Electrical System - Electrical power will initially be supplied to the Park by means of an existing 12.5 kV overhead feeder. Within the Park, the proposed distribution system will be similar to the University's existing campus-wide system, incorporating a ductbank and manhole system and utilizing sectionalizing switches installed in the manholes.

The development of the Park to an ultimate three million square feet of building area could require an electrical substation in the vicinity of the Park to serve the estimated 25 megawatts of electrical load. Prior to installation, a thorough study should be conducted to determine the best location. Such a study should analyze various possible sources of power, utility rates, transmission line easements, economic and aesthetic considerations. Park service should then be switched over to the future substation.

A layout of the proposed electrical distribution system location is shown in Exhibit 6.

Phase I - Phase I development, including removal of existing lines and installation of the proposed system, is shown on Exhibit 6.

Electrical service will be provided to the Park initially by tapping the existing 12.5 kV overhead feeder along University Drive and the Poultry Science road. (This feeder presently serves Easterwood Airport and ties into another 12.5 kV overhead feeder that runs along Jersey Street). This tap could be made at the existing Poultry Farm transformer directly east of the AGDP site. The 12.5 kV feeders would then enter the Park. The underground distribution system for Phase I would be sized to accommodate additional feeders installed in later phases.

As the load for Phase I grows, it may be desirable to provide more reliable service to Park tenants by looping the primary feeder back to the West Campus source. This could be accomplished by extending an underground feeder east to an existing ductbank system on the West Campus. Several potential routes exist for such an extension, including one route along Disposal Plant road for connection to the West Campus Switching Station. It is anticipated that a ductbank extension along this route would serve other future developments in the area.

Within the Phase I tract, all existing 2.4 kV overhead lines should be removed. These lines presently serve the Poultry Science Center, and waste storage facilities in the old Sewage Treatment Plant area. The Swine Science Center could continue to be served via the 12.5 kV airport feeder until the Swine Science Center is demolished in a later phase."
Exhibit 6

Lighting, Electrical & Telecommunications

12.5 kV Underground Electrical

Overhead Electrical to Remain

Overhead Electrical to be Removed

Street Lighting

Telecommunications

Phase 1

Phase 2

Texas A&M University Research Park
College Station, Texas
Drainage - Proposed drainage improvements can be divided into two categories. The first category consists of improvements designed to carry storm water runoff from the streets and individual tracts in the Park to the two drainage ways which transect the Park. These improvements consist of storm sewers and inlets. Park streets are also designed to aid storm water flow. The second category consists of improvements to mitigate the effect on the land of a 25-year storm frequency both within the Park and outside the Park of the increased peak flow from the developed Park. A series of detention ponds is proposed to provide this effect.

Proposed storm sewers consist of reinforced concrete pipe ranging in diameter from 24 to 66 inches, curb inlets, manholes and related appurtenances. Costs are based on a system designed to carry a ten year storm. The proposed storm sewer system is shown on Exhibit 7.

Retention ponds are proposed along the West Fork north of University Drive and north of FM 2818 and along East Fork north of Jersey Street.

Phase I - The Phase I storm sewer system is shown on Exhibit 7. It consists of storm sewer to drain streets proposed for Phase I construction.

The detention pond system along West Fork will also be completed in Phase I.

Natural Gas Service - Gas lines of 3-inch diameter exist in the Poultry Science Center to serve the existing structures. No other gas lines exist in the area of the Park.

Gas services for the Park will be extended from existing gas mains by the Lone Star Gas Company. Gas service lines are proposed to be located three feet outside the curb of the street.

Solid Waste - Solid wastes generated at the Poultry and Swine Science areas are currently removed by University personnel. A limited amount of wastes are currently stored at the abandoned wastewater treatment plant.

A single solid waste disposal agency or a private contract is recommended for the Park. This may be the University or a contractor hired by the Park. Wastes will be collected on each site by tenant personnel and consolidated at dumpsters for pick-up and removal, with tenants charged for the costs of the service.

The wastes stored at the abandoned wastewater treatment plant will be properly disposed of prior to demolition of the plant scheduled to occur as part of Phase I. Proper storage and disposal of hazardous wastes generated by tenants should be the sole responsibility of the tenant. The Park, however, should maintain the right to monitor these activities. All such wastes shall be handled and disposed of in a fashion that meets all appropriate federal and state regulations.
Exhibit 7
Storm Drainage

Phase 1
Phase 2

Texas A&M University Research Park
College Station, Texas
Security and Safety

Security for the Park may consist of a security force provided by the University Police Department together with alarm connections linked with the University's existing "Hawkeye" central system serving as prime deterrent with lighting systems being the secondary security component. Tenants will be primarily responsible for providing security for their individual facilities. The details of such a policy will be refined in the individual leases.

Security Force and Alarms - University security personnel could be assigned to patrol specific areas within the Park. In Phase I, the Park administration area and AODP site would be likely areas where security personnel would maintain periodic patrols, especially at night. As the Park develops, with an increase in the number of tenants during Phase I and beyond, a larger security force may be necessary to provide greater surveillance. An alternative might be a private security service contracted through the Park administration to service the needs of the individual tenants.

The University presently uses an electronic alarm system (the "Hawkeye" system) that detects various intrusion (burglar) and smoke/fire alarm conditions. It transmits the appropriate signals via radio waves to either the campus police headquarters or the City of College Station Fire Department. Tenants may be required to provide a detector unit - a control processor compatible with the Hawkeye system - in their buildings, programmed to monitor conditions required by University regulations and City ordinances.

Lighting - Security is a consideration in the planning of the lighting facilities, landscaping and building design for the Park. These factors contribute much in the way of "passive security". To reinforce the identity of the Park, an overall coordination of lighting elements is desirable. A proper balance of lighting intensity as it relates to safety, security, aesthetics and economics are major considerations in the master plan. Therefore, the plan reflects that lighting intensity is proportional to the degree of activity for specific applications.

The medium recommended for all applications is high intensity discharge (HID). This type is currently the best available in terms of energy efficiency, visibility and low maintenance requirements. The accompanying Table presents recommended lighting standards, including luminaire type (or medium) and average illumination level (in footcandles) for the various applications.
<table>
<thead>
<tr>
<th>LOCATION</th>
<th>LUMINAIRE TYPE (3)</th>
<th>AVERAGE FOOTCANDLES (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highways</td>
<td>MH</td>
<td>1.4</td>
</tr>
<tr>
<td>University Drive</td>
<td>MH</td>
<td>2.0</td>
</tr>
<tr>
<td>Jersey Street</td>
<td>MH</td>
<td>1.2</td>
</tr>
<tr>
<td>Research Parkway</td>
<td>MH</td>
<td></td>
</tr>
<tr>
<td>Minor Streets</td>
<td>MH</td>
<td></td>
</tr>
<tr>
<td>Circle Drive</td>
<td>HID</td>
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</tr>
<tr>
<td>East Street</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-S Collector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-W Collector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avenue A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avenue B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service Drives</td>
<td></td>
<td></td>
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<tr>
<td>Pedestrian Ways (1)</td>
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<td></td>
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<tr>
<td>Type A - Roadside</td>
<td>MH</td>
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</tr>
<tr>
<td>Type B - Distant from roadways</td>
<td>MV</td>
<td>0.5</td>
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<tr>
<td>Parking Lots</td>
<td>HID</td>
<td>1.0 - 2.0</td>
</tr>
<tr>
<td>Special Areas (2)</td>
<td>HID, Lasers, or Special Lighting</td>
<td>20.0 (Max.)</td>
</tr>
</tbody>
</table>

Notes
1. Includes walkways, biking and jogging trails.
2. Includes signage, decorative and accent lighting for building exteriors, sculptures, etc.
3. MH = Metal Halide; MV = Mercury Vapor; HID = High Intensity Discharge (includes HPS, MH, and MV).
4. Average maintained on the horizontal based on minimum levels recommended by the Illuminating Engineering Society of North America (IES).
Lighting facilities will be provided for all common roadways and parking areas, and some portions of the pedestrian walks, bicycle and jogging trails. Special accent or decorative lighting may also be used in selected areas. Individual tenants will be required to provide their own lighting in accordance with established lighting standards for the Park to achieve a unified Park appearance and to simplify general maintenance.

A layout of the proposed roadway and area lighting system (including Phase I) is shown in Exhibit 6. Lighting facilities within individual lots (for driveways, buildings, parking lots, etc.) are not shown, as these will be provided by the tenant in accordance with the Park covenants and restrictions.

Communications

Telecommunications - All telecommunications services should be rendered to tenants through a single or consolidated Telecommunications Utilities Service. In this way, a variety of services could be made available to tenants by the University on a reimbursable basis in the same manner that other utility services are provided. Several benefits would result to the University and tenants alike. These include hook-up and maintenance conveniences of a single-source contact; a more reliable and lower cost service due to shared switching facilities; the availability to tenants of centralized attendant services for emergencies; the capability for intercommunication between tenants and University personnel (Park to campus); and the adaptability of such a service to future growth and eventual transition of facilities to University ownership.

A separate switching facility will be required in the Park as it outgrows the capacity of the 845 Exchange. The new switching facility could serve a portion of the West Campus as well. Approximately 5,000 square feet of building space is required to accommodate the new facility based on an ultimate Park population in excess of 10,000 persons. Such space would house digital switching equipment, batteries, cable vault, maintenance, operation, and supplies rooms, and administrative offices. Switching equipment could be installed in phases as needed.

Computer Interface - Circuits for tie with the University's computer system and the University's planned broadband local area network will be installed in the telecommunication system along with the telephone circuits. The telecommunication duct system could also accommodate cable TV service if so desired.

Microwave Communications - Approximately four 6-foot diameter microwave dishes would be required for supplementing communications from the telecommunications utility service center. Since they would be tied into the switching facility, the dishes could either be located on the proposed identification tower.
Satellite Communications - Several Park tenants will probably want access to a two-way communication link with orbiting satellites for various purposes, research-related or not. Shared use of University-owned earth stations between the University and Park tenants is the most feasible plan for both parties, considering the installation cost and land requirement for individual stations. Service to the Park would best be provided from J. H. Moore Communication Center, on the southeastern part of the campus, which will already have direct access to several satellite links. The communication tie between the center and the Park could be made via microwave, utilizing receiving microwave dishes located within the Park. The proposed telecommunications duct system would be used to distribute service to each tenant. Satellite communications would be available as an optional service to all tenants, with billing based on tenant's choice of available satellite networks. It would be desirable to incorporate satellite communications and the proposed telecommunications utilities services, making various telephone, cable TV, computer, and other related services optional and available at a single-source contact.

Phase I - Exhibit 6 shows the proposed telecommunications which would consist of underground manholes and ducts. Manholes would be placed at all service points to lots and at maximum intervals of 600 feet. For cable pulling purposes, pullboxes would be located at approximate maximum intervals of 300-feet. Ducts would consist of high density polyethylene foam multi-duct systems similar to Phone-Ducts products or equal. Manholes and pullboxes would be precast concrete. The main lines would be installed initially in each phase along streets and corridors common to other utilities along property lines, with service laterals (taps) to individual lots to be installed as tenant lots are developed. All taps from main lines would be from manholes.

The Park administration area and AODP will be served from the campus' existing 845 Exchange switch. This would be done by tapping GTE's telephone feeder along University Drive. It is proposed that this feeder be converted to an underground duct system along with renovation to University Drive at that time.
Open Space/Amenities Plan

The Open Space/Amenities Plan was developed in coordination with the land use, circulation, security and utility requirements. In nearly every case, the open space serves several functions in addition to the aesthetic aspects. The primary thrust of the landscape development is to create an overall cohesiveness to the various tenant sites and establish an identity to the Park. This linkage is achieved through the introduction of an overall concept relative to the street frontages, tenant sites and greenbelt area. Exhibit 8 illustrates the various aspects of the Open Space/Amenities Plan. Exhibit 9 illustrates the proposed Walkways and Trails Plan.

The theme of this concept is to create a hierarchy of landscape intensity and types. At project points of entry, the landscape has a highly structured character associated with architectural identity features. As one proceeds into the site, the landscape undergoes a transition from the structural entry to a more native character representative of the Post Oak Savannah. This occurs along interior street right-of-ways, tenant frontages and esplanades. The Park image is further reinforced by landscape development along the project boundary and perimeter roads.

All elements of the street scene have been used to reinforce the project identity. Street furniture, graphics, lighting and paving will all be coordinated throughout the Park. The proposed system incorporates a family of signs of a style, character and design to blend with the landscape and be compatible to various architectural types. The overall use of directional graphics shall be kept to a minimum to prevent clutter and help emphasize their importance. The graphics system coordinates with the entry/identity structures.

Another feature which will help to create an identity and unify the site is a tall vertical element located near the center of the park. This is an important aspect as it will be visible from nearly every point on the site and will become a point of reference to visitors and park users.

The identity of the Park is strengthened by the natural wooded ravines. These will be enhanced for passive recreation use by tenants as well as detention for storm drainage.

A detailed description of the various elements follows.
Exhibit 8

Open Space and Amenities

Boxay Engineers, Inc.
Engineers and Planners

Texas A&M University
Research Park
College Station, Texas
Exhibit 9

Walkways and Trails

Major Walkways

Secondary Walkways

Bouey Engineers, Inc.
Engineers and Planners

Texas A&M University Research Park
College Station, Texas
Perimeter Development - The high degree of public exposure around the perimeter of the site from FM 2818, University Drive and Jersey Street, as well as adjacent campus uses, creates a strong need for delineation of project boundaries to establish and enhance the image and identity of the Park. The character of this perimeter delineation should be consistent with the current University boundaries and assist in establishing an image to the Park. The recommendations are as follows.

University Drive will provide the primary exposure for the Park for Phase I. The existing street has a five lane flush median cross section. It is recommended that the flush median be removed and an elevated landscape median with traffic barriers be introduced. Left turn lanes, where required, should also be added. In addition to the median improvements, the Park frontage along University Drive should be enhanced through the introduction of intermittent sections of wall and/or fence of a character similar to that on the existing campus. Along with the structural elements, the introduction of additional plant material consistent with the character of the site and accent plantings should also be considered. These plantings should be grouped near parcel property lines with intermittent openings along the parcel frontages to allow for exposure of tenant buildings along University Drive.
A similar cross section should be considered for Jersey Street once the Park growth extends to that area of the project. This would be consistent with the character of Jersey Street near the main campus. Frontage development along FM 2818 should have a character similar to that along Jersey Street and University Drive, however, the use of solid sections of walls should be more limited and possibly only occur at project corners or individual parcel corners to provide a more open feeling. The landscape character should be that of the Post Oak Savannah with introduced accent plantings and wild flower plantings. This would allow for a significant exposure from FM 2818 for tenant buildings.

Project property corners along the three major roadways should also be defined through the use of wall sections, scaled down versions of project entry markers or a combination thereof. These should also occur between the University campus and the Park boundary lines.
Entries/Project Identity - A more intense, structured landscape planting along with architectural features should occur at project entry points. These would occur primarily at the major entries off of Jersey Street, University Drive and the point of entry along Horticulture Road at the Park/Campus boundary. The illustration below and on the following page suggests the proposed entry maker. The marker would be set back from the curb to be viewed as one passes the entry, or as one enters it would occur on the right hand side. Also occurring in association with these markers, yet separated by landscape planting, would be a series of walls and fencing representative of the existing University entry markers. This would illustrate the relationship to the University yet the separation and individuality of the Park.
As previously mentioned, the landscape material at the points of entry would have a more formal and structured arrangement. This will emphasize and accent the entry point. The choice of plant material will be consistent with the native materials found on the site to achieve continuity in the overall landscape theme. Due to the character of the site, which creates "spacial rooms", there is a need for a central unifying element within the project. It is suggested that an identification marker occur near the high point of the major parkway boulevard. This feature should be of a character compatible to the entry development and with the image to be created for the Park, as well as consistent with the character of the University. It would serve to establish a landmark and point of reference for the Park and promote a progressive "high tech character" of the Park.
VEHICULAR PEDESTRIAN RAVINE CROSSING
Landscape Concept Within the Project - The concept for the project perimeters and points of entry has already been defined. A user or visitor entering the project will experience the hierarchy of landscape elements as illustrated in the diagram below. The character of the main vehicular parkway will exhibit that of the "Post Oak Savannah" as it currently exists in the project. As one progresses from the parkway into the "building zone" of the tenant sites, the character will be of a more structured nature and reflect the individual character of the Park tenants. As one proceeds from the tenant sites into the greenbelt areas, another transition will occur back to the natural character of that found in the existing greenbelt corridor.
The development along the vehicular parkway in terms of landscape elements will be of a natural character. The parkway right-of-way is of a larger width than that normally associated with a four-lane divided street. This additional width is to accommodate a variant esplanade and side right-of-way in order to preserve existing trees. The preservation of existing trees along the parkway will be perhaps the most significant landscape feature to occur. Their majestic size will set the tone for the "park-like" image. These existing stands will be enhanced by the introduction of additional large oak trees grouped in a natural formation. These will be supplemented by the addition of groupings of smaller ornamental varieties to provide an additional seasonal variation and delineation of the roadway.
The cross section of the parkway should be as illustrated above. The traffic lanes should be slightly depressed to accommodate storm drainage and minimize their exposure on the site. Where the proposed parkway occurs adjacent to existing trees, the natural grade should be maintained around those trees. In areas lacking in existing trees, the introduction of low sweeping berms may occur to create the depressed character of the roadway and provide for placement of excavated material from road construction. These berms should be of a natural rolling form consistent with the existing topography on the site.
The landscape theme along the parkway will carry over to the project streets and cul-de-sacs. Although not of a divided cross section, the alignment of these streets should be sensitive to the existing vegetation and accommodate it wherever possible.
The landscape development within tenant setback areas should be designed to achieve a transition from the Post Oak Savannah character of the road right-of-ways to the individual character of the tenant sites. In addition to achieving this transition, the planting in the setbacks should be utilized wherever possible to screen parking facilities, service areas and any visually objectionable use activities within the tenant site.
Greenbelt Development - The development within the greenbelts should be very sensitive to the existing conditions in terms of maintaining existing drainage patterns and preserving significant vegetation. As previously determined, there is a need for drainage improvement and water detention due to the potential increased volumes associated with the development of the Park. The development of the water drainage and retention system should follow the existing drainage pattern and relative proximity to existing contours. Portions of these ponds will need to be cleared and excavated in order to maintain an adequate depth for improved water quality. The general maintained surface areas of the various lakes will range from approximately 0.5 acre to slightly larger than one acre in size. These maintained areas will allow fish studies which can evaluate fish populations relative to this particular environment. In order to maintain a high aesthetic quality to the water and a maintained pool elevation, it will be necessary to provide make up water and/or circulation of water within the system.

One option is to develop a make up well near the upper end of each ravine. The exact size and capacity of this well should be determined during the design phase of the project. However, it would have a minimum flow to make up for evaporation losses within individual lake systems, as well as to create water movement for aeration and natural filtration purposes within the system. This water flow will further enhance the character in terms of aesthetics by creating a possibility for natural waterfalls and small rapids as illustrated in the following plan view and sections.

Another option is to pump and recirculate water within the ponds to reduce water requirements and to provide water flow to maintain water quality. The use of wells and/or recirculation of pond water will be determined during later design stages.

The water features would have a very natural appearance and character to blend with the existing character of the greenbelt. The introduction of these features will provide pleasant visual experiences from tenants sites and along the pedestrian system that passes through the greenbelt area. The potential waterfalls and small rapids will be of a small scale with a relatively small drop in elevation between lakes of two to four feet.
The cross section of the ponds should be of a character suitable to fish habitat and storm water retention. Side slopes should be relatively gentle at approximately a three to one slope for safety purposes. Maximum depth need not exceed seven feet, as depths below seven feet are considered dead in terms of fish habitat. Where development is very close to the water, and grades dictate it, "hard edge" should be considered. This hard edge should be of a material and character consistent with the natural qualities of the greenbelt.
Supplemental planting in the greenbelt should occur in areas disturbed by construction activities and in locations prone to erosion. Areas where increased storm water discharge occurs should also be planted with material to stabilize the soil conditions and prevent erosion. Some supplemental planting in areas near roadways should be considered when their intrusion is detrimental to the atmosphere of the greenbelt. Introduction of additional materials conducive to enhancement of wildlife activities should also be considered.
The pedestrian and bikeway system that is designed throughout the Park feeds into the greenbelt areas to provide passive recreational opportunities, as well as an alternate transportation system. The proposed system within the greenbelt provides three types of pedestrian/bicycle trails. Since the introduction of vehicular drives has been kept to a minimum in the greenbelt areas, the major trail is of a cross section capable of accommodating small maintenance vehicles. A secondary system is designed to accommodate pedestrians and bicycles only. The option also exists for a third classification which would be "nature trails" of a non-hard surface material. The suggested location of the walkways and
bikeways is to provide a pleasant experience along the greenbelt. Grade changes and slopes are kept to a minimum, by following existing contour lines. A variety of experiences along the lakes and areas of dense vegetation have been created. As previously mentioned, the bikeway system connects throughout the Park to provide opportunities for park tenants within the Park. The system is also suggested to connect to the main campus to provide an alternate means of transportation for campus students and faculty associated with the Park in some capacity. The following sketch illustrates a potential area for pond development within the Park. It also illustrates the introduction of a pedestrian bridge of a character consistent with the natural qualities of the area.
The bikeway system along the vehicular parkway and roadway will be designed in a manner to create a flowing less structured character of that associated with the roadways themselves. In instances where significant existing trees occur, the pedestrian bicycle way should be located to preserve those trees and if necessary may encroach into the landscape setback areas within the individual tenant sites.
Visual Elements - There are a number of other elements visible in the landscape that should be coordinated throughout the Park to further enhance and establish a strong identity to the facility. These include such items as bus stops, phone booths, street signs, light standards, bicycle racks, benches, stream crossings and a variety of other elements. The following illustrations suggest a character for these elements that would be consistent with the overall landscape theme. The elements should be coordinated through their design, character, materials selection, relative location to other features and their color.
VEHICULAR PEDESTRIAN RAVINE CROSSING
Signage and Graphics - The need for informational and directional graphics within a facility of this type cannot be disputed. The design and occurrence of these elements, however, should be carefully thought out and be a major consideration of the development. Individual tenant identification signs should be of a consistent format in terms of appearance and location. This has been further defined in the landscape and graphic standards along with the protective covenants. Illustrated below is a family of signs of a character and quality that would be consistent with the project identity, as well as a variety of architectural types which may occur on the tenant sites. It is suggested that a system be designed and incorporated throughout the project.

Directional signage within view of public right of ways shall be constructed of a component post and panel system. Posts and panels shall be PMS 408 grey. All lettering shall be White Helvetica Medium Upper and Lower case.

Extruded aluminum frames use either aluminum or Lexan polycarbonate faces for applied or subsurface copy and graphics.

MAXIMUM 8 SQ. FT.
MAXIMUM HEIGHT 5'

ABCDEFG
abcdefg

MAXIMUM 8' LETTER HEIGHT

Identification Graphics

Proportion and Scale

-64-
Copy wording should be kept to a minimum to eliminate confusion and enforce the importance of the various graphic elements. The following list represents a list of accepted copy wording.

<table>
<thead>
<tr>
<th>ACCEPTED</th>
<th>IN PLACE OF</th>
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</thead>
<tbody>
<tr>
<td>NO PARKING</td>
<td>PLEASE DO NOT PARK IN THIS AREA</td>
</tr>
<tr>
<td>TOW AWAY ZONE</td>
<td>NO PARKING ANYTIME</td>
</tr>
<tr>
<td></td>
<td>NO PARKING ANYTIME</td>
</tr>
<tr>
<td></td>
<td>DO NOT PARK</td>
</tr>
<tr>
<td></td>
<td>VIOLATORS WILL BE TOWED AWAY AT THEIR OWN EXPENSE</td>
</tr>
<tr>
<td>20 MPH</td>
<td>SPEED LIMIT, 20 MPH</td>
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<tr>
<td></td>
<td>DRIVE SLOWLY</td>
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<td></td>
<td>SLOW</td>
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<tr>
<td>SERVICE</td>
<td>SERVICE ENTRY</td>
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<td></td>
<td>NO ENTRY</td>
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<tr>
<td></td>
<td>EXIT ONLY</td>
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<tr>
<td>CLEARANCE 6'6&quot;</td>
<td>CAUTION! LOW OVERHEAD</td>
</tr>
<tr>
<td></td>
<td>VERTICAL CLEARANCE</td>
</tr>
</tbody>
</table>

In addition to copy wording, the use of graphic symbols can also be used to further enforce and emphasize the message being presented. The use of these symbols should be consistent with those currently in use today. The following is a representative sampling of graphic symbols taken from the Department of Transportation's study, "Symbols Signs Two", prepared by the Institute of Graphic Arts in 1979.
The graphic system should incorporate the use of the Park logo wherever appropriate. The following pages illustrate the official logo and a description of its design and meaning.

Texas A&M University Research Park

Two triangular shapes are positioned to form a perfect square. The maroon triangle represents the University and the grey or silver triangle represents the Research Park. This positioning signifies the relationship of the two working together in a common goal, yet with each one still being a separate unit. The graphic on the letterhead and cover of folder represents the development stages of the logo and in turn the development and growth of the University and then the Park. This contemporary design gives a feeling of high-technology, an important ingredient for the Research Park's image. This design could also be easily adapted to signage, flags, etc.
4. DEVELOPMENT COSTS

Preliminary order of magnitude costs have been estimated for the construction of the necessary Park infrastructure. These costs summarized on the accompanying table list systems costs for Phase I, later phases and project totals.

Construction costs associated with each system were computed considering connections to existing systems, replacement of existing facilities where warranted, demolition of certain identified facilities, and installation including labor and materials for new improvements.

A systems construction cost discussion identifying the premises for cost determination follows:

(Figures in Thousands)

<table>
<thead>
<tr>
<th>System</th>
<th>Phase I</th>
<th>Later Phases</th>
<th>Total</th>
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<td>695</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>231</td>
<td>500</td>
<td>730</td>
</tr>
<tr>
<td>Demolition of Existing Structures</td>
<td>255</td>
<td>90</td>
<td>345</td>
</tr>
<tr>
<td>Gas</td>
<td>120</td>
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<tr>
<td></td>
<td>$5,761</td>
<td>$15,910</td>
<td>$21,665</td>
</tr>
</tbody>
</table>

(1) Includes detention ponds.
(2) Does not include planting and tenant setback areas.

NOTES: All estimates in January 1984 dollars.
Water Distribution

The costs associated with providing a Park water distribution system includes a 12-inch water main connection to the University's trunk line on the site's perimeter. Included in the cost estimates are provisions for fire hydrants and valves.

Wastewater Collection

Connection to the existing main sewer trunk line which runs through the Park in a north-south direction will negate any off-site costs. Connections to the trunk line from both the east and western extremities of the Park can be accomplished readily through gravity flow exclusively.

Drainage

A positive storm drainage system has been designed encompassing storm water outlets at strategic points along the streets with flow to adjoining drainage channels. In addition, some storm water will be detained on-site together with establishing major retention ponds to minimize the sizing of culverts and channel improvements.

Roads

More than 4.6 miles of streets, service roads and Parkways, and the reconstruction of adjoining access roads Jersey Street and University Drive, have been determined as necessary to serve the Park. Approximately 3.0 million dollars has been estimated to accomplish the cost of these improvements. Phase I of Park development encompasses approximately 37 percent of the total street improvements. The lion's share of Phase I development costs are linked to the development of a 2100 lineal foot section of the main parkway.

Landscaping & Amenities

Included in this wide reaching category are: pedestrian ways, Park identification markers, amenities such as benches; site perimeter walls, permanent water level pond development, shoreline and channel improvements, and reforestation, landscaping including significant trees along street frontage, and the irrigation system.

Phase I costs include all of the above mentioned landscaping proposed within the Phase I boundaries. No costs have been included for the central identification marker. The eventual design will determine these costs.
Electrical & Lighting System

Distribution ductbanks, manholes, cable and associated switching equipment comprise the bulk of construction costs required to serve the Park. The system designed will be entirely in ductbank reflecting the higher costs. Phase I is estimated to cost approximately 1.0 million dollars which includes connecting lines to the existing West Campus facilities.

Also included in this cost category is the complete street and pedestrian lighting system.

Telecommunications

The telecommunications cost estimate includes installed costs for a complete underground duct system consisting of duct mains, locals, and taps to individual tenant lots. Costs are based on precast concrete manholes and pullboxes, pipe casings for duct crossings under roadways, various duct accessories, and all labor costs including trenching, backfilling and compaction.

Demolition

Costs associated with demolition include the removal of all structures related to the former sewage treatment plant together with the abandoned elevated sanitary sewer trunk line. In addition, approximately one million cubic feet of building area of Poultry Science Center buildings have been included for removal in Phase I. An additional one-half million cubic feet in the Swine Science Center is targeted for removal in later phases.
5. MANAGEMENT & OPERATIONS

The Park has a number of features as previously described that will help attract quality tenants from around the country including the prestige association with Texas A&M University, a beautiful setting, and the pleasant climate of the Bryan/College Station area. However, perhaps more important than these features, in determining the success of the Park is the Park management.

Organization

The development and operation of the Texas A&M University Research Park will be managed by a Park Director whose formal title will be "Vice Chancellor for Research Park and Corporate Relations". He will report and be directly responsible to the Chancellor of The Texas A&M University System. The key person serving as the Park Director will be responsible for planning and managing all aspects of the Park operations including marketing, park infrastructure, development, lease negotiations, tenant and university relations, enforcement of covenants, and maintenance of the Park.

Support staff for the Park Director will vary at different stages in Park development. A full time secretary/administrative assistant may be supplemented at various times with construction supervisors, marketing specialists, public relations professionals and others with specialized skills from within or outside of The Texas A&M University System. The Facilities Planning and Construction Department of The Texas A&M University System is expected to provide technical support on an as needed basis.

To further support the Park Director, a "Research Park Advisory Board" should also be established. The details of the Board make-up are covered in the proposed restrictive covenants located in the Appendix of this document.

Responsibilities of Park Director

The management of research park development is a combination of public relations, standards administration, and delicate coordination of development activities.

Management of research park development is a specialized field; it is divorced almost completely from traditional management concepts applied to the operation of commercial and apartment buildings. Traditional management occupies itself with the operational and maintenance aspects of building improvements. Management in the research or industrial development field, on the other hand, is more sales or leasing oriented and public relations assumes a greater importance. The buildings are constructed, managed and maintained by the tenant.

The Park Director will be the research activity promoter and public relations man for the project both as the development takes form and after it has become an operating part of The Texas A&M University System. Maintenance of a harmonious relationship between the project and the University is an essential ingredient in the expertise of the Park Director.
Management of the large-scale, long-term Park development will generally follow a two-phased program which features different priorities and goals for each phase. During the initial project implementation phase, coordination and timing goals are created to establish the Park's character and reputation and to initiate the lease of land to initial tenants. The second phase covers the maturing stages of development and is primarily concerned with lease space and lease rate levels.

Initial Period

The Park Director's tasks will be concerned primarily with coordinating the process of infrastructure development and attracting seed tenants to the development. However, at this point, the University, and to a lesser extent, the community response concerning disruption of existing activities (particularly agricultural operations) is critical, consequently an informational and public relations role may take priority.

The construction process with its noise, dirt, and increased traffic flow caused by construction equipment and material delivery vehicles, can also be a significant source of discontent. However, the location of the Park removed from the main campus and community activities should help minimize such disruptions.

It is particularly important during the initial Park development period, to preselect initial tenants who will best represent the research nature of the Park and present a high quality image of its tenants.

Often, the initial tenants will set the entire character and reputation of a Park and of the tenant mix. In addition to the type of tenants attracted by the initial tenants, the size of initial tenant buildings seems to have some relationship to the pattern which follows. If the first tenant occupies a 10,000 square foot building, it frequently develops that most of the remaining buildings will be in the category of 10,000 to 25,000 square feet. If the first tenant occupies a building of 100,000 square feet, most of the users attracted later will range from 50,000 square feet upward.

Timely completion of infrastructure is vitally important to the initial tenants who will establish overall project identity. If the initial tenants experience delays in occupancy due to what is considered poor management of problems by the Park, it is highly likely that these dissatisfactions will be conveyed to other potential tenants to the extreme disadvantage of the project. The Park's tenants and owners will be the project's best salesmen. Once initial development is underway and the pace quickens, Park management efforts should be focused toward coordinating the marketing and development planning during the major period of market absorption.

Absorption Period

The coordination and timing necessary in the initial stages of Park development are also necessary during the maturing process, but with a different emphasis. Primary emphasis at this later stage should be placed upon tenant selection, occupant relations, enforcement of restrictive covenants, financial management, and maintenance of the Park development's reputation.
Parcelization, locational relationships, and compatibility of potential tenants with those already committed, requires continuous attention and reevaluation. The Park Director must keep the long-term goals and objectives firmly in mind and must not sacrifice them for short-term considerations.

Financial management, including cost accounting, pricing, and new leasing information should become almost a day-to-day task of the Park staff during the absorption phase. Whereas the initial objective for Park management will be timing, coordination, and acquisition of initial tenants for the implementation of the project, the basic objective of Park development management at the absorption stage is to maximize the long-term financial potential inherent in the Park. This stage includes planning and budgeting both expenses (staff salaries, advertising, legal, accounting, and office space) and development expenditures (infrastructure costs). Either quarterly or semi-annual updating of the original projections with actual project experience is suggested.

Throughout the absorption phase, Park management must work to maintain the reputation of the Park and to continually enhance the project's identity in Texas and throughout the country. The coordinative aspect of management's role with respect to the financial aspects of the Park, tenant selection, and administration of covenants will comprise the Park's reputation as development proceeds.

Development Review Process and Covenants & Restrictions

The Park's marketability and eventual success can be enhanced through the establishment and enforcement of restrictive covenants concerning landscaping, architecture, outdoor storage, auto parking and other tenant development features. Contemporary research, office, and industrial parks find such covenants valuable as marketing tools by providing assurances to prospective tenants that the Park will continue to be developed and maintained in a high quality fashion.

All plans, specifications, and requests to build or modify any facilities within the tenant's leasehold parcel should be reviewed by the Park Director and the Research Park Advisory Board. Two documents are proposed to serve as the basis for developing and reviewing such plans: 1) the previously mentioned "Covenants and Restrictions" and 2) "Landscape Graphic Standards".

To assure that controls and guidelines are managed on an equal and impartial basis, a standard review and approval process has been outlined in the proposed version of the Covenants & Restrictions. It provides for two stages of review:

a. Concept Design Review. The objective of this review step is to ensure careful site planning with regard to building placement, parking, open space, and access. Approximate locations for utilities and connections, drainage, parking and loading areas, and landscaping should be presented for review and approval.
b. Final Design Review. The objective of this review is to examine the detailed design documents for site development and building construction. A clearing and tree protection plan, plus measures to protect the environment during construction should also be required. A "Letter of Approval" should be issued upon final design approval thereby enabling the tenant to initiate construction.

A recommended listing of review submittal requirements is contained in the proposed Covenants & Restrictions provided in the appendix of this report.