ASU at the Polytechnic campus
Building Competitiveness for the Region
ASU At The Polytechnic Campus: “Building Competitiveness For The Region”

Integrating applied science and technology throughout the curriculum, the Polytechnic campus of ASU is emerging as one of the nation’s leading polytechnics, whose graduates are grounded in experience-based learning and application-based problem solving. The Polytechnic campus will emphasize undergraduate education, with a focus on technical and professional programs. In general, the Polytechnic campus will deploy its human and physical resources to increase access to affordable undergraduate education in Arizona, although it will offer selected high demand professional graduate programs. With its state-of-the-art facilities, the campus is evolving into the leading educational and cultural center in the fast-growing southern East Valley, promoting collaboration with business and industry. Because the campus offers programs that apply cutting-edge technology to address professional and societal needs, Polytechnic campus graduates will be prepared for direct entry into the workforce.

Established in 1996 on a former U.S. Air Force base, the Polytechnic campus combines the supportive environment of a small residential college with access to all of the resources of a large research university, including PAC-10 athletic programs and a leading research library. Restrictions associated with the functions of buildings and grounds imposed by the federal government at the time of the transfer of the property, including their use for academic purposes only, require that existing structures be fully occupied prior to the construction of new buildings. With investment in new facilities to complement existing renovated Air Force buildings, the Polytechnic campus will serve 15,000 students at full build-out.

**CURRENT:**
- 600 acres
- 630,327 gross square feet of built space
- 4,000 students
- 900 beds of on-campus housing

**PROPOSED PLAN:**
- 600 acres
- 3.2 million gross square feet of built space
- 15,000 students
- 3,400 beds of on-campus housing
The Comprehensive Development Plan addresses:

• Creation of a cultural and educational center for the East Valley;
• Improved connections with business and industry;
• Redevelopment into a unique and comprehensible campus;
• Support for a commitment to integrate practical and theoretical study.

By removing obsolete facilities and investing in new ones, the Polytechnic campus will maximize what is currently dispersed and unstructured space. Among the plan’s recommendations is an appeal of certain restrictions in order to construct non-academic facilities, including a hotel/conference center that could generate significant revenue. Another priority is to integrate the movement of pedestrians, bicycles, and motor vehicles, and to offer alternative transit options. Development of the magnitude projected will require a stronger utility infrastructure. Ambitious plans call for the transformation of the campus into a model desert arboretum.

Future Cluster of Colleges and Schools

• School of Educational Innovation and Teacher Preparation
• College of Science and Technology
• Morrison School of Management and Agribusiness
• School of Health Sciences and Technologies
• College of Humanities and Social Sciences

Campus Data and Projections

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## Phasing

### Phase I
- Student capacity: 5,000
- On-campus housing (beds): 1,100
- GSF built space: 1,000,000
  - Build research and academic buildings
  - Develop multi-purpose auditorium
  - Expand union
  - Create student-oriented housing communities
  - Build new recreation center
  - Connect Backus Mall to Chandler-Gilbert Community College

### Phase II
- Student capacity: 8,000
- On-campus housing (beds): 1,700
- GSF built space: 1,500,000
  - Expand research and academic buildings
  - Create student-oriented housing
  - Transform library
  - Develop Polytechnic Mall

### Phase III
- Student capacity: 10,000
- On-campus housing (beds): 2,125
- GSF built space: 1,900,000
  - Expand research and academic buildings
  - Create student-oriented housing
  - Expand student union

### Phase IV
- Student capacity: 15,000
- On-campus housing (beds): 3,400
- GSF built space: 3,200,000
  - Develop research and academic buildings
  - Create additional student-oriented housing
  - Develop College Town
Phase I

Phase II

Phase III

Final Build-out
Although a single and unified institution, ASU is “One University in Many Places” spatially distributed across metropolitan Phoenix.
Summary of Observations, Planning Principles, and Concept Plan

The Comprehensive Development Plan ("master plan") process for the university is presented in the introductory chapter of this report. The summary of observations, planning principles, and concept plan that follow refer to the Polytechnic campus.

The observations phase of the process collected physical and programmatic information about the Polytechnic campus. Meetings were held with students, faculty, staff, administrators, and neighbors, as well as the cities of Mesa and Gilbert. This input was valuable in terms of understanding the issues facing the area and the campus in particular. Physical data was collected and summarized in the analysis diagrams included in this section.

Recently Completed Projects or Projects Under Construction
- Student Union
- Interdisciplinary Science and Technology Building III

Currently Planned Projects
- Science and Technology Building
- Classroom Office Building I
- Classroom Office Building II
- Combined Heat and Power Facility

Projects Currently in Feasibility Studies
- Administration and Services Building
- Facilities Management Building
- Remote Library Storage Expansion
- Student Union Phase II/Student Recreation/Student Support Services Building

The campus is an island.
The campus is a former Air Force base located away from development and is separated from the surrounding area by a storm drainage canal, an irrigation canal, and the airport. While the base was located away from development, the development of the cities of Gilbert and Mesa have approached the entrance of the campus bringing housing, commercial, retail, and potential students nearby.

Facilities have been used to maximum capacity. It is time to remove obsolete buildings and invest in new buildings.
As part of the terms of the conveyance of the U.S. Air Force property to the university through the U.S. Department of Education, one of the requirements was that every usable existing building needed to be used in support of the...
Polytechnic educational mission of the Institution. All of these buildings were designed for different purposes. Some have proven to be more adaptable than others. Due to constraints inherent in the original buildings, some of the buildings are not as efficient or flexible enough to meet specific space needs of the university. ASU has renovated and reused every usable building to capacity and is poised to build new buildings designed to meet the mission of the Polytechnic. Once new facilities are constructed, obsolete buildings can be considered for demolition.

Campus facilities are dispersed across unstructured open space, and new construction needs to establish a more compact campus core. The university inherited a site in which the buildings were spread out minimizing the feel of a concise or compact campus. While this may have been appropriate for a military base, it poses challenges for an academic institution. Students and faculty need to cross campus quickly between classes, walking distances become long, and without a critical mass of students, transit becomes cost prohibitive. The campus population is currently approximately 3,600 students but is projected to grow to 15,000. This growth will require new and expanded facilities in every space type category. Organizing the campus functions with a clear academic and student life core interspersed with research space and undergraduate housing within a one half mile radius of the academic core will improve the identity, function, and connectivity of the campus.

The campus lacks buildings and grounds consistent with the scope and stature of a major research institution. The existing campus retains much of the look and feel of the former Air Force base. While enormous strides have been made in terms of adapting the buildings for reuse, structures on campus are an inconsistent mix of light industrial, suburban, and residential architecture. Many students, faculty, and staff mentioned that it was difficult to recruit the best and the brightest students and faculty because of the impression made by the campus facilities and grounds. The new Student Union sets the stage for a new aesthetic on campus. New buildings should express the mission of the university, address the unique desert environment, and create meaningful outdoor spaces.

Current traffic patterns are marked by conflicts between pedestrians and bicycles, service vehicles, delivery vehicles, golf carts, and autos. The designated circulation patterns for vehicles on campus are confusing to drivers, and cause conflicts with pedestrians,
encourage excessive speed, and limit optimal transit. The former Air Force base was laid out within a grid pattern of streets that allowed free traffic movement to each building. The 1996 master plan identified streets that could be closed to daily traffic.

The campus lacks a comprehensible utility infrastructure.
Both above ground and underground utilities are a mix of ownership, ages, capacities, and condition. As a consequence, the campus utility infrastructure should be nearly completely updated. As new buildings are built, new utility corridors will need to be developed.

The campus should establish strategic partnerships with neighbors and strive to become a leading cultural, research, and education center.
As the population of the East Valley continues to grow, the need for higher education, research, commercial development, and cultural venues will increase. Given the campus location and immediate proximity to the Williams Gateway Airport, there is a unique opportunity to develop strategic partnerships between the university and its commercial and research neighbors. The Chandler-Gilbert Community College has developed a partnership with the university that allows both institutions to share resources and direct physical connections while maintaining their distinct identities.

The Toka Sticks Golf Course, for example, is immediately adjacent to the campus along Power Road. As the golf course develops further, the opportunity exists to find compatible uses that could commercially benefit and strengthen both ventures. The Town of Gilbert is developing a mixed-use commercial, retail, and residential development named Cooley Station one mile west of the campus entrance along Williams Gateway Road. This development could benefit the faculty, staff, students, and visitors to the campus.
Planning Principles and Concept Plan
Comprehensive Development Plan

Although a single and unified institution, ASU is “One University in Many Places”, spatially distributed across metropolitan Phoenix.

Planning Principles

- The campus master plan develops strong internal and community connections through transportation, open space, landscape, land use, and desert sensitive architecture
- Redevelopment seeks to create a campus that is both comprehensible and unique
- New buildings should express the mission of the university, address the unique desert environment, and create meaningful outdoor spaces
- A strong center with a critical mass of activities and population linked with landscaped open space and arcades will transform the campus into a unique place
- Internal connections between academic space, housing, recreation, and student services will foster a strong sense of place and community
- The redevelopment of the campus will improve connections between the university and business, industry, and the community
- Since students at Chandler-Gilbert Community College can attend classes at ASU and vice versa, a strong academic core that is conveniently linked with high quality walking corridors will foster interaction between the two institutions
- Research and applied sciences developed at the Polytechnic campus will foster partnerships with industry
- Adjacency to the airport and industrial sites will allow direct interaction between the university and industry
- Connections should be fostered with the Town of Gilbert and the adjacent proposed Cooley Station development with its mix of residential and retail
- The transformation of the campus will ensure that it becomes the leading cultural and educational center in the southern East Valley
- The master plan must reflect the vision and mission of the university
Proposed Open Space Framework
Comprehensive Plan and Elements
Comprehensive Development Plan

Although a single and unified institution, ASU is “One University in Many Places”, spatially distributed across metropolitan Phoenix.

**Circulation And Transportation**

ASU at the Polytechnic campus is located in the southeastern corner of the City of Mesa. The campus is bordered by Power Road on its west side and Williams Gateway Airport on the east. Williams Community College is located adjacent to the ASU campus.

The campus is located in a relatively undeveloped, but rapidly growing area. Alternatives to driving are very limited and will continue to be so for the foreseeable future. Therefore, transportation and parking strategies for this campus are different than those proposed for the Tempe and Downtown campuses.

**REGIONAL CONDITIONS AND PLANS**

**Existing Conditions**

The four Arizona State University campuses sit within Maricopa County, an area of 9,223 square miles and containing 24 incorporated cities and towns, five Indian Communities and a large area of unincorporated land. Maricopa County contains approximately 60 percent of the population in Arizona. For the past several decades, the region has been one of the fastest growing metropolitan areas in the United States, increasing 44 percent in the decade from 1990 to 2000 to a population of just over 3 million.

The region’s transportation system has struggled to keep pace with the travel demands of the growing population. While the region has a well-developed highway system consisting of freeways and grid patterns of major arterials, traffic is increasing at a dramatic rate as a result of rapid growth and regional development patterns that have favored sustained residential growth on the fringes of the urbanized area. In addition, improvements to transit service have not kept pace with the population growth.
Initiatives and the Regional Transportation Plan

Regional transportation issues, priorities and initiatives affect and provide a framework for transportation decisions at the local level, including the ASU campuses. The Regional Transportation Plan (adopted November 25, 2003), prepared by the Maricopa Association of Governments (MAG), is a comprehensive, multi-modal and coordinated plan that provides a blueprint for future transportation investments in the region for the next several decades.

The report warns that the region faces significant challenges in meeting the growth and mobility demands anticipated during the next thirty years. The region’s population is projected to double over the next 30 years, resulting in significant increases in congestion on the region’s major road system as vehicle-miles of travel continue to increase at a faster rate than population growth. A variety of transportation approaches will be necessary to respond to the different types of development occurring in the region, and must include increases in highway capacity, expanded mass transit service and alternative modes.

The plan is multi-modal, including freeways, highways, streets, high occupancy vehicle (HOV) lanes, bus service, high capacity transit, and other transit services, as well as modes such as airports, bicycles, pedestrians and freight. Despite major investment in new and improved roads over the next few decades (more than $10 billion), congestion is projected to worsen.

Transit

Current transit services in the region comprise on-street bus systems planned and operated by local cities (including Phoenix, Tempe, Mesa and Glendale). Regional connections are provided by Valley Metro. While much of the region is served, the level of convenience offered (i.e., frequency of service, travel times, etc.) does not make it an attractive alternative to many travelers who have an automobile available to them.

The Regional Public Transportation Authority (RPTA) has developed a regional transit plan, including a new light rail system. The plan is a component of the MAG Regional Transportation Plan. The plan is a phased implementation plan with the horizon year of 2030, and is designed to serve all needs for transit service in the Valley.

Key features of the plan are:

- A total of 57.5 miles of light rail transit (LRT) (see below)
- A regional bus plan known as a "supergrid." The supergrid concept includes new or enhanced service on 30 routes, plus the creation of 10 new routes
Improvements to express/bus rapid transit (BRT) service, including enhancements to 16 existing routes and the creation of 14 new routes. The regional LRT system ultimately will provide a vital connection between the four ASU campuses (though not directly connecting the Polytechnic and West campuses, which will require shuttle buses at the LRT terminal stations). It will improve access to the campuses, in particular the Downtown and Tempe campuses, which will be directly served by LRT, and will have the potential to reduce long-term parking needs and traffic. The initial section from Bethany Home Road in northern Phoenix to east of the Tempe campus is scheduled to open in 2008.

Trip Reduction Measures
Transportation Demand Management (TDM) programs promote the use of alternative modes of travel, including carpooling, vanpooling, riding transit, walking, bicycling, alternative work schedules that reduce trips, and telecommuting and compressed work schedules. According to the MAG Regional Transportation Plan, 37 percent of people use alternative commute modes or work schedules one or more days a week.

State and local legislations mandate that employers with 50 or more employees prepare and implement travel reduction plans to reduce the rates of single occupancy vehicle (SOV) trips or vehicle miles traveled. To date only a small percentage of employment sites have reached their targets, but currently there are no penalties for not reaching trip reduction targets.

Valley Metro Rideshare provides a variety of TDM services, including a free carpool/vanpool on-line ride matching service, the promotion of SOV alternatives, assistance to Transportation Management Networks and employers in the County’s Trip Reduction Program, administration of the Vanpool Program and promotion of the telecommuting program. Valley Metro also coordinates a system of publicly and privately owned park-and-ride lots throughout the metropolitan area. The Arizona Department of Administration Travel Reduction Program offers carpool matching and other rideshare services to all state employees located in the county.

Recently, ASU has created the ASU Bus Pass Program, which allows all eligible ASU faculty, staff and students to ride existing Valley Metro bus routes, including the Phoenix Rapid and regional express buses, for free. Promotion of this is key to its success and can foster a transit oriented campus.
LOCAL CONDITIONS AND PLANS

Transportation Goals and Objectives
The City of Mesa updated its transportation plan in 2002 (Mesa Transportation Plan). The City has grown very rapidly over the past 20 years, and now faces transportation challenges and choices. Tremendous growth is projected in Pinal County, and the airport area will be an urban center.

The plan focuses on multiple forms of transportation, including transit, biking, walking, and auto travel. Key elements with relevance for the Polytechnic campus are:

- Improved transit services (see figure above from the Mesa Transportation Plan), including local, circulator and express bus, and regional express bus and commuter rail (in the UPRR corridor) in the longer term.

- Implementation of bicycle lanes and paths, including Power Road and other roads surrounding the campus. All new arterial roads will have bike lanes.

- Transportation Demand Management (TDM) strategies to encourage use of alternative travel modes and reduce peak period travel, in coordination with regional efforts.

Streets
Current access to the Polytechnic Campus is limited. All access to the campus is from the west (the Airport forms a barrier on the north and east sides, and the area to the south is undeveloped). The major access is directly from Power Road, a four-lane arterial, with secondary access from Sossaman Road (a four-lane road which connects to Power Road at Ray Road north of the campus).

As noted above, the Mesa Transportation Plan contains elements that have relevance for the street system on and around the Polytechnic Campus, including:

- A one-mile grid system of six lane roads.

- Significant improvements to the street system, including widening and new roads in the vicinity of the campus. The plan calls for:
  - widening Power Road from four to six lanes
  - connecting Ray Road north of the campus from Power Road to Meridian Road
• connecting Pecos Road across the south of the campus
• extending Sossaman Road south to the future Pecos Road
• completion of the Santan Freeway that will connect to Loop 202 in Mesa
• a new road, the Williams Gateway Freeway, extending from the future Santan Freeway north of the Airport to Meridian Road (connecting between Ray and William Field Roads).

These are in addition to regional improvements that will enhance access to the campus, accommodate bus rapid transit and high occupancy vehicle lanes.

Transit
Transit services in Mesa are currently very limited. There are no routes serving the campus, the nearest being Route 108 along Guadalupe Road.

ASU provides campus shuttles between the Tempe campus and the Polytechnic campus (including Mesa Community College). Currently the shuttle carries an average of 850 riders a week. Shuttles run about every two hours. The Polytechnic campus funds 100 percent of its shuttle, with fares covering 30 percent of the cost.

There are several long-range regional transit improvements that would, in the longer term, enhance access to the campus. These are documented in the:

• MAG Regional Transportation Plan (November, 2003)
• Mesa Transportation Plan (June 2002)
• Southeast Maricopa/Northern Pinal County Area Transportation Study
• Gilbert/East Valley Transit System Study - Long-Range Transit Plan

In addition to regional improvements that will make transit more convenient generally, specific improvements are proposed in the area of the campus:

• Bus service on all arterials (new and existing). Refer to Figure ES-8 of the Mesa Transportation Plan, shown below. The Mesa Plan stresses that transit will play an increasingly important role in the city’s transportation system.

• Designate Power Road a transit priority corridor, planned to be introduced as early as 2008, with Polytechnic campus served by a circulator system to connect to the arterial services.

• Bus rapid transit (BRT) on Williams Field/Chandler Boulevard.
In addition to expanded coverage, increased service frequency and transit priority measures.

Connections to the future LRT terminus in the Mesa Town Center. The mid-term transit plan for Mesa recommends LRT be extended east along Main Street from Longmore to the Town Center. The long-term transit plan recommends LRT service in Mesa increase frequency from 10 minutes in the peak and 20 minutes in the off-peak to 6 minutes in the peak and 12 minutes in the off-peak. No decisions have been made regarding extending light rail beyond Mesa Town Center. Current conceptual alternatives include extending LRT east along a redeveloped Main Street or south to Chandler parallel to Mesa Drive.

BRT and high occupancy vehicle lanes on the future Santan Freeway (202).

Commuter rail in the UPRR corridor that crosses Power Road just south of the campus.

Additional park-and-ride lots linked into the transit system.

Most of these proposed improvements are not funded. With the recent approval of the regional tax, the transit priority corridors shown in the Plan could be implemented earlier than the dates shown in the Plan. However, transit improvements east of Power Road are not included in the regional tax referendum. The commuter rail also is not funded. A local tax would be needed.

Recently, ASU has created the ASU Bus Pass Program, which allows all eligible ASU faculty, staff and students to ride existing Valley Metro bus routes, including the Phoenix Rapid and regional express buses, for free. Promotion of this is key to its success and can foster a transit-oriented campus.
Comprehensive Development Plan

Although a single and unified institution, ASU is “One University in Many Places”, spatially distributed across metropolitan Phoenix.

Campus streets

The primary access is Williams Field Road from Powers Road. This road has been significantly upgraded and a traffic signal added at Powers Road. However, the road, which has five lanes and is approximately 60-feet wide, is an unattractive main entrance to the campus. The road splits at a newly installed roundabout (with slip lanes that encourage speeding) to create a loop around the campus core (Williams Campus Loop West, South, East and North). Ultimately existing roads within that core will be closed or dead ended to create a pedestrian core. In the longer term, William Campus Loop east could be closed and the loop extended farther east (South Kent). Sossaman Road is a secondary access road to the campus but primarily serves the community college, airfield and other facilities along the eastern edge of the campus. Ultimately, Sossaman Road will continue south and provide a southern access from Pecos Road.

Parking

According to the Polytechnic Campus Parking and Transit Services (PTS), there are currently approximately 2,400 parking spaces on the campus, spread over 44 surface lots and 9 on-street parking areas. In August 2003, a fee-for-parking program was established. Prior to that time, no decals were sold or issued to students, faculty or staff and lots were not identified through signage. Since the inception of the program, PTS has worked to install signage, issue decals and enforce the established parking regulations. The Polytechnic campus sells approximately 2100 green and 150 red commuter decals. Brown residential and turquoise decals are issued at no cost to vehicle owners. Approximately 860 brown residential and approximately 500 turquoise decals are issued.

No parking occupancy surveys had been undertaken at the time of the study to enable a determination of current demand. The current demand was estimated based on parking demand ratios on other campuses and results from the commuter survey which indicates that over 80 percent of employees and commuter students drive. It is estimated that one space is needed for every two people, which translates into approximately 7,500 parking spaces for 15,000 students. This translates into approximately 1,700 spaces for Polytechnic Campus (excluding parking for the community college and other users of the campus).
TRANSPORTATION PRINCIPLES

The following principles were developed to guide transportation recommendations for the campus:

Improve accessibility to campus by all modes
- Support planned regional roadway improvements
- Support bus service expansion plans
- Support long-range rail and bus rapid transit plans
- Work with cities of Mesa and Gilbert to modify major roads and/or add bicycle lanes/paths to improve safety for cyclists
- Promote and offer incentives for using alternative modes
- Continue free unlimited transit pass
- Improve shuttle to Tempe campus

Enhance on-campus circulation
- Improve clarity of campus street system (including signage)
- Consider closing streets within the Loop to through traffic
- Remove core surface parking lots over time

Minimize future parking needs and impacts
- Provide adequate, convenient parking for visitors
- Locate new parking on periphery of campus to minimize impact on pedestrians
- Reduce parking needs for employees and commuting students over time by promoting alternative modes
- Restrict free parking at the adjacent community college

Transportation Recommendations

The following improvements are recommended for the Polytechnic Campus:

Streets
- Modify Power Road to create a gateway and enhance the campus image, including installation of a landscaped median in front of the campus.
- Provide multiple access points on Power Road, including at least one between Williams Field Road and Pecos Road.
- Install a landscaped median on the five-lane section of Williams Field Road, and eliminate the slip lanes at the roundabout.
Transit
- Ensure that improvements to Power Road retain the concept of a transit priority corridor as included in various regional transportation plans.
- Double the frequency of the express bus service to the Tempe campus from the current two hour schedule.
- As the campus grows and expands, provide an internal circulation shuttle service.
- Provide shuttle services to external destinations in the area that may be patronized by students and employees.
- Work with cities and region to provide rail service in the longer term.
- Establish an unlimited access pass for students to use all transit services in the region.

Bicycle and pedestrian circulation
- Design all campus streets to have bike lanes or be bike-friendly.
- Work with Cities of Mesa and Gilbert to modify major roads and/or add bicycle lanes/paths to improve safety for cyclists.

Trip reduction
Introduce incentives for using alternative commute modes (preferential parking for car and vanpools, occasional parking vouchers for transit users, cyclists, and car/vanpoolers).

Parking
- Provide a total of 8,200 parking spaces for the academic functions of the campus for the projected enrollment of 15,000 students (assuming 0.5 spaces per person).

Service Routes
Service must be maintained to specific areas of the campus and separated from pedestrian flow. There are various levels of service needed across campus each with specific requirements:
- Daily and occasional deliveries
- Service and maintenance access
- Trash service
- Emergency vehicle access
- Move in and move out

Daily and occasional deliveries such as mail, overnight packages, and library deliveries are to be handled according to designated procedures. The plan allows for vehicular access within the core of campus, providing access to the library, central plant, food service, the union,
and future facilities such as theaters and museums. Overnight delivery vehicles may use these roads with permission from the university.

Service and maintenance vehicles such as trucks and vans will be limited to the service drives during weekdays. These vehicles may use the malls during the evening and weekend hours. Small electric vehicles may use the malls and park in designated areas during weekday hours when classes are in session.

Trash will be collected and consolidated in multiple locations accessible from the service drives.

Emergency vehicle access is allowed on the service roads and most malls. Please refer to the transportation guidelines and the design guidelines for further information regarding emergency vehicle access requirements.

On-campus residents generally move in and out at the beginning and end of the academic year. The service drives, parking lots, and malls will be available during these periods for limited vehicle access.

Deferred Maintenance

The university strives to maintain its facilities to the best of its ability and available funding. Most of the buildings on campus have been renovated within the last decade. Long term, many of the existing buildings will be replaced to accommodate campus growth and specific space needs.

Use And Capacity

Spatial organization of ASU at the Polytechnic campus

The campus is organized along two major open spaces. The east west mall forms the heart of the academic core with linkages to Power Road, research space, and the airport. The north south mall links the Chandler Gilbert Community College with ASU, recreation and athletics, residential and future campus development to the south.

On-campus housing summary

Currently, the campus has over 900 units of housing under management by an outside party, which will be in effect until the year 2030. Part of the agreement is that no new on-campus student housing can be built unless this housing is leased to reasonable capacity. These units are former military officer housing which is appropriate for graduate students, families, faculty, staff, and upper division students. These units do not have immediate access to retail grocery services and need to go off campus.
One of the goals of the master plan is to increase on-campus student housing, especially undergraduate lower-division housing. The projected housing population by division is as follows:

- Freshmen: 75%
- Upperclassmen: 34%
- Graduate/Family: 5%

It is anticipated that freshmen will live in more of a communal living arrangement such as traditional doubles, suites, and semi-suites, while upperclassmen will live in more private accommodations such as suites and apartments. As students transition to apartments with full kitchens, access to retail groceries or prepared food will become an opportunity for services on or adjacent to campus.

As new housing is built in the academic core, it should be designed for freshmen and sophomores with access to food service, recreation, meeting spaces, and other amenities.

**Student life needs**

As the daytime, evening, and residential populations grow, students, faculty, and staff will need additional support services including facilities for dining, meeting spaces, retail facilities, banking, office spaces for student groups, and lounges. It has been proposed that these functions will be met by expanding the existing student union.

As enrollment increases, recreation and athletics needs will continue to grow. These functions are proposed in the south central portion of the campus.

**Integration with the surrounding community**

One of the goals of the master plan is to develop a clear sense of identity for the campus while retaining an inviting presence. Because ASU is a socially embedded institution, visitors should feel welcome, yet be aware of being "on campus." Although perimeters are to be defined, the boundaries of campus will remain porous. Visitor parking and gateways should be clearly marked and convenient to destinations. The campus should be an extension of the community with free access to the campus grounds where appropriate and safe.

Given the man-made barriers on the west side of the campus, it is somewhat difficult to integrate the campus into the larger Gilbert-Mesa community. However, the university and the Williams Gateway partners could encourage and support initiatives that forge transit and bicycle connections with the larger community. The university, in partnership with Chandler-Gilbert Community College, can offer cultural activities and events that bring the community onto the campus.
Phasing

The proposed phasing is a result of analysis at three levels:

- Currently planned projects
- Prioritized needs as per the university or as a function of growth
- Interdependency of project phasing to allow a site to be created or the migration of use as needed to allow for efficient growth

The attached matrix assigns projects to phases one through four. The phasing is suggested based on the above analysis, but allows for flexibility in the development of the projects based on available funding and available sites.

Within each phase is a letter code that denotes interdependency on other projects that share the same letter code. The matrix also identifies the location of the building with a numerical designation as referenced on the attached plan.

The projected footprint size, number of stories, and overall gross square footage for each building is included as a suggested capacity for the site. In most cases the overall project size was determined by programmatic need. For example, the library addition size is based on the projected needs for a campus of 15,000 students. In other cases, the project gross square footage is based on the number of stories that projected use could sustain. For example, general academic classroom buildings need to be limited to five stories or less while research buildings or residential uses could be as tall as eight stories. In some cases, a mix of uses is suggested for a site. If this is the case, the matrix identifies the number of stories by use and provides an overall project square footage.
# Arizona State University
## Campus Master Plan
### Polytechnic Campus Phasing
5/12/05

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<td>1</td>
<td>64,659 GSF</td>
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<td>C</td>
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<td>46,703 GSF</td>
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<tr>
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<td>108,808 GSF</td>
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<tr>
<td>E</td>
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<td>E710</td>
<td>1.034</td>
<td>1.034 GSF</td>
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<td>Backus Mall</td>
<td>Landscape Mall</td>
<td>115,200 SF</td>
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</tr>
<tr>
<td>G</td>
<td>Parking Lots</td>
<td>Surface Lots</td>
<td>1,000 Spaces</td>
<td></td>
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### SUMMARY PHASE 2

| Academic Space Removed | 10,676 GSF |
| Academic Space Added | 313,576 GSF |
| Net Academic Space | 324,252 GSF |
| Current Net Academic Space | 517,078 GSF |
| Support Space Removed | 22,715 GSF |
| Support Space Added | 242,076 GSF |
| Net Support Space | 219,361 GSF |
| Current Net Support Space | 743,084 GSF |

**TOTAL NEW SPACE Phase 2** 581,626 GSF
**Arizona State University**

**Campus Master Plan**

**Polytechnic Campus Phasing**

5/12/05

### PHASE 3 - 8,000 to 10,000 Students

<table>
<thead>
<tr>
<th>Project</th>
<th>Use</th>
<th>Building No</th>
<th>Number of Stories</th>
<th>Demo Area</th>
<th>Footprint Area</th>
<th>Area or Quantity</th>
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<tbody>
<tr>
<td>A Demolish CNTR Complex</td>
<td>Admin</td>
<td>E4</td>
<td>5</td>
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<td>53,700</td>
<td>GSF</td>
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<tr>
<td>A Demolish FOOD</td>
<td>E664</td>
<td></td>
<td>5</td>
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<td>GSF</td>
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<td>A Demolish FM3</td>
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<td>5</td>
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<td>GSF</td>
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<tr>
<td>A Demolish AGB4</td>
<td>E232, E233</td>
<td></td>
<td>5</td>
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<td>GSF</td>
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<tr>
<td>A Residence Halls</td>
<td>Double Bedroom Semi-Suites</td>
<td>11p</td>
<td>4</td>
<td>10,231</td>
<td>40,924</td>
<td>GSF</td>
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<td>A New Academic Buildings</td>
<td>Meeting Space, Food Service</td>
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<td>SF</td>
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<tr>
<td>F Parking Lots</td>
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<td>4</td>
<td>1,000</td>
<td>1,000</td>
<td>Spaces</td>
</tr>
</tbody>
</table>

**SUMMARY PHASE 3**

- **Academic Space Removed**: 83,466 GSF
- **Academic Space Added**: 0 GSF
- **Net Academic Space**: 83,466 GSF
- **Previous Phase**: 517,078 GSF
- **Current Net Academic Space**: 600,544 GSF
- **Renovated Academic Space**: 0 GSF
- **Support Space Removed**: GSF
- **Support Space Added**: GSF
- **Net Support Space**: 0 GSF
- **Previous Phase**: 743,084 GSF
- **Current Net Support Space**: 743,084 GSF
- **Renovated Support Space**: 0 GSF
- **Beds Removed**: Beds Added
- **Net Added Beds**: 781
- **Net Added Parking**: 1,000
- **New Parking**: 0
- **Current Net Parking**: 3,000

**Notes:**

1. All conceptual project costs were developed in consultation with ASU in April 2005.
2. All conceptual pricing is in 2005 dollars. As project schedules are defined, adjustments for inflation will be needed to bring the estimates to current dollars.
3. Unless indicated otherwise, site development costs are included in each project.
4. The estimates provide order of magnitude costs only. Detailed estimates will need to be developed for each project.
5. The existing buildings slated for demolition are identified with an "E" prefix but are not shown on the proposed plan. Proposed new buildings are numbered.

<table>
<thead>
<tr>
<th>Summary</th>
<th>Academic Space</th>
<th>Support Space</th>
<th>Total Space</th>
<th>Residence Halls</th>
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<tr>
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<td>28,427 GSF</td>
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<tr>
<td>Space Renovated</td>
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<td>0 GSF</td>
<td>0</td>
<td>Renovated: 0</td>
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<tr>
<td>Existing Space</td>
<td>1,632,112</td>
<td>0 GSF</td>
<td>1,632,112</td>
<td>Existing Beds: 980</td>
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</table>

**TOTAL CAMPUS GSF**: 2,787,457

**Proposed Beds**: 3,204
Design Guidelines
Guiding Principles

Urban: respect and reinforce the civic nature of the campus
Desert: climate, comfort, and shade
Modern: contemporary buildings with contextual materials

The best campuses in the world are memorable not necessarily because of the buildings, but because of the spaces between the buildings. The civic realm of the campus is an important element to the organization, shape, and identity of the campus. At the Arizona State University campuses, the civic realm will define how the campuses develop.

The importance of climate-responsive design, shade, integration with the natural environment, human scale, memorably shaped outdoor spaces, active streets and walkways, a clear hierarchy of buildings, treating the campus as a whole as opposed to a collection of moments (or monuments), and developing palettes of desert-appropriate materials and details cannot be overstated.

Each new building on the campus needs to be LEED certified with a silver rating or better. Working with the environment will be critical to the success of the campus. Phoenix’s summers are severe with rainless days reaching temperatures of over 115 degrees Fahrenheit. The fall, winter, and spring months have sunny warm days that provide an opportunity to link indoor and outdoor spaces for active use. The built environment does not need to be hermetically sealed but should take advantage of the climate with spaces that can keep the heat out in summer, allow the sun to flow in during winter, and take advantage of pleasant weather whenever possible.

When it does rain, it comes in short downpours that tend to seal the clay rich earth and cause spot flooding. Storm water management is a key issue. Developing bio-detention swales and collection near the source throughout the campus will assist in reducing the impact of storms.

The goal of the Polytechnic campus is to develop a campus that embraces technology and expresses both aviation—because of its site, adjacent to the Williams Gateway Airport—and innovation. The buildings need to adhere to build-to lines to eventually create a meaningful hierarchy of outdoor spaces that develop strong indoor-outdoor relationships. The built and natural architecture needs to be developed around climate sensitive principles with desert-appropriate materials.
A New American University

Open Space Types
- Primary Open Space
- Secondary Open Space
- Tertiary Open Space
- Recreational Space
- Pedestrian Paths
- Roads

Polytechnic
Guidelines

Urban: respect and reinforce the civic nature of the campus

Most buildings should be parallel or perpendicular to the spaces they abut such that they define malls, quads, courtyards, and streets

1. Civic Space
   Shaped civic spaces form building footprints that are defined by build-to lines that create edges of malls, quads, courtyards, streets and pedestrian ways
   - Preserve view corridors and terminate with heroic-scaled buildings.

   Address civic spaces with composed facades and primary entrances.

2. Campus Edges
   New buildings should provide a welcoming front to the university where a well defined but porous edge should be maintained.
   - Develop edges at perimeter of campus along property lines.

   Service areas should be sited away from this public front or, if necessary, they should be screened from view.

3. Climate Sensitive Design
   Shade and sun determine building and open space form.
   - Orient buildings in East-West direction where possible for maximum day lighting potential and controlling solar gains; Design sunny and shady outdoor spaces for year-round use; Link sunny outdoor spaces to shaded interiors with partly shaded transitions.
   - Use building elements and mass to provide shade at pedestrian areas.

A strong landscape of native species can provide order, beauty, and shade.
A New American University

Axes and Terminuses

Loggia Locations and Alignments

Polytechnic

Stanford University

Arizona State University East
Architectural Hierarchy
The successful composition of a college campus requires that buildings work in concert with one another.

1. “Hero buildings” take on significance by nature of their function and mark a gateway or terminate a visual axis. These buildings may display a more heroic architectural character and could become an object in space. These buildings should be few in number and suggest an intuitive sense of order and legibility to the campus.

Hero buildings should be limited to those building types which embody and relate the most universal and lofty aspirations of the institution – libraries, places of assembly, museums, performing arts venues, main administration, historic iconic buildings, etc.

2. The majority of campus buildings should act as good soldiers that form a backdrop to open spaces and defer to hero buildings.

3. Striking a balance between “heroes” and “soldiers” is critical to creating a legible and hierarchical campus setting.

Uses

1. Districts, Neighborhoods, and Centers
The campus is organized in districts which are defined by primary uses with a mix of academic, residential, public venues, retail / food service, open space, and connection to the transportation network. Each of these districts are intended to be lively 24/7 neighborhoods which together build a connection to the university and to the surrounding community.

The location of specific uses needs to be carefully controlled due to such factors as retail viability, life safety issues related to specific uses, security of residential areas, and access to academic functions.

2. Functional Building Heights
The following functional height limitations need to be followed depending on site specific conditions (see campus use matrix for specific sites):

- All buildings should be a minimum of three stories.
• General classrooms, academic offices, and open labs: 3 to 4 stories (may have other uses above the fourth floor).

• Research and office space: up to 8 stories on specific sites (may be located above general academic space). Scientific Lab space with specific ventilation requirements should be located such that exhaust does not interfere with other adjacent uses.

• Residential: 4 stories preferred up to 8 stories on specific sites (may have academic, retail, food service, office, recreational, meeting or other student life space under residential uses).

• Retail and food service: preferred first story up to 2 stories adjacent to major nodes of activity such as libraries, academic centers, residential, public venues, meeting space, etc.

• Public venues such as museums, performing arts, galleries, libraries, etc. need ground level contact but may be part of a multi-story mixed-use building.
Desert: climate, comfort, and shade

Color images of courtyards, loggias, and shade structures

Indoor and outdoor relationships

1. With the relatively comfortable climate during the academic year, it is possible to create useful outdoor spaces as an extension of the built environment.

2. Buildings should be connected together and articulated at their base with loggias, colonnades, and shade structures. These provide a shaded place to walk and create a temperate transition zone from outside to inside.

3. Courtyard buildings can create shady cool outdoor spaces that can be a focal point within a building. Care must be taken to allow ventilation low into the courtyard and through the top to create a thermal chimney.

Building orientation and massing

1. The massing of a building can be defined as the overall geometry (length, width, and height) of its perceived form.

Massing is one of the more significant factors that contribute to establishing the “character” of a specific building.

Of particular importance in defining the massing of a building is the overall height of the form (actual and perceived) as well as the geometry of its roof.

2. A low rise, high density approach to massing is recommended for ASU
   • Maximize limited land resources
   • Building mass creates shade
   • Create interlocking indoor and outdoor space

3. Stair step buildings away from the open space to preserve light and views.

4. Relate height to width of space:

   Primary space width approximately six to eight times the height;
   Secondary space width approximately four times the height;
   Tertiary space width approximately two times the height

5. Step building mass down toward lower scale residential areas

Courtyards can be shady, active places that use water to cool the area such as this courtyard at the Heard Museum in Phoenix.
• generally 3 levels maximum at the edge

6. Buildings should maintain appropriate massing relative to the width of the street

7. Consistent massing along each edge of campus is preferred

8. Avoid massing that presents the image of an impenetrable campus wall at the edge of campus

9. Break down the mass of large footprint buildings into appropriately scaled parts

10. Massing for important public buildings may include grander civic elements that announce campus gateways and building use

Due to the intense sunlight the area receives, shade should be a prime determinant of buildings and open space design. Sunlight, if controlled, may be used to increase day lighting in buildings and reduce the dependence on artificial light during the day.

1. Shading strategies for exterior building surfaces are exposure specific and can vary on each building:
   - Southern exposure: horizontal shelves, louvers, or screens, brise soleil, exterior walkways, etc. (Large expanses of unshaded south facing glass are not allowed)
   - East and West exposure: vertical or brise soleil to reduce low and high angle solar angles
   - Roof: light colored surface and/or horizontal shade structure to reflect heat

2. Daylighting can be taken advantage of by incorporating light shelves into the building envelope which allows natural light to penetrate deep into a building by reflecting light off the ceiling.

3. Light may be bounced off of a south-facing wall into a north facing exposure; however, care must be taken to reduce highly reflective surfaces which can cause glare. Mirrored glass is not allowed.

Ventilation

• North exposure: primarily vertical

During the summer, Phoenix is extremely
Although a single and unified institution, ASU is “One University in Many Places”, spatially distributed across metropolitan Phoenix.

hot and arid while most of the academic year the weather is quite pleasant. Buildings should be designed to take advantage of natural ventilation through operable openings, courtyards, and thermal chimneys.

Technology to improve performance of the building

1. Building systems such as heating, ventilation, air-conditioning, electrical, lighting, plumbing, waste water management, energy generation, etc., should be designed to be monitored and to optimize building performance.

2. Buildings should be designed to be easily maintained and repaired.

3. Buildings are required to meet the requirements of the current applicable building code, Americans with Disabilities Act, and other appropriate regulations determined by the State of Arizona.

4. All new buildings and renovations should attain a LEED certification of Silver or better.

Modern: contemporary buildings with contextual materials
Composition and scale

1. The role of scale and proportion in defining architectural character is a very significant one. Not only do they relate a building’s parts to its whole, and dictate how buildings relate to the human body, they also govern the relationship between groups of buildings and the outdoor “rooms” they create. In other words, scale and proportion influence not only the character of architecture, but the places that they define as well.

2. Building scale should be modulated by façades that follow a tripartite composition: base, middle and top.

3. Vertical rhythms of façade hierarchy (bay system), shade-giving structures and fenestration also modulate scale.

4. A series of humanly-scaled architectural elements will enable even today’s large footprint buildings to exhibit pleasing proportions.

5. Humanly scaled elements should be used especially at gateways and pedestrian entries into campus.

6. Porches, porticos and colonnades provide well-scaled transitions between the landscape zone and building entry.

7. Façade elements such as window size and building units should reflect the scale of similar elements used in neighboring structures.

Architectural expression and details

1. Porticos, gables, cornices, columns, and dormers are not style-dependent architectural elements. Rather, they act as a kit of parts that can be used to help define the character of buildings and grounds by regulating scale, massing, and facade rhythm.

2. Elements such as gates, water features, signage and sculpture may be used in conjunction with building elements in order to highlight campus gateways and entries penetrating the campus edge.

3. Elements such as sidewalk paving patterns, low walls and colonnades used in tandem with landscaping create a subtle, graceful and identifiable transition zone between campus and community.

4. Architectural elements should be appropriate to the scale and hier-
Comprehensive Development Plan

The architecture forms the framework that balances the native and non-native landscapes.

Although a single and unified institution, ASU is “One University in Many Places”, spatially distributed across metropolitan Phoenix.

Colors and Materials

1. Appropriate materials for building construction on campus are very consistent. Brick with pre-cast concrete or stone trim is the historic material of choice and should remain as the primary building material. Traditional stucco or cement plaster or metal could be used as secondary materials. Metal accents and ornaments juxtapose well with monolithic masonry construction.

2. Glass entries, windows, and accents should be carefully considered given the overheated climate and in all cases should employ shade devices. Large unbroken scaleless expanses of glass are not allowed. Punched openings are preferred and should relate to the campus established patterns.

3. Sloped roofs should use material appropriate to sustainable design in the desert environment such as light colored metal or incorporating photovoltaic technology.

4. Materials
   - Masonry: Burgundy modular brick similar to existing
   - Trim, lintels, sills, columns, belt courses: pre-cast concrete or cast stone
   - Glass (shaded or screened depending on solar orientation). Mirrored or highly reflective glass is not allowed due to its potential to create glare.
   - Metal: copper
   - Traditional stucco or cement plaster

5. Colors
   - Desert: burgundy, tan, terra-cotta
   - Whites: warm grey, off-white

Process

Under development by ASU
ASU at the Polytechnic Campus should express a clean, contemporary, technology-rich image.

Entrances should be prominent and sheltering.

Buildings should be climate-sensitive and control solar exposure.

Masonry in Earth Tones

Stucco/Plaster

Native Stone and Masonry

Concrete and Glass

Metals, especially Copper
Arizona State University at the Polytechnic Campus
Landscape Architecture Design Guidelines

ASU at the Polytechnic Campus: Desert Garden Oasis

With a curriculum integrating applied science and technology, the campus is emerging as one of the nation’s premier polytechnics, whose graduates are grounded in experience-based learning and applications-based problem solving. The campus, with its state-of-the-art facilities, will evolve into the leading educational and cultural center in the fast-growing East Valley, promoting collaboration with business and industry. Because the campus offers programs that apply cutting-edge technology to address professional and societal needs, Polytechnic campus graduates will be prepared for direct entry into the workforce.

Introduction

The ASU Polytechnic campus is a desert garden oasis – an arid pedestrian-oriented environment tempered and enhanced by native and naturalized desert plant materials. The campus is surrounded by the desert landscapes of the Gila River valley and the Superstition Mountains to the northeast. The development, implementation, and care of the outdoor spaces are crucial to the character, coherence, and comfort of the campus. The goal of the guidelines is to direct the creation of comfortable outdoor environments that transition smoothly to the indoor comfort of buildings. The use of native formal and natural desert and arid gardens will be fundamental to establishing the campus and will be encouraged. The gardens and outdoor spaces will be exemplary in their character and techniques of environmental sustainability. The built and natural landscape will continue to be the strongest element that helps to create the unique campus identity, and sense of place whether it is a streetscape, pedestrian mall, courtyard, quad or secret quiet garden.

While people from around the country are drawn to Arizona for mild winters, the intense heat of the summer is brutal. Every aspect of the design must consider ways to mitigate the climate which can be uncomfortably warm. The Sonoran Desert climate dictates that designers create ample shade, reduce glare and heat reflection, and choose appropriate materials for seating and amenities.

Adjacent farmland and mountains in the distance portray the historic character of the area surrounding the campus.
These guidelines set forth the basic considerations that must accompany future development and renovations on the ASU Polytechnic Campus. They have been created to facilitate design on the campus that is cohesive, safe, easily-navigable and comfortable for all users. Therefore, designers must address the following general guidelines, which apply to all aspects of the campus:

- Build on the desert garden oasis theme for the campus
- Provide plenty of shade for outdoor areas, in the form of trees, vegetation, and shade structures.
- Consider sun exposure and orientation when selecting materials to reduce reflected heat, glare and hot metal surfaces.
- Incorporate a variety of gathering spaces and gardens, with special emphasis on the microclimates created by buildings and solar orientation.

The existing campus character of desert vegetation

Other examples of desert-adapted vegetation used to create comfortable, inviting outdoor spaces
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I. Human Comfort of Body and Spirit

II. Strong Campus Identity

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   B. Pedestrian Plazas and Nodes
   C. Vehicular Gateways
   D. Pedestrian Portals
   E. Campus Edges/Streetscape
   F. Bike Lanes and Bike Storage
   G. Courtyards/Building Entries/Mall Nodes
   H. Water Features
   I. Lawns
   J. Parking
   K. Variety of Spaces

IV. Design Specifics
   A. Coherent Wayfinding
   B. Pedestrian Paving
   C. Comfortable Site Furniture
      1. Benches
      2. Tables
      3. Trash, Recycling and Ash Receptacles
      4. Lighting
      5. Additional Site Amenities
   D. Safety
      1. CPTED
      2. Fire Access
   E. Sustainable Measures
   F. Universal Access
   G. Planting

V. Appendices
   Desert Plant List
I. Human Comfort of Body and Spirit

The biggest factor that influences design in the Sonoran Desert is climate modification for human comfort. The principles of the guidelines are further enhanced by directly making reference to the desert garden oasis concept – a place for respite and shelter that celebrates the diversity and unique quality of the Sonoran Desert plant palette. Of the four ASU campuses, it is the Polytechnic campus that will be the most characterized by Sonoran Desert plants. The successful enjoyment of the campus will be directly related to providing human comfort of both body and spirit in outdoor environs.

Shade is precious and every opportunity to provide it is welcomed on all of the ASU campuses. The desert garden oasis character of the Polytechnic campus must provide environmental respite through the creation of shade with desert trees and other plants. The provision of shade should be developed in as many ways as possible – using ordered, triangulated desert tree canopies, fabric awnings, building portales and entry coverings, shadows cast by building masses and brise-soleil, etc. to name a few.

Walkways should be developed with generous adjacent planting areas to provide tree establishment, longevity of growth, and vitality. Emphasis should be placed on integrating groves and linear gardens of canopy trees into paved walkways, courtyards, patios, seating areas and other gathering places. Particular emphasis is placed on providing shade at gathering areas and transitions from interior to exterior spaces. Building entries and seating areas should be the primary focus for providing shade when new campus developments are considered.

- Consider a variety of ways to incorporate shade, from trees and other vegetation to fabric awnings and entry coverings. Shade from trees is preferred over shade from structures.
- Include ample planting areas next to walkways and paved areas to allow for the growth of shade trees.
- Pay particular attention to building entries as these are important areas that often require extra shade to make the transition from inside to outside easier on pedestrians.
- Specify comfortable furniture with a variety of options, moveable and fixed.
- Develop building entry zones that accommodate inviting gathering, sitting and eating.
- Plant trees in groves in plazas and in linear bosques along walkways.
- Take advantage of microclimates created by buildings to create shaded gardens.
Providing shade and amenities for pedestrian comfort is crucial to the success of outdoor spaces developed on the ASU Polytechnic Campus.
Investigate shade in many forms to create comfortable gathering places.

- **trees**
- **vertical “green screen”**
- **tensile structures**
- **wire mesh**
- **architectural shade**

*Investigate shade in many forms to create comfortable gathering places.*
II. Strong Campus Identity
Because the campus is located within the urban fabric of Mesa, it is important to create a strong campus identity that helps students and visitors navigate the grounds. This incorporates everything from gateway markers at pedestrian and vehicular entries to specific plant choices that help define a mall. ASU Signature banners, markers and signs, as well as enhanced and identifiable plantings, will emphasize the edges. Consistency of design choices across the campus will unify the grounds through materials, paving patterns, and site amenities. The existing character and history of the campus, that of desert garden oasis, will be maintained.

- Place identity marker/luminaria at Williams Field Road for large scale beacon and focal point.
- Plan gateways at campus pedestrian entry points.
- Design consistency in Sonoran Desert plant material on major campus streets.
- Create consistency in hardscape materials throughout the campus for unity.
- Incorporate the selected site furnishings and lighting to match the rest of the campus.
- Simplify the palette of materials for these important markers by limiting hardscape materials to 2 or 3 types at most.

native desert plant palette

Colorful banners at the student union

Sketch of rich Sonoran Desert planting, university banners and campus site amenities that reinforce the desert garden oasis character.
III. Campus Places

Open spaces on the campus take a variety of forms. In this section, the guidelines address these spaces individually and provide design examples and sketches.

In addition, there is a hierarchy of gateways, entry points, and malls that will influence design factors. Not only must the form of the open space be considered, designers must also take into account the way in which users will access the space and how they will travel through it.

A. Primary & Secondary Malls

The pedestrian malls on campus help to move a large number of students quickly around campus. In addition, they serve as access for emergency and service vehicles. Fire truck access to the campus without interference must be considered. As the major passageways of the campus, malls shall be broad and straight, with ample shading and plenty of places to sit and rest. Triangulated rows of desert canopy trees will be added to each mall to create more consistency and identification of these important spaces. This ceremonial hierarchy contributes to their recognition for wayfinding and importance. Paving and signage will encourage universal access and ease of wayfinding. Amenities shall be matched and grouped together in the formation of “outdoor rooms” to delineate and organize the space without prohibiting movement. When designing pedestrian malls:

- Refer to the tree species plan for designated tree varieties on each mall.
- Gather benches, lighting, signage and other site amenities to make them easily accessible without disrupting pedestrian traffic flows.
- Provide shaded seating at regular intervals
- Refer to the Paving section of the guidelines for information on materials and paving patterns in pedestrian malls.
- Use consistent matte finish paving for malls, such as exposed aggregate 3/8” minus concrete, to reduce glare.
Location of existing and future malls of the Polytechnic Campus

Tree Species Concept Plan
B. Pedestrian Plazas and Nodes

At the major intersections and along the edges of pedestrian malls are enlarged paved areas we identify as plazas and nodes. Plazas and nodes serve the dual purposes of facilitating traffic flow and directional change, and providing gathering spaces for students. They are natural places for social activities and are the logical choice for amenities like fountains and kiosks. Design considerations should include paving and lighting that allow for easy wayfinding, and site furnishings that create comfortable spaces for gathering, resting, reading, studying, and formally assembling. Attention to placement of site furnishings, shade and accessibility is essential for this space to function.

Nodes created at the mall intersections can provide visual cues for wayfinding and mall identity. These landmark spaces should be developed with public art, fountains, shade structures and planting.
Design of pedestrian plazas and nodes must:

- Incorporate different types of seating, such as tables with chairs, permanent benches and moveable seating, to allow for many types of uses.
- Address the conflicting needs of users wishing to pass through the site uninterrupted and the desires of those coming to the plaza as a gathering space.
- Integrate directional kiosks and water features appropriate to the significance of the particular plaza.
- Use matte finish non-reflective paving materials, such as 3/8” minus crushed exposed aggregate paving or stabilized decomposed granite.

This flexible desert plaza can be used for many types of events.

This plaza in downtown Phoenix makes use of a mesquite grove to create a comfortable, shady place to spend time.
The following is an example of how plazas and nodes can create unique places on campus:

**Twining Mall Fountain Plaza Opportunity**

The development of this focal space must include the functional aspects of circulation for pedestrians and service needs, but also engaging, powerful, comfortable and lively. A new plaza must be a multi-purpose space that creates gathering opportunities for ceremonies, informal presentations, meetings, resting and lounging, while delivering a shady respite from the extremes of the Sonoran Desert climate.

![Section of a fountain as a central focal point at Twining Mall central plaza](image)

**C. Vehicular Gateways**

Campus gateways are very important to visitors and motorists as visual indicators that they are entering the campus precinct. These thresholds to the campus shall be emphasized with unique markers/lighting features and a continuation of the existing low, simple sign walls that mark the campus corners and vehicular entries. Formal rows of drought tolerant trees will mark the transition from city street to urban campus. Special paving will indicate the entry points and plant massing will speak of the desert garden oasis.

The entrance to the Polytechnic campus on Williams Field Road will be greatly enhanced with an added center median to soften the expanse of paving of the current road. This opportunity represents the arrival onto the campus proper and will be the touchstone for wayfinding and identity.

- Place campus markers and simple sign walls at vehicular entry points.
- Create formal alleés with desert-adapted trees to provide shade and provide a formal recognition of the campus threshold.
- Incorporate mass plantings of colorful desert shrubs to have a big impact on visitors passing through in a vehicle.
- Begin banners at furthermost points to lead in to campus.

![Map of gateways to the campus](image)
Sign walls, campus markers and banners signal the importance of campus gateways.

Sketch of Williams Field Road with a planted median added to provide a more welcoming and visually appealing entry to the campus.

Existing entry to the campus at Williams Field Road
D. Pedestrian Portals
The renovation of the existing primary portal, Williams Field at Power Road, must be made welcoming and identifiable. The new entry space must mark a clear entry into the campus, make a statement about the place, and create a shady invitation to the campus for meeting and gathering. Elements of the pedestrian portal shall include sizeable ASU signature column markers and low seatwall/signwalls that identify the name of the campus and entry.

Because of the proximity of residential development and the growth of the East Valley around the campus, the importance of the pedestrian entry points will grow as the campus grows and attracts more students. Plant material at these entry locations should be low and colorful to entice visitors and emphasize the desert garden oasis of the campus. ASU signature column markers, campus banners and shaded seating will help demarcate the campus entries.

When designing pedestrian portals:
- Position ASU signature column markers and low seat wall identification markers with mall name at major pedestrian portals to create strong gateways.
- Provide shaded seating with well-spaced benches.
- Refer to the plant lists in the appendix for colorful, desert-adapted plant choices.
- Organize newspaper racks in a system similar to the one in the photograph below to eliminate clutter at these important entries.

E. Campus Edges/Streetscape
Located in the heart of suburban Mesa, Arizona the campus has many miles of perimeter street frontage. The presentation of the campus along these streetscapes is very important to its identity as a special place in the urban fabric. The image and character presented should be inviting and physically and visually accessible. There is no established landscape character on the eastern campus edge along Power Road. There is the beginnings of structured planting along the main entry – Williams Field Road – which needs to be enhanced. A strong and consistent streetscape character should be continued along the other three perimeter street edges of the campus too: Sossaman Road, Ulysses Avenue, Union Avenue, and Sagewood, Edgewater, and Tillman Avenues.

Double rows of trees are proposed creating formal allées to shade the pedestrian and bicycle paths and form a strong but pleasant edge of the campus. Modification of the pedestrian walkways on these edges will be a critical step in enhancing the campus. This will need to be closely coordinated with the City of Mesa. The goal for the edge modification is to create a presentation of a special garden environment of tree shaded detached sidewalks, seating opportunities, and pedestrian safety.

The detached pedestrian walks are separated from the travel lanes by a continuous planting bed along the curb edge. The planting bed must be sufficient in width to provide a viable medium for robust tree growth and longevity. Use of structural soil in these harsh urban conditions is encouraged to facilitate aeration of tree roots. Low, colorful plantings will entice visitors without impairing visual access to traffic and lush shrubs emphasize the garden oasis in the desert.
Elevation of a pedestrian portal with dense planting and sign wall to indicate the campus location

Organization of newspaper boxes and other site amenities makes for a welcoming entry that is free from clutter.

Sketch of the mass tree planting and campus marker that help to define a pedestrian portal at pedestrian crossing at vehicular arterial

Map of campus edge and key streetscapes
Create formal double rows of trees in a triangulated pattern on streetscapes to provide a maximum amount of shade to pedestrians and bicyclists.
Designate detached sidewalks and allow for wide planters between sidewalks and traffic lanes. Minimum 8’ wide planters should be incorporated to encourage large, healthy trees.
Refer to the City of Mesa’s Street Tree planting guidelines to select tree species that match the City’s designated street trees.
Specify structural soil where possible to provide adequate soil volume for tree root growth. This will not only encourage larger trees, it will also increase their life-spans.
Provide for colorful, lush plantings that will not interfere with traffic visibility.
Incorporate the University’s signature banners and lighting to celebrate edges.

Section at typical street through campus

The existing street condition could be more pleasant for pedestrians and bicyclists.
F. Bike Lanes and Bike Storage

The major design considerations for bike lanes are safety and climate modification. Bike storage areas will be divided into several types, including large areas for storage of 60 to 100 bikes, and smaller stations that hold 10 to 15. They should be convenient to bike paths and located close to building entrances. They will be well-lit and designed with appropriate screening, such as planting or green fencing, that helps blend them into the surrounding landscape without compromising the safety of users when locking up their bikes.

- Use low plantings around bike storage areas to blend them into the surroundings without blocking visual access.
- Incorporate lighting to illuminate bike storage racks.
- Position bike storage racks as close as possible to building entries.

Existing bike storage area on the West campus, showing the successful use of vegetation as a screen that doesn’t compromise safety

Light, unobtrusive bike rack integrated into the overall plaza design

Clunky existing bike storage on the Polytechnic campus
G. Courtyards/Building Entries/Mall Nodes

These are the spaces between the Mall edges and the entries to campus buildings. They are crucial to the success of the existing and new architecture on campus because it is also in these spaces that students and professors potentially gather, meet and socialize more informally before and after classes. Building courtyards, entries and patios play a major role in blurring the line between indoors and outdoors. In the desert, they serve as important transitions between the blazing heat and the cool darkness of the interior. They are perfect places for unique and specimen plants and often provide opportunities to use plants that thrive in the microclimates created by the buildings. These spaces shall be shady either with the aid of shade structures or groves of trees. Comfortable seating and trash receptacles are other elements to be included. Paving patterns here should indicate the importance of the building’s entrance.

- Design planting plans that emphasize the building’s entrance.
- Consider using unique specimen plantings in appropriate entry locations.
- Augment the building’s shade with trees or vegetative screening as needed
- Position trash and ash receptacles close to building entrances.
- Include ample seating in the form of benches and seat walls.
- Design paving that leads visitors to building entrances.

This plan incorporates paving patterns to indicate the building’s entry and a seating node that takes advantage of the microclimate near the building.
Building courtyards and shaded entries help pedestrians make the transition to cool, dark interiors from the bright, hot Arizona sun.

H. Water Features

Water in the desert southwest is precious and its use for psychological cooling is important, however it must be done with restraint. Water’s soothing effect is needed on campus and it is recommended that water be present at major gathering areas on campus – where the masses can enjoy it. Fountains are also encouraged in small gathering areas and cooling microclimates of courtyards and outdoor rooms. All fountains’ mechanical systems to include high quality pumps and filters and these systems shall be designed by fountain mechanical engineers.

The designer is encouraged to be more open as to what a water feature can be in the Sonoran desert. As a cutting-edge learning facility, the ASU Polytechnic campus has a special opportunity to provide a living-laboratory of using waste water such as storm water and condensate in the urban landscape. There are a variety of sustainable water feature systems that can be developed on campus in addition to the traditional methods of using potable water for fountains. These include harvesting and reuse of storm water runoff, HVAC condensate, gray-water recycling and other resources. These resources can then be used in fountains and water features that not only provide enhancements of visual quality, sound quality, and cooling but create demonstration gardens that scrub the water of impurities, augment the landscape irrigation systems, and potentially recharge the local water table.

- Locate fountains at important campus locations where they will have the biggest impact.
- Using water features in courtyards and outdoor rooms where appropriate to create cooling microclimates for protected gathering spaces.
- Incorporate sustainable practices into water feature design by considering rainwater harvesting and reuse, collection of air conditioner condensate and gray-water recycling.
- Consider small or subdued, brimming fountains to provide a cooling, soothing effect while minimizing evaporation.
- Use high quality pumps and filters.
This design features irrigation as a fountain.

An elegant, brimming fountain minimizes the evaporation that occurs with more active fountains.

Small fountains can be effective in small places.

This is a rainwater harvesting garden which doubles as a unique water feature at the Biodesign Institute at ASU.

Irrigation seep provides the cooling effect as an ephemeral water source at the Biodesign Institute at ASU.
I. Lawns

As the Polytechnic campus is developed, central lawns in key spots will create the character of the university setting. However, the predominant character of this campus is a desert oasis, so turf should not be the prevailing groundcover. Aside from the key campus gathering spots, lawns should be minimized in favor of desert-adapted xeric vegetation. The existing lawn spaces on the campus are scarce and should be protected. They provide students with a cool, green place to relax and gather with friends. These areas should be kept relatively open, allowing for visual enjoyment as well as recreational and gathering space.

- Balance tree planting in lawn to create maximum usable space for gatherings and recreation.
- Trees should be generally located around the perimeter.
- Provide benches and seatwalls at lawn edges to take advantage of shade for seating.
- Avoid breaking up lawn areas with paving and numerous walkways.

J. Parking

As with any college campus, surface parking at ASU takes up a good percentage of land. Careful design considerations, however, can help blend parking lots into the landscape so they appear less dominant than they tend to be. An abundance of trees for shade keeps the temperature down and ample groundcovers and shrubs can ease the transition from parking to landscape. Permeable paving softens the visual impact of parking lots while allowing for better drainage, aquifer recharge and natural basins.
K. Variety of Spaces

The existing campus has a special quality because of the garden spaces that are interwoven throughout. Particular attention should be paid to microclimates created by building juxtapositions and solar orientation. Include a variety of different space types to provide interesting gathering areas and more secluded locations for quiet study.

- Integrate more private/surprise gardens all over campus and in new developments.
- Create shaded seating opportunities around sports fields and recreation areas for spectators – activate the edges.
- Provide places along malls and near buildings for groups to study together in comfort.
- Protect existing lawn gathering spaces.

IV. Design Specifics

A. Coherent Wayfinding

Wayfinding provides campus visitors, faculty, students and staff the opportunity to recognize their location and easily navigate the campus. This is most often accomplished with signage and environmental graphic systems, focal point elements, paving systems, landscape themes and other visual cues to aid in recall. These arrangements allow people on campus the ability to associate key elements and environmental treatments specifically to certain areas of the campus.

- Follow the University’s accepted styles for all signage and identity markers.
- Locate navigational aids at all major pedestrian nodes, key intersections and campus entries.
- Refer to the map of Pedestrian Mall Tree Species to adhere to the chosen species for each mall. This will help visitors orient themselves on campus.
- Create unique focal points such as...
fountains and sculpture at mall intersections.

- Design mall plantings to create defined, identifiable, unique malls.
- Create monuments and strong gateway character at campus perimeter.

**B. Pedestrian Paving**

Cost effective, non-reflective paving materials must be matched with aesthetically pleasing accents to identify primary circulation systems from secondary & tertiary walkways. A variety of alternatives in both pattern and finish are available to explore. Special consideration has been made to define a consistent surface treatment for providing a detectable surface for the visually impaired.

It is anticipated that a wide variety of materials, colors and finishes will be proposed for campus development in the future. One of the most important aspects to consider is the reflective quality of the paving surfaces. Glare from highly reflective pavements is uncomfortable and distracting. Surface finishes for concrete pavements should be matte finishes such as sandblasted, acid-etched, broom-finished, or exposed aggregate (1/4” - 3/8” aggregates; see specification in appendix). All of these methods will reduce the reflectivity of the material, regardless of color.

The pedestrian malls on the ASU Polytechnic campus which provide principal access for students, faculty and staff must include methods to guide visually impaired users. The existing walks on campus feature smooth concrete with no special treatment of the edge. Walks that feature a textured band on the edges proved a warning signal that can be felt and heard by the walking canes of the visually impaired.

The concept for using an aggregate edge treatment is sound, but its execution must be standardized and limited. These are described in the alternatives illustrated. An alternative method for treating the edge of pavement condition may include use of a raised curbing along the outside edge of the pavement. If the curb alternative is used, regularly placed scuppers or weep apertures should be located in the curbing to allow storm water runoff from the walkways to be diverted to adjacent landscape planting areas. Also it may be advantageous to use a field of the smaller 3/8” exposed aggregate material with smooth, light sandblasting on the edges as a contrast to reduce the immense glare from smooth concrete.

*This photo from the Tempe campus shows a 3/8” crushed aggregate walkway that cuts down on reflected glare.*

*Stabilized decomposed granite gives this plaza a softer, more natural look*
• Incorporate surface finishes to reduce the glare from reflective, smooth paving.
• Design patterns that do not conflict with the pavement edge warning.
• Choose light integral color paving over darker colors to reduce heat absorption.

C. Comfortable Site Furniture

Great care and thought must be taken when selecting site furniture (seating, benches, tables, trash receptacles, etc.) for environments in the desert southwest. The intense heat and powerful solar rays are brutal on materials and their longevity, and no one wants to sit on an overheated metal bench in the summer. In addition, users can be destructive to the materials and elements selected, (through skating, boarding, biking, and general abuse). Site furniture should be simple and blend in to the landscape so the furniture that has been selected is light, airy and visually simple. Plazas and gathering spaces should have plenty of shaded tables with moveable chairs so that users can make themselves comfortable for eating, studying, or visiting with friends.

On the Polytechnic campus, there are many different types of existing furnishings. To unify the campus, these should be limited to a kit of parts, a series of coordinated pieces of like materials. A series of recommended site furnishings is provided here. The elements have been selected for their proven durability, sustainable use of materials and relative simplicity (lessening the probability that the style becomes dated). These same principles should be taken into consideration when identifying site elements not found in these guidelines.

left: exposed 3/8” minus crushed exposed aggregate sidewalk
middle: inlaid black pebbles
right: sandblasted concrete

contrasting textures and colors of concrete paving

This existing teak bench will not last as long as other materials in our harsh climate.

Although this existing piece is made of desert-appropriate materials, a more sleek, contemporary look would help modernize the campus.
1. Benches
Vendor: LandscapeForms

Product Data
- Benches are available backed or backless surface mount style or freestanding (should include wear-resistant non-marring glides).
- All metal is polyester powdercoat, a hard yet flexible finish to resist rusting, chipping, peeling and fading.
- Benches should meet BIFMA performance and safety standards.
- Optional seat divider is a contoured cast aluminum component that fits across the seat from back to front – to provide personal space and discourage sleepers and skateboarders.
- Benches shown here have a minimum of 69% recycled content and are 100% recyclable.
- Landscape Forms’ Panguard II® Powdercoat finish contains no heavy metals, is HAPS-free and has extremely low VOCs.

To complete the contemporary look of the campus, benches should be styled in perforated metal or cast concrete, both of which provide a modern look that is long lasting.
2. Tables & Café Seating
Vendor: Landscape Forms Carousel Table
Product Data
- Metal grid seats stays cool in the sun; dry quickly after rain
- 3, 4, 5 or 6 seat styles offered, 3-seat and 5-seat are spaced to allow one open seat for wheelchair accessible.
- Surface mount or freestanding with glides
- Metal grid or perforated metal seats; backed or backless
- Table tops may be Marneaux, Catena (powdercoated metal or random finish stainless steel), Steelhead (solid or perforated top), Fiberglass
- Tables can be selected with optional umbrella hole, which cannot be added later, and the built-in umbrella holder and mounting bolts for umbrella pole.
- Metal parts finished with Panguard II® powdercoat available in standard colors (Catena with stainless steel table top is not powdercoated.)
- Carousel table with grid seats has a recycled material content of 90% or higher and is 100% recyclable.
- Landscape Forms Panguard II (R) Powdercoat finish contains no heavy metals, is HAPS-free and has extremely low VOCs.

3. Trash, Recycling, and Ash Receptacles
Vendor: LandscapeForms Petoskey Litter Receptacles
Product Data
- Receptacles can be freestanding or surface mount.
- They have a heavy, stable cast iron base and are perforated at the bottom for ventilation.
- All metal is finished with polyester powdercoat, a hard yet flexible finish that resists rusting, chipping, peeling and fading.
- Petoskey Litter Receptacle has a recycled material content of 86% or greater. The post consumer content is 56% or greater and the post industrial content is 30% or greater. The Petoskey Ash Urn has a recycled content of 90% or greater. The post consumer content of the ash is 59% or greater and the post industrial content is 31% or greater. Both styles are 100% recyclable.
- Landscape Forms Panguard II® Powdercoat finish contains no heavy metals, is HAPS-free and has extremely low VOCs.
4. Lighting

Selection of site lighting must address safety and follow a consistent and logical family of fixtures, materials and aesthetics. The following models have been chosen to provide a clean, consistent look on campus.

Vendor: Architectural Area Lighting
Model: ‘Largent’ for pedestrian mall lighting and parking lots

With the rise of Dark Sky ordinances throughout the US, AAL has created several product lines that meet the International Dark Sky Seal of Approval for IES Full-Cutoff luminaries.

“Largent” lights

Low voltage landscape lighting is encouraged
5. Additional Site Amenities

Other pieces chosen for the campus should follow the look of being clean, modern and exciting. When exact models are not specified, keep to the character described in these guidelines.
D. Safety

1. CPTED
The ASU campuses should always exhibit and ensure a safe and comfortable environment for all throughout the 24 hour day. In order to promote this goal, it is recommended that all developments on campus follow the rules and guidelines set forth in the Crime Prevention Through Environmental Design (CPTED) guidelines. CPTED guideline follow the principle that “The proper design and effective use of the built environment can lead to a reduction in the fear and incidence of crime, and an improvement of the quality of life.”

There are three relevant overlapping CPTED strategies:

**Natural Surveillance**
A design concept directed primarily at keeping intruders easily observable. Promoted by features that maximize visibility of people, parking areas and building entrances: doors and windows that look out on to streets and parking areas; pedestrian-friendly sidewalks and streets; adequate nighttime lighting.

**Territorial Reinforcement**
Physical design can create or extend a sphere of influence. Users then develop a sense of territorial control while potential offenders, perceiving this control, are discouraged. Promoted by features that define property lines and distinguish private spaces from public spaces using landscape plantings, pavement designs, gateway treatments, and “CPTED” fences.

**Natural Access Control**
A design concept directed primarily at decreasing crime opportunity by denying access to crime targets and creating in offenders a perception of risk. Gained by designing streets, sidewalks, building entrances and neighborhood gateways to clearly indicate public routes and discouraging access to private areas with structural elements.

Designers and planners may reference the International CPTED organization website at [http://www.cpted.net](http://www.cpted.net)

2. Fire and Safety Access
Fire and safety access on a campus is a critical factor that must be successful at every level. The ASU Polytechnic Campus has its fire protection provided by the City of Mesa. Therefore the campus and all of its susceptible areas must be accessible by Mesa’s fire and emergency vehicles. The basic criteria for emergency and fire truck use on campus are as follows:

- Incorporate a minimum 20’ wide path on all malls to allow for emergency
access.

- Do not locate objects in the mall that would conflict with a fire truck’s 25’ inner turning radius and 50’ outer turning radius or impede their ability to turn from one mall onto another.
- Provide space for fire trucks to get within 150’ of a building.
- Allow fire truck access to at least 3 sides of building, or all 4 sides if there is an entrance on all sides.
- Provide ample space for fire trucks to continue through without having to reverse if the access path to a building entry is more than 150’.
- Design malls that can support the required 55,000 lb load.

This is not an all-inclusive list. Prior to designing and planning more technical information and detail should be acquired from the University Architect and the City of Mesa Fire Department.

**E. Sustainable Measures**

The ASU Polytechnic campus is a unique learning environment, providing a virtual urban design laboratory within its campus. One of the wonderful opportunities available in this setting is the development of sustainable measures for cities and urban spaces.

In the arid climate of the Sonoran Desert, water is precious. The landscape development guidelines include working models for rainwater harvesting on the campus. These models should investigate both low-tech and innovative methods, such as stormwater reuse, gray-water recycling and collection of air conditioner condensate for water features and irrigation systems. These can be as simple as manipulating paved surfaces to direct runoff to planters or as involved as collaborating with a design team to plan for a condensate collection system on new building construction. In addition, designers can implement proven practices to encourage vigorous tree growth, such as using structural soil and creating ample planter space. Techniques like these will encourage healthy trees with long life spans, helping improve air quality and environmental quality for pedestrians. As a university, we have a unique opportunity to showcase best practices and be a model for sustainable design.

Therefore:

- Investigate techniques for water harvesting, such as collecting condensate from HVAC systems, reusing rainwater runoff, and recycling gray-water.
- Specify low water use plants. Refer to the Plant Materials section of these guidelines.
- Specify low maintenance plants. Allow room on planting plans for plants to reach their mature size without extensive pruning.
• Use irrigation techniques known to save water, such as installing drip irrigation systems and watering in the early morning.
• Practice/develop techniques for improved tree growth, with use of structural soil and tree planting trenches near hardscape elements.
• Focus runoff towards planting and tree beds.
• Use furnishings that have recycled and post-consumer recyclable materials.
• Use permeable paving.
• Locate shade trees to block the sun and provide natural cooling for buildings.
• Specify long-lived trees.
• Incorporate ample shade in parking lots to shade cars thereby reducing VOC emissions that contribute to poor air quality.
• Use recycled and recyclable materials.
• Specify material from local sources.
Porous paving in parking lots

Wall made of recycled concrete sidewalk

Natural metals

Recycled broken concrete paving

Porous paving and stabilized decomposed granite
F. Universal Access

All new and renovated constructions are required by law to adhere to the standards set forth in the Americans with Disabilities Act (As published in the Title III regulations (28 CFR Part 36, revised July 1, 1994) issued by the Department of Justice. The ADA Standards for Accessible Design).

More stringent standards than those established by ADA will be required for all new and renovation projects on ASU campuses. The standards proposed are to ensure universal accessibility to all users of all areas of the campuses. The standards proposed are as follows:

- All points of development for active exterior use shall be universally accessible (e.g., lawns, quads, walks, ramps, courtyards, patios, recreation fields, malls, and entryways)
- Sloped walks shall not exceed 5% and may not maintain a continuous slope for more than 30’ (thirty linear feet) without providing a 60” x 60” min. landing interval. The landing area may not exceed 1% slope in any direction.
- No walkway, ramp, or inclined access shall have a cross slope exceeding 2% maximum.
- All sloped entry ramps 4% or greater shall have a minimum 5 foot landing for every 30’ of run.
- All walks with a slope greater than 5% are considered ramps and shall have a handrail that meets the requirements of the ADA.
- Reduce use of overly coarse textured paving surfaces.
- Stairs shall have uniform and comfortable riser to tread relationship.
- All pedestrian street interfaces should incorporate tactile paving and audible cross walk signal.

This bio-sponge treats stormwater runoff before it enters the aquifer

Stormwater enters ground through bubbler box in reinforced concrete pipe

Clunky existing ramp on the Tempe campus
G. Planting

The plant palette for the “Desert Garden Oasis” theme of this campus differs from the other campuses. The location in Mesa, Arizona is the perfect setting for a university campus showcasing the beauty of desert-adapted plants. The plant palette for the Polytechnic campus is made up of predominantly Sonoran Desert natives, but supplemented by additional drought-tolerant, low water use varieties. See the plant list in the appendix for the complete suggested plant palette.
Phoenix Mesquite
Palo Verde
Date Palm - to punctuate Twining Mall and central plaza
Lawn gathering spaces integrated with desert planting
ASU Desert Plant list

Trees:
Acacia smallii
Acacia stenophylla
Acacia willardiana
Bauhinia lunarioides
Bauhinia macranthera
Celtis reticulata
Chilopsis linearis ‘Lucretia Hamilton’ Desert Willow
Chitalpa tashkimensis hybrid
Olneya tesota
Parkinsonia ‘Desert Museum’
Parkinsonia floridum
Parkinsonia microphyllum
Parkinsonia praecox
Phoenix canariensis
Phoenix dactylifera
Pithecellobium flexicaule
Populus fremontii
Prosopis alba
Prosopis chilensis
Prosopis velutina
Sophora secundiflora
Vitex angus-castus

Shrubs:
Podranea ricasoliana

Accents:
Agave spp.
Aloe spp.
Asclepias subulata
Bulbine frutescens
Carnegiea gigantea
Cereus spp.
Euphorbia antispyphillitica
Euphorbia biglandulosa
Stenocereus spp.
Dasylirion longissimum
Dasylirion wheeleri
Ferocactus wislizenii
Foquiera splendens
Hesperaloe parviflora
Opuntia spp.
Pediadanthus macrocarpus

Vines:
Antigonon leptopus
Dyssodia acerosa
Dyssodia pentachaeta
Mascagnia macroptera
Mascagnia liliacea
Clematis drummondii
Parthenocissus quinquefolia
Podranea ricasoliana

Shrubs: (cont’d.)
Caesalpinia pulcherrima
Celtis pallida
Chrysanthenia mexicana
Cordia parvifolia
Cordia boissierii
Dalea frutescens
Dalea pulchra
Dodonaea viscose
Encelia farinosa
Ericameria laricifolia
Eriogonum spp.
Euphorbia biglandulosa
Justicia californica
Justicia ovata
Justicia spicigera
Leucophyllum pruinosum
Leucophyllum spp.
Lycium fremontii
Plumbago scandens
Psiostrophe cooperi
Bestella brittoniana
Ruellia peninsularis
Salvia chamaedryoides
Salvia clevelandii
Salvia coccinea
Salvia greggii
Salvia leucantha
Sambucus mexicana
Simmondsia chinensis
Stachys coccinea
Tagetes lemmonii
Tecoma stans ‘Orange Jubilee’
Tecoma stans
Trixis californica
Vigueria deltoidea

Perennials and Groundcovers:
Baileya multiflora
Calliandra eriophylla
Calliandra ericoides
Desert Bird of Paradise
Desert Hackberry
Elymus canadensis
Ficus carica
Globe mallow
Lantana
Penstemon
Ruellia brittoniana
White Rain Lily

Grasses:
Bouteloua curtipendula
Bouteloua gracilis
Muhlenbergia spp.
Nolina spp.

Podranea

Queen’s Wreath Vine
Yellow Orchid Vine
Purple Orchid Vine
Native Clethra
Virginia Creeper
Podranea

Bursage
Quail Bush
Wooly Butterfly Bush
Mexican Bird of Paradise
Yellow Bird of Paradise

Desert Marigold
Shrubby Dogwood
Globe mallow
Lantana
Penstemon
Sandpaper Verbena

Sideauty Grass
Blue Grama
Beargrass

Paperflower
Baja Ruellia
Scarlet Sage
Autumn Sage
Mexican Bush Sage
Mexican Elderberry
Jojoba
Betony
Mt. Lemon Marigold
Orange Tecoma Stans
Yellow Tecoma Stans
Trixis
Goldeneye
Appendix
Although a single and unified institution, ASU is “One University in Many Places”, spatially distributed across metropolitan Phoenix.

History of ASU at the Polytechnic Campus

When Williams Air Force Base closed in 1993, ASU administrators and local community leaders saw the closure as an opportunity to increase the ASU presence in the burgeoning southern East Valley. ASU at the Polytechnic campus, initially designated ASU East, started as a small campus in 1996, with nearly 1,000 students. At the time, the new campus allowed for growth in programs that lacked room to expand on the Tempe campus and helped to accommodate the overall growth in the ASU population.

Initially, the southeast Mesa campus offered a handful of programs, housed in either the College of Technology and Applied Sciences or the Morrison School of Agribusiness and Resource Management. East College was formed in 1997 to develop the liberal arts and sciences curriculum and serve as an incubator for new professional programs.

Today, more than 4,800 students are enrolled in 33 bachelor’s and graduate degree programs. ASU shares more than 700 acres at the intersection of Power Road and Williams Field Road with Chandler-Gilbert Community College, Mesa Community College, Embry-Riddle Aeronautical University, an Air Force research laboratory, and a Maricopa County elementary school. These entities comprise what is known as the Williams Campus.

In July 2005, the campus became designated ASU at the Polytechnic campus to better reflect its differentiated mission. The Polytechnic campus offers programs that integrate practical and theoretical study; learning that emphasizes problem-solving, project-based activities, laboratories, and work experience; education based solidly in the liberal arts and sciences; research that emphasizes applied subjects and solutions to problems; a campus culture that values diversity, creativity, engagement and participation in the public community, and work.

In 2005, a proposed five-year roadmap for the campus recommended the reorganization of existing colleges and establishing new colleges, schools, and degree programs. As part of the Comprehensive Development Plan, a series of new facilities are being proposed for the Polytechnic campus. Over the long term, the built space will increase to approximately 3,200,000, increasing classroom, research, and housing space.
ASU at the Polytechnic campus was laid out in a grid format. With the addition of significant open space, courtyards, and connections, the campus plan is similar to the following plan precedents:

- Virginia Polytechnic Institute and State University (Virginia Tech), Blacksburg, Virginia
- California State Polytechnic University (Cal Poly Pomona), Pomona, California
- University of Virginia, Charlottesville, Virginia
- Stanford University, Stanford, California

The historic cores of these campuses were master planned around a series of strong “outdoor rooms” that were shaped by the buildings around them. The buildings for the most part are not objects in the landscape; rather they have a clear hierarchy in terms of the architecture and open space. In addition, the open space and the buildings are linked in a symbiotic relationship in which one cannot survive without the other. Arcades link buildings, frame openings, and define large and small scale spaces. The landscape responds to the local conditions and provides shade or sun as appropriate.

These precedents are less successful where this pattern language of open spaces, architecture, and landscape becomes disconnected, buildings become objects in the landscape, and outdoor rooms are poorly defined.
Communications, and IT

psi. The City of Mesa has reportedly tried pipe failures if the pressure exceeds 55
sure of 50 psi, reporting that there are control the system to run at a peak pres
years of age. University staff has had to agree on ownership and maintenance re
Mesa, and the Williams Housing Author
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Maps provided by the City of Mesa indicate that the majority of the campus water distribution mains are city owned and maintained. Polytechnic campus water maps indicate that the city does not maintain the entire system and owns little more than the main loop of 8” pipe along Williams Field Campus Loop and Williams Field Road. The city owned portion of the waterlines are repaired at city cost, with the university being billed for repairs on the remaining majority portion of the system. The campus has a plumber who repairs water service lines and interior plumbing, but presently lacks the additional personnel and equipment necessary to repair their own water distribution system.

The waterlines serving the residential areas to the north and south of campus are owned by the Williams Housing Authority. City of Mesa and ASU maps do not agree on ownership and maintenance responsibilities of all lines. University staff indicated that the potable water distribution system is inadequate to provide required routine flow rates at an acceptable operating pressure range.

The existing on-site distribution system consists of pipe generally in excess of 50 years of age. University staff has had to control the system to run at a peak pressure of 50 psi, reporting that there are pipe failures if the pressure exceeds 55 psi. The City of Mesa has reportedly tried to have the university operate the water distribution system at the available 80 psi of water pressure, but university staff cannot comply due to poor pipe conditions which can no longer operate under that pressure. When the golf course is being watered, the campus water pressure reportedly drops as low as 20 psi, a level too low to reliably operate many water using appliances, and clearly too low for fire protection.

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A substantial portion of the campus and housing area are served by 4” and 6” waterlines, which should be replaced with 8” and larger lines. With prudent operation and pressure control, repair costs paid to the city for water line repairs by the campus presently averages $8,000 to $12,000 per year. Present dollar repair costs are anticipated to increase over time.

A new 16” waterline was installed east of campus as a part of the recent Sossaman Road improvements in 2002. A 24” waterline was constructed in Power Road, to the west in 1998. These lines are in good condition and are owned, maintained, and operated by the City of Mesa. Adequate water supply is therefore available at the perimeter of the campus, but inadequately sized and structurally deficient waterlines within campus limits campus water flow. The City of Mesa has assured continuing expansion of the off-campus potable water distribution as demand increases on campus and off campus.

Fire Flow

Existing: The adequacy of fire flow was not formally evaluated. Based on the system operating pressure, pressure drop under irrigation flows, and on-campus pipe size it is unlikely that adequate fire flow is available to significant portions of campus when the golf course is being irrigated.

Fire flow in support of future construction may not be available, especially for multi-story buildings. The housing area water supply system consists mainly of 6” mains with 4” lines with a limited amount of 8” distribution mains. It is almost certain that any 4” pipe served by a 6” pipe operating at a static pressure of 50 psi will be unable to deliver a fire flow of 1,000 gallons per minute in the residential areas. Fire flow for the 6” mains likewise is likely to be deficient.

Hydrants are shown on City of Mesa utility maps as being a combination of privately and publicly maintained features located on waterlines of various ownership. Maintenance responsibilities for hydrants are split between the Williams Housing Authority, ASU, and the City of Mesa. Under
Prepared by
PAULIEN & ASSOCIATES, INC.
Denver, CO

John R. Bengston, Vice President and Principal
Frank Markley, Ph.D., Associate

In cooperation with
Ayers/Saint/Gross Architects
Baltimore, MD

Adam Gross, Principal
Kevin King, Senior Associate
Chris Rice, Associate

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Raymond Marquardt, Dean, Morrison School of Agribusiness and Resource Management
Albert McHenry, Dean, College of Technology and Applied Science
Jean Humphries, Director, Research and Sponsored Projects
Charles Brownson, Director, Library Services
Kati Weingartner, Director, Information Technology
# SPACE NEEDS ANALYSIS

*Prepared by*
*Paulien & Associates, Inc.*

*June 2004*

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2. Observations
3. Key Space Determinants
4. Space Needs Planning
5. Conclusion

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*PAULIEN & ASSOCIATES, INC.*
Arizona State University – Polytechnic,
Williams Campus Space Needs Analysis

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<td>APPENDIX B</td>
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</tbody>
</table>
EXECUTIVE SUMMARY

PURPOSE
Arizona State University is striving to re-conceptualize itself as a comprehensive metropolitan research university that offers the combination of academic excellence and a firm commitment to its social, economic, cultural, and environmental setting. To that end, the institution has embarked on a comprehensive planning process that includes physical planning at each of its four campus locations. The space needs analysis, contracted to Paulien & Associates, Inc. of Denver, Colorado, is part of the overall campus planning effort. The space master plan looks from the inside out and translates the academic mission of each campus into space, using several enrollment scenarios. The ASU-Polytechnic campus is the focus of this report.

OBSERVATIONS
After assimilation of data elements including a comprehensive facilities inventory, staffing file, and the Fall 2002 course file, work sessions were held with both academic and administrative constituent groups on campus. Some critical observations following the campus work sessions and review of the existing facilities are as follows:

- This campus sees itself as healthy lifestyles versus medical school environment. This would include nutrition, exercise and wellness, alternative medicine, Psychology, nutraceuticals, and will include some greenhouses.
- Eventually, there will be a college or school of health-related programs on the campus. Applied Biological Sciences will need greenhouses, indoor laboratories, instruction, and research space.
- Basic Art will include Fine Arts and Humanities, but will not be a large program. Fine and Performing Arts facilities in support of the core campus majors should be incorporated into the campus master plan.
- As a polytechnic campus, experientially intensive courses will require more laboratories and activity space.
- The College is finished with renovation projects. Most of the old buildings will be torn down.
- Campus will need an office/classroom building in the next five years.
- For the Morrison School of Agribusiness and Natural Resources, the primary facility issues are a 17-acre driving range as you enter campus and a 180-acre golf course on the south boundary. Need a 400-yard driving range with 45
stations, 3 practice holes, and putting greens. Would like own golf course, clubhouse, hotel, and foodservice over next 10 years.

- Need for support space such as parking, police, and mail services. No shipping/receiving space. No financial services, cashier, research support services space. No fleet services space or dept. of public safety. Need space for a full accounting function.

- Most interest is in the immediate construction of additional classrooms, laboratories, and offices in support of the anticipated enrollment growth.

- A library on the East Campus should be more of a learning resource center with emphasis on study space, digital formats, and retrieval system.

- The Williams Campus library is presently independent, but could become a branch of the Tempe Hayden Library. They need more space for reader stations and service space, computers, and work tables. Learning center, IT, academic computing, and library could be in the same building.

- Visitor's information area, often the one-stop concept, is out of space.

- Need dining hall facility. The housing office also needs to move.

- Registrar, bursar, academic advising, visitor information, etc. should be located in a central location and main entry to campus. A testing quiet room and a strong disability services component will be needed on this campus.

- The Aviation program is primarily classroom and flight line based and needs approximately $3 million for a flight hangar on the airport grounds.

- Engineering programs will be project based and need projects-type buildings. This learning style will require several technicians as part of the staffing for the College.

- Photovoltaic research facility needs to be enlarged. Most of the research on campus will be applied, not fundamental. Also need facilities for computer programs and engineering technology.

- Adjacencies of programs are important. Engineering and computer systems as well as projected environmental importance on campus with the Biology program.

These are some of the major observations. Many other observations were made by the consultants and have been brought to the attention of ASU administration and the master planning team.

**KEY SPACE DETERMINANTS**

As part of the comprehensive realignment of enrollments between the four campuses, three iterations of space needs were used to project growth from the fall 2002 level of 3,126 headcount students or 1,778 FTE. Enrollment horizons included 8,000, 10,000, and 15,000 headcount students. The time period for reaching these enrollment levels is not a factor in this analysis. This report provides detailed analysis for each of the enrollment horizon levels but focuses on the 10,000 and 15,000 student enrollment levels. Built into enrollment numbers is the assumption of increasing the student population from its current level but adding additional degrees and programs, a process that has already begun at the ASU-Polytechnic campus.
SPACE NEEDS PLANNING

The Arizona Board of Regents (ABOR) as well as other national guidelines appropriate to the ASU-Polytechnic mission and pedagogy was used to quantify space needs. Horizon enrollments A through C were generated in relation to existing space using Fall 2002 as the baseline. The guidelines were applied using key space determinants of the target enrollment mix, faculty and staff assumptions. Research space was generated using the number of tenured/tenure-track faculty.

The space needs analysis was performed by classifying existing space categories on campus into three areas: Academic Space that includes classrooms, laboratories, offices, physical educational, and recreation; Academic Support Space that includes assembly and exhibit, library, and physical plant space; and Auxiliary Space that includes categories such as student union and health care facilities. Residence life space is reported separately. The existing facility inventory of assignable square feet (ASF) was then compared to the guideline generated ASF to produce surpluses and/or deficits of space at the base year and Horizon C enrollment assumptions.

In the Academic Space classification categories at the base year, ASU-Polytechnic operates with more space in certain categories than ABOR and other normative space guidelines would recommend. These categories include Teaching Laboratories & Service, Offices & Service, and Classroom & Service spaces. The surplus of space is due in part to the conversion of Williams Air Force Base buildings into programs for higher education with a research mission. The majority of this conversion process is complete by Enrollment Horizon C.

<table>
<thead>
<tr>
<th>SPACE CATEGORY</th>
<th>Base Year</th>
<th>Enrollment Horizon C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing ASF</td>
<td>Guideline ASF</td>
</tr>
<tr>
<td>Classroom &amp; Service</td>
<td>52,965</td>
<td>19,742</td>
</tr>
<tr>
<td>Teaching Laboratories &amp; Service</td>
<td>91,989</td>
<td>39,818</td>
</tr>
<tr>
<td>Open Laboratories &amp; Service</td>
<td>4,964</td>
<td>5,335</td>
</tr>
<tr>
<td>Research Laboratories &amp; Service</td>
<td>18,615</td>
<td>58,232</td>
</tr>
<tr>
<td>Offices &amp; Service</td>
<td>98,905</td>
<td>48,095</td>
</tr>
<tr>
<td>Physical Education &amp; Recreation</td>
<td>7,013</td>
<td>30,630</td>
</tr>
<tr>
<td>Other Academic Space</td>
<td>12,318</td>
<td>7,114</td>
</tr>
<tr>
<td>Academic Space Subtotal</td>
<td>286,769</td>
<td>208,966</td>
</tr>
</tbody>
</table>

ASF = Assignable Square Feet

At Horizon C, the guideline generated substantial space increases in offices, teaching and research laboratories, and physical education & recreation spaces. Other Academic Space, which supports some of the office functions, shows a deficit of space, much of which is attributable to the achieving a favorable ratio of student to full-time faculty and the growth of staff needed at the 15,000 student headcount level.

When comparing existing space to guideline generated space needs for Academic Support Space, once again, ASU-Polytechnic is operating with less space than guidelines would recommend at Horizon C in three of the four categories. Each space type under the Academic Support Space classification shows the affect enrollment and staff increases have on the campus at Horizon C.
The Library deficit is primarily due to slower growth in volumes and a larger quantity of reader station space. The Assembly and Exhibit category generated a sizable deficit as the existing theater facility is unusable for anticipated student programs. Physical Plant and Other Administrative Space categories are reactions to the overall space deficit in other areas and will need to be considered as new construction occurs to offset the deficits in all the space classifications.

The guidelines applied to Student Union and Health Care Facilities space at the master plan level in the Auxiliary Space Category produced a sizable need at Horizon C. The base year analysis includes the new student union facility. Currently, student health care is administered via separate contract by the Veteran’s Administration staff on the Williams campus.

Additional student union space will be needed in conjunction with long-term enrollment growth, especially as the campus shifts to more of a residential student population. In addition, student demographic shifts will require larger health care facilities in the long-term future.

The deficit in Residence Life category is based on the master planning goals of having a total of 2,376 beds and new dining facilities to the campus by planning Horizon C.

A total of 1,295,214 ASF of academic, academic support, and auxiliary space on campus will be needed as enrollments reach the 15,000 student headcount level. As a result, at Horizon C, ASU-Polytechnic will need three times as much space as currently exists on the campus.

The guidelines applied in this space master plan model would suggest that, in total, approximately 1,865,454 ASF of space will be required to accurately meet the academic mission and enrollment goals of the institution. This is a 1,415,220 ASF deficit over existing space on campus. Sub-classifications of Inactive and Conversion as well as outside organization space presently held by ASU-Polytechnic in their facilities inventory could be available for use in reducing the Horizon C space deficit.
## CONCLUSION

ASU-Polytechnic, with a strong applied technology focus, is continuing to develop both undergraduate and graduate programs, with plans of adding new programs based on the *One University In Many Places – Transitional Design to Twenty-First Century Excellence* White Paper, as published from the Office of the President. Such widespread changes will require that the space master plan be a dynamic document, closely aligned with the academic mission and aspirations of Arizona State University. This plan expresses the commitment of ASU to provide the facilities needed to enhance the comprehensive educational needs of its students and to support the social, economic, and cultural responsibilities within the Phoenix metropolitan region. The space master plan provides ASU with a vision for an improved physical environment that will assist in achieving the gold standard of the new American university.

<table>
<thead>
<tr>
<th>Space Category</th>
<th>Existing ASF</th>
<th>Guideline ASF</th>
<th>Surplus/ (Deficit)</th>
<th>Percent Surplus/ (Deficit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residence Life Space</td>
<td>Residence Life</td>
<td>56,807</td>
<td>231,120</td>
<td>(174,313)</td>
</tr>
<tr>
<td>Inactive/Conversion Space</td>
<td>1,802</td>
<td>527,631</td>
<td>(405,832)</td>
<td>(77.397%)</td>
</tr>
<tr>
<td>Outside Organizations</td>
<td>50,728</td>
<td>50,728</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>INSTITUTION TOTAL</strong></td>
<td><strong>450,234</strong></td>
<td><strong>570,240</strong></td>
<td><strong>(1,415,220)</strong></td>
<td><strong>(314%)</strong></td>
</tr>
</tbody>
</table>

ASF = Assignable Square Feet
INTRODUCTION

Paulien & Associates, Inc. was contracted as part of the comprehensive master plan team, to examine the space needs at Arizona State University at each of their four campus locations. These included the Main campus, recently renamed the Tempe Campus, ASU-West Campus, the Polytechnic Campus, formerly called the East Campus, and the Capital Center Campus in downtown Phoenix. This report focuses solely on ASU’s Polytechnic, Williams Campus. The other campuses are included under separate report titles and dates. This study is being conducted as part of a comprehensive campus facility master planning effort headed by Ayers/Saint/Gross Architects from Baltimore. The major responsibility of Paulien & Associates was to:

- apply appropriate space guidelines to determine current and future space needs; and
- compare projected space needs to the existing and future facilities.

Space guidelines were generated for three planning horizons. Horizons A through C included enrollments of 8,000, 10,000, and 15,000 headcount students respectively. The study was conducted using Fall 2002 as the base year. The facilities inventory accurately represents spaces on campus as of Fall 2003.

Paulien & Associates was provided with facilities, enrollment, course, staffing, and research data by the Arizona State University. Meetings were held with the Provost and Vice President, vice provosts, directors, academic deans, and facilities personnel on the campus to become familiar with the unique needs of the colleges and administrative units. In addition, visits were made to various spaces throughout the campus to gain familiarity with campus facilities.

ASU-Polytechnic serves the needs of students in the larger Phoenix metropolitan area and attracts students from other parts of Arizona wanting to major in applied technology programs. The campus was established in 1996 after the federal government announced plans to close the Williams Air Force Base in 1991. The more than 700 acres of land is home to ASU, Chandler-Gilbert Community College (CGCC), Mesa Community College, as well as the U.S. Air Force Research laboratory. Maricopa County (CGCC) also has an elementary school on the premises. The College offers undergraduate and graduate-level courses in 24 degree programs. Current academic units include the College of Technology & Applied Sciences, East College, and the Morrison School of Agribusiness and Resource Management. Programs in the East College include Business Administration as well as Human Health, Exercise & Wellness, and Nutrition.

The ASU-Polytechnic campus provides a strong array of professional and technological programs based in the liberal arts and sciences. The focus on interdisciplinary relationships among the academic units and community-centered mission are vital components of the learning community. The Partnership in Baccalaureate Education with Chandler-Gilbert Community College allows ASU students to take a mixture of ASU and CGCC courses at the lower division. New programs envisioned for ASU-Polytechnic will allow enrollments to increase steadily over the planning period.

ASU-Polytechnic is a full-service campus and includes all of the facilities normally found in a university of 3,000-5,000 students. Facilities include a library, cafeteria, student union, lounges, bookstore, and meeting rooms and hundreds of single-family residential units.

Under the leadership of President Michael Crow, ASU-Polytechnic is anticipating an exciting future. In November 2002, President Crow outlined a new model for ASU in the 21st Century. His inaugural address, entitled A New American University: The New Gold Standard, set the stage for
the “New College” at ASU-West. In April 2004, additional information was made available in a White Paper entitled One University in Many Places, Transitional Design to Twenty-First Century Excellence. The object of the paper is the re-conceptualization of ASU based on the University Design Team Report. The Report includes the projected number of students and various academic programs that could be located to the William’s Campus over the next several years. Since the final details of these programs were still in the discussion stages, they are not reflected in this study.

Since all ASU campuses were in the midst of wide-scale strategic planning, detailed enrollment, staffing and research expenditure data at the school and college level was not available. As a result, the consultant maintained a campuswide approach to the space needs analysis.

There are four sections in this report along with the Executive Summary. Section 1 describes enrollment, staffing, research expenditure, and facilities assumptions. Section 2 is an analysis of each space type that includes a description of the space type as well as a description of the guideline(s) applied for that space type. Section 3 contains observations from work sessions with deans and other administrative units regarding space specific issues, and Section 4 is an analysis of peer institutions comparable to ASU-Polytechnic enrollment levels at Horizons B and C.
FUTURE ASSUMPTIONS

ENROLLMENT ASSUMPTIONS

As a result of President Crow's message, as delivered in his inaugural address, ASU engaged in extensive enrollment planning to implement the goals and strategies stated in his report. Enrollment and staffing data for this report were provided from several source documents. These include ASU’s Pathway to 2020, Enrollment Planning for the New American University, ASU Enrollment and Employee Projections, 2002-2020, as provided by the University Office of Institutional Analysis, dated November 24, 2003, and the Arizona State University Fact Book 2002-03.

ASU-Polytechnic has grown dramatically since its inception in 1996. Between 1998 and 2002, student FTE growth increase by 165%, while growth between Fall 2002 and 2003 increased 16% to 2,288 FTE in Fall 2003. The campus anticipates growth in faculty, staff, student enrollment, and research levels over the three planning horizons. The consultants discussed assumptions for growth with the Vice Provost of Planning and Budget and the Director of Research and Sponsored Projects.

In analyzing the growth of the campus, the overall assumption of growth in enrollment was from a Fall 2002 headcount of 3,126 students to projected student headcounts of 8,000, 10,000, and 15,000 students. Since final recommendations from the University Design Team were not available during the assembly of this report, the enrollment assumptions do not assume specific time periods, thus allowing the flexibility in reaching enrollment goals. Full-time equivalent student (FTE) was analyzed by assumptions of future FTE/Headcount ratios as noted in the following table.

ASU Polytechnic Comprehensive Master Plan Assumptions

<table>
<thead>
<tr>
<th>ENROLLMENT</th>
<th>Base Year</th>
<th>Horizon A</th>
<th>Horizon B</th>
<th>Horizon C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headcount Analysis</td>
<td>Fall 2002</td>
<td>8,000</td>
<td>10,000</td>
<td>15,000</td>
</tr>
<tr>
<td>% on Campus</td>
<td>0.87</td>
<td>0.87</td>
<td>0.87</td>
<td>0.87</td>
</tr>
<tr>
<td>Total Student HC On Campus</td>
<td>2,714</td>
<td>6,960</td>
<td>8,700</td>
<td>13,050</td>
</tr>
<tr>
<td>Undergraduate HC %</td>
<td>0.80</td>
<td>0.80</td>
<td>0.80</td>
<td>0.80</td>
</tr>
<tr>
<td>Total Undergraduate Headcount On Campus</td>
<td>2,146</td>
<td>5,568</td>
<td>6,960</td>
<td>10,440</td>
</tr>
<tr>
<td>FTE/HC Ratio</td>
<td>0.67</td>
<td>0.70</td>
<td>0.72</td>
<td>0.72</td>
</tr>
<tr>
<td>Total Student FTE</td>
<td>1,976</td>
<td>5,360</td>
<td>7,000</td>
<td>10,800</td>
</tr>
<tr>
<td>% on Campus</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Total Student FTE On Campus</td>
<td>1,778</td>
<td>4,824</td>
<td>6,300</td>
<td>9,720</td>
</tr>
<tr>
<td>Undergraduate FTE %</td>
<td>0.80</td>
<td>0.80</td>
<td>0.80</td>
<td>0.80</td>
</tr>
<tr>
<td>Total Undergraduate FTE On Campus</td>
<td>1,478</td>
<td>3,859</td>
<td>5,040</td>
<td>7,776</td>
</tr>
</tbody>
</table>

Notes:
- Base Year reflects actual campus data and excludes Extended Education FTE
- FTE projections for target years from Office of the President
- Ratios and percentages from the University Office of Institutional Analysis

The Fall 2002 term excludes FTE generated by the College of Extended Education since the FTE was generated off of the ASU-Polytechnic, Williams campus. Undergraduate full-time equivalent
students totaled 1,478. The on campus FTE enrollment is expected to increase to 9,720 at Horizon C. The ratio of undergraduate students to graduate students is expected to remain steady at 0.80 over the three planning periods.

**FACULTY AND STAFF ASSUMPTIONS**

For this study, the faculty and staff assumptions were provided by the University Office of Institutional Analysis. Student workers, graduate teaching assistants (GTA) and graduate research assistants (GRA) were estimated by the consultant based on historic trends. From staffing data provided by the ASU Office of Human Resources, each graduate student worker accounted for 0.25 FTE while each GRA and TA accounted for 0.30 FTE. The data are presented in the table.

Since faculty and staff support extended education programs, the total FTE was used in the analysis of staffing assumptions. Tenured/tenure-track (T/TT) faculty and part-time faculty are reported separately in this analysis. For Horizon C, personnel include 509 faculty FTE, 764 staff FTE, and 172 student worker/TA/GRA FTE.

**ASU Polytechnic Comprehensive Master Plan Assumptions**

<table>
<thead>
<tr>
<th>STAFFING</th>
<th>Base Year</th>
<th>Fall 2002</th>
<th>Horizon A</th>
<th>Horizon B</th>
<th>Horizon C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Student FTE</td>
<td>1,976</td>
<td>5,360</td>
<td>7,000</td>
<td>10,800</td>
<td></td>
</tr>
<tr>
<td>T/TT &amp; Fac. Assoc. Ratio student FTE/Fac. FTE</td>
<td>19.7</td>
<td>20.4</td>
<td>21.2</td>
<td></td>
<td></td>
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<tr>
<td>Total Faculty FTE</td>
<td>107</td>
<td>272</td>
<td>343</td>
<td>509</td>
<td></td>
</tr>
<tr>
<td>T/TT Faculty Ratio 28:1</td>
<td>92</td>
<td>191</td>
<td>250</td>
<td>386</td>
<td></td>
</tr>
<tr>
<td>PT Faculty FTE</td>
<td>15</td>
<td>81</td>
<td>93</td>
<td>124</td>
<td></td>
</tr>
<tr>
<td>Ratio: Fac. FTE to Fac HC</td>
<td>0.71</td>
<td>0.75</td>
<td>0.79</td>
<td>0.82</td>
<td></td>
</tr>
<tr>
<td>Total Faculty Headcount</td>
<td>151</td>
<td>363</td>
<td>434</td>
<td>621</td>
<td></td>
</tr>
<tr>
<td>Contractual Staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ratio of staff per Faculty</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Staff FTE</td>
<td>140</td>
<td>408</td>
<td>515</td>
<td>764</td>
<td></td>
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<tr>
<td>Ratio Staff FTE to Staff Hdct</td>
<td>0.87</td>
<td>0.86</td>
<td>0.85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Staff Headcount</td>
<td>155</td>
<td>469</td>
<td>598</td>
<td>899</td>
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</tr>
<tr>
<td>Combined Faculty &amp; Staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total T/TT Faculty &amp; Staff FTE</td>
<td>232</td>
<td>600</td>
<td>765</td>
<td>1150</td>
<td></td>
</tr>
<tr>
<td>Total T/TT Faculty &amp; Staff Headcount</td>
<td>306</td>
<td>832</td>
<td>1033</td>
<td>1520</td>
<td></td>
</tr>
<tr>
<td>Student Workers (TA's &amp; GRA's)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ratio Student Worker to Fac. &amp; Staff (FTE)</td>
<td>0.129</td>
<td>0.3</td>
<td>0.4</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Student Workers, TA's &amp; GRA's Headcount</td>
<td>105</td>
<td>180</td>
<td>306</td>
<td>575</td>
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</tr>
<tr>
<td>Ratio FTE/HC</td>
<td>0.29</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
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<tr>
<td>Student Worker FTE*</td>
<td>30</td>
<td>54</td>
<td>92</td>
<td>172</td>
<td></td>
</tr>
</tbody>
</table>

*Assumption of four student worker positions per FTE & three TA/GRA positions per FTE.

T/TT = Tenured/Tenure Track faculty
RESEARCH ASSUMPTIONS
The consultant requested that the University make assumptions of anticipated levels of research expenditures over the three horizons. Since the planning horizons were not attached to specific years, the projection of research expenditures was not feasible. Actual expenditures for Fiscal Year 2002 for ASU-Polytechnic were $2,641,297. As an alternative approach, the consultant used current and projected tenured/tenure-track faculty to develop the space needs analysis for this category. This methodology is further defined under the research space needs guideline in the Space Needs Analysis section of the report.

FACILITIES ASSUMPTIONS

Construction Projects Completed at the Target Year
The existing space for each of the three planning horizons was calculated using the Fall 2002 facilities inventory and adding projects in planning, design, or construction. Estimated space amounts were made available to the consultants for these projects from the ASU Department of Facilities Planning.

New Construction
During the planning horizon, two buildings are currently scheduled for completion. These include a new research building of approximately 33,000 ASF and a new student union of 23,604 ASF. Since the research building was still in the planning stages, the square footage is not included in this report. The building program for the student union is included in existing space classifications for target enrollment planning horizons A through C.

Renovation of Existing Buildings
At the base year, several buildings were in the process of renovation. These buildings include: College of Technology Dean’s Office, Nursing program space in the Health Sciences Center, the Agribusiness Center, and the Exercise & Wellness Center. The building program for each of these projects is also included in target enrollment planning horizons A through C.

Permanant Buildings Scheduled for Demolition
There are several buildings at ASU-Polytechnic that are scheduled for demolition over the planning period.
“A” List - Buildings already scheduled for demolition. If funds were available, they would already have been removed:

- The E-320s (E320, 321, 322, 323) - both east and north of the old union.
- The old base Library
- TLQs
- E1244

“B” List – These buildings are good candidates because they appear to be in the way of logical progress, but generally cannot go unless something is built to replace them.

- Dining Hall
- Quads
- Altitude Chamber – Move to SIM and replace with student services
- Old Union
- Taylor - could renovate like Wanner-Sutton or into a dorm.
- Bowling Alley
- AIP-AIP2, Archives, Post Office, William Copy Center
- Launderette
- Most of the scattered facilities buildings and warehouses. Turn FMDPS over to DPS.
- PTL and the little building (trailer) behind it.
- Ice House
- Run-N-Chef
- Auditorium

Due to the uncertainty of demolition timing and absence of building condition assessment information, the facilities inventory for base and horizon years does not take into account buildings that are scheduled for demolition.

**Temporary Buildings**

ASU-Polytechnic owns several buildings that could be classified as temporary. However, due to age, most are scheduled for demolition. While these buildings have been classified as temporary, they have been included in the space calculations for this analysis.

**Buildings at ASU-Polytechnic but not Included in the Analysis**

The Library Storage Module – Building E-811 (holding 1 million volumes) and the Greenhouse – Building E-810, are not included in the ASU-East facilities inventory. These spaces are assigned to the Tempe Campus.
SPACE NEEDS ANALYSIS

PROCESS

Originally, Arizona State University provided the consultants with background information including room-by-room facilities inventory, Fall 2002 course data, and staffing information for Fall 2002. However, it was discovered during on-campus work sessions that the Fall 2002 inventory did not reflect the most recent moves and additions. The consultant secured the Fall 2003 inventory which reflected updated information for the space needs analysis.

The facilities inventory provided building, square footage, room use, and departmental information on a room–by–room basis. This information can be found in the appendices of this report. The course data contains the course number and description, enrollment, start and stop times, meeting location, and program on a section–by–section basis. The staffing data contains the headcount and full-time equivalent (FTE) by EEO categories on a departmental basis. This data provides a snapshot of the activities for the Fall 2002 semester which is used as the master planning base year.

In conducting the space needs analysis, the consultants worked closely with Ayers/Saint/Gross, Architects (ASG) and other members of the Facilities Master Planning Team, located on the Tempe campus. On-site work sessions and interviews were conducted the week of November 3, 2003 with ASU-Polytechnic administration, deans, librarian and planning staff to become familiar with the unique needs of the schools and colleges located on the Williams Campus. These work sessions included discussions of space deficiencies as well as verification of existing course, staffing, and enrollment data.

During the consultants time on site, visits were made to various buildings, grounds and spaces throughout the campus to gain familiarity and assess the overall reliability of the facilities inventory. In addition, visits were made to specialized spaces on the campus.

As information was obtained from the University Design Team, the Provost’s Office, the Office of Institutional Research, and other sources, several iterations of space needs analysis at various target enrollment assumptions were completed. The space needs outcomes at each of these iterations were shared with ASG and the rest of the campus master planning team to inform the physical planning process as it developed through the spring of 2004. This space needs analysis report is the outcome of the final iteration and assumptions available at the time of the completion of the data analysis.

GUIDELINE ASSUMPTIONS AND APPLICATION

The consultants used the Arizona Board of Regents Guidelines which were prepared in 1997, revised in 1999, and implemented in 2000, as the primary source of guideline formulas for determining the University’s space needs. The operating assumption is to provide Arizona State University – Polytechnic with a reasonable amount of space to conduct its current and projected activities.

For some space categories, alternative guideline models were used and deemed appropriate by the consultants and Arizona State University planners. One source is The Council of Educational Facility Planners, International (CEFPI), a leader in this field for over 50 years. CEFPI published “Space Planning Guidelines For Institutions of Higher Education” in 1985. The CEFPI Space Planning Guidelines are the basis for the ABOR Guidelines. The sections below specify which guideline system was applied for each space category and provides an explanation of the guideline application.
SPACE NEEDS ANALYSIS – SUMMARY FINDINGS

The enrollment projections are the foundation for all projected classroom and laboratory space needs and any other space needs based upon total number of student headcount or FTE’s. The space needs analysis found ASU-Polytechnic, Williams campus to have an overall space surplus (without residential) of 96,916 ASF at the base year when comparing guidelines to actual space. Once again, most of the ASF is in older buildings and most of these structures will be replaced over time. While residence life ASF is included in the following table, it was not included in the overall analysis since the ASF in single family homes (rented to ASU and non-ASU students) was not included in the analysis.

When buildings in planning, design, or construction are added to the facilities inventory and the revised square footage are compared to Horizon C guidelines with 15,000 students, the guideline generated a total need for 1,295,214 ASF of space, including 570,240 ASF of residence life space.

ASU-Polytechnic operates with more space in certain space categories than normative space guidelines would recommend. The consultants modified the guidelines in some categories to reflect numbers closer to the actual needs and polytechnic mission of ASU’s Williams campus. This is because of all of the old base buildings that were not designed for the mission of a higher education campus. As these are removed and new buildings constructed, the amounts will vary. The important component is the ASF needed at each enrollment level.

At the time of this analysis, ASU was completing the renovation of several buildings. At this point in time, there are no other buildings scheduled for renovation. All other buildings on the grounds, while serving the needs of the university campus, can be demolished as new facilities are constructed.
FALL 2002 BASE YEAR

At Fall 2002 enrollment and staffing levels ASU-Polytechnic showed an overall surplus of 96,916 ASF of space, excluding residential space. This is a 25% surplus in square footage when comparing guideline ASF to existing ASF on campus. One reason for the surplus involves buildings that are still being used by the University but are scheduled for demolition at some time in the future. The analysis does not take into consideration the condition of each facility. Buildings marked as vacant or unoccupied by the University are not included in the space needs analysis.

Assignable square footage is defined as the usable space inside classrooms, laboratories, offices, etc. It does not include circulation and building service space or the thickness of walls. For most types of space, gross square footage is 30% to 40% more than assignable square feet.

- The Academic space categories show a surplus of 77,803 ASF over existing space with the largest surpluses in Office & Service and Teaching Laboratories & Service categories (50,810 ASF and 52,171 ASF respectively). The largest deficit in the Academic Space category included Research Laboratories & Service with a 39,617 ASF deficit. Once the research building is completed on the Williams campus, the deficit will be reduced to less than 6,000 ASF.
- Academic support space categories show a surplus of 18,373 ASF at the base year. The largest surplus was generated in the Physical Plant category with a total surplus of 29,119 ASF.
- Auxiliary space shows a combined surplus of 740 ASF, predominately in the Student Union category. The base year includes the new student union.

Existing Space by Category

[Graph showing existing space distribution by category]
### Space Needs Analysis - Base Year (Fall 2002)

**Base Year**

- **Student HC=3,126**
- **Student FTE=1,778**
- **Staffing FTE = 247**

<table>
<thead>
<tr>
<th>SPACE CATEGORY</th>
<th>Existing ASF</th>
<th>Guideline ASF</th>
<th>Surplus/(Deficit)</th>
<th>Percent Surplus/(Deficit)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Academic Space</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classroom &amp; Service</td>
<td>52,965</td>
<td>19,742</td>
<td>33,223</td>
<td>63%</td>
</tr>
<tr>
<td>Teaching Laboratories &amp; Service</td>
<td>91,989</td>
<td>39,818</td>
<td>52,171</td>
<td>57%</td>
</tr>
<tr>
<td>Open Laboratories &amp; Service</td>
<td>4,964</td>
<td>5,335</td>
<td>(371)</td>
<td>(7%)</td>
</tr>
<tr>
<td>Research Laboratories &amp; Service</td>
<td>18,615</td>
<td>58,232</td>
<td>(39,617)</td>
<td>(213%)</td>
</tr>
<tr>
<td>Offices &amp; Service</td>
<td>98,905</td>
<td>48,095</td>
<td>50,810</td>
<td>51%</td>
</tr>
<tr>
<td>Physical Education &amp; Recreation</td>
<td>7,013</td>
<td>30,630</td>
<td>(23,617)</td>
<td>(337%)</td>
</tr>
<tr>
<td>Other Academic Space</td>
<td>12,318</td>
<td>7,114</td>
<td>5,204</td>
<td>42%</td>
</tr>
<tr>
<td><strong>Academic Space Subtotal</strong></td>
<td>286,769</td>
<td>208,966</td>
<td>77,803</td>
<td>27%</td>
</tr>
<tr>
<td><strong>Academic Support Space</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Library</td>
<td>15,680</td>
<td>10,218</td>
<td>5,462</td>
<td>35%</td>
</tr>
<tr>
<td>Assembly &amp; Exhibit</td>
<td>6,301</td>
<td>24,228</td>
<td>(17,927)</td>
<td>(285%)</td>
</tr>
<tr>
<td>Physical Plant</td>
<td>45,903</td>
<td>16,784</td>
<td>29,119</td>
<td>63%</td>
</tr>
<tr>
<td>Other Administrative Space</td>
<td>8,833</td>
<td>7,114</td>
<td>1,719</td>
<td>19%</td>
</tr>
<tr>
<td><strong>Academic Support Space Subtotal</strong></td>
<td>76,717</td>
<td>58,344</td>
<td>18,373</td>
<td>24%</td>
</tr>
<tr>
<td><strong>Auxiliary Space</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Union</td>
<td>29,941</td>
<td>28,134</td>
<td>1,807</td>
<td>6%</td>
</tr>
<tr>
<td>Health Care Facilities</td>
<td>0</td>
<td>1,067</td>
<td>(1,067)</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Auxiliary Space Subtotal</strong></td>
<td>29,941</td>
<td>29,201</td>
<td>740</td>
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</tr>
<tr>
<td><strong>TOTAL (w/o residence Life)</strong></td>
<td>393,427</td>
<td>296,511</td>
<td>96,916</td>
<td>25%</td>
</tr>
<tr>
<td><strong>Residence Life Space</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Residence Life</td>
<td>56,807</td>
<td>231,120</td>
<td>(174,313)</td>
<td>(307%)</td>
</tr>
<tr>
<td><strong>INSTITUTION TOTAL</strong></td>
<td>450,234</td>
<td>527,631</td>
<td>(77,397)</td>
<td>(17%)</td>
</tr>
</tbody>
</table>

**ASF = Assignable Square Feet**

Overall, there is a 77,397 ASF or 17% deficit in space at the base year when residence life is included in the analysis. The space categories with the greatest space needs at the Base Year (Fall 2002) include:

- Research Laboratories & Service with a deficit of 39,617 ASF
- Physical Education & Recreation with a deficit of 23,617 ASF
- Assembly & Exhibit Space with a deficit of 17,927 ASF

The Space Needs Analysis for the base year is presented in the table above.
HORIZON C – ENROLLMENT OF 15,000 STUDENTS

At Horizon C enrollment and staffing levels, ASU-Polytechnic shows a campuswide need for 1,865,454 ASF. This is a 314% increase over the amount of projected existing space at this planning horizon. Without the Residence Life category, the guideline generated 1,295,214 ASF of space.

- The Academic space categories generated a total need of 931,309 ASF of space. The areas with the largest needs include Research and Teaching Laboratories & Service as well as Offices & Service categories.
- Academic support space categories generated 223,073 ASF of campuswide need at the Horizon C enrollment level. The largest needs were generated in the Physical Plant and the Library categories with total allocations of 73,314 ASF and 60,109 ASF respectively.
- Auxiliary space shows a need for 140,832 ASF, predominately in the Student Union category.

Given proposed housing goals based on the percentage of students living on campus, the analysis generated a total residence life need of 570,240 ASF of various types of living units and dining halls.

In total, the space needs analysis generated at total of 1,865,454 ASF of space among the 14 categories. This total does take into consideration the 50,728 ASF of space occupied by outside organizations.
Space Needs Analysis - Horizon C (15,000 Student Headcount)

**Enrollment Horizon C**  
*Student HC= 15,000*  
*Student FTE=9,720*  
*Staffing FTE = 1274*

<table>
<thead>
<tr>
<th>SPACE CATEGORY</th>
<th>Existing ASF</th>
<th>ASF</th>
<th>Surplus/Deficit</th>
<th>Percent Surplus/Deficit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Academic Space</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classroom &amp; Service</td>
<td>52,965</td>
<td>82,370</td>
<td>(29,405)</td>
<td>(56%)</td>
</tr>
<tr>
<td>Teaching Laboratories &amp; Service</td>
<td>91,989</td>
<td>195,865</td>
<td>(103,876)</td>
<td>(113%)</td>
</tr>
<tr>
<td>Open Laboratories &amp; Service</td>
<td>4,964</td>
<td>29,160</td>
<td>(24,196)</td>
<td>(487%)</td>
</tr>
<tr>
<td>Research Laboratories &amp; Service</td>
<td>18,615</td>
<td>244,140</td>
<td>(225,525)</td>
<td>(1,212%)</td>
</tr>
<tr>
<td>Offices &amp; Service</td>
<td>98,905</td>
<td>250,894</td>
<td>(151,989)</td>
<td>(154%)</td>
</tr>
<tr>
<td>Physical Education &amp; Recreation</td>
<td>7,013</td>
<td>90,000</td>
<td>(82,987)</td>
<td>(1,183%)</td>
</tr>
<tr>
<td>Other Academic Space</td>
<td>12,318</td>
<td>38,880</td>
<td>(26,562)</td>
<td>(216%)</td>
</tr>
<tr>
<td><strong>Academic Space Subtotal</strong></td>
<td>286,769</td>
<td>931,309</td>
<td>(644,540)</td>
<td>(225%)</td>
</tr>
<tr>
<td><strong>Academic Support Space</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Library</td>
<td>15,680</td>
<td>60,109</td>
<td>(44,429)</td>
<td>(283%)</td>
</tr>
<tr>
<td>Assembly &amp; Exhibit</td>
<td>6,301</td>
<td>50,770</td>
<td>(44,469)</td>
<td>(706%)</td>
</tr>
<tr>
<td>Physical Plant</td>
<td>45,903</td>
<td>73,314</td>
<td>(27,411)</td>
<td>(60%)</td>
</tr>
<tr>
<td>Other Administrative Space</td>
<td>8,833</td>
<td>38,880</td>
<td>(30,047)</td>
<td>(340%)</td>
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<tr>
<td><strong>Academic Support Space Subtotal</strong></td>
<td>76,717</td>
<td>223,073</td>
<td>(146,356)</td>
<td>(191%)</td>
</tr>
<tr>
<td><strong>Auxiliary Space</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Union</td>
<td>29,941</td>
<td>135,000</td>
<td>(105,059)</td>
<td>(351%)</td>
</tr>
<tr>
<td>Health Care Facilities</td>
<td>0</td>
<td>5,832</td>
<td>(5,832)</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Auxiliary Space Subtotal</strong></td>
<td>29,941</td>
<td>140,832</td>
<td>(110,891)</td>
<td>(370%)</td>
</tr>
<tr>
<td><strong>TOTAL (w/o residence Life)</strong></td>
<td>393,427</td>
<td>1,295,214</td>
<td>(901,787)</td>
<td>(229%)</td>
</tr>
<tr>
<td><strong>Residence Life Space</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residence Life</td>
<td>56,807</td>
<td>570,240</td>
<td>(513,433)</td>
<td>(904%)</td>
</tr>
<tr>
<td><strong>INSTITUTION TOTAL</strong></td>
<td>450,234</td>
<td>1,865,454</td>
<td>(1,415,220)</td>
<td>(314%)</td>
</tr>
<tr>
<td><strong>Inactive/Conversion Space</strong></td>
<td>1,802</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Outside Organizations</strong></td>
<td>50,728</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ASF = Assignable Square Feet
The space categories with the greatest space needs at the Horizon C enrollment and staffing levels include:

- Residence Life – 513,433 ASF
- Research Laboratories & Service – 225,525 ASF
- Offices & Service – 250,894
- Teaching Laboratories & Service – 195,865 ASF
- Student Union – 135,000 ASF
HORIZON A AND B SUMMARIES
Since enrollments are unlikely to grow from base year to Horizon C levels over a short period of time, there was a need to provide additional enrollment intervals. Horizons A, at 8,000 headcount students and Horizon B, with 10,000 headcount students, provides a way to look at the overall phasing implementation of the master plan. Spaces such as libraries, student unions, and physical education facilities are normally constructed based on the future student capacity, in this case enrollment Horizon C. These facilities allow for future growth of the student population. However, spaces that include classrooms, laboratories, offices, and physical plant are constructed as needed, often adding facilities at selected target enrollment levels. The space needs analysis for Horizon A and B are presented in the following table.

### Space Needs Analysis - Enrollment Horizons A & B

<table>
<thead>
<tr>
<th>SPACE CATEGORY</th>
<th>Existing ASF</th>
<th>ASF @ Enrollment Horizon A</th>
<th>ASF @ Enrollment Horizon B</th>
<th>Percent Surplus/(Deficit)</th>
<th>Percent Surplus/(Deficit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Space</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classroom &amp; Service</td>
<td>52,965</td>
<td>40,880</td>
<td>12,085</td>
<td>23%</td>
<td>(23%</td>
</tr>
<tr>
<td>Teaching Laboratories &amp; Service</td>
<td>91,898</td>
<td>97,207</td>
<td>5,312</td>
<td>(6%)</td>
<td>(38%)</td>
</tr>
<tr>
<td>Open Laboratories &amp; Service</td>
<td>4,964</td>
<td>14,472</td>
<td>(9,508)</td>
<td>(92%)</td>
<td>(281%)</td>
</tr>
<tr>
<td>Research Laboratories &amp; Service</td>
<td>18,615</td>
<td>121,166</td>
<td>(102,551)</td>
<td>(551%)</td>
<td>(750%)</td>
</tr>
<tr>
<td>Offices &amp; Service</td>
<td>98,905</td>
<td>129,660</td>
<td>(30,755)</td>
<td>(31%)</td>
<td>(68%)</td>
</tr>
<tr>
<td>Physical Education &amp; Recreation</td>
<td>7,013</td>
<td>55,000</td>
<td>(47,987)</td>
<td>(684%)</td>
<td>(827%)</td>
</tr>
<tr>
<td>Other Academic Space</td>
<td>12,318</td>
<td>19,296</td>
<td>(6,978)</td>
<td>(57%)</td>
<td>(105%)</td>
</tr>
<tr>
<td><strong>Academic Space Subtotal</strong></td>
<td></td>
<td>286,769</td>
<td>477,680</td>
<td>(190,911)</td>
<td>(67%)</td>
</tr>
<tr>
<td>Academic Support Space</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Library</td>
<td>15,680</td>
<td>28,936</td>
<td>(13,256)</td>
<td>(85%)</td>
<td>(49%)</td>
</tr>
<tr>
<td>Assembly &amp; Exhibit</td>
<td>6,301</td>
<td>27,274</td>
<td>(20,973)</td>
<td>(333%)</td>
<td>(380%)</td>
</tr>
<tr>
<td>Physical Plant</td>
<td>45,903</td>
<td>37,685</td>
<td>8,218</td>
<td>18%</td>
<td>5%</td>
</tr>
<tr>
<td>Other Administrative Space</td>
<td>8,033</td>
<td>19,296</td>
<td>(10,463)</td>
<td>(118%)</td>
<td>(185%)</td>
</tr>
<tr>
<td><strong>Academic Support Space Subtotal</strong></td>
<td>76,717</td>
<td>113,191</td>
<td>(36,474)</td>
<td>(48%)</td>
<td>(86%)</td>
</tr>
<tr>
<td>Auxiliary Space</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Union</td>
<td>29,941</td>
<td>72,000</td>
<td>(42,059)</td>
<td>(140%)</td>
<td>(201%)</td>
</tr>
<tr>
<td>Health Care Facilities</td>
<td>0</td>
<td>2,094</td>
<td>(2,094)</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Auxiliary Space Subtotal</strong></td>
<td>29,941</td>
<td>74,894</td>
<td>(44,953)</td>
<td>(150%)</td>
<td>(213%)</td>
</tr>
<tr>
<td>TOTAL (w/ residence Life)</td>
<td>383,427</td>
<td>665,766</td>
<td>(282,339)</td>
<td>(69%)</td>
<td>(116%)</td>
</tr>
<tr>
<td>Residence Life Space</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residence Life</td>
<td>56,807</td>
<td>304,080</td>
<td>(247,273)</td>
<td>(435%)</td>
<td>(569%)</td>
</tr>
<tr>
<td><strong>INSTITUTION TOTAL</strong></td>
<td>450,234</td>
<td>969,846</td>
<td>(519,612)</td>
<td>(115%)</td>
<td>(173%)</td>
</tr>
</tbody>
</table>

At Enrollment Horizon A (8,000 headcount students), the guideline produced a need for 665,766 ASF of academic, academic support, and auxiliary space. When residence life is added to the analysis, the guideline generated a total need for 969,846 ASF. With the exception of residence life, the greatest needs were generated in Offices & Service (129,660 ASF) Research Laboratories & Service (121,166 ASF) and Teaching Laboratories & Service (97,207 ASF) categories. Horizon A represents a 442,215 ASF increase over the base year guideline space.

Enrollment Horizon B (10,000 students) enrollment and staffing assumptions generated a guideline total of 1,230,514 ASF of space, including 380,160 ASF of residential life space. In total, Horizon B would require a campus about three times the size of current facilities.
SPACE NEEDS ANALYSIS – GUIDELINE APPLICATION

CLASSROOM ANALYSIS
Classrooms are defined as any room generally used for scheduled instruction requiring no special equipment and referred to as a "general purpose" classroom, seminar room, or lecture hall. Classroom service space directly supports one or more classrooms as an extension of the classroom activities by providing media space, preparation areas, or storage. The classroom station size includes the classroom service area space; however, additional service space can be justified on a program or classroom basis. Given the liberal arts focus, the consultant assumed that a large majority of instruction occurs in traditional classrooms with a lecture format.

The ABOR Guidelines specify a classroom utilization goal of 35 hours of use per week at 65% student station occupancy for lecture courses. The guidelines call for 19 ASF as the average classroom station size. Classroom space requirements were determined by a formula that takes the target utilization of 35 hours per week, multiplies it by the average student occupancy target of 65%, and divides the result into the 19 ASF per student station. This calculation produces a guideline of .84 ASF per weekly student contact hour for classrooms. Similarly, the ABOR Guidelines for lecture rooms call for 17 ASF per station, 32 hours per week, and an occupancy rate of 63%, producing a guideline of .84 ASF/WSCH. Because the guideline calculation is the same, classrooms and lecture halls have been treated as one category for this analysis. Assignable square feet per weekly student contact hour (ASF/WSCH) is calculated as follows:

For seminar and computer instructional rooms similar calculations were made using the guidelines. For seminar rooms, the guidelines used were 22 ASF per student station, 35 hours per week, and 67% student station occupancy which results in a guideline of .94 ASF per weekly student contact hour. For computer instructional rooms, the guidelines used were 32 ASF per student station, 32 hours per week, and 75% student station occupancy which results in a guideline of 1.33 ASF per weekly student contact hour.

The total number of weekly student contact hours for a lecture course section is obtained by multiplying the enrollment of the course section by the number of meeting hours in one week. For example: a history course with 30 students enrolled which meets three (3) times a week for one hour produces 90 weekly student contact hours (WSCH) [30 students x 3 weekly contact hours = 90]. Multiplying 90 weekly student contact hours by the classroom guideline of .84 ASF/WSCH generates 75.6 ASF of classroom space.

Given the polytechnic focus, the consultant assumed that a smaller amount of instruction will occur in classrooms with a lecture format for programs that are technical in nature. The large majority of classrooms will be housed within liberal arts, business, and education programs which are currently under the East College umbrella.

The classroom guideline application for the ASU–Polytechnic Campus generated a 63% surplus (33,223 ASF) of classroom space at the base year. The enrollment projection growth percentages were applied to the course data to determine projected classroom calculations. At the Target Enrollment Horizon B (10,000 HC Students), the space needs analysis indicates a slight deficit of
423 ASF. At Horizon C, the guideline generated a need for 82,370 ASF of space.

In reviewing an informal classroom utilization analysis conducted by the consultant, there are 48 classrooms on the Williams campus (16 of these classrooms were still under construction during the completion of this report). One classroom in the Altitude Chamber (Room 104) and four rooms in the Simulator building (Rooms 155,157,255,257) showed no utilization during the Fall 2002 semester. Classrooms average 41 stations per room with 24 ASF per station.

On average, classroom use peaked between the hours of 9:00 AM to 11:00 AM with 43% scheduled use and between 1:00 PM and 3:00 PM with 39% scheduled use. The 6:00 PM to 8:00 PM timeframe also showed some use with 35% of the scheduled classrooms in use. During other times from 8:00 AM to 9:00 PM, only 10% of the scheduled classrooms are in use. This finding suggests that the campus currently has a surplus of classrooms. As the student population continues to grow at the ASU-Polytechnic, classrooms should be available to expand course offerings during weekdays.

**TEACHING LABORATORY ANALYSIS**

Teaching Laboratories, referred to in the ABOR Guidelines as Classroom Laboratories, are defined as rooms used primarily by regularly scheduled classes that require special purpose equipment to serve the needs of particular disciplines for group instruction, participation, observation, experimentation, or practice. Station sizes in teaching laboratories vary by discipline. Space requirements are calculated with a formula which is similar to that used to determine classroom space requirements, except that the ASF per student station varies by discipline.

The CEFPI space per student station guideline has approximately 50 different subject areas for which it provides teaching laboratory modules. In all cases, these are expressed as a range and the ABOR Guidelines use the middle of the range. The guideline space per station in each discipline includes service space for laboratories and takes into account the need for enough space for new paradigms in teaching methodology requiring collaborative learning environments such as mediated laboratories.

**ABOR Guidelines** indicate a standard of 85% student station occupancy. The weekly room hour standard varies by discipline. Disciplines are categorized into three groups:

- **Group A** • Social Sciences, Business and Education – 25 hours per week
- **Group B** • Physical Sciences and Biological Sciences – 22.5 hours per week
- **Group C** • Engineering, Architecture, Health Sciences, and Agriculture – 12.5 hours per week

In addition to using the standard method of calculating teaching laboratory space needs using weekly student contact hours, the consultants used the existing amount of teaching laboratory space as the guideline at the base year and increased the guideline proportionate to the colleges’ enrollment growth to generate a guideline space need for the target year.

It was assumed that teaching laboratories will be used heavily in the College of Technology and Applied Science and the Health Programs currently housed under the East College. The Morrison School of Agribusiness will not be a heavy user of teaching laboratories. ASU East College will have some arts and performance programs. However, the focus will be on experimental theatre and related performance programs.

ASU-Polytechnic’s teaching laboratory space at the base year shows a surplus of 52,171 ASF. One reason for the large surplus is the inclusion of the Agribusiness Center and the Exercise and
Wellness Center into the analysis. Each of these facilities was in the final phases of construction during the completion of this report. The consultant assumed that spaces within these programs will be able to accommodate future FTE growth. In addition, more than 28,000 ASF of teaching laboratory space is contained within the Simulator Building. As with most of the other buildings on campus, many of the spaces were acquired from the U.S. Air Force and not designed using ABOR guidelines. At Horizon B, the campus will need a total of approximately 127,000 ASF. This need increases to 195,865 ASF as the campus reaches the 15,000 student headcount enrollment level.

The analysis does not take into account ASU’s partnership with Chandler-Gilbert Community College.

**OPEN LABORATORY ANALYSIS**

The category of open laboratory space consists of rooms that are open for student use and are not used on a regularly scheduled basis. These rooms provide equipment to serve the needs of particular disciplines for group instruction in informally or irregularly scheduled classes. Alternatively, these rooms are used for individual student experimentation, observation, or practice in a particular field of study. The size of these laboratories is based on equipment size and/or on the station size and student count desired and should be determined on an individual basis. Types of rooms included in this category are computer laboratories, language laboratories, music practice rooms, and tutoring and testing facilities.

Open laboratories are not specifically addressed by either the ABOR Guidelines or the CEFPI guidelines. In recent benchmarking and consulting work with several statewide systems, the consultants found between five and ten ASF per student FTE allocated for space in this category. The consultants note that the amount of space the University has classified in this category is about three ASF per student FTE, at the low end of what the consultants expect to find at institutions similar to Arizona State University.

The consultants believe that a reasonable guideline for the University open laboratory space is 3 ASF per student FTE. This is a number lower than the benchmark range, but closer to the amount of space that ASU-Polytechnic currently provides in this category. The number also takes into consideration ASU-Polytechnic’s applied science focus.

Base year open laboratory space needs analysis generated a deficit of 371 ASF. At Target Enrollment B, the open laboratory category generated a need for 18,900 ASF of space. At Horizon C, the need increases to 29,160 ASF.

**RESEARCH LABORATORY ANALYSIS**

The consultants calculated the need for research space using ABOR Guidelines, which are based on CEFPI standards, using a square feet allocation for the number of headcount faculty and graduate faculty.

The research used for this analysis was based on the Higher Education Facilities Planning and Management Manuals, as published by the Western Interstate Commission for Higher Education (WICHE). This guideline uses the number of tenure/tenure-track faculty and graduate students involved in research as the indicator of research space. Research spaces vary significantly among academic programs and disciplines. A range of 200 ASF to 1,300 ASF was applied per tenure/tenure-track faculty member. A range of 20 ASF to 200 ASF was used for each graduate student. The ASF guideline for faculty includes up to four graduate students working with each faculty member. The criteria are listed below.
Due to the technical applied nature and the uniqueness of programs, it was assumed that ASU Polytechnic will have research wet laboratories with specialized research equipment but limited animal quarters. The Williams campus will focus on providing senior projects for students in technical programs. With respect to research productivity, the consultants assumed that a high percentage of all tenured tenure-track faculty and a slightly smaller number of all graduate students would be engaged in some type of research endeavor.

The guideline resulted in a calculation of 39,617 ASF in additional need at the base year, not including the new research building. The guideline generated at Horizon B was a need of just over 158,000 ASF while at Horizon C the guideline generated more than 244,000 ASF. The consultants assumed that this method will generate the research space required to support an increase in research expenditures in the future. However, since the guideline is calculated based upon research personnel rather than research productivity, a dramatic increase in research expenditures may necessitate the need for additional space.

An alternative guideline method of calculating research space needs is based on sponsored research expenditures. The guideline applies 900 ASF per $100,000 of expenditure for the first $50,000,000; 600 ASF per $100,000 for the second $50,000,000; and 300 ASF per $100,000 for sponsored research expenditures over $100,000,000. This formula is calculated on a campuswide basis.

**Office Space Analysis**

Office space guidelines in the ABOR Guidelines are based on CEFPI standards. The CEFPI guideline determines office space needs based on major categories of staff and application of space amounts for office service and conference space needs. ASU provided staffing information for major categories of staff by college. The consultants then applied the ABOR Guidelines to each major category. The amount of office space allotted to each position is specified in the ABOR Guidelines based on the status and duties of the employee. Headcounts were used in the analysis for the number of employees except positions that were less than half-time faculty and part-time students. In this instance total FTE was substituted.

Some modifications were made to the application of the ABOR Guidelines based upon CEFPI guidelines. CEFPI identifies certain units to receive an additional amount of office space per
The mid-point of the suggested range for extra office or studio space was selected (60 ASF per headcount) since ABOR Guidelines use the mid-point of the guideline range for regular office space. These units are: Architecture, Art, Law, and Music. However, most are not applicable to the ASU-Polytechnic campus.

CEFPI also recommends that supplemental conference space be allotted to each department. Conference space was allocated to faculty, professional/technical, and clerical/secretarial positions on the campus. Faculty and professional/technical position received 25 ASF per employee, while clerical staff received 15 ASF per employee. This allocation of conference space may overestimate conference room needs for large departments or underestimate needs for colleges that have few departments. However, at the campuswide level, the numbers should adequately reflect conference space needs.

### ABOR Office Guidelines as Applied to the Office Analysis

<table>
<thead>
<tr>
<th>Employee Type</th>
<th>Conference ASF</th>
<th>Office ASF</th>
<th>ASF</th>
<th>Service ASF</th>
<th>Total ASF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator Executive</td>
<td>160</td>
<td>50</td>
<td>30</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td>Administrator Other</td>
<td>160</td>
<td>50</td>
<td>30</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td>Faculty Administrator</td>
<td>160</td>
<td>50</td>
<td>30</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td>Faculty Instruction</td>
<td>125</td>
<td>25</td>
<td>30</td>
<td>180</td>
<td></td>
</tr>
<tr>
<td>Faculty Instruction (requiring studio space)</td>
<td>185</td>
<td>25</td>
<td>30</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td>Professional</td>
<td>130</td>
<td>25</td>
<td>30</td>
<td>185</td>
<td></td>
</tr>
<tr>
<td>Staff - Professional</td>
<td>130</td>
<td>25</td>
<td>30</td>
<td>185</td>
<td></td>
</tr>
<tr>
<td>Staff - Technical</td>
<td>130</td>
<td>15</td>
<td>30</td>
<td>175</td>
<td></td>
</tr>
<tr>
<td>Staff - Clerical</td>
<td>105</td>
<td>15</td>
<td>30</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>GTA (Teaching)</td>
<td>55</td>
<td>0</td>
<td>0</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>GRA (Research)</td>
<td>55</td>
<td>0</td>
<td>0</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Student Worker</td>
<td>55</td>
<td>0</td>
<td>0</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Employees Not Requiring an Office</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Library Personnel (office space included in Library Gdln)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Crafts &amp; Trades</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

When viewing the guidelines for office space, it is important to note the following. First, most administrative and academic functions, including Student Affairs and Information Technology, are assigned to the Provost and Vice President. Second, since ASU-Polytechnic acquired almost all of the buildings and grounds from the Air Force they were not originally designed using ABOR guidelines. The large surplus of existing space at the base year is predominately a result of these factors.

Currently ASU-Polytechnic has 443 offices comprising 68,175 ASF, providing an average office size of 154 ASF. In addition, there are 37 conference rooms, averaging 288 ASF per room. These numbers do not include office or conference room service space, which comprises another 19,574 ASF.

The ABOR Guidelines specify 125 ASF for faculty offices and 130 ASF for professional staff offices. Using the 125 ASF per office to calculate guideline space needs and comparing the calculation to the average of 154 ASF per office of existing permanent office space may under-represent the amount of space needed for offices and indicate a surplus of office space. If the guidelines were applied using the average size of existing permanent offices at the base year, the campus office surplus would be smaller while Horizon A through C deficits would be larger. It is necessary to balance the ABOR Guidelines against the reality of the average size of existing permanent offices.
when interpreting the results of this analysis for use in detailed program planning in new construction or renovation.

The base year guideline analysis showed a surplus of 50,810 ASF in the office space category. At Horizon B, the guideline generated a need for 166,209 ASF, a 67,304 ASF deficit based on existing space. At Horizon C, the need increases to 250,894 ASF.

PHYSICAL EDUCATION AND RECREATION SPACE ANALYSIS
The Fitness Center on the Williams campus is owned by Chandler-Gilbert Community College. ASU owns the pools and bathhouse. The space for outdoor pools is not reflected in the space inventory. The Exercise and Wellness Center is used only for academic purposes. This category includes indoor space for recreation/physical education activities.

The consultants used the CEFPI guidelines to generate physical education and recreation space. There are other guidelines and formulas that could be used that would generate more space for ASU-Polytechnic. However, the consultants chose to use the CEFPI standard as that is the basis for most of the other categories of space in the ABOR Guidelines.

The CEFPI formula for physical education and recreation space uses a core of 20,000 ASF for the first 1,000 headcount students. An additional five ASF per headcount is added to the base 20,000 ASF for the students over the first 1,000. If the headcount enrollment is over 2,000 then the student FTE is substituted for the student headcount. Student FTE was used for this analysis.

Space needs analysis at the base year showed a deficit of 23,617 ASF over existing physical education and recreation space. At Enrollment Horizon B, year, the guideline generated a need for a 65,000 ASF in physical education and recreation space. The facility size increases to 90,000 ASF at the 15,000 student headcount planning scenario.

This category includes indoor space for recreation/physical education activities. Current space includes the Fitness Center located in the basement of the University Center Building. Both enrollment growth and the guideline application suggest that this space will not meet the needs for student fitness in the near future.

ATHLETIC SPACE NEEDS
There are no major competitive athletics programs envisioned for the campus. The space needs for Athletics will largely be met through programs at ASU’s Tempe Campus. As a result, the guideline application was not applied.

OTHER ACADEMIC SPACE ANALYSIS
The space classified as other academic space includes all other space assigned to an academic unit that has not been included in the other classification of classrooms, teaching laboratories, open laboratories, research laboratories, or offices. This space category consists of a variety of space types. Due to the diversity of these spaces and the different ways various campuses might classify these spaces, these spaces are not specifically addressed by the CEFPI or ABOR Guidelines. In recent benchmarking studies the consultants conducted, this space category tends to exhibit a wide range of between one and 18 ASF per student FTE.

The types of space included in this space category at ASU-Polytechnic include:

- study rooms
- animal quarters
- lounges
- shops for engineering programs
food facilities for the Nutrition program
- clinic spaces

Other academic space at the ASU-Polytechnic averaged nearly 7 ASF per student FTE. The consultants believe that a reasonable guideline to apply in this category is 4 ASF per student FTE. While this factor does not reflect the current campuswide use of space in this category, it allows for additional lounge, animal, and meeting spaces for faculty and student interaction in planning Horizons B and C.

At the base year, guideline application shows a space surplus of 5,204 ASF in the other academic space category. At Horizon B, the need increases to 25,200 ASF. At the 15,000 student headcount level, the guideline generates a total of 38,880 ASF.

**LIBRARY ANALYSIS**

The ASU-Polytechnic Library on the Williams campus is presently independent of the main Library at the Tempe campus. The Williams Campus Library relies heavily on the Tempe Campus Library for resources. ASU-Polytechnic does not see a need to replicate volumes of the Tempe Campus and will provide most serials electronically. The library subscribes to approximately 15,000 on-line periodicals and does not anticipate adding a large print collection over the planning period. The Old Base Library is currently being used as physical plant storage and is scheduled for demolition in the future. The main ASU Library in Tempe has a modular library storage facility on the Polytechnic Campus with a capacity of more than 1 million volumes, but it is not used by this campus.

Most of the guideline systems for library space utilize one set of factors for collections, another for readers, and a third for service space. This approach was used by the consultants. The library analysis is based on collections data reported by Arizona State University to the Association of Research Libraries (ARL) and shared with the consultants.

The *ABOR Guidelines* for library collections assume that .07 ASF per volume is used for collection space in the ASU-Polytechnic Library. This .07 ASF is 30% lower than standard CEFPI guidelines.

Until recently, the reader space calculations have generally been based on seating for 25% of the student body. The Association of College and Research Libraries (ACRL) suggests that if a college or university has more than 50% of its students in residential housing, it should have one reader station for every four full-time equivalent students. If less than 50% were on site, it would be calculated at one for every five students or 20%. Because many students now do research electronically from non-library locations, this percentage of students has begun to lower. *ABOR Guidelines* use the CEFPI reader guideline percentage which specifies a 15% factor to undergraduate headcount, a 20% factor to graduate headcount, and 10% to the total full-time equivalent faculty.

In determining the guidelines for reader station sizes, the consultants believe the 25 square feet per reader station recommended by CEFPI is not adequate because of the increased use of electronic carrels. The consultants applied 25 ASF per reader station for regular study stations, but 35 ASF per station for electronic study stations. For the Williams campus Library, 40% of the stations were considered as electronic seats for this analysis.

CEFPI suggests 25% of the total collection and reader station space for service and staff space. ACRL, in their most recent guidelines, changed this category to 12.5%. The consultants used this number for the analysis given the size of the print and electronic collections.
### Library Guideline Application

<table>
<thead>
<tr>
<th>VOLUME GENERATION</th>
<th>Current Items</th>
<th>Conversion Factor</th>
<th>Fall 2002 Volumes</th>
<th>Horizon B</th>
<th>Horizon C</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Volumes</td>
<td>4,171</td>
<td>1.00</td>
<td>4,171</td>
<td>50,000</td>
<td>75,000</td>
</tr>
</tbody>
</table>

| TOTAL VOLUMES     | 4,171        | 25,000            | 75,000            |

<table>
<thead>
<tr>
<th>COLLECTION SPACE</th>
<th>No. of Volumes</th>
<th>ASF per Volume</th>
<th>Fall 2000 Collection Space</th>
<th>Fall 2010 Collection Space</th>
<th>TOTAL COLLECTION SPACE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 - 150,000</td>
<td>0.07</td>
<td>16,500</td>
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<tr>
<th>STUDY SPACE</th>
<th>Percent of FTE</th>
<th>Fall 2002 Headcount</th>
<th>Fall 2002 Stations</th>
<th>Horizon B Stations</th>
<th>Horizon C Stations</th>
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<tr>
<td>Undergraduate</td>
<td>15%</td>
<td>1,478</td>
<td>222</td>
<td>756</td>
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<tr>
<td>Graduate</td>
<td>20%</td>
<td>300</td>
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<td>252</td>
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<td>Faculty (FTE)</td>
<td>10%</td>
<td>107</td>
<td>11</td>
<td>34</td>
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<td>Total Study Stations</td>
<td></td>
<td>293</td>
<td>1,042</td>
<td>1,606</td>
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</table>

| Regular Study Stations | 60% @ 25 ASF/Station | 4,395 | 15,630 | 24,090 |
| Electronic Study Stations | 40% @ 35 ASF/Station | 4,102 | 14,588 | 22,484 |

| TOTAL STUDY SPACE | 8,791 | 31,260 | 48,180 |

| TOTAL COLLECTION & STUDY SPACE | 9,083 | 34,760 | 53,430 |
| Service Space | (12.5% of Total Collection and Study Space) | 1,135 | 4,345 | 6,679 |
| Lounge Space | (Not included in this analysis) | 0 | 0 | 0 |

| TOTAL DEDICATED LIBRARY SPACE | 10,218 | 39,105 | 60,109 |

Overall library space needs analysis at the base year showed a space surplus of 5,462 ASF. At Horizon B, the guideline generated a need for 39,105 ASF of space, increasing to 60,109 ASF at the 15,000 student headcount level. To accommodate the need for reader space, non-library units housed on the lower level of the Academic Center Building were moved to the quads.

### Assembly & Exhibit Space Analysis

Assembly and exhibit space is defined as any room designed and equipped for the assembly of large numbers of people. This includes theaters, auditoriums, concert halls, arenas, and chapels. Exhibit spaces are used for exhibition of materials, works of art, or artifacts intended for general use by students and the public. The CEFPI guideline has a core allowance of 22,450 ASF for institutions with a minimum of 5,000 student FTE and an active fine arts program. It then allows for an additional six ASF per student FTE over the 5,000 FTE minimum. CEFPI also adds 5,000 ASF for institutions with an active music program. The consultants applied two of the three allowances (the core allowance and the six ASF per FTE over 5,000, in the guideline application).

Currently the “ASU-East” Auditorium comprises all of the assembly and exhibit space on campus.
However, this facility is scheduled for demolition.

Application of the CEFPI guidelines for the base year shows a deficit of 17,927 ASF. This number is misleading since the 6,301 ASF of existing space is not functional for the University without additional HVAC repairs. At Horizon B, a facility of 30,250 ASF would be needed. At the 15,000 student headcount level, the size of the facility would increase to approximately 51,000 ASF.

It was suggested during work sessions that academic programs would need at least a 500-seat auditorium to serve their needs through the planning levels. The assembly and exhibit space at the 15,000 student headcount level in this planning scenario includes space for a performing arts center of approximately 23,000 ASF. This facility includes up to a 500-seat theatre with stage and wings at approximately 8,500 ASF. In addition, the consultant factored in control rooms, costume and storage, scene shop for sets and props storage, lighting and repair space, sound effects and production rooms, rehearsal room, make-up and dressing rooms, and a green room. It also includes 2,500 ASF in exhibition space. The space beyond the 23,000 ASF is for additional needs of the performing arts department, mostly exhibition and gallery space located throughout the campus.

**PHYSICAL PLANT ANALYSIS**

Most guidelines suggest a 7% to 8% of all square footage on campus, minus existing physical plant and residence life space, be used to drive master plan needs in this category. In most cases, these percentages generate a space need that is greater than the amount of physical plant space typically found at an institution. From previous studies, the consultants have found that the average percentage used to drive physical plant space needs is approximately 4% to 7%. One of the reasons a lower percentage is adequate for master planning purposes is the fact that many physical plant departments are increasing the outsourcing of many typical shop functions and are using just-in-time purchasing methods to decrease warehousing needs.

For this analysis, the consultants applied 6% of all square footage on campus, with the exception of existing physical plant, parking, and residence life space to calculate the space needs in this category. A range was used to reflect enrollment growth over the planning period and the maintenance load of new and existing buildings.

The base year guideline analysis shows a surplus of 29,173 ASF or 64%. Currently, there are more than 20 buildings assigned as physical plant space. However, most are metal sheds that are used for miscellaneous storage and shops.

There is no integrated physical plant space on the campus that combines shops, storage, and service space. The consultant recommends constructing a facility that will accommodate additional space as enrollment grows and greater demands are placed on the physical plant department. At Horizon B, this facility would need to include approximately 48,000 ASF of space. At Horizon C, the need increases to more than 73,000 ASF.

**OTHER ADMINISTRATIVE SPACE ANALYSIS**

As with other academic space, other administrative space consists of a variety of space types. Again, no guideline has been developed by CEFPI or the ABOR Guidelines to deal with such a diverse set of space types. In recent benchmarking studies, the consultants found other administrative space to have a range of less than one ASF per student FTE and as great as 46 ASF per student FTE. The types of space included in this space category at ASU-Polytechnic include:

- central telecommunications spaces
- central storage
- merchandising
police station

Other administrative space averaged slightly less than five ASF per student FTE at ASU-Polytechnic. One reason for the large amount of space per student FTE is the abundance of storage space in this category, much of it is either poorly located or in buildings that are in disrepair.

The consultant believes that a reasonable guideline for this space category is four ASF per student FTE. This guideline is at the low end of the benchmark range but reflects the current campuswide economics of space for this category as enrollments grow.

At the base year, when the guideline is compared to existing space, a 1,719 ASF surplus of space was generated. For the Other Administrative Space category, the analysis at Horizon B generated a need for 25,200 ASF. The need increases to 38,880 ASF as enrollments substantiate the need at Horizon C.

**STUDENT UNION SPACE ANALYSIS**

CEFPI recommends a formula of nine ASF per student headcount and the Association of College Unions International (ACUI) recommends a formula of 10 ASF per student for each graduate and undergraduate student for generating student union space. These guidelines for space application provide space for the various functions and the room use code designations that are typically found in a comprehensive student union including: food service, bookstore, lounge, meeting space, student government/club space, and other student service type space categories. The guideline applied by the consultants is nine ASF per student for student union space at ASU-Polytechnic.

The 29,941 ASF of existing space includes the new student union, currently under construction during the writing of this report. In addition, some student functions will remain in the Conference Center Building.

At the base year, the application of space guidelines shows a surplus of 1,807 ASF. At Horizon B, there will be a need for a 90,000 ASF facility. The need increases to 135,000 ASF as the student population grow to the 15,000 student headcount level.

**RESIDENCE LIFE**

ASU-Polytechnic currently houses a small portion of students on campus. Currently the ASU portion of the Williams Campus has three residence halls (Freshman Experience Dorm, Bell Hall, and Dean Hall) with a total 266 beds, occupying 56,807 ASF. The residence halls outside of Williams Campus Loop Road are owned by Chandler-Gilbert Community College. Students from each institution are allowed to obtain on-campus housing. The Williams Campus Dining Hall is included as residence life space.

The total ASF in the Base year and Enrollment periods A through C includes only the residence halls space. **No single family housing is included in the space needs analysis.**

The space breakdown for the single family homes includes a total of 697 beds:
- North Desert Village – 175,398 GSF with 106 houses
- West Desert Village – 75,040 GSF with 70 houses
- South Desert Village – 541,670 GSF with 390 homes

It is anticipated that ASU-Polytechnic will demolish a large portion of the single family housing and build dorms, suite, or apartment style housing over the planning period.
Across the nation, there are changes in student demands for housing. These changes result in more housing space per student in most recently constructed facilities. A guideline widely used in higher education residence life planning is 275 ASF per bed. A 275 ASF per bed guideline provides sufficient space for a variety of housing types ranging from traditional double-loaded corridor layouts to suite and apartment-style housing. This analysis uses 275 ASF per bed as the guideline to address housing needs and space for a small dining hall.

The numbers of beds for enrollment Horizons A through C were obtained from planning data as calculated by ASG, as part of the master planning process. Based on these housing goals, the residence life guideline application shows a 174,313 ASF deficit at the base year, not including single family homes. This number is somewhat misleading since many ASU students are also living in single family housing. The need for residence life facilities become more accurate as the older single family homes are demolished during implementation of the campus master plan. At Horizon B, there will be a need for 380,160 ASF of residence life space. At the 15,000 student headcount level (Horizon C), the need increases 570,240 ASF. At this enrollment period it was assumed that all of the existing single family housing space would be demolished.

HEALTH CARE FACILITIES
Health care facilities are not specifically addressed by the CEFPI guidelines. In recent benchmarking and consulting work with several statewide systems, the consultants found amounts of space in this category ranging from 0.3 ASF per student FTE to four ASF per student FTE. All student health care is currently being administered by the Veteran’s Administration in the Health Sciences Center building. The University would like its own health care facilities for students constructed during the planning period.

The average space per student FTE for this category at ASU-Polytechnic is not known. While the Veteran’s Administration occupies 8,794 ASF of ASU-owned health care space, comments by the Dean of Student Affairs notes that the space dedicated specifically to student health care represents only a small portion of this facility. The consultants believe that a reasonable guideline for ASU-Polytechnic is 0.6 ASF per student FTE. This factor takes into account student demographics, residential population, and the mix of academic programs. While this factor is at the low end of the benchmark range, it is a number that reflects adequate use and allocation of space in this category.

While the guideline application shows a deficit of 1,067 ASF at the base year, it is common to build or occupy a facility that will allow for future growth. At the 10,000 student headcount level, a 3,780 ASF facility would be needed while at the 15,000 student headcount level, the facility would increase in size to 5,832 ASF. It should be noted that health care facilities are defined as clinics established for the use of students.

OTHER SPACE
Spaces in the facilities inventory database coded as parking garages, inactive/conversion spaces, temporary buildings, and space leased to outside organizations are not included in this analysis. The existing and projected amounts of space in these categories have been noted at the bottom of the Space Needs Analysis table for ASU-Polytechnic is not included in the total space calculations. These include 1,802 of vacant space in residential life.

At the time of this analysis, 50,728 ASF of ASU-owned space was being occupied by outside organizations.

LIMITATIONS OF ANALYSIS
The consultants analyzed campus data provided by The Arizona State University for staffing, courses, and facilities information. The data provides a "snapshot in time" of staff, course enrollments, and facilities at ASU-Polytechnic. As with other complex higher education institutions
that the consultants have studied, many changes are occurring simultaneously on a continuous basis. Out of necessity, all these analyses are "snapshots in time," but nevertheless, are consistently used as valuable tools for institutional planning.

The Space Needs Analysis is a quantitative analysis only. All permanent existing space is counted regardless of its quality. Because several rooms in the facilities inventory have multiple functions (i.e., one room containing a reception space, clerical workstation, storage, and filing), it is impossible to accurately distribute the existing space among the appropriate room use and functional categories. However, the proposed area calculations are distributed among the room use and functional categories. Therefore, the relationship between existing space and proposed guideline space for individual categories should be considered as rough comparisons. The only true comparison is between a unit's total existing space and proposed guideline space.

Space needs analysis for the purpose of master planning is a process that estimates space amounts likely to be needed by various units of an institution at current and projected enrollment, staffing, and activity levels. Reliability of the findings of any space needs study depends on several factors including the quality of the data, the appropriateness of the space standards used, and the validity of the projections. Data used in this study was updated and refined to a high level of accuracy and currency. Space standards that reflect national trends and specific ABOR Guidelines were applied. Future projections of enrollment and research levels were carefully reviewed. The consultants, therefore, believe that the findings and recommendations of this study may be considered reliable and may be used with confidence by ASU for its campus master planning effort.

The study was conducted at the campus level and was intended for use in initial planning of future facilities expansion. The scope of the study at the campus level did not identify every individual school or college requirement and did not include detail normally developed in room-by-room program planning of specific facilities. This study was not intended to replace program plan level analysis. Further, this study only analyzed space needs and did not evaluate the quality of existing space or the suitability of the space.

Unless otherwise noted, all findings are in assignable square feet (ASF). ASF is defined as the area measured within the interior walls of a room that can be assigned to a program. It does not include circulation, mechanical, or building service spaces. Converting assignable space to gross square foot usually adds about 30% to 40% to the assignable space.
OBSERVATIONS
The consultant conducted work sessions with each major administrative and academic unit on the campus. The focus of the work sessions centered on facilities and space needs. The following is a condensed version of these discussions.

Office of Research and Sponsored Program
- The new research building is to be occupied in December 2005. Jones Studio Architects out of Phoenix has been chosen to perform the Architecture. Research is growing at 15% annually.
- This campus sees itself as healthy lifestyles versus medical school environment. This would include nutrition, exercise and wellness, alternative medicine, psychology, nutraceuticals, and will include some greenhouses.

East College
- The East College is primarily the incubator for new programs, initiates new programs, and is the undergraduate academic unit on the East Campus.
- Applied Biological Sciences will be a new program with extensive growth potential. Where mostly field work, the program will need greenhouses, research and teaching laboratories.
- East College has the Applied Psychology program which presently has three faculty and will grow.
- Business Administration, now part of the William P. Carey School of Business, could reach 2,000 to 4,000 majors and be its own college by the first horizon year. They need a strong business component. Need case study rooms.
- Education could easily reach 1,500 majors. It will not need a laboratory school.
- Human Health presently has one faculty and ten students, has potential for some growth. Exercise and Wellness has great potential and will need laboratory activity space. Epidemiology will act as the glue to hold it together and will generate research funding. Programs in research for Human Health will be through the NIH. Eventually, there will be a college or school of health-related programs on each campus. Applied Biological Sciences will need greenhouses, indoor laboratories, instruction, and research space.
- Growth in lower division will occur in Mathematics, quantitative based with a lot of faculty. Also the Basic Science which will coordinate with MCCCD for general chemistry, physics, and earth sciences.
- Basic Art will include Fine Arts and Humanities, but will not be large program. Courses will be primarily in General Education along with social and behavioral sciences. Fine and Performing Arts in support of the core campus majors should be thought about and a place holder warranted in the master plan.

Campuswide
- As a polytechnic campus, experientially intensive courses will require more laboratories and activity space.
- Peers: Cal Poly San Luis Obispo, Purdue University, Texas A&M University, Texas Tech University, University of California-Davis, University of Missouri-Rolla, Virginia Tech University, Georgia Tech.
Office of Planning and Budget

- There are large numbers of transfer students. Twenty percent are graduate students.
- Many ASU students at the Williams Campus take the lower division courses at CGCC. Student Affairs including Registrar, etc. will grow in proportion to the student population.
- The demographics of the Williams Campus have a slightly older population, 60/40 male female, 20% graduate students.
- Over the next couple of years, 25% per year growth is not out of the question, mostly as the result of new programs.
- The Campus is done with renovation projects. Most of old buildings will be torn down.
- Will need an office/classroom building in the next five years.

Morrison School of Agriculture and Resource Management

- Golf programs are growing rapidly, especially turf management.
- Research will double in the next five years.
- New programs in rural tourism, hotel management, hospital management are possible.
- A Product Innovation Development program would be focused on food and be laboratory based.
- May go off campus with food marketing and retailing, maybe Downtown.
- A Ph.D. is the newest priority program and will not be faculty intensive.
- Primary facility issues are a 17-acre driving range as you enter campus and a 180-acre golf course on the south boundary, the need for a grocery store close to campus. Need a 400-yard driving range with 45 stations, 3 practice holes and putting greens. Would like own golf course, clubhouse, hotel and foodservice over next 10 years.
- The Golf program and the Flight programs majors mostly come from out of state and have high use of existing housing.
- Library services and delivery is presently very good. They need more journals as Ph.D. programs are added.
- Food science program is laboratory intensive. Otherwise, not heavy need of laboratory space.

Williams Campus Tour

- Need for support space such as parking, police, and mail services. No shipping/receiving space. No financial services, cashier, research support services space. No fleet services space or department of public safety. Need space for a full accounting function.

Office of Vice President and Provost

- ASU-Polytechnic has typically not had student fees; however, the construction of the new Student Union and new Recreation Center are going to demand that student fees be instituted.
- Cal Poly and Purdue University are good examples of peers. Need applied sciences without engineering core for undergraduates.
- Are mostly programs that lead to career paths.
- Most interest is in the immediate construction of additional classrooms, laboratories, and offices in support of the anticipated enrollment growth.
If East Campus is to be polytechnic campus, most polytechnic campuses are engineering based. However there is no engineering core at the East Campus.

Interested in facilities for fine arts. Mostly teaching facilities.

A library on the East Campus should be more of a learning resource center with emphasis on study space, digital formats, and retrieval system.

**Office of Student Affairs**

- The new Student Union will have housing food service as a significant component.
- Health Services are presently in the HSC (Health Science Center) which is jointly used with the Veteran’s Administration.
- They anticipate having doctors in residence similar to the Main Campus including counseling.
- Health services will work cooperatively with the Tempe Campus.

**Recreation Center**

- This will include club sports since no athletics is anticipated on the East Campus.

**Student Union**

- This will include student government and organizations as well as meeting rooms and the student newspaper.
- Visitor’s information area, often the one-stop concept, is out of space.
- Need dining hall facility.
- The housing office needs to move.

**Student Services**

- Registrar, bursar, academic advising, visitor information, etc. should be located in a central location and main entry to campus.

**Disability Services**

- A testing quiet room and a strong disability services component will be needed on the East Campus.
- Campus Housing offices will need to be located somewhere within the Student Services purview.

**Library & Office Information Technology**

**Library**

- The East Campus library is presently independent, but could become a branch of the main library.
- Library needs more space for reader stations and service space, computers, work tables.
- The present 38,000 square feet building which includes the Learning Center, Academic Computing, and the Library could probably accommodate up to about 5,000 students.
- Learning center, IT, academic computing, and library could be in the same building.
- There are three professional and five FTE staff at the library for a total of seven.
- Need 3 to 4 times more staff to open more hours and increase public service.
Information Technology
- There are presently seven computer classrooms and laboratories on campus. Adding four more in Fall of 2003. Media is also within IT.
- All of the classrooms are mediated with technology.
- It would be advantageous for IT and the Library to co-habit space.
- IT provides administrative support as well as academic support and provides network services throughout the campus and the buildings.
- IT staffing is presently ten.
- Central IT academic and support services should be integrated.

College of Technology and Applied Sciences
- The College of Technology moved from the Main Campus. There were 744 students who came to the East Campus.

Aviation
- The Aviation program is primary classroom and flight line based and needs approximately $3 million for a flight hangar on the airport grounds.
- They have two simulators in the Simulator Building and an altitude chamber in a separate building which is one of only three private chambers in the country.

Engineering
- The Engineering program on the East Campus is primarily applied versus theoretical on the Main Campus.
- Engineering program will be project based and need project-type buildings. This learning style will require several technicians as part of the staffing for the College.
- Lower level courses may still be provided by CGCC; however all upper level courses will be at ASU.

Industrial Management
- Project management, quality control, industrial relations, and human relations are part of this program.
- There is a need for a heavy computing environment that is wireless.
- Enterprise activities requiring University investments will eventually be on campus where linkage between business industry and the University take place.

Research
- Photovoltaic research facility needs to be enlarged. Most of the research on campus will be applied, not fundamental.
- Need facilities for computer program and engineering technology.

Staffing
- Will need 50 more faculty within the next couple of years to keep up with enrollment growth. Laboratory assistants are increasing due to project based approach.
- Adjacencies and program are important. Engineering and information computer as well as projected environmental importance on campus with the Biology program.
PEER ANALYSIS

During on-campus work sessions, several institutions were named that ASU-Polytechnic thought were good peer institutions for benchmarking purposes. In the draft document *Arizona State University East Evolution Towards a Polytechnic Model*, dated December 16, 2002, 15 public and private polytechnic universities were identified as comparisons institutions to ASU-Polytechnic. The goal of this analysis was to use similar institutions in both student FTE and mission as a check against the consultants ASF recommendations based on target year enrollment Horizon C. Selected institutions, with total FTE and headcount included:

### Arizona State University - Polytechnic Campus

<table>
<thead>
<tr>
<th>Institution</th>
<th>Total Student FTE</th>
<th>FT Faculty</th>
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</thead>
<tbody>
<tr>
<td>Texas A&amp;M University</td>
<td>38,546</td>
<td>1,604</td>
</tr>
<tr>
<td>Purdue University - Main Campus (IN)</td>
<td>37,168</td>
<td>1,827</td>
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<tr>
<td>University of California - Davis</td>
<td>25,916</td>
<td>1,327</td>
</tr>
<tr>
<td>Virginia Polytechnic Institute &amp; State University</td>
<td>25,663</td>
<td>1,541</td>
</tr>
<tr>
<td>Texas Tech University</td>
<td>24,276</td>
<td>906</td>
</tr>
<tr>
<td><strong>Larger Institutions Subtotal</strong></td>
<td><strong>30,314</strong></td>
<td><strong>1,441</strong></td>
</tr>
<tr>
<td>Georgia Institute of Technology</td>
<td>17,044</td>
<td>775</td>
</tr>
<tr>
<td>Cal Polytechnic State University - San Luis Obispo</td>
<td>16,745</td>
<td>693</td>
</tr>
<tr>
<td>Cal Polytechnic State University - Pomona</td>
<td>15,668</td>
<td>606</td>
</tr>
<tr>
<td>Florida A &amp; M</td>
<td>9,726</td>
<td>511</td>
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<td>University of Missouri- Rolla</td>
<td>4,172</td>
<td>347</td>
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<tr>
<td><strong>Small Institutions Subtotal</strong></td>
<td><strong>12,671</strong></td>
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<tr>
<td><strong>All Institution Average</strong></td>
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<td><strong>1,053</strong></td>
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</table>
The analysis is divided into two sections. The first portion of the analysis is illustrated in the above table. The second section will follow this analysis. Total ASF/FTE (without residential space) for the five larger peer institutions averaged 173 ASF per FTE while the five smaller institutions averaged 171 ASF/FTE. It is interesting to note that both sizes of institutions have, on average, the same amount of ASF/FTE. At the base year, ASU-Polytechnic contained 221 ASF/FTE, a 28% difference from the peer average. The base year analysis does not include the ASF for the new research building. This finding would suggest that ASU-Polytechnic could continue to increase enrollments without additional facilities in the immediate future.

However, this analysis does not take into account the condition of facilities.

During Fall 2002, ASU-Polytechnic provided more space per FTE in classrooms, teaching laboratories and office & conference space than the peer averages. In other categories such as open laboratories, research laboratories, and study spaces, ASU-polytechnic was below peer average ranges.

At Enrollment Horizon C, using the guideline space needs as a point of comparison, total ASF without residential was calculated at 133 ASF, or a 39 ASF/FTE difference from the peer average. Classrooms and research laboratories, at 8 ASF/FTE and 25 ASF/FTE respectively, compared very favorable to the peer average. Space in teaching laboratories (20 ASF/FTE) was significantly above the peer averages. The categories of open laboratories and study (including library space) generated less space per FTE than was calculated by the 10 peers. Since there is a disparity between teaching laboratories and open laboratories as compared to the peers, some of the teaching laboratories at ASU’s Williams campus may be open to students during selected times. The 7 ASF/FTE study space at ASU, as compared to the 12 ASF/FTE study space of the peers is understandable since the goal is to create more of a learning resource center than a full service library.

Finally, the ABOR guidelines produced approximately half of the office & conference space than peer institutions. The ASU-Polytechnic number is influenced the ABOR guideline and the fact that ASU does not have the same amount of office space for researchers as found in a large research intensive university.
The preceding table provides a review of other types of spaces in the peer analysis. At the base year, most of the categories for ASU-Polytechnic were below the peer average. Both general use space (50 ASF/FTE) and student union space (17 ASF/FTE) were above the peer averages. As explained previously, not all of this space is habitable by the institution.

At Enrollment Horizon C, using the guideline space needs as a point of comparison, only a few space categories continued to be below peer averages. These include Special Use (4 ASF/FTE) and Physical Plant (8 ASF/FTE). For most large institutions, the special use category includes an athletic and physical education component, which is nonexistent on the ASU-Polytechnic campus.

Other categories such as General Use (13 ASF), Healthcare (1 ASF/FTE), Residential Life (59 ASF/FTE), and Physical Education & Recreation (9 ASF/FTE) were all within the calculated peer averages. The Student Union (14 ASF/FTE) was one category where the guideline was considerably above the peer average. However, the lack of complete information on the part of the peers may be skewing the results.

The comparison of the peer analysis findings and the space needs determination at enrollment Horizon C based on guideline applications would indicate that the 135 ASF/FTE, as compared to the peers, is in line with an institution of approximately 10,000 FTE. However, it is more difficult to ascertain the outcomes of the guideline application for each of the space categories, since only a portion are good indicators of the potential needs for space at the enrollment levels and programmatic assumptions made in the development of this analysis.

The lack of programmatic and physical data related to the intended purpose of the campus and firm enrollment assumptions suggests that the spaces needs analysis should be updated within the next five years. This will allow for a more accurate assessment of the campus once greater program definition is achieved.
APPENDIX A

ASSIGNABLE SQUARE FEET BY BUILDING
## Assignable Square Feet by Building

| Classrooms | Teaching Labs | Open Labs | Research Labs | Acad Offices | Admin Offices | Library | PE/Rec Athletics | Assembly/Exhibit | Student Union | FB/AQ Gmhs | Physical Plant | Other Dept Space | Residence Life | Health Care | Parking Garages | Inactive | Vacated Space | Outside Agencies | TOTAL ASF |
|------------|---------------|-----------|---------------|--------------|--------------|---------|------------------|-----------------|----------------|-------------|---------------|----------------|----------------|--------------|--------------|-------------|-----------|----------------|----------------|----------|
| Academic Center | 6,118 | 1,390 | 2,913 | 9,034 | 15,029 | 4,095 | 38,579 |
| Administrative | 5,979 |
| Administrative Services | 1,828 |
| Agribusiness Center | 17,658 | 7,203 | 99 | 168 | 25,128 |
| Altitude Chamber | 1,303 | 2,603 | 1,247 | 1,935 | 7,088 |
| American Indian Programs | 707 | 1,180 | 1,887 |
| American Indian Programs Annex | 868 | 846 | 1,715 |
| ASUE Auditorium | | | | 6,301 | 170 | 475 | 6,946 |
| Ballfield Restrooms | | | 258 |
| Bell Hall | | | | | 13,095 | 13,095 |
| Child Development Center | | | | | 7,466 | 7,466 |
| Classroom Building | 3,446 | 5,275 | 383 | 1,742 | 4,069 | 14,915 |
| Communications | | | | | 1,758 | 1,758 |
| Communications Annex | | | | | 3,142 | 3,142 |
| Dean Hall | | | | | | 9,149 |
| Dining Hall | | | | | | 10,031 |
| East Campus Unknown Building Name | | | | | | 1,660 |
| ECET Research | | | | | | 385 | 385 |

2519 • Arizona State University
# Assignable Square Feet by Building

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<th>Teaching Labs</th>
<th>Open Labs</th>
<th>Research Labs</th>
<th>Acad Offices</th>
<th>Admin Offices</th>
<th>Library</th>
<th>PE/Rec</th>
<th>Athletics</th>
<th>Assembly &amp; Exhibit</th>
<th>Student Union</th>
<th>F/G/AQ &amp; MNHS</th>
<th>Physical Plant</th>
<th>Other Dept Space</th>
<th>Residence Life</th>
<th>Health Care</th>
<th>Parking Garages</th>
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Paulien & Associates, Inc. • ASF SNA Crosstab by Bldg • 25-Jun-04 • 01:54 PM
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<th>Teaching Labs</th>
<th>Open Labs</th>
<th>Research Labs</th>
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Paulien & Associates, Inc. • ASF SNA Crosstab by Bldg • 25-Jun-04 • 01:54 PM
## Assignable Square Feet by Building

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### APPENDIX B

**ASSIGNABLE SQUARE FEET BY COLLEGE UNIT, DEPARTMENT, AND BUILDING**

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<th>Building</th>
<th>Assignable Square Feet</th>
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### ASU MAIN • COLLEGE OF PUBLIC PROGRAMS

**College of Tech & Applied Sciences**

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### COLLEGE OF TECHNOLOGY & APPLIED SCIENCES

**ASUE Aeronautical Mgt Tech**

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**Simulator Building**

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**2519 • Arizona State University**

Paulien & Associates, Inc. • ASF SNA Crosstab by Campus by Clg/Unit by Dept by Bldg • 25-Jun-04 • 01:57 PM
### ARIZONA STATE UNIVERSITY • EAST CAMPUS

**Assignable Square Feet by College/Unit by Department by Building**

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<th>Research Labs</th>
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<th>Admin Offices</th>
<th>Library</th>
<th>PE/Rec</th>
<th>Athletics</th>
<th>Assembly</th>
<th>Student Union</th>
<th>FB/AQ Grnhs</th>
<th>Physical Plant</th>
<th>Other Dept. Space</th>
<th>Residence Life</th>
<th>Health Care</th>
<th>Parking Garages</th>
<th>Inactive Space</th>
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2519 • Arizona State University

Paulien & Associates, Inc. • ASF SNA Crosstab by Campus by Clg/Unit by Dept by Bldg • 25-Jun-04 • 01:57 PM
### Assignable Square Feet by College/Unit by Department by Building

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#### EAST COLLEGE

**ASUE Applied Psychology**

Quad 3

| | Class-rooms | Teaching | Open | Research | Acad | Admin | Library | PE/Rec | Athletics | Assembly | Student | Physical | OtherDept | Residence | Health | Parking | Vacated | Outside | TOTAL |
| | 849 | 700 | | | | | | | | | | | | | | | | 1,549 |

Sutton Hall

| | Class-rooms | Teaching | Open | Research | Acad | Admin | Library | PE/Rec | Athletics | Assembly | Student | Physical | OtherDept | Residence | Health | Parking | Vacated | Outside | TOTAL |
| | 654 | 1,484 | | | | | | | | | | | | | | | | 2,138 |

**ASUE Applied Psychology Total:**

| | Class-rooms | Teaching | Open | Research | Acad | Admin | Library | PE/Rec | Athletics | Assembly | Student | Physical | OtherDept | Residence | Health | Parking | Vacated | Outside | TOTAL |
| | 1,503 | 2,184 | | | | | | | | | | | | | | | | 3,687 |

**ASUE Business Administration**

Sutton Hall

| | Class-rooms | Teaching | Open | Research | Acad | Admin | Library | PE/Rec | Athletics | Assembly | Student | Physical | OtherDept | Residence | Health | Parking | Vacated | Outside | TOTAL |
| | 681 | | | | | | | | | | | | | | | | | 681 |

**ASUE East College**

Classroom Building

| | Class-rooms | Teaching | Open | Research | Acad | Admin | Library | PE/Rec | Athletics | Assembly | Student | Physical | OtherDept | Residence | Health | Parking | Vacated | Outside | TOTAL |
| | 524 | 125 | | | | | | | | | | | | | | | | 649 |

Sutton Hall

| | Class-rooms | Teaching | Open | Research | Acad | Admin | Library | PE/Rec | Athletics | Assembly | Student | Physical | OtherDept | Residence | Health | Parking | Vacated | Outside | TOTAL |
| | 300 | 4,538 | | | | | | | | | | | | | | | | 5,571 |

Wanner Hall

| | Class-rooms | Teaching | Open | Research | Acad | Admin | Library | PE/Rec | Athletics | Assembly | Student | Physical | OtherDept | Residence | Health | Parking | Vacated | Outside | TOTAL |
| | 395 | | | | | | | | | | | | | | | | | 586 |

**ASUE East College Total:**

| | Class-rooms | Teaching | Open | Research | Acad | Admin | Library | PE/Rec | Athletics | Assembly | Student | Physical | OtherDept | Residence | Health | Parking | Vacated | Outside | TOTAL |
| | 824 | 5,058 | | | | | | | | | | | | | | | | 6,605 |

**ASUE Education**

Sutton Hall

| | Class-rooms | Teaching | Open | Research | Acad | Admin | Library | PE/Rec | Athletics | Assembly | Student | Physical | OtherDept | Residence | Health | Parking | Vacated | Outside | TOTAL |
| | 392 | 3,722 | | | | | | | | | | | | | | | | 4,114 |
## Assignable Square Feet by College/Unit by Department by Building

### ARIZONA STATE UNIVERSITY • EAST CAMPUS

### Asue Exercise And Wellness

<table>
<thead>
<tr>
<th>Academic Building</th>
<th>Class-rooms</th>
<th>Teaching Labs</th>
<th>Open Labs</th>
<th>Research Labs</th>
<th>Acad Offices</th>
<th>Admin Offices</th>
<th>Library</th>
<th>PE/Rec</th>
<th>Athletics</th>
<th>Assembly</th>
<th>Student Union</th>
<th>FB/AQ Grnhs</th>
<th>Physical Plant</th>
<th>Other Dept</th>
<th>Residence Life</th>
<th>Health Care</th>
<th>Parking Garages</th>
<th>Vacated Space</th>
<th>Outside Agencies</th>
<th>TOTAL ASF</th>
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<tbody>
<tr>
<td>Classroom Building</td>
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### Asue Human Health

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<th>Student Union</th>
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<th>Physical Plant</th>
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<th>Residence Life</th>
<th>Health Care</th>
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<th>TOTAL ASF</th>
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### Asue Multi-Med Writ/Tech Com

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<th>Library</th>
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<th>Physical Plant</th>
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### Asue Nutrition

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<th>Assembly</th>
<th>Student Union</th>
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<th>Residence Life</th>
<th>Health Care</th>
<th>Parking Garages</th>
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### East College Total:

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<th>Research Labs</th>
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<th>Admin Offices</th>
<th>Library</th>
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<th>Residence Life</th>
<th>Health Care</th>
<th>Parking Garages</th>
<th>Vacated Space</th>
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### MORRISON SCHOOL OF AGRIBUSINESS

**ASUE Morrison School of Agribu**

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<thead>
<tr>
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<th>4,688</th>
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<td>Professional Golf Management</td>
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<td>Wanner Hall</td>
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<td>11,312</td>
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**ASUE Morrison School of Agribu Total:**

| 6,180 | 11,312 | 191 | 11,312 |

**Morrison School of Agribusiness Total:**

| 6,180 | 11,312 | 191 | 18,192 |

### OFFICE OF VICE PRESIDENT/PROVOST ASU EAST

**ASUE Academic Programs & Srvcs**

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**ASU EAST Assignable Square Feet by College/Unit by Department by Building**

<table>
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<tr>
<th>Class-rooms</th>
<th>Teaching Labs</th>
<th>Open Labs</th>
<th>Research Labs</th>
<th>Acad Offices</th>
<th>Adminn Offices</th>
<th>Library</th>
<th>PE/Rec Athletics</th>
<th>Assembly /Exhibit</th>
<th>Student Union</th>
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### Assignable Square Feet by College/Unit by Department by Building

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<th>Class-rooms</th>
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<tbody>
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**2519 • Arizona State University**

*Paulien & Associates, Inc. • ASF SNA Crosstab by Campus by Clg/Unit by Dept by Bldg • 25-Jun-04 • 01:58 PM*
<table>
<thead>
<tr>
<th>Classrooms</th>
<th>Teaching Labs</th>
<th>Open Labs</th>
<th>Research Labs</th>
<th>Acad Offices</th>
<th>Admin Offices</th>
<th>Library</th>
<th>PE/Rec</th>
<th>Athletics</th>
<th>Assembly</th>
<th>Student Union</th>
<th>FB/AQ Grnhs</th>
<th>Physical Plant</th>
<th>Other Dept Space</th>
<th>Residence Life</th>
<th>Health Care</th>
<th>Parking Garages</th>
<th>Inactive Space</th>
<th>Outside Agencies</th>
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</tbody>
</table>

ASUE Business & Financial Srvc

| Academic Center | | | | | | | | | | | | | | | | | | | | | 3,218 |
| Administrative Services | | | | | | | | | | | | | | | | | | | | | 358 |

New Student Union Building (E812)

| | | | | | | | | | | | | | | | | | | | | | 4,329 |

Quad 2

| | | | | | | | | | | | | | | | | | | | | | 574 |

Williams Campus Post Office

| | | | | | | | | | | | | | | | | | | | | | 1,566 |

**ASUE Business & Financial Srvc Total:**

| | | | | | | | | | | | | | | | | | | | | | 10,045 |

ASUE College of Nursing

| Health Sciences Center | | | | | | | | | | | | | | | | | | | | | 3,890 |

ASUE Dean Hall

| Dean Hall | | | | | | | | | | | | | | | | | | | | | 9,148 |

ASUE Development

| Administration | | | | | | | | | | | | | | | | | | | | | 600 |

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**Assignable Square Feet by College/Unit by Department by Building**

2519 • Arizona State University

Paulien & Associates, Inc. • ASF SNA Crosstab by Campus by Clg/Unit by Dept by Bldg • 25-Jun-04 • 01:58 PM
###Assignable Square Feet by College/Unit by Department by Building

<table>
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## Assignable Square Feet by College/Unit by Department by Building

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<th>FB/AQ Grnhs</th>
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**ASUE Facilities Management Total:**

| | | | | | | | | | | | | | | | | | | | | | |
| Facilities Management 6 | Committees | | | | | | | | | | | | | | | | | | | 1,570 |
| Facilities Management 7 | | | | | | | | | | | | | | | | | | | | 2,471 |
| Facilities Management 8 | | | | | | | | | | | | | | | | | | | | 979 |
| Facilities Management 9 | | | | | | | | | | | | | | | | | | | | 619 |
| Information Center | | | | | | | | | | | | | | | | | | | | 497 |
| Library Storage Facility | | | | | | | | | | | | | | | | | | | | 3,054 |
| Simulator Building | | | | | | | | | | | | | | | | | | | | 448 |
| Sutton Hall | | | | | | | | | | | | | | | | | | | | 32 |

**ASUE Facilities Management Total:**

| | | | | | | | | | | | | | | | | | | | | | |
| ASUE Information Technology | | | | | | | | | | | | | | | | | | | | 61,092 |

### ASUE Information Technology

| Academic Center | | | | | | | | | | | | | | | | | | | | 9,594 |
| Administration | | | | | | | | | | | | | | | | | | | | 132 |
| Classroom Building | | | | | | | | | | | | | | | | | | | | 486 |
| Communications | | | | | | | | | | | | | | | | | | | | 1,758 |
| Facilities Management 2 | | | | | | | | | | | | | | | | | | | | 40 |

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##Assignable Square Feet by College/Unit by Department by Building

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<th>Classrooms</th>
<th>Teaching Labs</th>
<th>Open Labs</th>
<th>Research Labs</th>
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<th>Other Dept Space</th>
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<th>Parking Garages</th>
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<th>Vacated Space</th>
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**ASUE Information Technology Total:**

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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 3,990 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 2,537 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 16,812 |

**ASUE JACMET**

Altitude Chamber

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 486 |

**ASUE Library Services**

Academic Center

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 5,276 |

Library Archives

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 80 |

**ASUE Library Services Total:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 5,355 |

**ASUE Office of Provost**

Administration

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 2,800 |

**ASUE Owned/Non-ASU Usage**

American Indian Programs Annex

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 846 |

Child Development Center

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 7,456 |

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*Paulien & Associates, Inc. • ASF SNA Crosstab by Campus by Clg/Unit by Dept by Bldg • 25-Jun-04 • 01:58 PM*
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<th>Open Labs</th>
<th>Research Labs</th>
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<th>PE/Rec Athletics</th>
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<th>Student Union</th>
<th>FB/AQ Grnhs</th>
<th>Physical Plant</th>
<th>Other Dept Space</th>
<th>Residence Life</th>
<th>Health Care</th>
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### Assignable Square Feet by College/Unit by Department by Building

#### ASUE Research & Sponsored Proj

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<th>Department</th>
<th>ASF</th>
<th>Acad Offices</th>
<th>Admin Offices</th>
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<th>Assembly/Exhibit</th>
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<td>New Student Union Building (E812)</td>
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*ASUE Residential Life Total:*

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<th>ASF</th>
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<th>Admin Offices</th>
<th>Library</th>
<th>PE/Rec Athletics</th>
<th>Assembly/Exhibit</th>
<th>Student Union</th>
<th>FB/AQ Grnhs</th>
<th>Physical Plant</th>
<th>Other Dept Space</th>
<th>Residence Life</th>
<th>Health Care</th>
<th>Parking Garages</th>
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<td>51</td>
<td></td>
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###Assignable Square Feet by College/Unit by Department by Building

<table>
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<tr>
<th>Class-rooms</th>
<th>Teaching Labs</th>
<th>Open Labs</th>
<th>Research Labs</th>
<th>Acad Offices</th>
<th>Admin Offices</th>
<th>Library</th>
<th>PE/Rec Athletics</th>
<th>Assembly/Exhibit</th>
<th>Student Union</th>
<th>FB/AQ Grnhs</th>
<th>Physical Plant</th>
<th>Other Dept Space</th>
<th>Residence Life</th>
<th>Health Care</th>
<th>Parking Garages</th>
<th>Vacated Space</th>
<th>Outside Agencies</th>
<th>TOTAL ASF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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### ASUE Structural Area

Wanner Hall

<table>
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### ASUE Student Affairs

New Student Union Building (E812)

<table>
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<th>Research Labs</th>
<th>Acad Offices</th>
<th>Admin Offices</th>
<th>Library</th>
<th>PE/Rec Athletics</th>
<th>Assembly/Exhibit</th>
<th>Student Union</th>
<th>FB/AQ Grnhs</th>
<th>Physical Plant</th>
<th>Other Dept Space</th>
<th>Residence Life</th>
<th>Health Care</th>
<th>Parking Garages</th>
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</table>

**ASUE Student Affairs Total:**

<table>
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<tr>
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<th>Open Labs</th>
<th>Research Labs</th>
<th>Acad Offices</th>
<th>Admin Offices</th>
<th>Library</th>
<th>PE/Rec Athletics</th>
<th>Assembly/Exhibit</th>
<th>Student Union</th>
<th>FB/AQ Grnhs</th>
<th>Physical Plant</th>
<th>Other Dept Space</th>
<th>Residence Life</th>
<th>Health Care</th>
<th>Parking Garages</th>
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<tr>
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### ASUE Teaching Factory

Technology Center

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### ASUE Unclassified Area

Vacant

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### ASUE University Classroom

Academic Center

<table>
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<th>Class-rooms</th>
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Altitude Chamber

<table>
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2519 • Arizona State University

Paulien & Associates, Inc. •ASF SNA Crosstab by Campus by Clg/Unit by Dept by Bldg • 25-Jun-04 • 01:58 PM
## Assignable Square Feet by College/Unit by Department by Building

<table>
<thead>
<tr>
<th></th>
<th>Classroom Building</th>
<th>Health Sciences Center</th>
<th>Simulator Building</th>
<th>Technology Center</th>
<th>ASUE University Classroom Total:</th>
<th>Office of Vice President/Provost ASU East Total:</th>
<th>ARIZONA STATE UNIVERSITY • EAST CAMPUS TOTAL</th>
<th>2002 Campus Student FTE: 1,781</th>
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</thead>
<tbody>
<tr>
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<td>3,346</td>
<td>6,561</td>
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<td>50,728</td>
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### ARIZONA STATE UNIVERSITY • EAST CAMPUS TOTAL

<table>
<thead>
<tr>
<th></th>
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<th>502,764</th>
<th>2002 Campus Student FTE: 1,781</th>
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<td>355,764</td>
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</table>
ADDENDUM  A  

TO THE 

SPACE NEEDS ANALYSIS  

In support of  
Comprehensive Facilities Master Planning  
for  
Arizona State University – Polytechnic 

Prepared by  
Paulien & Associates, Inc.  

July 2004  

PURPOSE  
In mid-June 2004, Paulien & Associates, Inc. published the space needs analysis for ASU-Polytechnic at the Williams Campus. Enrollment horizons in that report included 8,000, 10,000 and 15,000 headcount students. During work sessions with members of the master planning team and the executive administration of ASU, it was decided that enrollments at the 15,000 student headcount level should be compared to adjusted or “best practices” guidelines. The scope of this addendum includes comparing projected ABOR space needs, as published in the Paulien & Associates, Inc. report entitled Arizona State University Polytechnic at the Williams Campus, Space Needs Analysis, to adjusted guidelines.  

SPACE NEEDS PLANNING  
In the original study, the Arizona Board of Regents (ABOR) as well as other national guidelines appropriate to ASU-Polytechnic campus mission and pedagogy was used to quantify space needs. This addendum contains one additional analysis at the 15,000 student headcount level using adjusted guidelines, which provides a comparison to ABOR guidelines.  

ENROLLMENT, FACULTY AND STAFF ASSUMPTIONS  
Enrollment and staffing data for this report were provided from several source documents. These include ASU’s Pathway to 2020, Enrollment Planning for the New American University, and ASU Enrollment and Employee Projections, 2002-2020, as provided by the University Office of Institutional Analysis, dated November 24, 2003. The ratios used to develop the space needs analysis for this addendum are the same assumptions as described in greater detail in the consultant’s final report.
RESEARCH ASSUMPTIONS

The consultant used current and projected tenured/tenure track faculty to develop the space needs analysis for this category. The methodology is fully explained in the original report.

SPACE NEEDS ANALYSIS - COMPARISON OF ABOR AND ADJUSTED GUIDELINES

First, the consultants used the Arizona Board of Regents Guidelines which were prepared in 1997, revised in 1999, and implemented in 2000 as the primary source of guideline formulas for determining the University’s space needs for enrollments at the target of 15,000 headcount students. For some space categories, alternative guideline models were used as deemed appropriate by the consultants and Arizona State University planners.

Second, as a point of comparison, the consultant was asked to develop a space needs analysis at the 15,000 student headcount level using non-ABOR or adjusted standards. The consultant, with 25 year of experience in space planning on more than 400 campuses, revised a number of the ABOR guidelines to reflect space allowances more commonly used in higher education.

Deviations from the ABOR guidelines included:

1) Classroom Space Guidelines, as noted in the table.

<table>
<thead>
<tr>
<th>Classroom Space Guidelines - Adjusted and ABOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted</td>
</tr>
<tr>
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</tr>
<tr>
<td>Classrooms</td>
</tr>
<tr>
<td>Seminar</td>
</tr>
<tr>
<td>Computer Inst.</td>
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</table>

2) Teaching Laboratories – For the analysis, the consultant used 80% student station occupancy vs. 85% with ABOR. The high point of the range for module size in liberal arts and sciences programs was used in the adjusted guideline. Most of the ABOR guidelines use the mid-range.

3) Office Space – The consultant increased the ASF of office space for administrators and faculty. In most cases, this added another 5 ASF to 60 ASF of office space per office, depending on employee type.

4) Library/Digital Commons/Information Center – Used 0.10 ASF/volume as opposed ABOR’s 0.07 ASF/volume and increased the percent of undergraduate spaces for reading stations from the ABOR guideline of 15% to the adjusted guideline of 20%.

The results are noted in the following table. At the 15,000 student headcount level, the space needs analysis generated a need for 1,295,214 ASF of space, excluding residence life, when ABOR guidelines were applied. When adjusted guidelines were substituted for ABOR standards, the space needs analysis at the 15,000 student headcount level generated 1,367,655 ASF of space prior to the
addition of residence life. The net change, not including residence life space, was 72,441 ASF or 6% between the two guidelines. Therefore, Paulien & Associates, Inc. believes that a good range for master planning purposes at the 15,000 student headcount level, including residential, for ASU-Polytechnic is between 1,865,000 ASF and 1,938,000 ASF of space.

PAULIEN & ASSOCIATES, INC.
PLANNING CONSULTANTS
ASU - Polytechnic
Space Needs Analysis - Guideline Comparison at 15,000 Student Headcount

<table>
<thead>
<tr>
<th>SPACE CATEGORY</th>
<th>Existing ASF</th>
<th>Guideline ASF</th>
<th>Surplus/ (Deficit)</th>
<th>Percent Surplus/ (Deficit)</th>
<th>Existing ASF</th>
<th>Guideline ASF</th>
<th>Existing ASF</th>
<th>Guideline ASF</th>
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<td></td>
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</tr>
<tr>
<td>Classroom &amp; Service</td>
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<td>4,964</td>
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<td>(24,196)</td>
<td>(487%)</td>
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<td>18,615</td>
<td>244,140</td>
<td>(225,525)</td>
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<tr>
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<td>7,013</td>
<td>90,000</td>
<td>(82,987)</td>
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<td>(216%)</td>
<td>12,318</td>
<td>38,880</td>
<td>(26,562)</td>
<td>(216%)</td>
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<td>Academic Space Subtotal</td>
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<td>286,769</td>
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<td>50,770</td>
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</tr>
<tr>
<td>Auxiliary Space Subtotal</td>
<td>29,941</td>
<td>140,812</td>
<td>(110,891)</td>
<td>(370%)</td>
<td>29,941</td>
<td>140,812</td>
<td>(110,891)</td>
<td>(370%)</td>
</tr>
<tr>
<td>TOTAL (w/o residence Life)</td>
<td>393,427</td>
<td>1,295,214</td>
<td>(901,788)</td>
<td>(229%)</td>
<td>393,427</td>
<td>1,367,655</td>
<td>(974,228)</td>
<td>(248%)</td>
</tr>
<tr>
<td>Residence Life Space</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residence Life</td>
<td>56,807</td>
<td>570,240</td>
<td>(513,433)</td>
<td>(904%)</td>
<td>56,807</td>
<td>570,240</td>
<td>(513,433)</td>
<td>(904%)</td>
</tr>
<tr>
<td>INSTITUTION TOTAL</td>
<td>450,234</td>
<td>1,865,454</td>
<td>(1,415,220)</td>
<td>(314%)</td>
<td>450,234</td>
<td>1,937,895</td>
<td>(1,487,661)</td>
<td>(330%)</td>
</tr>
<tr>
<td>Inactive/Conversion Space</td>
<td>1,802</td>
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<td></td>
<td></td>
<td>1,802</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Outside Organizations</td>
<td>50,728</td>
<td></td>
<td></td>
<td></td>
<td>50,728</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ASF = Assignable Square Feet
Communications, and IT

The City of Mesa has reportedly tried to have the university operate the water distribution system at the available 80 psi of water pressure, but university staff cannot comply due to poor pipe conditions which can no longer operate under that pressure. When the golf course is being watered, the campus water pressure reportedly drops as low as 20 psi, a level too low to reliably operate many water using appliances, and clearly too low for fire protection.

Maps provided by the City of Mesa indicate that the majority of the campus water distribution mains are city owned and maintained. Polytechnic campus water maps indicate that the city does not maintain the entire system and owns little more than the main loop of 8” pipe along Williams Field Campus Loop and Williams Field Road. The city owned portion of the waterlines are repaired at city cost, with the university being billed for repairs on the remaining majority portion of the system. The campus has a plumber who repairs water service lines and interior plumbing, but presently lacks the additional personnel and equipment necessary to repair their own water distribution system.

The waterlines serving the residential areas to the north and south of campus are owned by the Williams Housing Authority. City of Mesa and ASU maps do not agree on ownership and maintenance responsibilities of all lines. University staff indicated that the potable water distribution system is inadequate to provide required routine flow rates at an acceptable operating pressure range.

The existing on-site distribution system consists of pipe generally in excess of 50 years of age. University staff has had to control the system to run at a peak pressure of 50 psi, reporting that there are pipe failures if the pressure exceeds 55 psi. The City of Mesa has reportedly tried to have the university operate the water distribution system at the available 80 psi of water pressure, but university staff cannot comply due to poor pipe conditions which can no longer operate under that pressure. When the golf course is being watered, the campus water pressure reportedly drops as low as 20 psi, a level too low to reliably operate many water using appliances, and clearly too low for fire protection.

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Existing: The campus is supplied with water by the municipality of Mesa, Arizona. Various portions of the campus supply and distribution system are owned by Arizona State University, the City of Mesa, and the Williams Housing Authority. City of Mesa and ASU maps do not agree on ownership and maintenance responsibilities of all lines. University staff indicated that the potable water distribution system is inadequate to provide required routine flow rates at an acceptable operating pressure range.

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such a dispersal of authority, routine maintenance and exercising of the hydrant valves cannot be assured for all hydrants. In addition, it cannot be assured that existing water maps provided by the City of Mesa are accurate, especially with respect to ownership, although they are quite thorough.

**Irrigation Water Supply And Control**

Irrigation water for campus landscaping; driving range, and the adjacent golf course - which is owned by the Gila River Indians - is provided utilizing potable water. No reclaimed water is presently available, although a new wastewater treatment is proposed for the near future several miles southwest of the campus which can potentially supply reclaimed water for irrigation purposes. It is not known whether the treated effluent will be provided to the campus for irrigation purposes. There is a Roosevelt Water Conservation District (RWCD) irrigation canal located west of the campus on the far side of the Eastern Maricopa Floodway.

An irrigation study was prepared by Aqua Engineering, Inc. for the ASU – East Campus. In this study the possibility of obtaining irrigation water from the RWCD canal was evaluated and an on-campus distribution system was conceptually designed. In that report it is stated that: “ASU has informed Aqua Engineering that they have 150 acre-feet of water available through the RWCD canal and will be acquiring additional water rights to meet landscape irrigation build-out demands of the East Campus.” In meetings with ASU staff, the availability of water from the canal was questioned and it was stated that the University has no water rights from the canal. Obviously this issue would need to be resolved before RWCD water could be used on campus.

It was agreed, however, that water rights could be purchased and it was surmised that with the conversion of agricultural land to residential use, water rights may become increasingly available. The estimated annual irrigation-water requirement would be 629 acre feet, with a peak season flow rate of approximately 2,500 GPM based on watering 10 hours per day during peak season. The estimated cost to access and supply RWCD irrigation water to campus, exclusive of any cost for the water, as shown in the Aqua Engineering report, is between $575,000 and $690,000 in 2002 dollars. This cost is exclusive of any water right or water costs. The irrigation supply line would have to cross the East Maricopa Floodway which is under the jurisdiction of the Flood Control District of Maricopa County. A separate on-campus irrigation distribution system would be required if non-potable water is used.
The on-site irrigation-control system is composed of non-interconnected individual building-mounted controllers. Portions of the irrigation system have been replaced or repaired since the University assumed control of the campus from the Air Force, while other portions, including most of the underground piping is old and of uncertain condition.

**Phases 1 through 4:** Future campus expansion will require the development of a new potable water distribution system. Due to the age, condition, and size of the existing distribution system, a new system should be constructed concurrently with campus development, replacing the existing system.

**Water Supply Summary:** Based on records and incident reports, the existing water distribution system within campus limits is deficient in both size and condition and should be replaced. Adequate water supply and pressure is available at the campus boundaries. Reliable fire flows cannot be assured due to pressure and flow rate limitations. Reclaimed water (treated wastewater effluent) is not available for use at this location at this time. A new wastewater treatment plant southwest of the campus is scheduled for construction by the end of 2007. A 60” sewer main has been constructed west of the campus. The new treatment plant has been scheduled to expand by phases and offers the possibility of utilizing reclaimed water for irrigation purposes in the future if transmission mains are constructed.

**Sanitary Sewer**

**Existing:** The campus was fully sewered when it operated as Williams Air Force Base. The sewer system included a small wastewater treatment plant on-base. This plant has since been removed and the sewer collection system connected to the City of Mesa waste water collection system. The City of Mesa sewer maps show the majority of the campus system, and all lines smaller than 10” in diameter, as being "foreign mains." "Foreign mains" is the term generally applied to lines constructed by other entities. "Private mains" are classified separately on the sewer map legend, and are not shown on campus. All sewer lines 10” and larger are classified as “Standard Mains”. The on-site campus sanitary sewer system is reportedly in fair condition with limited capacity for expansion. The system is adequate to serve current needs, but will require replacement in the future. University staff reported that the wastewater collection system is operating with excess capacity and reported no significant operational problems. It is not known whether any routine maintenance is occurring on manholes and sewer lines. University staff is not equipped to repair or maintain sewer manholes or sewer lines and relies on the City of Mesa for repairs.

**Phases 1 through 4:** The sanitary sewer system serving the Polytechnic Campus will require reconstruction to serve future needs. Most of the existing buildings will be demolished and reconstructed to serve future University needs. Specific alignment and routing of the new sanitary sewer system is dependent on the campus master plan and the location and capacity of the City of Mesa receiving system. Due to the lack of information regarding the existing system, the existing and future wastewater collection system was not addressed.

As with the water system, the on-campus sanitary sewer system is over 50 years old. Records indicate that the system in vitrified clay pipe (VCP), which while having excellent chemical resistance, is somewhat brittle. The overall condition of the wastewater collection system is unknown.

**Stormwater Management**

**Existing:** Campus stormwater conveyance is primarily via street flow to the East Maricopa County Floodway to the west and the Pecos Road Floodway to the south. A detention/retention facility exists in the driving range, but it provides no retention of stormwater runoff. The existing campus is not required to provide retention of stormwater runoff. The approved East Maricopa Area Drainage Master Plan does not assume retention on-site. City of Mesa detention/retention requirements allow the continued discharge of stormwater runoff for existing developments. New development and redevelopment would require compliance with retention requirements. This condition will apply to the phased expansion of the Arizona State University Polytechnic campus, additional retention capacity being required for each phase of development. A drainage master plan is being prepared for the campus to assure development occurs in a manner supportive of required stormwater management practices.

**Phases 1 through 4:** Due to the size of the campus development project and the need to provide significant retention volumes in a phased manner, a drainage master plan for the Polytechnic Campus is required. This master plan will identify required retention volumes required for each phase of development, identify potential sites for retention, and determine bleed-off pipe connection locations, if required.

Stormwater conveyance via street flows, overland flows, and stormdrains, where required, will be provided as the campus
ELECTRICAL UTILITIES

Normal Power
Existing: The present campus area is served by the Salt River Project (SRP) with overhead distribution. The campus is located at the edge of a developed area and the electrical distribution system is reportedly somewhat unreliable. Power outages have been reported by campus staff. As development continues in the southeastern portion of Maricopa County the power system will expand and reliability should increase. Although the overhead system is owned and maintained by SRP, the maintenance and repair costs are paid for by Arizona State University (ASU). There is some underground power distribution, from the overhead system, to pad mounted transformers that feed various buildings.

Phase 1: Install an underground distribution system from new medium voltage metered switchgear serviced by SRP that will supply the campus development and other Williams Gateway Development partners with an upgraded underground distribution system. A new loop power distribution system shall be installed similar to ASU’s West and Tempe Campuses. The existing SRP overhead system would be removed and/or replaced with an underground system to maintain service to existing ASU facilities and other SRP customers within the Williams Gateway Development. The new conduit system will generally be located in present street locations following the present routing of the existing telecommunication system. Provide new underground services to newly constructed buildings and transfer existing underground services to the new distribution system.

Phase 2: Expand the Phase 1 underground system with additional underground and overhead removal. Provide new underground services to newly constructed buildings and transfer existing underground services to the new distribution system.

Phase 3: Expand the Phase 1 and 2 underground systems with additional underground and overhead removal. Provide new underground services to newly constructed buildings and transfer existing underground services to the new distribution system.

Phase 4: Expand the Phase 1, 2, and 3 underground systems with additional underground and overhead removal. Provide new underground services to newly constructed buildings and transfer existing underground services to the new distribution system.

Emergency Power
Existing: There is presently no central emergency distribution system. The present emergency system consists of individual generators at most existing buildings. Limited emergency power is supplied by a 4KVA Fuel Cell installed under a contract with SRP and is adequate only for minimal power requirements of a few key buildings.

Phase 1: Install a new central plant essential electrical system to distribute emergency power in parallel with the normal distribution system. Provide new buildings with new emergency underground service.

Phase 2: Expand the Phase 1 underground emergency system with additional underground distribution. Provide new buildings with new emergency underground services.

develops. The natural direction of drainage is to the west and southwest in this area. It is proposed that City of Mesa detention/retention requirements be met on a continuing basis as construction proceeds. The Sossaman Road construction project provided storm drain stubouts to serve the campus at East Upton Avenue, East Texas Avenue, and at South Avery Road. These connections to the municipal storm drain system are available for bleed-off locations from retention basins, subject to permitting by the City of Mesa. To the west, the East Maricopa County Floodway offers a point of discharge for retention basin bleed-offs, although connection will require permitting from the Flood Control District of Maricopa County.

Details related to proposed drainage improvements and phasing will be provided in the Campus Master Drainage Report. To the extent possible and appropriate, landscaped areas and turf will be used for water harvesting. This will create shallow ponding to provide stormwater runoff for vegetative use. This type of development would reduce the runoff coefficient for portions of the campus, thereby reducing the required storage volume in more formal retention basins. The future use patterns and extensive use of green areas, turf, and sports fields will reduce the volume of stormwater runoff and thereby reduce retention basin size. In addition to land use and water harvesting, additional retention would be provided by retention basins between one and three feet in depth with bleed-off lines at least 8" in diameter permitting the basin to drain within 36 hours. The retention facility size and corresponding depth will be adjusted as required to facilitate overall campus development. Dry wells are not proposed for stormwater disposal in accordance with City of Mesa requirements.
Phase 3: Expand the Phase 1 and 2 underground emergency systems with additional underground distribution. Provide new buildings with new emergency underground services.

Phase 4: Expand the Phase 1, 2, and 3 underground emergency systems with additional underground distribution. Provide new buildings with new emergency underground services.

Telecommunications

Existing: There is an existing underground communication distribution system covering most of the campus area. This system has not been evaluated; however, the conduit system appears to have capacity for future ASU expansion.

Future: The communication distribution system will have to be evaluated.

MECHANICAL UTILITIES

Chilled Water

Existing: There currently is no chilled water production or distribution system on the campus.

Phases 1 through 4: As the campus begins to grow a new chilled water production and distribution system will be constructed. The new central utility plant is envisioned in the south/central portion of the campus. The chilled water piping grid will start out as a radial system, eventually forming loops. Thermal storage will be included in the new chilled water plant. The chilled water piping will most probably be direct buried.

Heating System

There is no central heating system on campus. It is anticipated, similar to the West campus, that the air handling systems will be variable air volume with terminal reheat. It is anticipated that electric resistance heating will be used. Small natural gas fired boilers will provide hot water for domestic purposes.

Observation Phase

Observations, January 27, 2004, 3:00–4:30 p.m., 5:00–6:30 p.m.
Precinct Meeting Observation/Walkthrough, April 27, 2004, 1:00–4:00 p.m.
Community Meeting, April 28, 2004, 5:30–7:00 p.m.
Senior Administration, April 29, 2004, 7:30–8:30 a.m.
Precinct Meeting, April 29, 2004, 9:00–11:00 a.m.

Workshops/Meetings/Presentations

Update on East Campus Master Plan, August 23, 2004, 4:00–5:00 p.m.
East Provost and City of Mesa, August 25, 2004, 1:30–2:30 p.m.
East Valley Partnership, September 2, 2004, 4:30–5:30 p.m.
Williams AFB Reuse, November 9, 2004, 1:30–2:30 p.m.
Williams AFB Reuse, November 10, 2004, 8:30–11:30 a.m.
Presentation by Williams Gateway Airport, December 7, 2004, 8:00–10:00 a.m.
Williams AFB Reuse, January 5, 2005, 8:30–11:30 a.m.
Economic Impact Studies for the Polytechnic Campus, January 18, 2005, 12:00–1:00 p.m.
Williams Development Partnership Report, February 8, 2005, 1:30–2:30 p.m.
Williams AFB Reuse Plan, February 9, 2005, 8:30 a.m.–1:30 p.m.
Williams Gateway Freeway Focus Group, February 21, 2005, 1:00–3:00 p.m.
Williams Development Update, February 28, 2005, 2:00–3:30 p.m.
East Campus Land Restrictions, March 1, 2005, 10:00–11:00 a.m.
Williams Gateway Planning Team, April 20, 2005, 10:00 a.m.–12:00 p.m.