft.)

* Absolute Maximum Total  
Building square footage: 6 million sq. ft.

* Likely Total Building Sq. Ft.: 3 million sq. ft.

* Total Daytime Population (Assuming 3.5 Persons/1000 sq. ft.)  
Likely: 10,500  
Absolute Maximum: 21,000

Circulation & Parking

* A hierarchy of streets ranging from "Parkways" (120' to 200' R-O-W), to "Minor Streets" (80' R-O-W) to "Service Streets" (80' R-O-W).

* Adequate off-street auto parking by all tenants to avoid the necessity of on-street auto or truck parking.

* Linkages for auto, bus, pedestrian, and bicycle circulation to the West Campus. Special attention to ingress and egress from the proposed "Special Events Center".

Water Distribution

* Distribution main (approximately 12" diameter) linked to Jersey Street and University Drive supply mains.

* Distribution main centrally located to minimize size and cost of branch lines.

* Branch lines looped to distribution main if possible.

Sewage

* Collection lines oriented to flow from north to south to make maximum use of existing ground slope.

* New Park collection lines sized to handle flows from existing lines crossing the Park as well as new Park flows so that existing lines across Park can be abandoned.

* New lines coverage near intersection of FM 2818 and Jersey Street for gravity flow or pumping to wastewater treatment plant.

* Topography suggests two main collectors, one on each side of and parallel to north-south ridge line to make maximum use of existing cross slopes and minimize depths of bury. However, cost of parallel collectors versus increased depth of bury with one main collector must be examined.
Drainage

* Maximum use of existing drainage patterns.
* Multiple detention ponds to minimize need for channel improvements and therefore maximize preservation of existing vegetation.
* Detention ponds upstream of each major road crossing to eliminate the alternative necessity of replacing existing large costly box culverts.
* Permanent water levels within detention ponds to provide a basic park amenity.

Electrical Power

* Looped feeder extension to existing west campus distribution system (initially).
* Underground manhole - ductbank system in corridors along roadways and pedestrian ways common to other water and sewer utilities.
* Transformers and service taps provided by individual tenants.

Lighting

* Safety, security, economics, and aesthetics, the major considerations.
* "High level" lighting for all roadways, parking areas, and high activity areas; "Low level" lighting for bicycle and jogging trails, pedestrian walks, and most landscaped areas.
* HID type lighting used for all lighting, with metal halide the likely type for major street applications.

Security & Communications

* General security may be provided by University Police and electronic alarm system tied into University "Hawkeye" system.
* Tenants to provide security for own facilities and generally responsible for own plots.
* Telecommunication system tied into University existing system.
* Tower for possible communications applications.
* Avoid interference with radio and other communications in vicinity.

Park Image and Aesthetics

* Maintain and enhance the existing oak/meadow to dense wooded landscape character through supplemental plantings.
* A hierarchy of plantings ranging from more structured planting along the perimeter of the site and at points of entry and accent to a totally natural setting in the drainage ravines.
* All plantings to be native to the local area or have proven their adaptability and use.
* Identifying structural element at points of entry and appropriate perimeter locations. A substantially taller central landmark to provide project identity and orientation.
Identification structures related to sections of wall that reflect the character of the existing brick entries to the University. Close proximity of identification structure (sign) with wall structures symbolize the separate, but related aspects of the Park and the main campus of the University.

Use additional details such as paving patterns, signage, lighting, bus stops, benches, trash receptacles, etc., as unifying visual elements.

Passive recreation/open space to include jogging and hiking trails.

Overall Plan Concept

Based upon the preceding development requirements of the proposed Park and the design parameters which evolved from the consultants' environmental evaluations, a concept plan was prepared.

The thrust of the concept plan centers upon a circulation system that provides a main parkway drive through the site in a north-south direction connecting University Drive with Jersey Street. Local streets and cul-de-sacs branch off from this central parkway. Two cul-de-sacs are shown for the main Park tract. These would be oversized with up to one acre of landscaped islands in their centers and provide a focal point for those tenants fronting on these streets. The large islands in the cul-de-sacs allow for a 200 foot to 300 foot diameter turn-around which would accommodate even the largest trucks. The large cul-de-sacs also serve to increase the street frontage of adjoining lots.

The open space system provides major 300 foot to 600 foot wide green belts along the existing creeks. The concept incorporates narrower 50 foot to 100 foot wide pedestrian ways connecting the landscaped cul-de-sac areas to the major green belt areas.

The Park administration area is proposed in the northwest corner of the main Park tract. A 2-lane loop street connecting to the main N-S parkway provides good access for visitors and to interior-located Park tenants.

Park development would be phased from the northern sections of the main tract to the south and east. The location of the Park administration area was also viewed favorably because of the attractive natural setting of the proposed site and its high visibility from University Drive.

Circulation and Parking Concept - Approximately 40,000 vehicle trips per day are expected to be generated to and from the proposed Park. The main tract south of University Drive is expected to generate 32,600 vehicle trips per day of the total 40,000 trips.* The techniques involved are based on average observed trip data for various categories of land use.

*This forecast was based on techniques from the National Cooperative Highway Research Program Report 187 entitled Quick-Response Urban Travel Estimation Techniques and Transferable Parameters.
The above trip forecast incorporated an assumed land use mix of general and research and development office uses. These uses typically generate 145 trips daily per developed acre. Also, peak hour volume for these land uses typically is 21 percent of the total trips which would be 7300 vehicles per peak hour. Assuming a traffic distribution pattern from the main park area of 30 percent to the south, 15 percent to the east, and 55 percent to the north, and a typical directional distribution traffic split of 60 percent in one direction and 40 percent in the opposite direction, traffic will be well dissipated by the proposed thoroughfare and street network. The table below shows the traffic distribution and the proposed roadway capacity to accommodate the traffic flow.

<table>
<thead>
<tr>
<th>Direction</th>
<th>Proposed Roadway</th>
<th>Forecasted Peak VPH</th>
<th>Assumed Directional Split 60%</th>
<th>Assumed Directional Split 40%</th>
<th>Maximum Desirable 2-Way Capacity VPH</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>4-Lanes Divided</td>
<td>4000</td>
<td>2400</td>
<td>1600</td>
<td>5350</td>
</tr>
<tr>
<td>South</td>
<td>4-Lanes Divided</td>
<td>2400</td>
<td>1750</td>
<td>1150</td>
<td>5350</td>
</tr>
<tr>
<td>East</td>
<td>2-Lanes Undivided</td>
<td>1100</td>
<td>650</td>
<td>450</td>
<td>3150</td>
</tr>
</tbody>
</table>

Proposed improvements to University Drive adjacent to the Park include the construction of landscaped esplanades to replace the existing flush median. Since University Drive is a state maintained highway, SDHPT was contacted to determine the feasibility of this improvement. No objections were raised by SDHPT from a design standpoint, however, funding for these improvements would not be available from the State at this time.

Linkages to University and Community Concept - The Parks' egress and ingress points to the West Campus will be coordinated with existing and proposed campus roadways and bikeway system to insure consistency and continuity in circulation patterns with the University.

The proposed West Campus Plan includes a Special Events Center. While the use of this facility will likely be predominantly in the evening or weekends, the traffic generated will be extremely heavy at certain times. The street planning for the Park should not interfere with ingress or egress from this center and consideration of ways to use Park streets to expedite peak traffic flow should be considered.

Pedestrian connections to the expansion tract north of University Drive should be accomplished at future intersections with the use of coordinated traffic and pedestrian signal lights.

Park Image & Aesthetic Concepts - To develop a strong positive "park" image, it will be necessary to provide landscape reserves throughout the project site. In most situations, these reserves can serve a dual purpose, i.e., road right-of-ways, utility and drainage easements.
Specific space requirements will occur at points of entry. These areas suggest a triangular shaped parcel of adequate size to create an experience of entering or passing through a "door" into the project. Additional right-of-way width along major streets should be considered to allow for flexibility in road alignment as it relates to existing vegetation and topography.

Reserves or vegetation easements should also be considered along perimeter roads to allow for landscape and security development. In some situations, i.e., expansion site, this may only be a protected vegetation easement to preserve existing vegetation with little or no introduction of additional material.

The protection of the natural beauty along the drainage ravines will be very important. These areas are less desirable for development due to limitations associated with slope and flooding. Although these areas will need to be protected, the introduction of paths and people areas will be necessary in order for their qualities to be enjoyed by the user.

Water features (small ponds) along the ravines should be developed in a manner sensitive to the preservation of existing trees. This would suggest that the ponds have an excavated conservation pool with a water level at or below existing grade. This will prevent continual inundation of plant root zones. Occasional flooding for short periods of time could occur in existing tree areas without severe destruction of material.

To maintain a high water quality, the use of circulation pumps for minimal aeration and passive water features would be desirable and appropriate. The features could take on a natural character of small rapids and falls.
Chapter 2 Development Requirements and Concepts provided a review of Park requirements and selected planning system concepts as a framework for formulating the master plan for the Park.

The following chapter, Master Plan Elements, focuses upon a more detailed description of each of the planning systems that comprise the Park master plan. Each system or element is discussed in two contexts—-the first relating the system to the Park as a whole and the second focusing upon Phase I Development.

Phase I of the development has been established by the University to accommodate lead clients. Some of these lead clients are expected to commit as early as 1984. Phase I encompasses approximately 120 acres of land, including all of the acreage between the West Bypass (FM 2818) and Poultry Science Road and extending southward from University Drive a distance of approximately 2000 feet.

Plans for each of the individual elements have been approached from the perspective of maximizing the use of existing facilities, utilities and services.

Likewise, each of the planning elements has been designed in a manner that integrates those features of each of the elements in a more cohesive manner resulting in ease of maintenance, development staging and costing.

The format of the master plan considers the land use arrangement and phasing, circulation, utilities, security/safety, communications, landscape development and furnishings.
Land Use and Development

The composition and arrangement of land uses (See Exhibit 3) include four principal components within the Park:

- Open space and amenity activities
- High security research activities
- General research activities
- Support activities

Approximately 20 percent of the Park will be devoted to open space and amenity activities. This allocation provides for the retention and expansion of current drainageways and provision for several retention ponds to supplement the existing drainage pattern. In addition, considerable acreage will be reserved in conservation areas (ravines, tree stands and others).

Market studies reveal that defense oriented research facilities are projected to grow faster than other research efforts. Recognition of their position in the national economy merits consideration that adequate land as to size and location be set aside to accommodate these special research activities. Approximately 65 leasable acres have been allotted for potential high security research interests. This area lies north of University Drive and east of the Bypass (FM 2818). Access to the area will be via a single entry with a potential security station at the University Drive entrance. If the demand for such high security research development does not materialize, the Park area north of University Drive should be considered as Park expansion and to accommodate the same type of tenants located in the main portion of the Park.

The majority of land in the Park will be allotted to general purpose research activities. Lot sizes have been analyzed in a hierarchy of 20 acres at the upper limit to as small as three acres. Lot arrangement on the tracts is such that only a limited number of tenants will interface or adjoin each other. Likewise, massing and bulk will be minimized by setback limitations and landscape provisions.

In light of the Park's location being somewhat separated from the campus and commercial developments, it will be essential that certain support activities be located within or adjacent to the Park. This could include a Park administrative area and possible conference facilities including lodging and food services. Other activities which will be essential in a successful Park include recreational facilities. An on-site grounds maintenance facility may also eventually be needed and should be located within or adjacent to the major open space corridors.
Phase I of Park development (see Exhibit 4) includes approximately 120 acres south of University Drive between the FM 2818 bypass and Poultry Science Road. Net leasable land in Phase I amounts to approximately 62 acres. This includes a five acre site south of Horticulture Road for the AODP facility and an eight acre site at the southeast corner of the FM 2818 Bypass and University Drive for a Park administration area.

In addition to infrastructure construction typically associated with large scale development, demolition of several existing facilities will be required to establish an attractive setting for future tenants. The Poultry Science Center, the abandoned waste treatment plant (located within the southwest corner of Phase I), and the eastern 1800 feet of Disposal Plant Road, through the Park, are all scheduled for demolition during Phase I.

Later phasing of development cannot be realistically scheduled at this time. However, the general development after Phase I would likely extend south along the major Parkway boulevard eventually connecting to Jersey Street.

Two longer range "expansion sites" have also been designated to accommodate the last stages of Park development. The southern expansion site involving approximately 25 acres is located in the southeast corner of the Park along Jersey Street. The separation of this site from the main Park suggests that this could alternatively be used for University related housing as suggested in the 1981 West Campus Plan. The northern "expansion site" is located north of University Drive and includes approximately 103 acres (65 acres leasable) of mostly wooded land. As discussed elsewhere, this rather remote area may also be considered as the high security portion of the Park particularly suitable for defense oriented research.
Exhibit 4
Phase 1 Land Use & Development

Lease Parcels
Dedicated Open Space
Pedestrianways

Texas A&M University Research Park
College Station, Texas
Circulation (Roads and Parking)

Roadway System - Vehicular traffic circulation within the Park will be provided by a roadway system consisting of a network of parkways, minor streets and service/cul-de-sac streets as shown on Exhibit 3.

A proposed north/south parkway will serve as the main arterial through the Park. This arterial will access the Park from University Drive on the north and Jersey Street on the south. The parkway will consist of a 4-lane divided curb and gutter street with two 12-foot lanes in each direction, separated by a landscaped esplanade of varying widths. Right-of-way widths required for this roadway will be 200 feet and larger to allow for preservation of existing vegetation.

Proposed minor streets will serve as collectors and provide access to the various tracts and linkage to West Campus and the Special Events Center. Minor streets are proposed along the existing alignment of Poultry Science Road, the east-west extension of Horticulture Road, a link connection from the parkway to Horticulture Road extension, and a connection from Jersey Street to the West Campus area, on the south end of the Park expansion site.

Except for the Poultry Science Road, the typical cross-sections of these streets will be 2-lane undivided curb and gutter streets with a usual pavement width of 30 feet. Right-of-way requirements for these streets will be 80 feet. Poultry Science Road will be 4-lane undivided curb and gutter with 48 feet pavement width and 80 feet right-of-way.

Service and cul-de-sac streets are proposed for short non-through streets. Two cul-de-sac streets are proposed in the Park to service the area between the parkway and FM 2818 Bypass. These streets will feed from the parkway. On the northern expansion site service streets with cul-de-sac, turn arounds are proposed. These streets will be 2-lane undivided, curb and gutter streets with a minimum pavement width of 30 feet. Right-of-way required is 80 feet for these streets.

The access street servicing the Park administration area will also have this type of typical section. This street is basically a loop road with two ingress and egress points to the parkway. It is intentionally proposed as a 30 foot street to attempt to maintain the natural appearance of the approach area to the Park administration area.

Improvements are proposed for the external perimeter streets of the Park. University Drive improvements include the addition of landscaped esplanades in the median of the street.

Proposed improvements for Jersey Street will require the total reconstruction of its existing rural 2-lane highway with open-ditch configuration to an urban 4-lane divided boulevard with landscaped median and curb and gutters.
Phase I - Improvements include approximately 2100 feet of the parkway from University Drive to Disposal Plant Road, 1400 feet of Horticulture Road from Poultry Science Road to the Parkway, 500 feet of minor street section from Horticulture Road to Disposal Plant Road, and 2200 feet service street section to the Park administration area access street.

The remainder of the proposed street construction is expected to occur in subsequent phases of this project. These improvements include the remaining 3200 feet of the Parkway from Disposal Plant Road to Jersey Street, 2000 feet of minor street section on Poultry Science Road from University Drive to Disposal Plant Road, 1800 feet of minor street section from Disposal Plant Road to Parkway, 1350 feet of minor street section from Jersey Street to West Campus Area, 1000 feet and 1150 feet of cul-de-sac streets from the Parkway and extending westward, and 3100 feet of service street section in the northern expansion area. The reconstruction of University Drive and Jersey Street is subject to negotiations with the State Department of Highways and Public Transportation.

Parking - Parking will be exclusively off-street located adjacent to Individual buildings.

Tenant parking requirements will be based on the national standards of 3.8 spaces/1000 gross square feet of building. Additional open space will be reserved for future parking if it is anticipated that the national standard will be exceeded. While the tenant will only be required to develop the parking needed for his own use, the requirement that he reserve open space for possible future off-street parking will prevent a future parking space shortage if his number of employees increases substantially. In no case, however, should parking area (including reserves) in excess of 3.8 spaces/1000 square feet of gross floor space be required. Assuming 350 square feet per parking space, a total of 1330 square feet of parking lot (or reserve) per 1000 square feet of building floor area will be required. Open space reserved for parking will be counted as part of the maximum lot coverage.

Bus Transportation - As the Park develops, bus service should be expanded from the existing service in the main campus area. Bus shelters will be constructed at locations of high bus ridership demands. Future bus routes will likely traverse the parkway, the Park administration area street and perhaps on some of the minor streets connecting to the West Campus.
Utilities

The locations of the various existing utility systems were instrumental in proposing future Park utility systems. Water and power distribution, wastewater collection and telecommunication systems are proposed to be extensions of existing University systems. Drainage and roadway lighting will be provided through construction on the Park site. Gas will be provided by the Lone Star Gas Company through the use of gas lines constructed in easements dedicated by the University. Solid waste disposal will be provided by the University or by a contractor selected by the Park.

Water distribution, storm sewer and street lighting systems are aligned along proposed Park streets. Power distribution, telecommunications, wastewater collection and gas distribution systems are also generally aligned along the proposed streets. Back-lot easements have been used to provide service to all tracts within the Park and maintain flexibility in the actual configuration of the individual tracts. Typical sections for the street and easements are indicated on the accompanying illustration. The following further describes the proposed systems.

Water Distribution System - The Park's water system should have sufficient capacity to provide the daily water use requirements for the Park tenants. Estimated minimum water demand for office buildings is 20 gallons per person per day plus landscape irrigation requirements. The overriding criteria, however, is the ability of a system to maintain pressure of 35 pounds per square inch under normal operating conditions, and a minimum residual pressure of 20 pounds per square inch under all conditions of demand.

In addition, water must be provided in sufficient pressure and supply to meet expected fire protection needs.

The impact of development of the Park on the University water system must be studied in conjunction with the current design of the new supply mains along University Drive and Jersey Street. Expected water demands for the Park, including pressure requirements, should be inputed as part of a network analysis of the University system. This is currently being coordinated with the supply main designs.

Domestic water for the Park will be provided through construction of distribution mains within the Park which will be connected to the proposed supply mains along University Drive and Jersey Street. Water mains will follow the routes of proposed Park streets.
TYPICAL STREET & UTILITY CROSS SECTION

TYPICAL BACK-LOT CONFIGURATION CROSS SECTION
The proposed water distribution system is shown on Exhibit 5. A 12-inch distribution main is proposed to run the length of the Park from a connection to the proposed supply main on University Drive to a connection to the proposed supply main on Jersey Street. These two connections will minimize the possibility of service interruption in the event that a section of water main needs to be valved off for maintenance or repairs.

An 8-inch water main will connect to the proposed 12-inch main at the intersection of the Park major thoroughfare and the proposed extension of Horticulture Road. A 12-inch main will loop around the former Poultry Science area with a second connection to the proposed supply main along University Drive.

Eight inch water mains are also proposed to be constructed along the remainder of the Park streets. These mains will be looped wherever possible.

Proposed appurtenances will include fire hydrants, isolation valves and combination air/vacuum relief valves where appropriate.

Phase I - The Phase I water distribution system will consist of the construction of all proposed mains within the Phase I development area. This will include a 12-inch main from its connection with the University Drive supply main to the southeastern boundary of Phase I. It also includes an 8-inch main located along the proposed extension of Horticulture Road to the northeast boundary of the Park and back to the University Drive supply main. Other 8-inch mains will be constructed along all Phase I streets to serve all Phase I tracts and to minimize construction along the Phase I streets during the development of future phases.

Wastewater Collection - The proposed sanitary sewer system will serve two purposes. First, it will provide wastewater collection for development in the Park. Secondly, it will allow the continued flow of wastewater through the Park area from University facilities outside the Park.

The proposed wastewater collection system consists of two trunk lines, each of which generally run north to south across the Park, as well as smaller laterals which provide service to tracts which do not border on the trunk lines. The proposed system is shown on Exhibit 5.

The first trunk line is aligned along the eastern edge of the 100-year flood plain of the West Fork of White Creek. This proposed line will intercept the existing 12-inch line from the toxicology area.

The second trunk line is aligned along the northeastern boundary of the Park at University Drive. South of the proposed AODP site, this line is aligned along the western edge of the 100-year flood plain of the East Fork of White Creek. This line will intercept the flow of the 10-inch line from the West Campus area and will join the first trunk line at FM 2818 northwest of the FM 2818 - Jersey Street intersection.
The existing 18-inch sewer line from FM 2818 to the new wastewater treatment plant will be adequate for the Phase I development of the Park and may be adequate for the ultimate development. In any case, replacement of this line due to lack of sufficient capacity should not be necessary for many years at the earliest. The cost of the possible replacement of this line has not been included in the cost estimates in this report.

Capacity of the wastewater treatment plant should not be a problem for many years. Because the expected rate of development of the Park is not expected to be rapid, wastewater flow will increase only gradually. This will allow time for continued analysis of the wastewater plant in light of Park development, as well as other factors not related to the Park, such as student enrollment, facility expansion, etc. Therefore, the costs of expansion of the wastewater plant is also not included in this report.

Existing sewer lines in the Park will be abandoned as the Park is developed. Lines will not be removed except where they exist above ground level. These lines will be removed for aesthetic and safety reasons.

The site of the abandoned wastewater treatment plant will be reclaimed through the demolition of existing structures.

Phase I - Phase I wastewater collection system improvements include construction of the trunk line along the West Fork of White Creek and a portion of the East Fork system. The existing 15-inch line south of Disposal Plant Road will be used to connect the two systems. The aerial crossing of the abandoned 15-inch line across the East Fork of White Creek will be demolished as will the abandoned treatment plant. Phase I wastewater collection system improvements are shown on Exhibit 5.

Cooling and Heating System - Because of the phased development of the Park and the requirement of a disproportionate high early investment in constructing a Park central plant system, it is proposed that each building be required to provide its own cooling and heating equipment.
Exhibit 5

Water and Wastewater

Abandon Line
Remove Line
Phase I
Later Phases

Bovay Engineers, Inc.
Engineers and Planners

Texas A&M University
Research Park
College Station, Texas