ANGELO STATE UNIVERSITY

A MEMBER OF THE TEXAS TECH UNIVERSITY SYSTEM

CENTENNIAL MASTER PLAN 2028 - UPDATE 2011

FACILITY PROGRAMMING AND CONSULTING | FORD, POWELL & CARSON

FINAL - JULY 2011

Angelo State University

A Member of The Texas Tech University System

Centennial Master Plan 2028

Update 2011

(Final, July 2011)

Facility Programming and Consulting | Ford, Powell & Carson

President's Statement

Angelo State University's Centennial Master Plan 1928-2028 remains as the planning blueprint for our future. That future envisions a residential campus with 10,000 students and the various amenities needed to sustain a dynamic environment. We are well on track toward that goal with new and renovated facilities having opened including: Centennial Village, Plaza Verde I and its associated green spaces, the greatly expanded recreation center and the Learning Commons in the Library. Each of these facilities moves us closer to the requirements associated with a campus which supports mostly residential, undergraduate students.

The Centennial Master Plan has multiple planning components to guide our continued growth:

- Develop the overall building program for the university
- Create and sustain a dynamic core for the campus
- Improve wayfinding and associated signage
- Continue beautification initiatives to include public art
- Sustain a campus environment which leads to student success
- Provide an attractive resource to benefit the community

An integrated strategic planning process must incorporate all elements of the campus and community to achieve its goals. Although the Master Plan was crafted by many individuals, they share the common attribute of pride in the university and a desire to position it for continued success in the future. The Master Plan is a dynamic document in which we can all take pride and one that will continue to evolve to meet the emerging needs of a university campus in the 21st century.

Sincerely,

Joseph C. Rallo

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Introductory Information

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Introductory Information

Introduction

Angelo State University initiated an update to their Centennial Master Plan in early 2010. The major ideal of the updated plan is to guide the programmatic and physical development of the University as they progress toward their centennial in 2028. Perhaps the most significant development since the Centennial Master Plan was published in 2005 was the incorporation of the University into the Texas Tech University System in June of 2007. This new affiliation has already helped ASU better meet the ideals set out in their mission statement.

This report consists of three major components: an update to the facilities master plan, to the design guidelines, and to the space analysis. Each has been reworked to reflect current conditions, including newly established programmatic priorities, recent construction on campus, and a directive from the State requiring a higher percentage of online classes.

The University engaged Facility Programming and Consulting and Ford, Powell, and Carson, Architects and Planners, Inc. to oversee and develop the update to the master plan. The consulting team also includes SA Research for demographics, Bain Medina Bain, Inc. for Civil Engineering, CNG Engineering for mechanical, electrical, and plumbing (MEP) engineering, DataCom Design Group for technology, GKW, Inc. for traffic engineering, and Project Cost resources for cost estimating.

Executive Summary

Since the completion of the Centennial Master Plan in 2005, a number of important changes have taken place at Angelo State. First, enrollment growth has continued at a steady pace, from about 6,000 in 2004 to 6,400 in the fall of 2009. Also during that period, the University has greatly increased utilization of teaching space, improving to approximately the average of Texas colleges and universities. Completed or near completion are a number of important construction projects. The Learning Commons in the Porter Henderson Library will bring much needed, technologically rich, individual and group study space to campus, greatly benefitting ASU students. An addition to the Center for Human Performance will bring additional workout space to campus and includes a climbing wall and indoor track. Additional housing units will also be provided in Plaza Verde I, which will add 405 beds to the inventory. Administrative space is insufficient, and so temporary buildings have been provided to help with this need. Finally, the Campus Green project will add to the recreational area on campus, adjacent to Plaza Verde I, and at the same time improve drainage on the east central portion of campus.

Looking forward, there are a number of changes that will impact the Master Plan Update. The University has moved up its timetable to reach enrollment of 10,000 students to 2020 from 2028 in the Centennial Master Plan. Programs of distinction have been identified, and include Nursing, Education, and Agriculture. These are part of a new strategic plan for the University and are woven into the Master Plan projections and recommendations. ASU also continues to strive toward its goal of increasing the percentage of students residing on campus, although a difficult financial climate may impact the institution's ability to achieve this goal.

The building program for 10,000 students suggests the addition of approximately 300,000 assignable square feet in a series of four new academic buildings, building remodels, and renovation projects. All academic Colleges will benefit with additional space, but the programs of distinction are to be a high priority. Improved utilization will also continue to be a priority. Support space such as additional dining, student organization spaces, additional housing, and IT space will also be included in the program.

In addition to accommodating the building program, the physical master plan incorporates the goals of focusing on campus entrances; creating a strong, active campus; improving the pedestrian experience; and incorporating public art, including architectural craft. The Master Plan continues to advocate for the closing of Johnson Street, which currently cuts the campus in two and reduces student safety, in addition to slowing them down as they traverse the east/ west axis of campus. This closing will enable the creation of the heart of the campus, with a central plaza which will create a focus for the academic areas, as well as the campus as a whole.

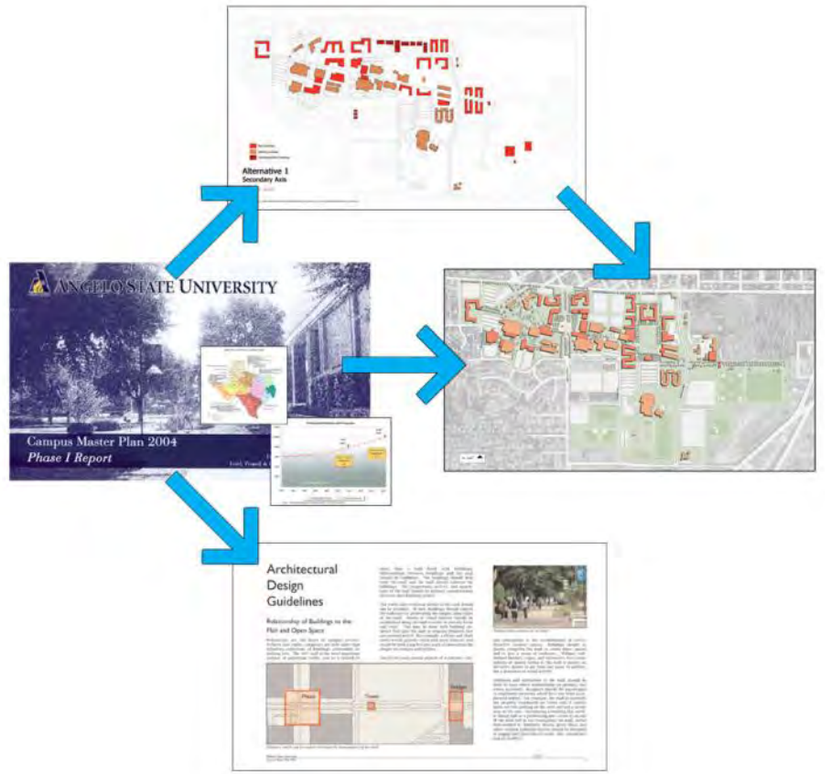
All in all, the Master Plan Update aspires to provide the programmatic and physical planning strategy necessary to assist Angelo State University meet or exceed its ambitious goals in preparation for its upcoming centennial in 2028.

Planning Process

This Master Plan Update was a collaboration of the Angelo State Master Plan Steering Committee, headed by Dr. James M. Limbaugh, many members of the Angelo State community, including faculty, staff, and students, and the consulting team. The effort was divided into two major parts: an analysis of space utilization and space need and the the creation and forming of physical design options into a single cohesive master plan.

Although the master plan update process has taken over a year from start to finish, it has an important advantage over the original Centennial Master Plan. Since the adoption of the Centennial Master Plan, the University completed Vision 2020, a strategic plan which encompassed both a plan for academic programs and initiatives and an overall strategic plan. These plans added a depth of academic and institutional direction that was not a part of the Centennial Master Plan. In addition, as a part of Vision 2020, ASU projected enrollment to 2020 and identified a number of "Programs of Distinction," both of which added still another layer of academic richness to the updated plan.

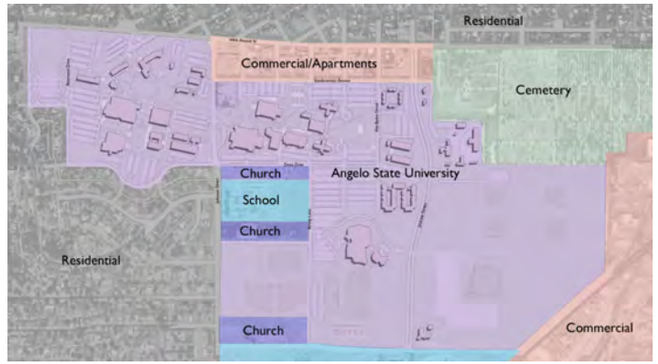
The process began with a kick off meeting, at which time introductions were made, a process laid out and agreed upon, updates to University facilities were reviewed, and interviews of ASU faculty and staff conducted. Subsequent to that meeting, ASU completed Vision 2020 and forwarded enrollment projections and programs of distinction to the consultants. Space utilization was analyzed and reviewed with the University, space projections were calculated, and strategic options or "building blocks" were proposed. The physical design phase then began with a visioning session, followed by a charette at which a number of design alternatives were discussed, and finally a charette to review and tweak the final plan. San Angelo community members were invited to a presentation in the midst of the process to hear about the master plan update's progress, and City of San Angelo representatives were included in discussions of infrastructure, including utilities and the recommended closure of Johnson Street.



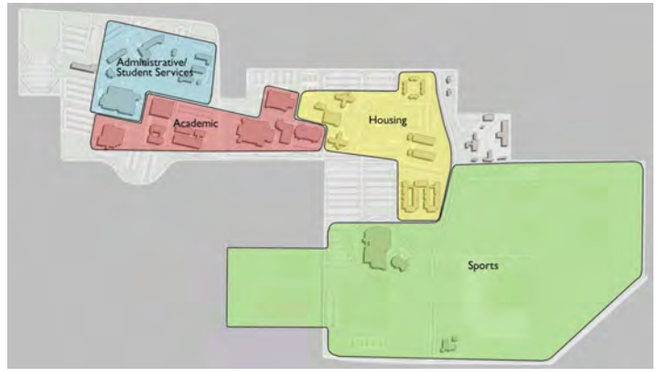
Physical Planning Issues

The ASU campus is located on a 268-acre tract of land southwest of downtown San Angelo. The campus is bordered on the west and the western half of its north and south edges by single-family residential developments. The rest of the southern border is mostly lined with churches and San Angelo Independent School District land. Crockett Elementary School, John Glenn Junior High School, and the SAISD Administration Building are all south of campus. Part of the north edge is bordered by a mixture of apartments and retail, and the eastern edges are bounded by a cemetery across S. Jackson St. and by Knickerbocker Road.

Map of ASU location within San Angelo



Surrounding land use



Campus Zones

Parking locations

With the exception of a few localized conditions such as the depressed grade at Jackson Street and a low area to the east of the Porter Henderson Library, the ASU campus is generally flat and grades down from southwest to northeast. Some drainage issues are being addressed through the construction of a retention pond as part of the Campus Green project.

Little to no natural foliage remains on the site, as unbuilt areas have been either landscaped or cleared. There are, however, a large number of carefully tended mature trees which were planted early in the history of the campus.

The buildings on the ASU campus are organized into four zones: administrative and student services, academics, housing, and sports. There is some intermixing between zones (and buildings that serve multiple functions such as the Center for Human Performance with both academic and recreational functions), but by and large the facilities are grouped according to use. Recent construction of Centennial Village on the west side of campus has distributed campus housing more evenly.

Parking is primarily located in a ring outside the campus buildings. The largest lot is on the eastern end of campus, but the current parking surplus means that this lot is not filled on a regular basis. It does, however, serve as parking for special events at the Junell Center/Stephens Arena. Although there is an excess of physical parking spots, the distribution/location of parking is viewed on campus as undesirable with many under the impression that there is a parking shortage.

Demographics & Enrollment

In this document, demographics are considered using Fall 2009 enrollment as the current student enrollment.

Historical Enrollment and Target Enrollment

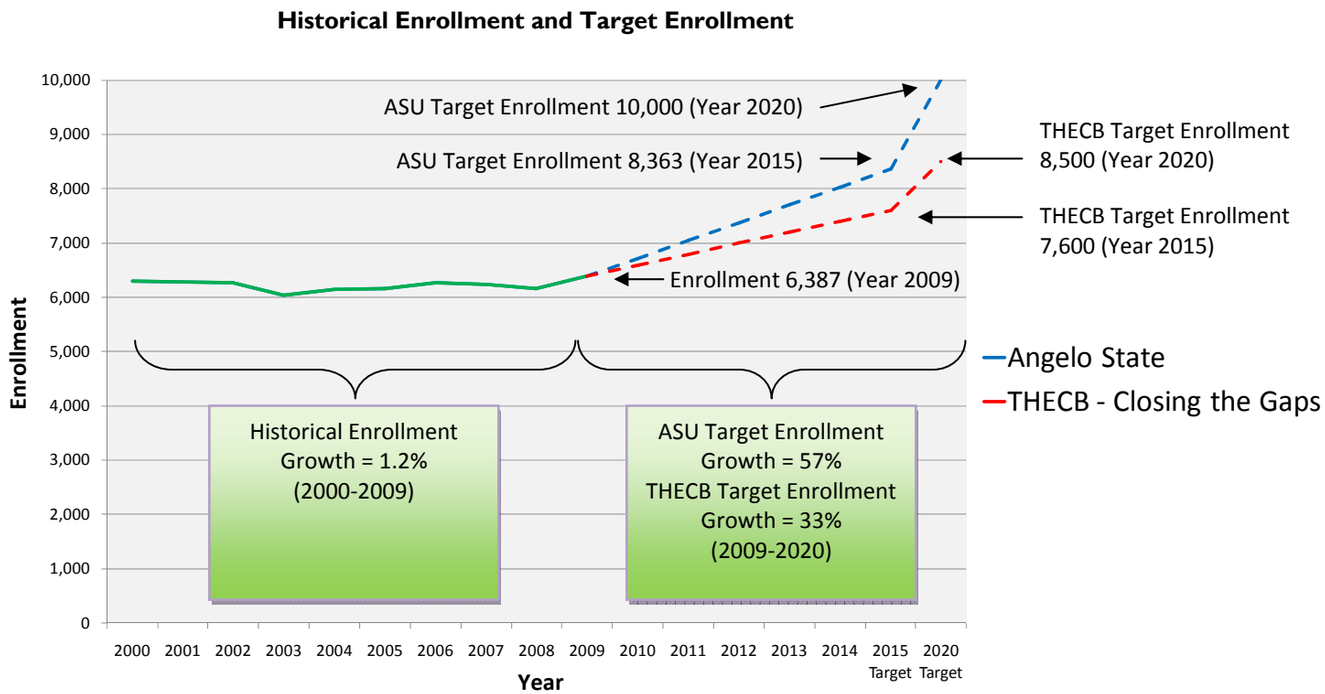
The University has had a very steady enrollment history for the last 20 years. Student enrollment is currently around 6,400 with the percent change in enrollment at approximately 1.2% total over the 2000-2009 period.

Due to Angelo State University joining the Texas Tech University System, and the installation of a new president, ASU has developed ambitious enrollment goals for the next ten years leading to a target enrollment of 10,000 by 2020. The Texas Higher Education Coordinating Board, as part of their *Closing the Gaps* initiative directed at closing educational gaps in Texas student participation, success, excellence and research, has set a target enrollment for Angelo State University of 8,500 by 2020.

The University anticipates accelerated growth for the future in order to meet their enrollment goals. An annual percent change of approximately 5.7% per year between 2009 and 2020 is required to meet the 10,000 enrollment goal by 2020. Cumulative target growth for the next 10 years will be 57%.

Angelo State has goals to improve enrollment and retention by drawing students from a larger geographical area, improving student services, and focusing on Programs of Distinction such as the Nursing School, Agriculture, and Education.

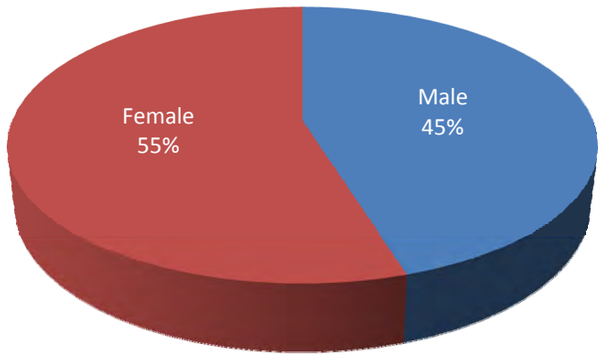
Angelo State University enrollment goals are set in conjunction with the Texas Tech University System.



Source: Texas Higher Education Coordinating Board – Closing the Gaps & Angelo State University – Fact Book

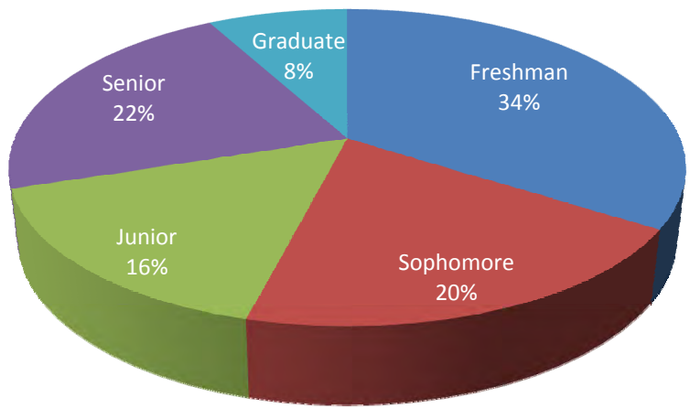
Enrollment by Gender

The University has 55% female and 45% male first time degree seeking students. This ratio has stayed fairly constant over the last ten years and is similar to ratios found in other Texas public universities.



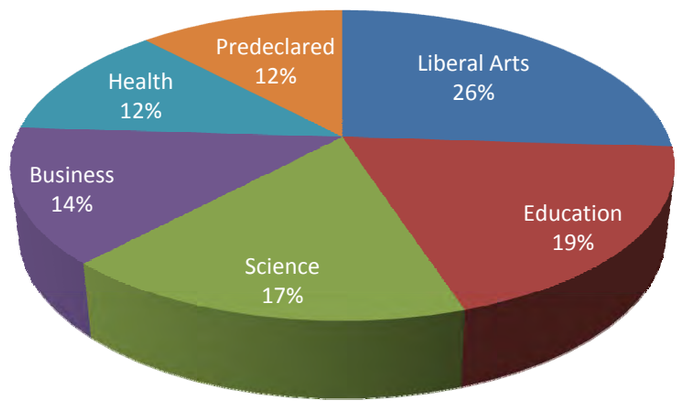
Enrollment by Level

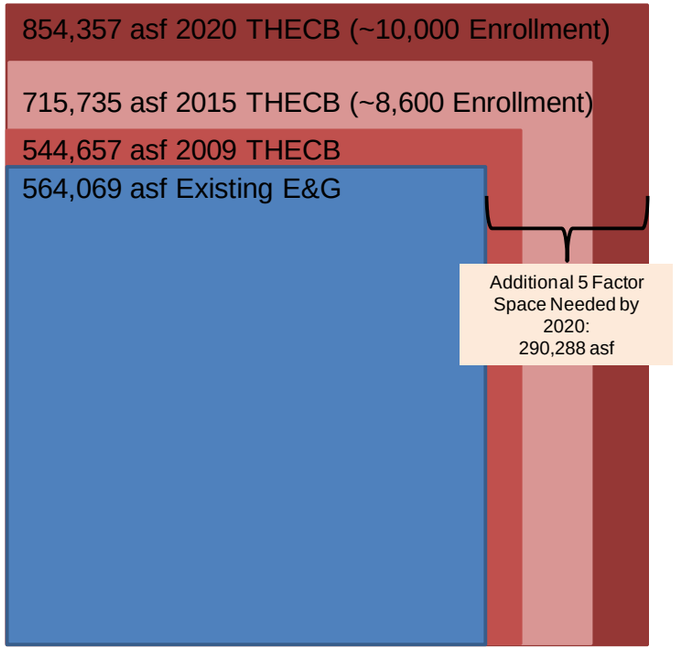
The University has a high freshman population: 33% of total students. Sophomores, juniors and seniors are distributed at 21.6%, 16.6%, and 23.8% respectively. Total undergraduate students are about 92% while post baccalaureate and masters are 8%. This distribution of undergraduate to graduate students has changed slightly in the last five years. Previously there were 90% undergraduates to 10% graduates; whereas five years ago nearly half of the freshman population never made it to their sophomore year. This number is improving.



Student Full-Time Equivalent by College and Department

The College of Liberal and Fine Arts has the largest number of student full-time equivalent (FTE) or 26% of the total student FTE. The College of Liberal and Fine Arts offers lower level core curriculum, naturally resulting in an increased percentage of FTE; however their total percentage is down from 41% in 2005. The remaining FTE are fairly evenly divided between the remaining Colleges, ranging between 12% and 19% of the total. Twelve percent of FTE fall into the Predeclared category. The University has a goal to reduce this enrollment category.





Space Planning Issues

Based on the Texas Higher Education Coordinating Board (THECB) Space Projection Model, for an enrollment of 10,000 an addition of approximately 290,000 assignable square feet (ASF) or 464,000 gross square feet (GSF) of Education and General (E&G) space is required. At an enrollment of 10,000, it is projected that ASU will also require approximately 63,500 additional ASF or 92,000 GSF of non-E&G space.

In addition to new construction, the campus will require 26,400 ASF or 27,000 GSF of renovated or back-filled E&G space to meet enrollment projections. Approximately 3,600 ASF of E&G space will need to be renovated and reassigned as non-E&G for IT purposes.

Additional land will be required for parking on the north side of campus in order to meet housing needs. Although there is a sufficient number of parking spaces, students and staff feel there should be more parking closer to the campus core. This wish is addressed in the master plan in a thoughtful and appropriate manner, to the extent possible.

Challenges for the Master Plan

As the master plan aspires to be a comprehensive document, it provides information and insight into programmatic, physical planning, social, and financial issues affecting the University community. Each of these criteria presents its own set of challenges although, in a very real sense, many of these are interrelated.

For example, on the programmatic side, perhaps the greatest challenge is gaining an understanding of what spaces will be needed to accommodate the academic programs of distinction as they continue to grow. This question is complicated by the desire of the university to expand aggressively its on-line programs as a component of its enrollment. This additional development forces the University and consultants to quickly measure the potential impact of the growth through online education, and based on experience and research, to make educated judgments about space needs.

From a social standpoint, the University desires to increase the percentage of students on campus in order to improve the activity and quality of campus life. This ideal ties into the physical planning aspect of the plan as questions arise about where to locate additional housing. Student commentary has questioned the location of most housing on the east end of campus, with most activity centers on or near the west end. So one of the challenges is to locate additional housing to meet University goals and at the same time locate it near activity centers, or provide new activity centers that are convenient to all housing. The financial consideration must also be layered onto this analysis, as challenging economic times make the provision of additional housing even more difficult than it would ordinarily be.

The physical planning aspect of the plan has the perhaps unenviable task of making all the other criteria flow into a single, harmonious concept that has balanced all of the trade-offs inherent in these disparate criteria and arrived at a plan that all University stakeholders can support.

It is the consultants' hope that the overcoming of challenges in the creation of the plan will be matched in a similar fashion during the implementation of the plan.

Plaza and Entrance

Master Plan Goals - Programmatic

The major programmatic goals for the master plan are to:

- Assure that facilities are adequate for the accommodation of 10,000 students by 2020. Many of these will be online students.
- Provide adequate space for the programs of distinction: Nursing, Education, and Agriculture.
- Provide more spaces for the support of Distance Education curriculum including faculty and IT space.
- Provide spaces for student support.
- Assure adequate administrative spaces, eliminate temporary facilities, and provide a 'one-stop shop' for registration functions.
- Provide appropriate space for the successful incorporation of the 'Closing the Gaps' initiative.
- Display projected program space needs aligned with enrollment projections rather than with time (by year) projections.

Master Plan Goals - Physical

Accommodate the Building Program

Plan facilities for 10,000 students

The master planning committee has set a target of 10,000 students. This is an ambitious goal, but achieving it will have positive effects on campus life, academic priorities, and university funding. The facilities and infrastructure needed to accommodate a larger student body will be the primary force behind most facets of the master plan.

Accommodate additional students in campus housing

Enhancing campus life is a crucial aspect of this master plan. By housing more students, the campus will become a livelier, more fulfilling place. The increased number of students on campus will also positively impact recreational facilities, food service, and other student services disproportionately greater than the increase in the total student population.

Develop a cohesive infrastructure expansion scheme

Buildings are only a part of a successful master plan. Roadways, walks, utilities, signage, technology, and other parts of the campus infrastructure are equally important. The master plan should address the infrastructure-related implications of the goal for growth.

Focus the Campus Entrances

Establish strong campus presence at Johnson Street and Avenue N/Dena

The front door of ASU will be at the intersection of Johnson and Avenue N. The new student services facility will be located here, and it will be the primary public destination for visitors and others. On the south side of campus, Dena Drive and Johnson will be a similar entrance, though it will be primarily for students and other ASU personnel, rather than the public.

Acquire land along Johnson Street

A portion of the land lining Johnson Street is not owned by ASU. It is critical that the acquisition of this land be pursued, through purchase or swap, so that an appropriately prominent campus entrance can be created here.

Create a Strong, Active Campus

Focus the campus core on academics

Academics are of primary importance to ASU, and the master plan should strengthen the existing academic area. Student services, housing, and other facilities should support the academic core. This has implications for where buildings should be sited in the master plan.

Create places where students feel comfortable congregating outside

Actively managed outdoor and indoor spaces are only part of healthy campus life. Students, faculty members, and staff should also have access to outdoor seating and recreation areas around campus where they can gather, study, and play. There should be a variety of different spaces, both formal and informal, so that groups and individuals with a multitude of preferences can be accommodated. Some of these kinds of spaces have recently been built or are under construction now, and that trend should continue.

Move vehicular traffic toward the edges of campus

Presently, traffic moves right through the heart of campus along Johnson Street. The street severs the otherwise strong pedestrian connection between the two halves of campus. This is detrimental not only to safe pedestrian passage, but also to the cohesiveness of the academic core and campus activity in general. The master plan should reduce the impact of vehicular traffic on the campus, and moving traffic to the edges of campus is the most effective way to do this.

Improve Pedestrian Experiences

Create and enhance a series of strong, well-used centers along the mall

The mall should not be just a corridor leading from one end of the campus to the other; rather it should be the connection between a number of activity-oriented spaces and facilities. The level of campus activity is one of the best measures of the success of a university in attracting and retaining students. Campus life can be enhanced by carefully siting facilities like recreation centers, student services buildings, and food service centers in order to create strong areas of activity. These centers of activity – some of which are already under construction – should be located in conjunction with the academic core and should support the academic goals of the institution.

Improve the pedestrian-friendly qualities of campus

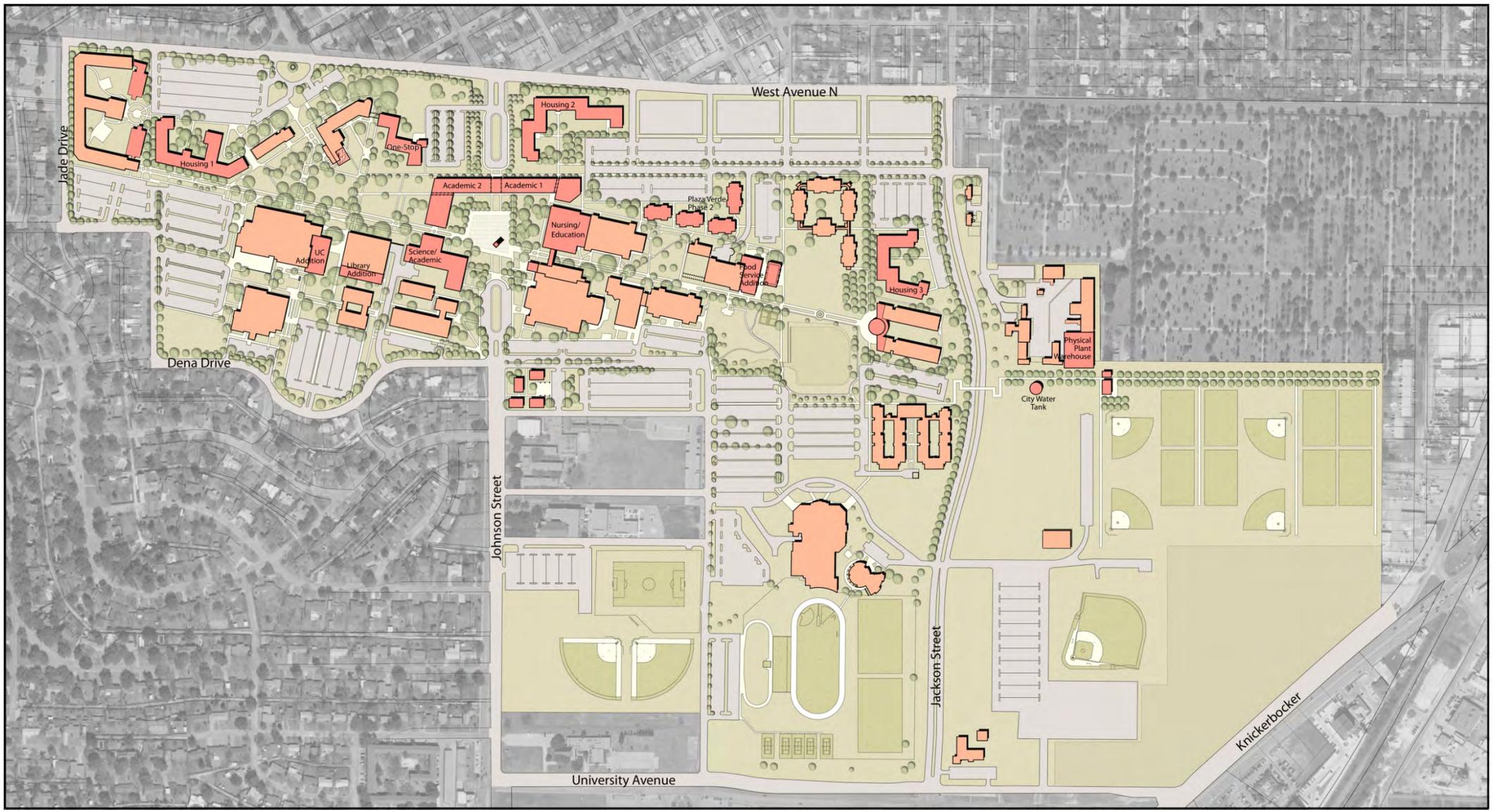
Creating a pedestrian-friendly campus requires more than just paving; it also entails attractive spaces, good, useful furniture, a high level of activity, and a comfortable scale. Walkways, outdoor and indoor spaces, and other pedestrian-related amenities in the master plan should be designed with this in mind.

Incorporate Public Art and

Architectural Craft

Incorporating art and architectural craft into buildings, outdoor spaces, and other areas will enhance the beauty of campus. This directly supports the goal of creating good places for activity and student life. Possibilities for art and architectural craft include murals, free-standing sculpture, decorative sconces, fountains, and light sculpture. ASU should continue to support the existing public art committee. The committee will encourage and guide the incorporation of public art in campus buildings.

Campus Core



2011 Campus Master Plan Update (New Buildings in Red)

Alternatives Considered

The master planning process involved consideration of several different alternatives, from which the master plan itself was developed. Primary options revolved around various locations of housing on campus and different ways to establish the north and south campus entrances along Johnson Street.

One early option placed additional housing primarily on the east side of campus, rather than adding housing on the west side as in the final plan. This scheme was discarded in favor of the final selection because it did a comparatively poor job of balancing housing across campus, which would minimize housing's contribution to campus life and campus activity.

Another option considered early on placed a theater at the north entrance, potentially in conjunction with a one-stop center. While there are advantages to placing such a facility in a public spot, the difficulty in financing that building indicated that giving it such focus was misplaced. The final master plan instead flanks the north entrance with housing and a one-stop center supported by additional parking. While the housing in particular, is still a long-term project, this solution is supportable within the horizon of the master plan and offers the additional advantage of placing more parking near the campus core.

Texan Hall

Facilities Master Plan

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Facilities Master Plan

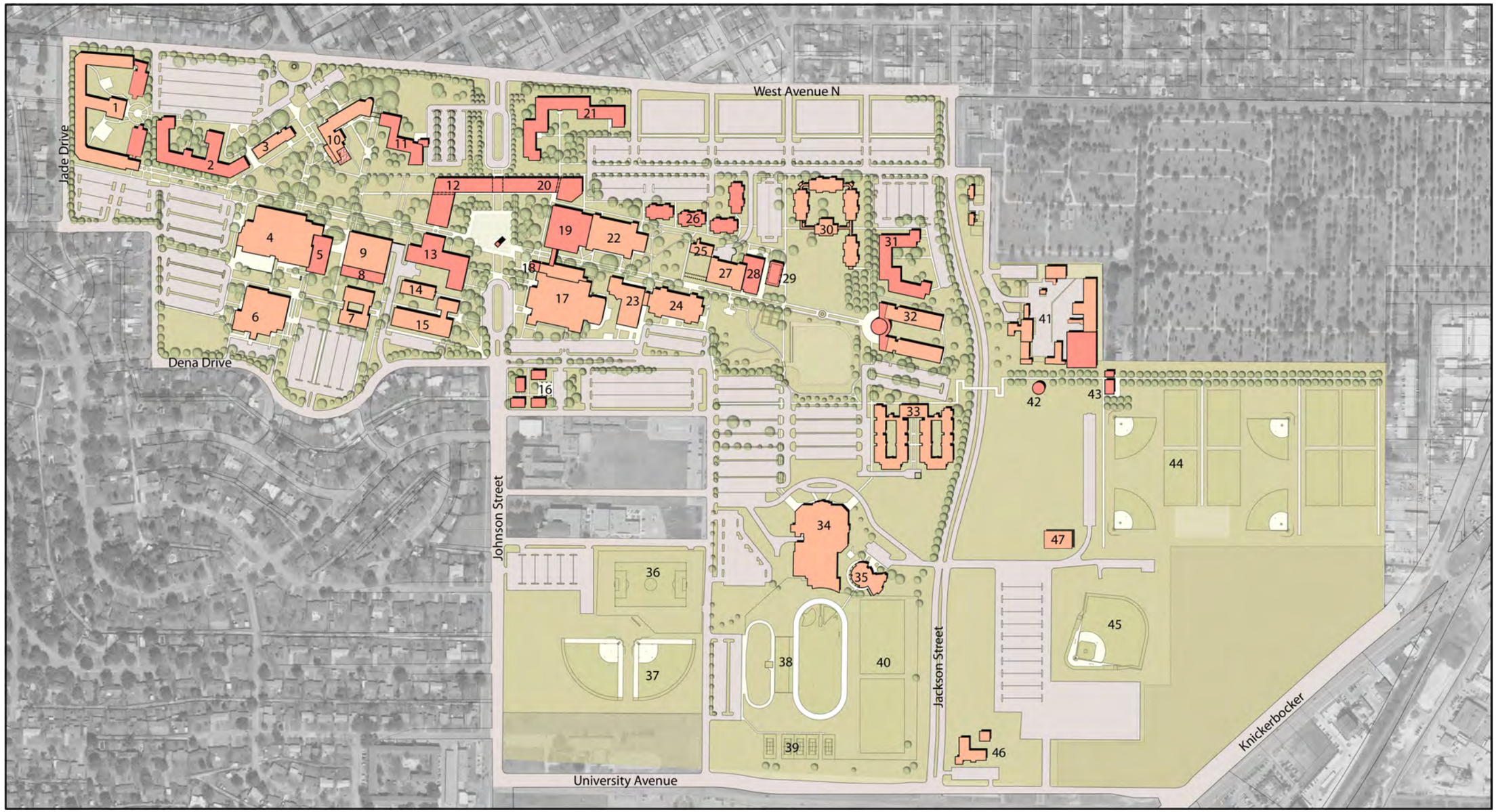
Introduction

The main component of this report is the Facilities Master Plan. The plan modifies and adds to existing campus facilities in order to create a sense of place and to better fulfill the mission of the University. The plan proposes physical developments such as new buildings and renovations to and demolitions of existing buildings as well as new parking and site development. The plan is divided into four development phases based on project priorities.

Angelo State University Master Plan
Building List

1 Centennial Hall
2 Housing 1
3 Hardeman Student Services Center
4 University Center
5 University Center Addition
6 Carr Education-Fine Arts Building
7 Academic Building
8 Library Addition
9 Porter Henderson Library
10 Mayer Administration Building
11 One-Stop Center (Administration/Student Services)
12 Academic III
13 Science/Academic Building (Academic Building IV)
14 Science III
15 Cavness Science Building
16 Campus Religious Centers
17 Center for Human Performance
18 CHP Addition
19 Nursing/Education Building (Academic Building I)
20 Academic II
21 Housing 2
22 Vincent Nursing-Physical Science Building
23 Math-Computer Science Building
24 Rassman Building
25 Central Plant
26 Plaza Verde Phase II
27 Food Service Center
28 Food Service Center Addition
29 Pavilion (Relocate Existing)
30 Plaza Verde I
31 Housing 3
32 Massie Halls
33 Texan Hall
34 Junell Center/Stephens Arena
35 Fieldhouse
36 Varsity Soccer Field
37 Varsity Softball Complex
38 LeGrand Sports Complex
39 Tennis Courts
40 Varsity Football Practice Field
41 Facilities Management (New Warehouse)
42 Water Tower
43 Multipurpose Intramural Facility
44 Intramural Fields (Improve and Expand)
45 Foster Field/Colts Stadium
46 LeGrand Alumni & Visitors Center
47 Norris Baseball Clubhouse

Note:
Black denotes new buildings
Grey denotes existing buildings



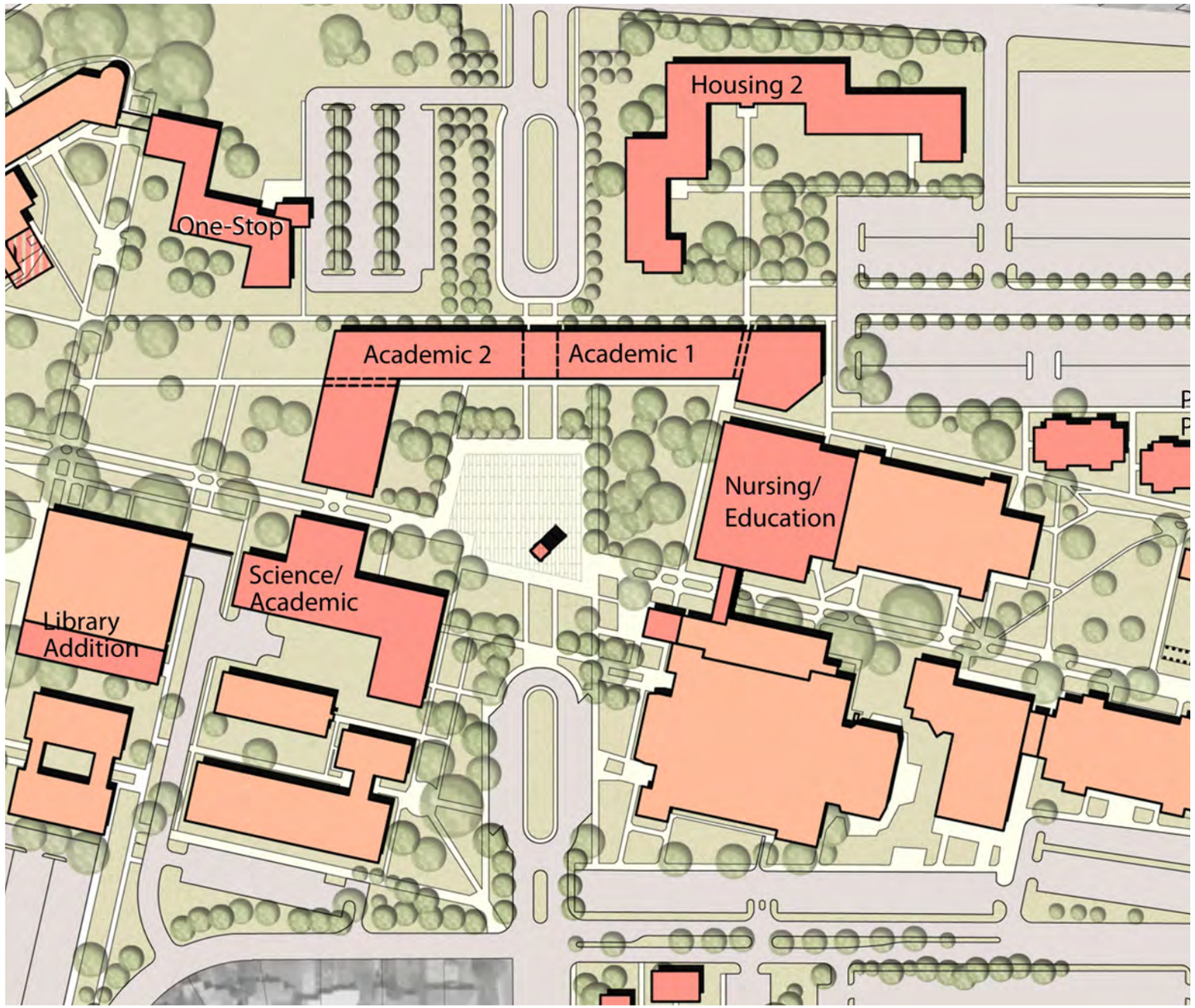
Campus master plan

Academic Core and Central Plaza

The conceptual organization of the master plan is essentially three concentric rings. The outer ring is parking, which is pushed to the perimeter in order to minimize conflict with pedestrians and to leave core space for academic and other uses. Inside that ring is housing, which is located in the middle ring because it must both be close to parking and located near the academic and student service facilities which form the core of the campus and the center of the diagram. The core of the plan, the central ring, is academic facilities.

The master plan focuses academic development in the area centered on the intersection of Johnson Street and the mall. This future heart is currently occupied by academic buildings, but at present, they lack any organization which expressly indicates the academic focus of the University – the linearity of the mall de-emphasizes the importance of any particular group of buildings. This will be resolved by a central plaza which will create a focus for the academic areas and the campus as a whole.

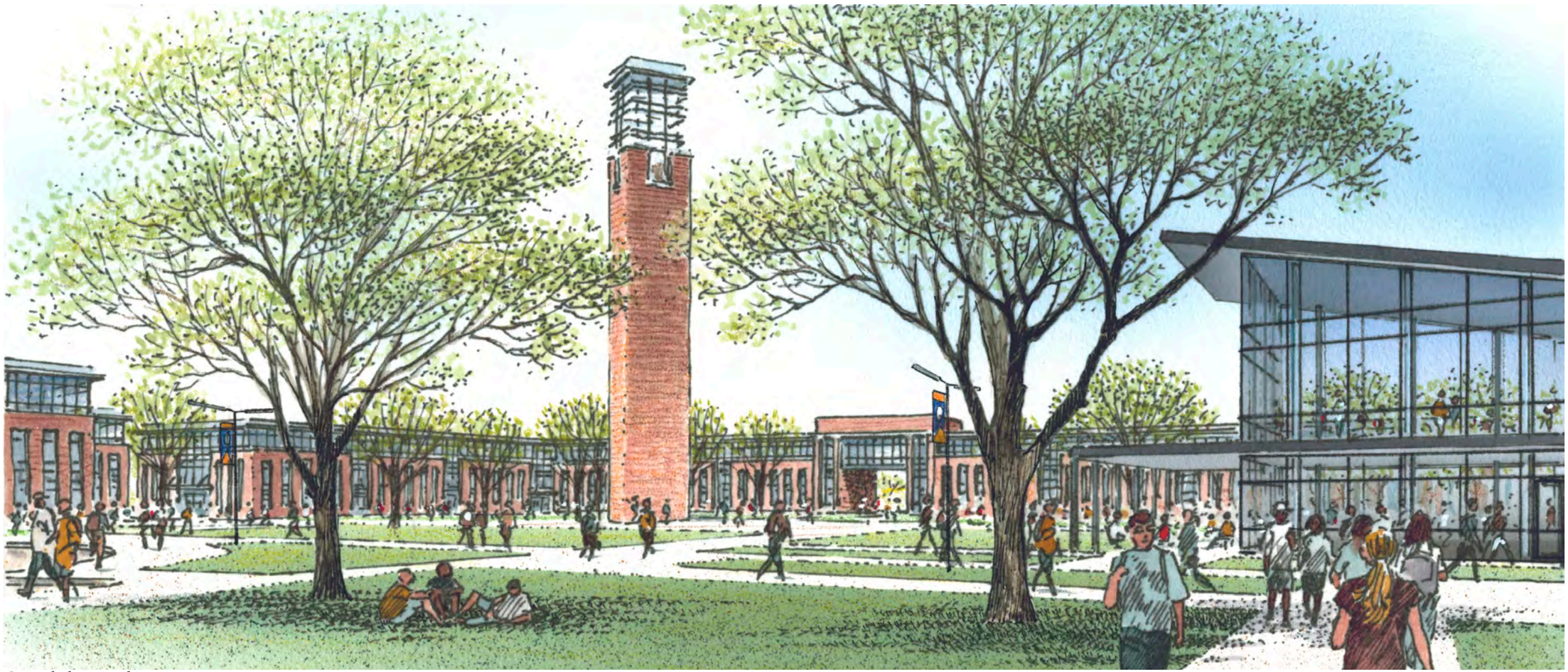
The central plaza will be a large outdoor space in the center of campus bordered by academic buildings and other important campus facilities. While Johnson still will cross the plaza in the early phases of development, Johnson will ultimately be closed. In the interim phases, the pedestrian-centered design of the plaza will serve to lessen Johnson's visual and circulatory prominence. This will slow traffic and will encourage drivers to find more appropriate routes around campus, rather than through campus. In this report, the mall has been designated as West Mall and East Mall according to position. This change in terminology should be explored in conjunction with the development of the central plaza.



Central plaza plan

A tall, thin tower and a lower gathering place will be the primary visual features of the central plaza. The chimes currently located on the Administration Building or a new carillon should be placed in the tower so that it will have an auditory presence as well as a visual presence. The gathering place will be linked to a future second Center for Human Performance addition and will provide shelter and places to sit. Because this space is located close to the academic core, the mall, and the plaza, it will be an active destination for individuals, groups, and even classes. A snack bar is planned as part of one of the future academic buildings, which will be an additional locus for activity.

The center of the plaza is a paved area surrounded by landscaped beds and trees. The tower and gathering place are located on opposite sides of both the mall and Johnson Street, which will balance the space. Various campus buildings will be located around the plaza outside the landscape beds and walkways.



Central plaza rendering

Avenue N Gateway

Angelo State University does not have an obvious, well-marked destination for people new to the campus. Also, because of a lack of frontage on Avenue N, the "front" side of the campus, there is not a clear and apparent demarcation point where the campus begins. A new student services building will resolve this issue on the western side of Johnson by helping to create a new gateway at Avenue N and by becoming a centralized point for a variety of services for students and visitors. A new parking lot, screened by a bank of trees, will provide ample parking for the student services facility as well as new academic buildings in the core of the campus.

The other half of the gateway is a proposed residence hall on the east side of Johnson Street. This hall must be designed with its role as a framing element in mind – the western and northern edges of the complex, in particular, should be designed to define the corner and to create a relationship with the buildings on the west side of Johnson, as shown in the plan.

Avenue N gateway site plan

Avenue N gateway rendering

Campus Housing

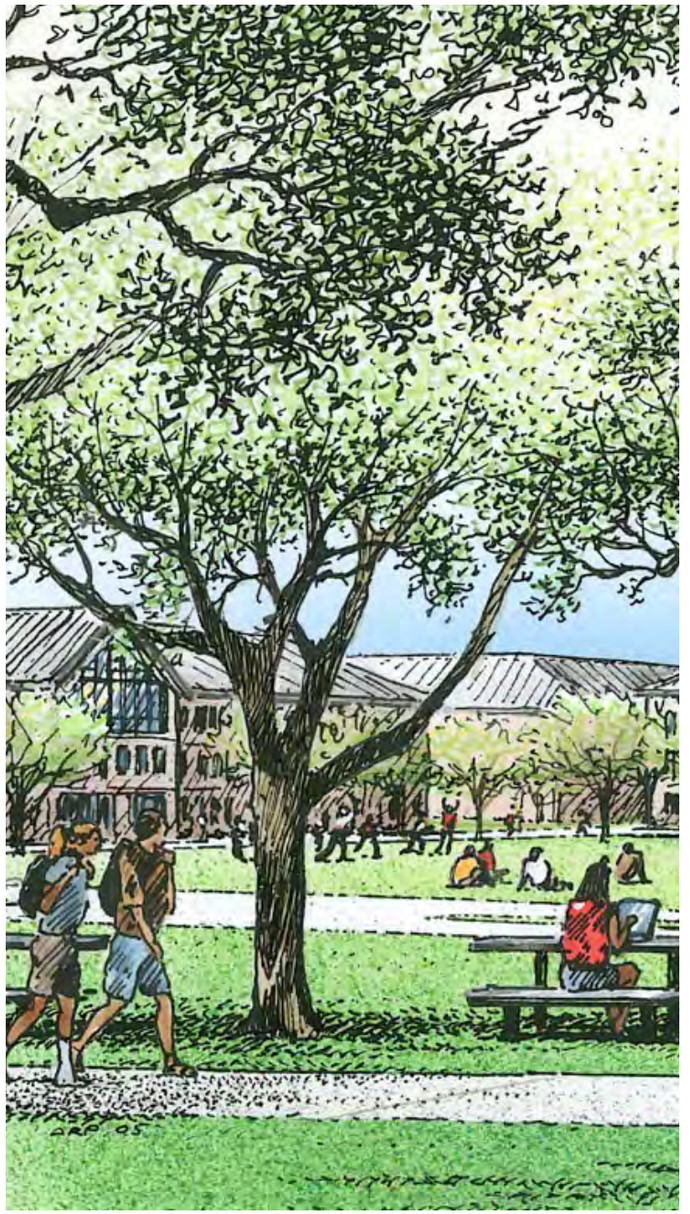
About half of the housing on campus will be sited around a large campus green located to the east of the Food Service Center. This green will be a prime location for all sorts of informal and organized recreational activities. The pavilion will be relocated to near the Food Service Center. This new location will keep it next to the green – and additionally, next to the activity at the cafeteria – but will make the green itself the focus, rather than the pavilion.

The Massie halls are relatively popular and can be suitably renovated in the future as needed, so they are retained in the master plan. The plan shows an addition to the halls, however, which will join them into one complex. Common spaces and some additional rooms will be housed in this addition. While the role of this addition as a means to unite the two halls and reduce personnel-related operating expenses is important, it is no less important that the addition be designed as a termination point for the mall.

In the plan, housing has been laid out in block units of varying sizes based on the units which have recently been built on campus. A large number of small buildings is not appropriate to create an appropriate college-like atmosphere, so where possible, these halls have been grouped into larger masses. In practice, the buildings may be separate, but with a unifying roof. The housing developments to the north and southwest of the campus green, to the north of the central plaza, and on the far west side of the site have all been sited to take advantage of this type of pairing.

Not all students desire the same type of housing, and the types of accommodations which students prefer may change over time. A variety of different housing types, including single suites of various sizes, as well as doubles and apartments, should be constructed as student preferences dictate. In fact, it is possible that individual residence halls may contain more than one housing type, though apartment-type housing may be separated from other types. Diverse housing choices will encourage students to remain in campus housing past their sophomore years. Currently, many students leave because off-campus housing offers alternatives which are not available on campus. If this situation is rectified by construction of sufficient amounts of high-quality apartment-like housing with amenities that older students desire, then in addition to privacy and flexibility, campus housing will offer advantages of proximity and community which non-university housing cannot.

The existing Food Service Center will not be sufficient to serve as the sole dining hall as the number of students in on-campus housing grows, and it has some operational and aesthetic deficiencies even now. In the future, large-scale food service will be located in two places: in an expanded Food Service Center, and in an expanded and reprogrammed University Center food court. In addition to these main locations, there will be smaller facilities distributed across campus. Much like the current Roscoe's Den, they will serve different types of food and may serve at different times from the main facilities.



Campus housing

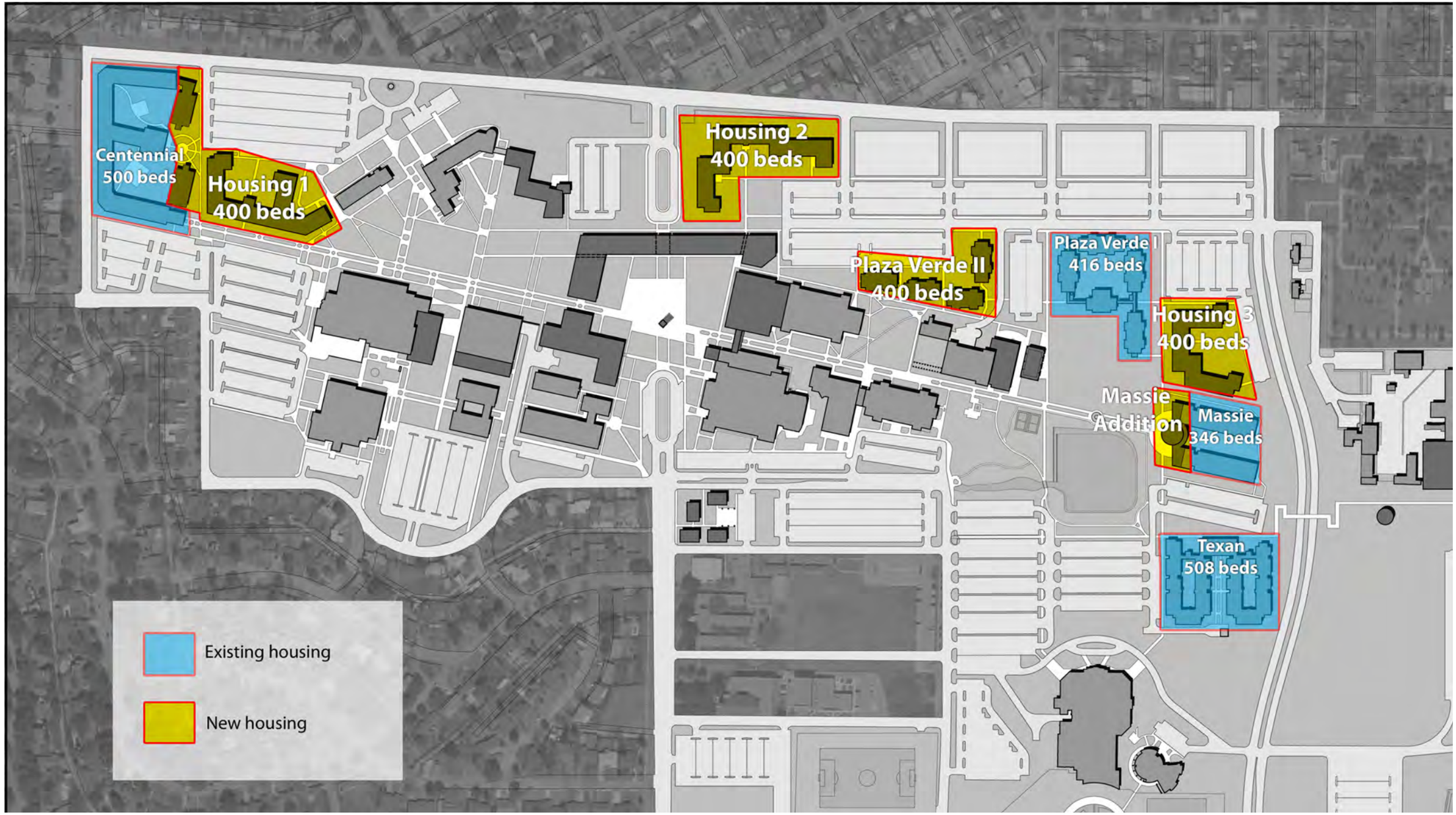


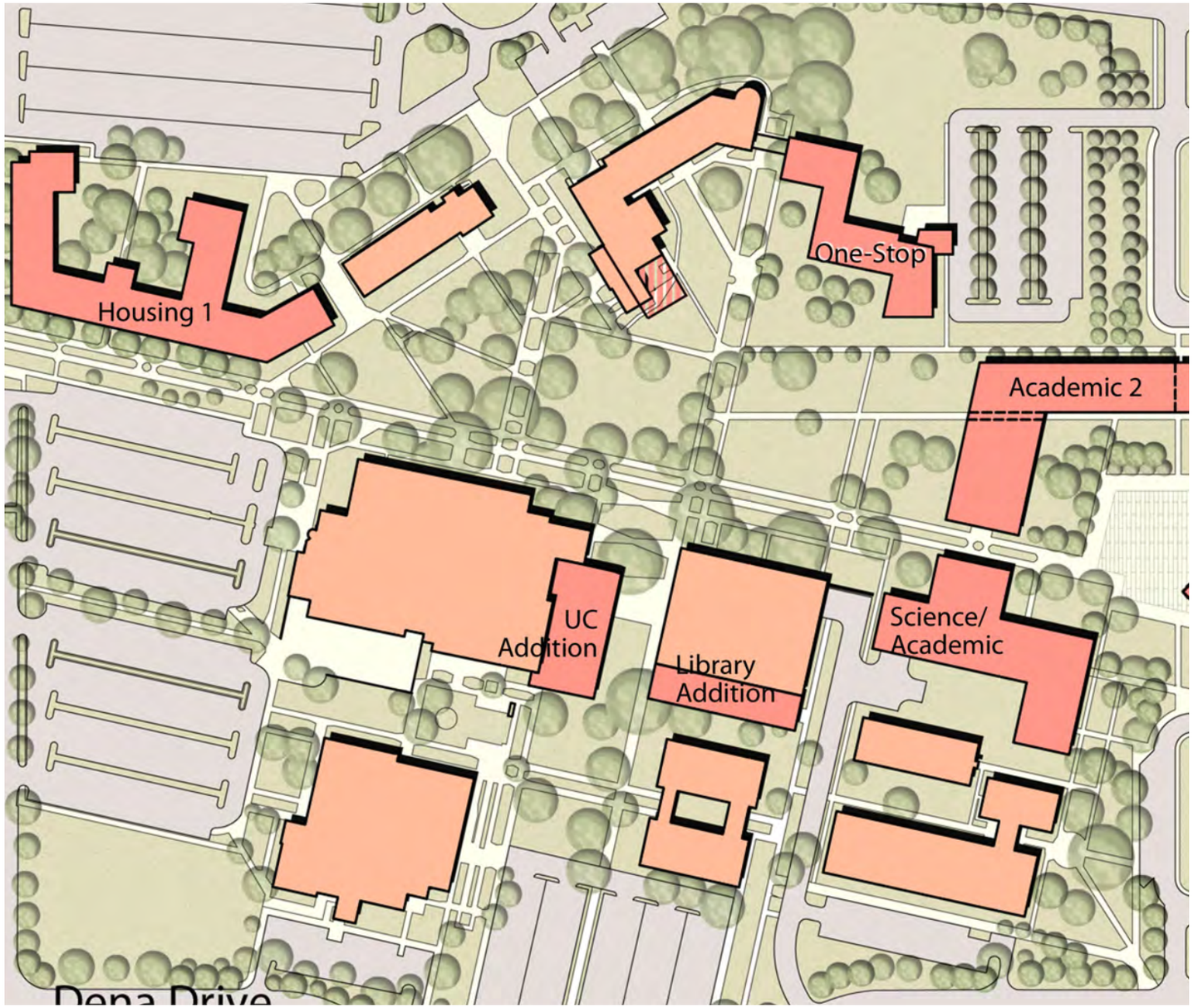
Diagram of campus housing locations

One-Stop Center and Other Areas

Student services are currently scattered across several different facilities, which is not ideal for coordination of services nor for ease of use. A new one-stop type center is proposed at the north campus entrance. It will consolidate services, help form the entrance itself, and act as a destination for first-time visitors to the campus.

While the C.J. Davidson Center and several other spaces on campus can support large events, there is not a dedicated, up-to-date auditorium space on campus. Instead of building a standalone facility, the existing auditorium at the Administration Building may be enlarged and updated to fill this role. It is located near the University Center, which will allow events requiring multiple venues to be held in the two facilities, and parking is well located nearby. Potential difficulties with expanding and/or renovating that space should be carefully studied; the layout of the existing space and accessibility issues may make a renovation project difficult.

Additional library space – approximately 30,000 square feet – will be required as the campus reaches its growth targets. A two-story addition to the south face of the library building will allow for that growth while not requiring demolition of the Academic Building. The addition will be two stories, and will also encompass the space in the arcade to the north of the addition. The existing exterior walls should be partially or entirely removed to allow for maximum flexibility.



One-Stop Center, Library, University Center, and various spaces site plan

One-stop center rendering

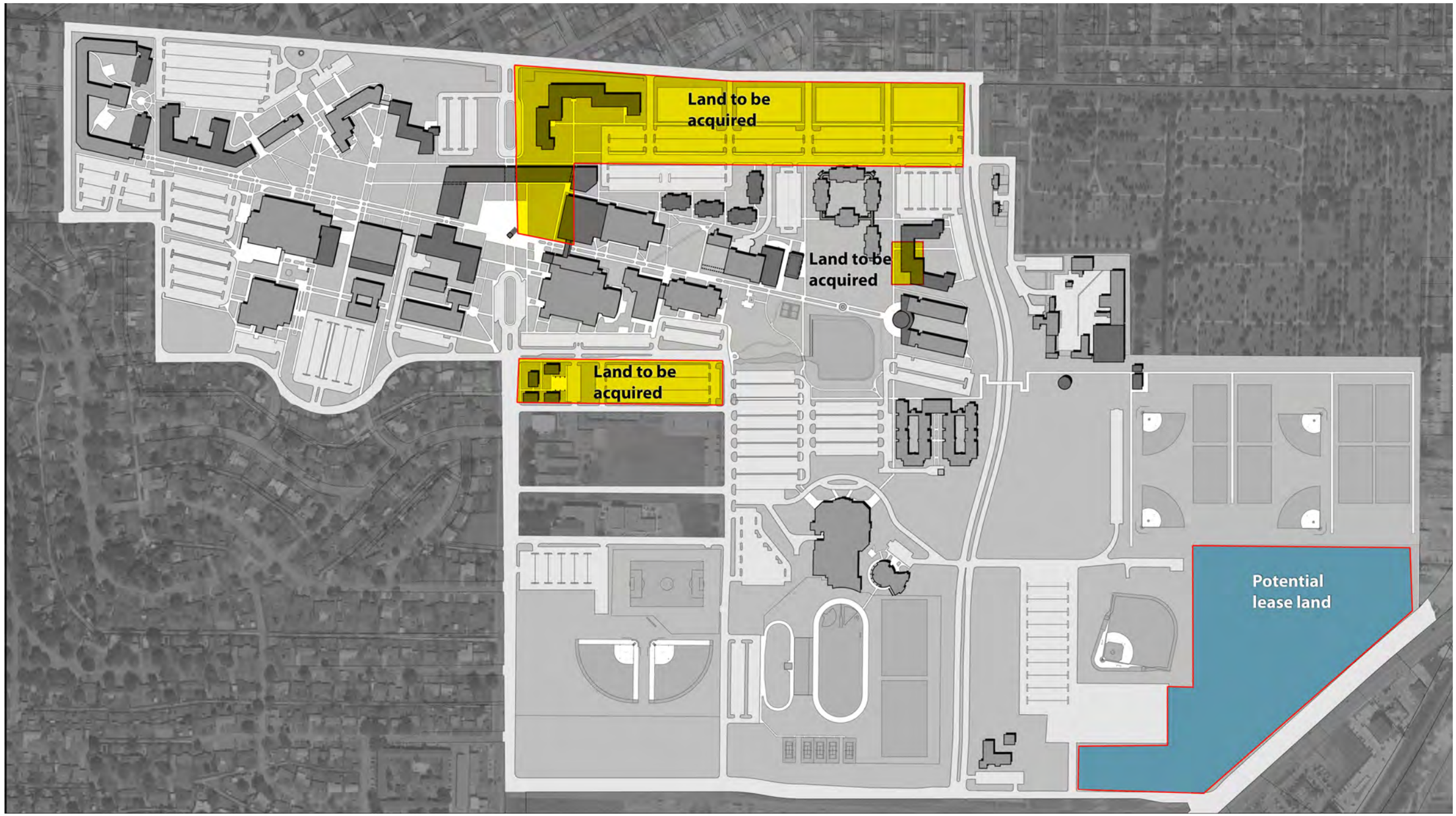
Land Acquisition

The growth targets for the University will require the purchase of additional land. There are several plots along ASU's edges which are prime opportunities for campus expansion because of their locations. The master plan shows construction on these plots. In all cases, land will be acquired in individual pieces rather than in one large chunk; construction sequencing can then be adapted to the varying availability of land. Also, portions of Vanderventer and Van Buren will be closed in order to limit vehicular activity in the campus and to assemble several small plots of land into larger, more useful building sites. This must be coordinated with the city, but will result in significant additional land available to ASU.

Land currently owned by campus religious centers is shown as a future acquisition because of its importance to ASU. This land is located very near the center of campus, so it is a prime opportunity to refine and develop the heart of campus. It should not be ignored, however, that the religious centers play an important role in student life on campus. Opportunities to move these facilities to equally central and easily accessible locations, including land swaps, should be investigated so that the students, the University, and the groups involved with the centers all benefit. A location for the relocated campus religious centers has been identified in the plan at the south entrance to the university.

ASU owns land southeast of the main campus which, because of its distance from the center of campus, is more useful for commercial and other uses than for directly university-related purposes. About 19 acres of this land are unused in this master plan. The unused land fronts on Knickerbocker Road, so it has the benefits of frontage on a heavily-traveled thoroughfare. Because the land is not used in the master plan, it is available for lease to a private developer or can be developed commercially by the university. ASU should retain ownership of this land in the event that it is required by future campus development, but any such need is well beyond the horizon of this master plan. Long-term campus development of the land could include parking, housing, athletics, or recreational uses. It is also possible to create a larger leasable area by reconfiguring parking around the baseball stadium, should that prove financially worthwhile.

North campus entrance rendering



Land issues diagram

Recreation and Athletics

Recreation

Campus recreational facilities play an important role in campus life, and as the enhancement of campus life is one of the primary goals in this master plan, the recreational facilities have been carefully sited and sized to maximize their positive impact on campus activity. The current location of the Center for Human Performance (CHP) is favorable; it is near the center of campus, and access to it has recently been significantly improved by a new addition which has also added a climbing wall, workout areas, and other high-visibility components along the mall. The master plan shows a future second addition to the CHP which will have food service and will span across the mall. In addition to helping enclose the central plaza to its west, the bridging element will also break up the long, monotonous length of the mall.

The outdoor recreation fields cannot be located in the heart of campus. There is no land available for them, and areas in the center of campus are better used for academic buildings, gathering spaces, and other uses. In the master plan, the fields are located across Jackson Street, as they are currently. While this location is a good match for the space needs and utilization of the fields, it is not connected well to the rest of campus. A bridge will be built across Jackson Street in order to enhance this connection for the fields as well as for possible future developments located across Jackson. A walkway runs east from the bridge, between several housing developments, and then to the recreational area. Walks branch out from the main walk, between the recreational fields, to allow better access to the fields.

As the number of students participating in recreational sports increases, the programs will benefit from storage space, restrooms, and potential concessions located near the outdoor fields.

The master plan shows a small facility, the Norris Baseball Clubhouse, placed immediately northwest of the fields that will supplement the recently-completed Norris facility, which will continue to serve the southern end of the recreational fields. The new building will also have a small plaza located adjacent to it which will serve as a gathering place for students using the recreational fields. The space shown for the fields is sufficient for the needs of the campus at 10,000 students if lights are provided to allow the fields to be used at night.

The tennis courts near Vanderventer will be removed so that higher-density uses can be built in their place, but the courts south of the Multipurpose Sports Complex will remain. If these courts are converted to athletic use in the future, new recreational courts should be constructed near the recreational fields east of Jackson.

The pavilion presently located east of the Food Service Center must be moved in order to create a larger, more cohesive campus green as a center for several large housing developments. The pavilion will be relocated next to the Food Service Center, which will make both spaces more active.

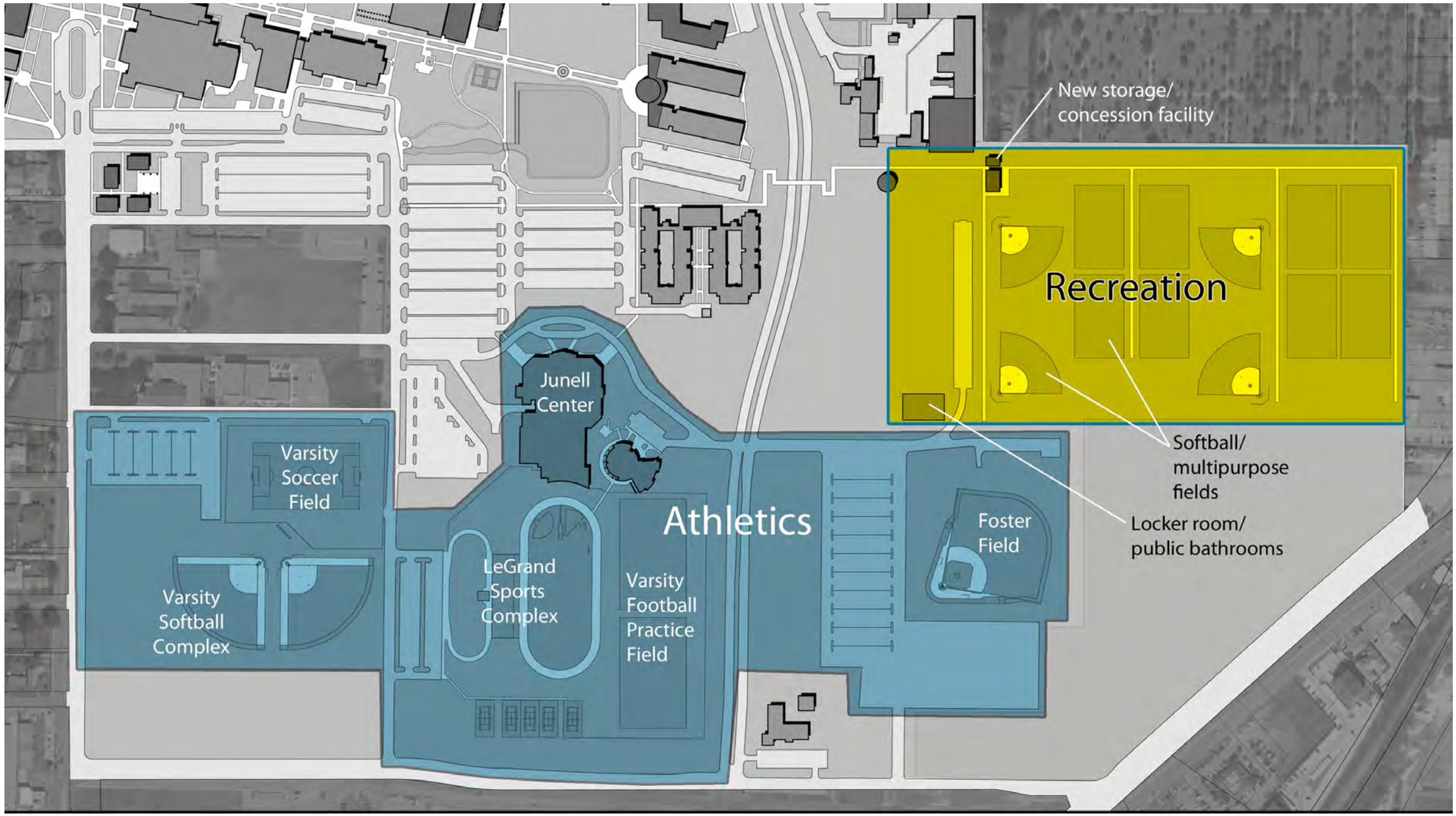
Athletics

The athletics facilities at ASU are adequate both for current needs and for the needs of a student population of 10,000 with only a few minor additions. If and when separate locker rooms become necessary, this should be rectified by constructing additional locker rooms at the stadium. Also, the area which currently houses the varsity practice field can actually hold two fields placed end-to-end; should more fields be required in the future, they can be accommodated here.

Additional sports programs, such as tennis, may be initiated as ASU's enrollment increases. Within the last few years, a ladies golf team was established. The golf program does not impose many requirements; practice and competition both occur off-site, which leaves only limited locker room, office, storage, and meeting facilities to be provided on campus. The addition of more space-intensive programs or large expansions of existing programs are not likely.

Adding tennis programs would require more additions and modifications to existing facilities. While the courts south of the Multipurpose Sports Complex are likely adequate for practice and some competition, they would require access to dressing rooms and seating for spectators. Additionally, use of these courts for athletics would displace recreational users. Recreational courts in this case could be provided near the recreational fields east of Jackson Street. If competition courts with large-capacity seating areas are required, they should be built near these existing courts where they can make use of existing parking and locker room facilities.

Beyond tennis, the only athletic changes likely are modifications and renovations to existing facilities. Football will remain at the San Angelo Independent School District stadium as there is insufficient land on the ASU campus to build a stadium and the duplication of such expensive facilities and their attendant parking would be wasteful. Basketball and other indoor sports are accommodated well in the Stephens Arena. Major expenditures on athletics facilities should in most cases be limited to maintenance and renovation.



Athletics and recreation/intramurals locations

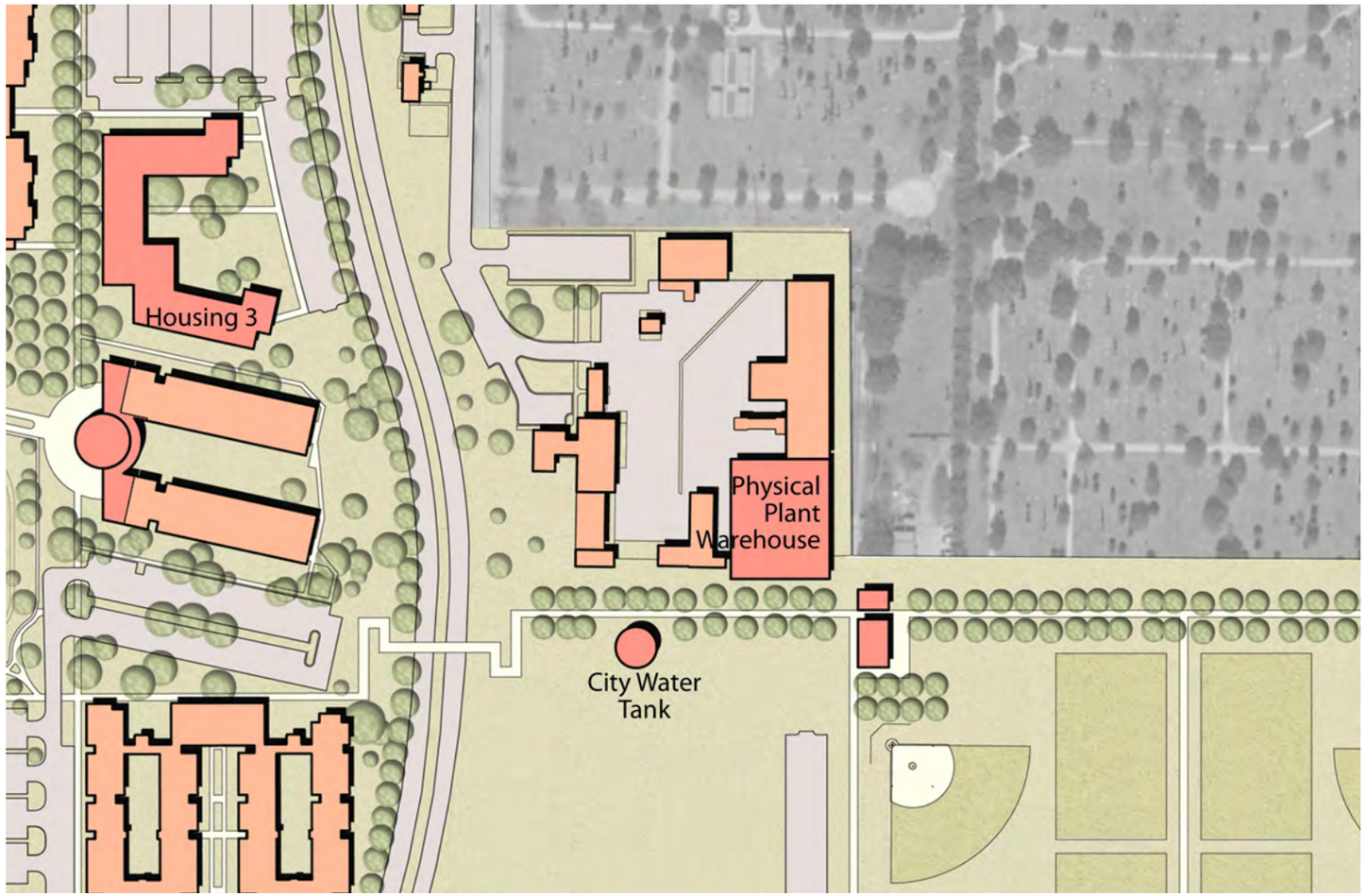
Physical Plant

The physical plant will remain in its current location with few changes except for the construction of additional space. The current location is good in that it is close to the campus, yet it does not occupy space which is needed for other facilities. A new 25,000 GSF warehouse will be required as the campus grows; a site for this has been located on the plan adjacent to other physical plant facilities.

As the campus is built out, land west of Jackson Street will become scarce. If new programs, additional growth, more housing, or other changing needs require more space than shown, then the site of the physical plant and the land south of it will be the best opportunities for expansion of facilities close to the campus core. This land, therefore, should be maintained as a land bank to provide for future needs. Parking and sports fields are good uses for the land until it is needed.

If future uses require more land than can be provided in the area south of the physical plant and north of the parking, then the physical plant should be relocated from its current site to a new location south of the recreational fields. While the physical plant should be located near the rest of campus, it does not require direct pedestrian access or any particular adjacencies. The new site would suit the requirements of the physical plant well, and the current site would be opened up for uses which can benefit from a closer relationship to the campus.

In this scenario, because the future site of the physical plant is empty, the plant may be moved in stages or all at once, as determined by the university. When the plant is relocated, departments which are located in different buildings now should be housed collectively in order to minimize construction costs.

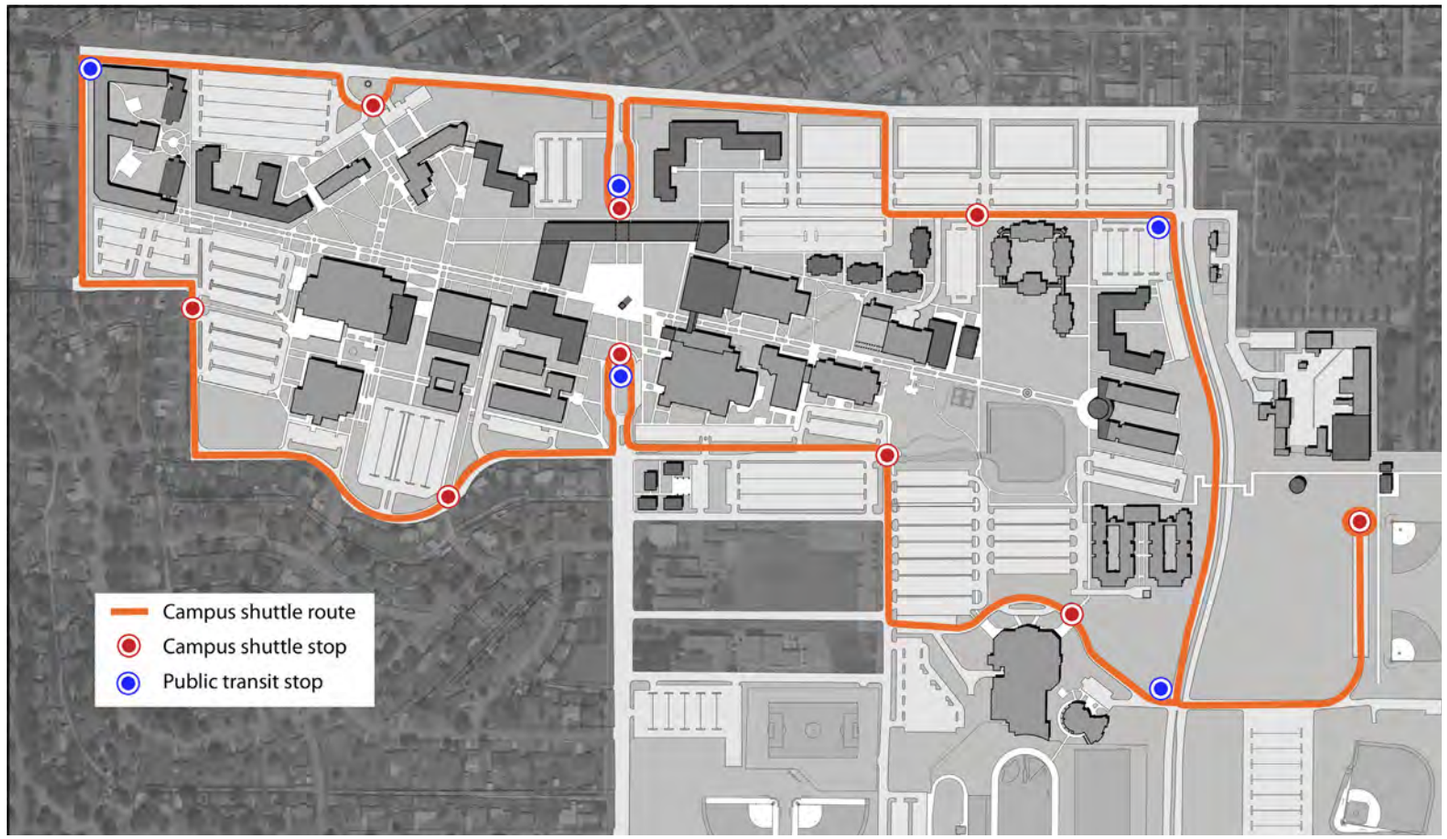


Physical Plan site plan

A city water tank, not currently in use, is located north of Massie Hall. The master plan proposes that the University donate land to the city south of the physical plant complex for the construction of a new, elevated water tower. This elevated tower will improve pressure to the campus and surrounding communities.

In turn, land currently occupied by the existing empty water tank will become available for University use. The master plan calls for the long term construction of a residence hall on this land.

Campus Shuttle and Public Transit



Public transit stops and campus shuttle route and stops diagram

San Angelo currently has limited public transportation options. The University would benefit from better transit connections to different parts of the city and surrounding communities. As ASU's enrollment grows, the need for the University to provide parking and roadway infrastructure will be mitigated by encouraging students to utilize mass transportation.

A good location for a future transit stop is near the heart of the campus, yet along a street which will allow for easy maneuvering and will have minimal delay due to traffic. The north turnaround at Johnson Street, once constructed, will satisfy these requirements. Johnson Street connects to West Avenue N, which in turn has good connections to the rest of the city. This location will remain viable even when the portion of Johnson Street which runs through campus is closed in the future. Other locations have been identified in the accompanying diagram.

Future parking requirements may necessitate a shuttle system to convey students from remote parking locations to the campus. The south turnaround at Johnson Street is a good location for shuttles, as it is near the center of campus and has good connections to the likely locations of remote parking south of campus. Potential campus shuttle route and dropoff locations have been identified in the diagram.

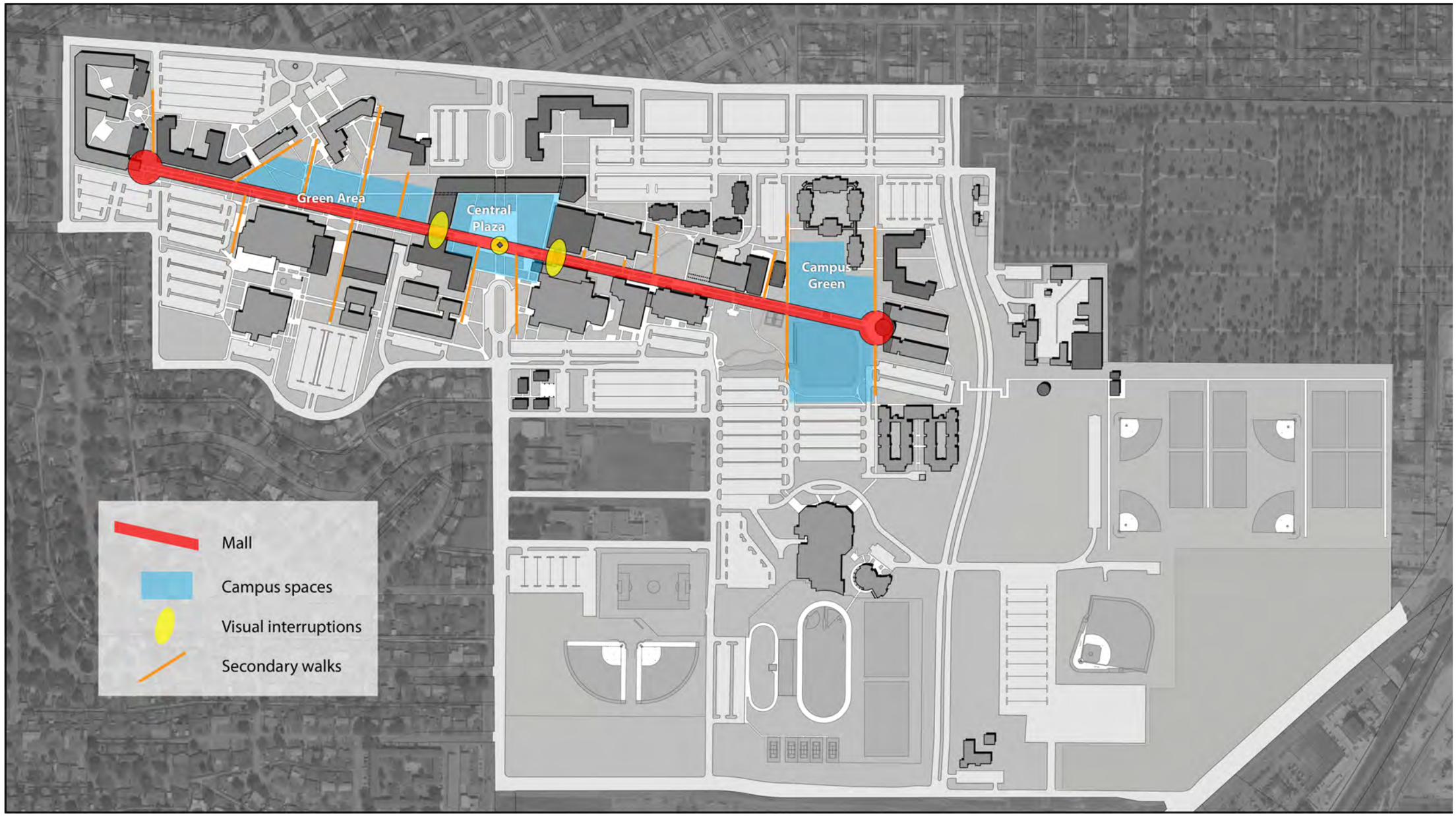
Pedestrian Walkways

The mall is the dominant pedestrian feature on campus, and it will remain so. The master plan adds interest and activity to the mall, however, by inserting plazas, greens, and bridging elements which break up the long, featureless stretches of the mall.

Land to the north of the current campus limits will be acquired as sites for future buildings and parking. The alignment of the mall does not provide access to these areas, so a new walkway will be built which runs along the current location of Vanderventer Avenue. This walk will connect the administration complex to the new areas of campus. Perpendicular walkways will also connect the two main walks on the eastern end of campus. The campus green will be framed by two of these perpendiculars on the sides, by the new main walk on the north, and by a relocated pavilion on the south. The mall will run through the south side of the green.

The grounds along and around the pedestrian walkways will be landscaped in accordance with the design guidelines. Some sections of the mall and other walks will be lined with rows of trees, and other portions will run through grassy areas. All pedestrian walks will have site furniture such as benches and trash cans.

Pedestrian walkway/mall rendering



Main pedestrian walks/spaces diagram

Campus Roadways and Central Plaza

Johnson Street has long been a problem for the campus. While it is a major north-south vehicular link through campus, it also severs all of the east-west pedestrian linkages. As the vitality of the ASU campus depends upon encouraging pedestrian traffic and activity along the mall, this situation should be changed in phases. In the first phases, the primacy of the pedestrian connection over the vehicular roadway should be firmly established, and then Johnson should be closed.

As construction for new buildings in the academic core is funded, the first pieces to be built should be those which are located close to the road in order to compress the space, which will help to slow and moderate traffic. The layout of the lanes, the curbs, and the paving of the street should be done so that it is clear to drivers that they are intruding upon a pedestrian environment. Johnson Street will be narrowed to one lane each way, and the two lanes will be separated.

When the changes shown in this master plan are implemented, traffic patterns will change. As more traffic is deflected to Jackson Street and to other routes, the issue of closing Johnson either permanently or during certain times of day should be revisited. Turnarounds on both sides of the plaza will allow the section of Johnson intersecting the plaza to be closed.

Jackson Street similarly breaks the east-west circulation pattern on campus, but because it is depressed below the grade of surrounding land, a bridge will be built across it to convey pedestrian traffic. The recreational fields and parking lots across Jackson will become important destinations as the student population grows.

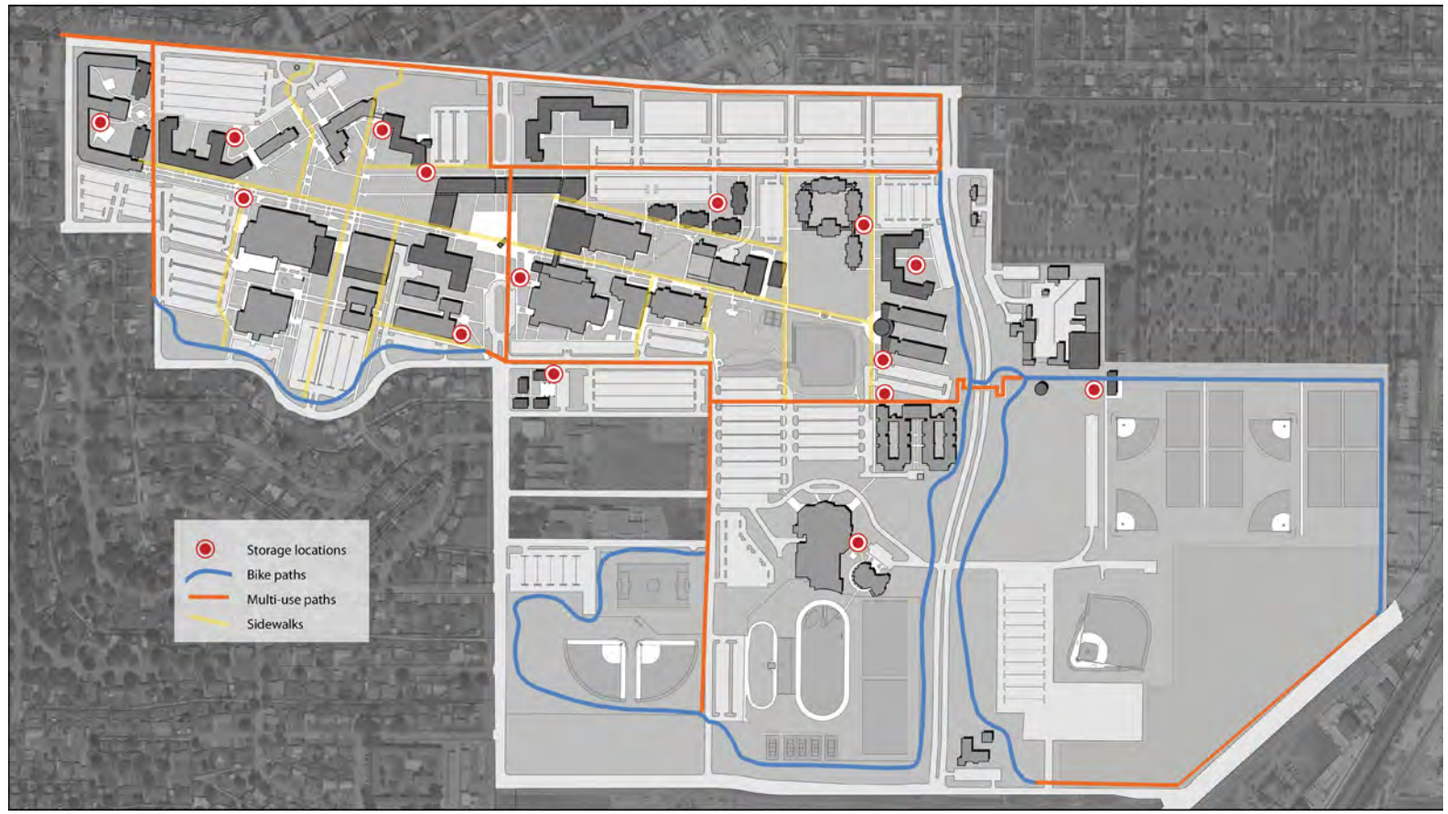
As the pedestrian-centered area of the campus expands, some portions of city streets located completely within University boundaries should be closed and rededicated to University use. Sections of both Vanderventer and Rosemont are closed or converted to internal campus circulation in the master plan, which has several benefits. First, it will eliminate unnecessary vehicular traffic. Parking lots which are retained or built within campus limits can be accessed directly, rather than by a roadway which cuts across pedestrian routes. Second, it will increase the amount of buildable area for the university, which will help achieve the density necessary to fit the building program on the site. Most importantly, eliminating unnecessary roadways will separate pedestrian traffic from vehicular traffic and will open up new area for pedestrian circulation.

Campus aerial rendering

Bike Paths

As the campus grows, the greater distances involved will cause an increase in travel times. ASU will remain a small place relative to many large state institutions, but alternatives to walking will still be needed. Enhancing campus amenities for bicyclists and encouraging the use of bicycles, rather than automobiles, can reduce the infrastructure required for automobiles. Given the significantly higher costs of developing roadways and parking for automobiles versus developing paths and walks for bicycles and pedestrians, non-vehicular and mass transportation should be encouraged wherever feasible. The diagram shows future routes for bicycles, both on roads and on multi-use paths.

Proper accommodations for bicycles should be provided at all buildings just as parking is provided for vehicles. Bicycle racks should be placed at all buildings, and walks will connect bicycle lanes and paths to buildings as necessary. These amenities are particularly important at residence halls and at places where students will gather, such as the University Center or the Center for Human Performance.



Bike path and route diagram

Parking

ASU currently has a parking surplus. As with most university campuses, however, ASU has a deficit of parking spaces in the areas where students and faculty prefer to park. This is, to some extent, both an unavoidable and an irremediable situation. If parking lots of sufficient size were to be intermixed with the academic core of campus, then the quality and continuity of the campus would suffer tremendously. Large garages could improve the situation from a functional perspective, but they can be unsightly and are not a financially viable option. Parking is therefore mainly located in a ring outside the main facilities.

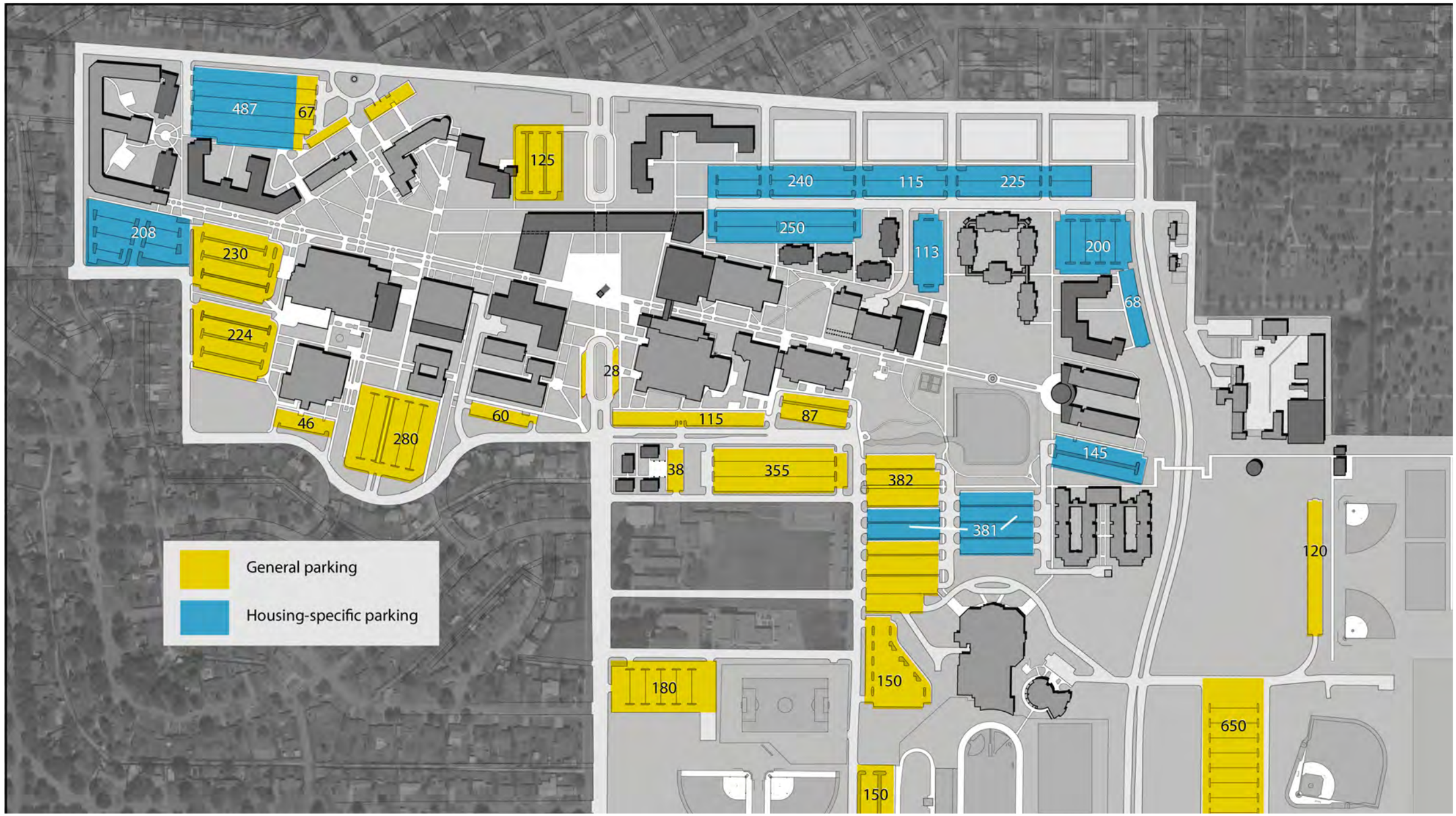
Pedestrian connections from parking to the mall and other walkways should receive even more emphasis than they do now. Parking will be pooled into somewhat larger lots rather than a series of small ones, and it is easy to neglect basic necessities such as shade, walkways, and street furniture in such a setting. Future large lots should be seen not as vast warehouses for vehicles, but as the starting points for the numerous walkways which serve as tributaries to the mall and other main walks. Pedestrian amenities should receive precedence over matters of efficiency and maximum capacity, though good parking lot design will ignore neither consideration.

The projected growth of the student population at ASU will obviously require commensurate growth in parking. As a larger percentage of the student body lives in on-campus housing, the number of spaces provided for those students must grow as well. Because of the increasing demands on parking availability as the student population grows, ASU's current policy of allowing on-campus students to park only in spaces designated for their use should continue. At the build-out of the master plan, parking will be limited, and if on-campus students are allowed to park in general parking, then inefficiencies and parking shortages will result. Encouraging bicycling is another way to reduce this problem. In the master plan, parking has generally been located near housing in quantities sufficient to allow on-campus residents to park near their residence halls.

ASU currently has a small parking surplus. With a future enrollment of 10,000 students, about 6700 parking spaces will be required. The master plan as shown provides sufficient parking, but just as now, not all parking is exactly where all students, faculty, and staff would like for it to be. As the campus gets larger, the disconnection between desire and reality may widen to some extent. Limited shuttle service and revised permitting practices may be necessary.

Should the student population grow beyond the targets of this master plan, additional parking can be located at the San Angelo Independent School District football stadium, in the lots by Colts Field, or on land south of the future location of the physical plant. Shuttle service will be required for all of these options.

Although large-scale structured parking is not a feasible option for the University, strategically placed small garages can mitigate parking problems at specific locations. Good placements for parking garages include sites near buildings which are heavily used, such as the University Center or the academic core facilities. Parking in garages may be separated from general student parking, which would enable the university to charge for parking on an hourly or daily basis.



Parking diagram

Project Priorities and Phasing

The Master Plan Update advocates for many new projects for the University, including infrastructure projects, new buildings, and remodels/expansions to existing buildings. Land acquisition will be a part of the effort in order to make room for needed facilities.

It is worth noting that there are a number of projects on campus which have just been completed or are about to be completed. These include the Learning Commons at the Porter Henderson Library, the expansion of the Center for Human Performance, and Plaza Verde I, a new housing complex with approximately 405 beds. Also underway is the Campus Green project, which creates green space for student gathering and outdoor activities, while also providing for the retention of storm water, and thus providing some relief to downstream San Angelo residents.

The Master Plan Update proposes that the needed infrastructure and facilities be added in two phases. The first phase consists of the highest priority projects, focusing on the programs of distinction and associated support projects. The second phase consists of important projects which, largely due to the difficult funding environment, would take place in later years.

Phase I

The first phase is focused on education and general (E&G) space, and is suggested to be composed of the following projects. The buildings should be designed with flexibility in mind, so that evolving academic needs and priorities can be accommodated:

- New Academic building. It is anticipated that the first new building might provide for the Nursing and Education programs, which are programs of distinction, and high priorities for the University. This new building is estimated to be approximately 108,000 gross square feet (GSF), and could also include new classrooms, collaborative space, and the Center for Innovation in Teaching and Research (CITR).
- Assuming that the new building is large enough to house all of Nursing, the next suggested project could be the remodeling of space in Vincent which has been vacated by Nursing. This space could be occupied by Agriculture, the other program of distinction. This project would be approximately 12,000 GSF in size.
- Another suggested remodeling could be to Carr, assuming that the new building is large enough to consolidate Education spaces from that building. The vacated space could easily accommodate Liberal and Fine Arts space. This project would be approximately 11,000 GSF in size.
- Renovate or replace Cavness. This building has not been significantly renovated since it was constructed, so needs to be updated for safety and building code requirements, and functional requirements such as right-sizing of labs and classrooms. The ideal solution would be replacement if funding can be found.
- Another priority for the University is to continue to improve classroom utilization. A suggested project that could assist in that goal, and also provide classrooms of a more appropriate size for current teaching needs, is the remodeling of the existing classrooms in the Academic building. Small classrooms could be joined together in order to right size classrooms.
- In order to better accommodate IT needs for the future, a renovation of classroom space in MCS is suggested. This assumes that appropriate new replacement classrooms have already been put in place. Approximately 2,000 GSF is suggested for renovation.
- One Stop Building. In order to accommodate administrative needs, particularly for a One Stop Center and to eliminate portable facilities, this project is suggested. It is estimated at about 25,000 GSF.
- Housing. Plaza Verde One, currently under construction and consisting of 405 beds and common space, should be completed in the early part of Phase I.
- As suggested in the Housing Study (see Executive Smmary in Appendix), a Connector between Robert and Mary Massie Halls would help provide amenities to these older facilities that have a limited range of support space, and provide a potential space for additional rooms. It is suggested to be a part of Phase I, but the timing would be dependent on the financial picture at the time the Connector is proposed.
- Food Service is limited to either end of campus, with expansion of the University Center and Food Service Center proposed in Phase II. A more central location for a small facility such as a snack and drink bar, is proposed for the CHP building in Phase I. This would leverage the significant activity already present at the building, and encourage more interaction between students and faculty and staff.
- The intramural fields are in need of upgrading and improved lighting, ideally in Phase I.
- Infrastructure. Infrastructure projects are identified in Phase II, but some, such as walks and bike paths, may well be needed in Phase I. It is estimated that there is enough chilled water capacity in the existing central plant for the projects proposed in Phase I.

Phase II

Phase II remains focused on E&G projects, but begins to bring in necessary student support space such as additional University Center space, additional housing, dining, and warehouse space. As in Phase I, space should be flexible to accommodate evolving academic needs and priorities. Suggested projects are:

- Three new academic buildings. These would total about 356,000 GSF, and provide for the future space needs for all Colleges not already included in Phase I.
- Backfill Rassman. Subsequent to the new building which might relocate Government from Rassman and consolidate them with other Liberal Arts colleagues, the College of Business could occupy the vacated space. This is about 6,400 GSF.
- The Library will also need to expand during Phase II. Approximately 30,000 GSF are estimated to be needed for Library expansion.
- University Center (UC) expansion. As the number of students grows, so does the need for additional student government space. An addition to the University Center could address this need, as well as expand food service offerings in the facility. This addition is estimated at approximately 27,000 GSF.
- Food Service. The University needs to strengthen food service at both ends of campus, particularly as the master plan attempts to provide a more geographically balanced approach to housing location. The west end would be served by the UC expansion. The east end would be served by an addition to the existing Food Service Center. It is estimated that approximately 15,000 GSF would be needed. This is in addition to the small snack bar proposed for the CHP building in Phase I.
- Housing. Additional housing will be needed to meet University targets for students on campus. Additional construction or acquisition will be needed to accomplish this goal. The demolition of Concho is also proposed. Reference the Executive Summary of the Housing report in the Appendix.
- Move Campus Religious Centers. These spaces are assumed to be moved and consolidated into a series of small buildings south of the CHP building. They are estimated at a total of about 12,800 GSF.
- Warehouse Space. The University will need another warehouse to assist with bulk storage. This is estimated at about 25,000 GSF.
- Infrastructure Projects. A variety of infrastructure projects will be required to support the additional space created in all the projects proposed by the Master Plan. A Chiller Plant expansion will be required; and walks, pathways, signage, parking areas, storm water detention, all will be critical to the success of the master plan. Traffic calming for Johnson Street will need to begin (if not underway in Phase I), with the eventual closing and construction of the plaza the Master Plan envisions.
- Intramural Facility. In order to accommodate needed showers, restroom, and changing activities, a new Intramural Facility is proposed for Phase II at about 5,000 GSF.
- Renovate existing auditorium. This facility is due for a complete renovation of its approximately 10,000 GSF.

Phasing will, to some extent, be determined by program needs. Construction of the initial buildings around the central plaza should be guided by an understanding about how building placement can influence perceptions about Johnson Street: as property is acquired and program needs defined, sites which create a sense of enclosure at the future central plaza should be selected for initial projects.

Gray denotes existing buildings
(asterisk denotes renovations to existing buildings)*
Black denotes new buildings

Phase I Facilities

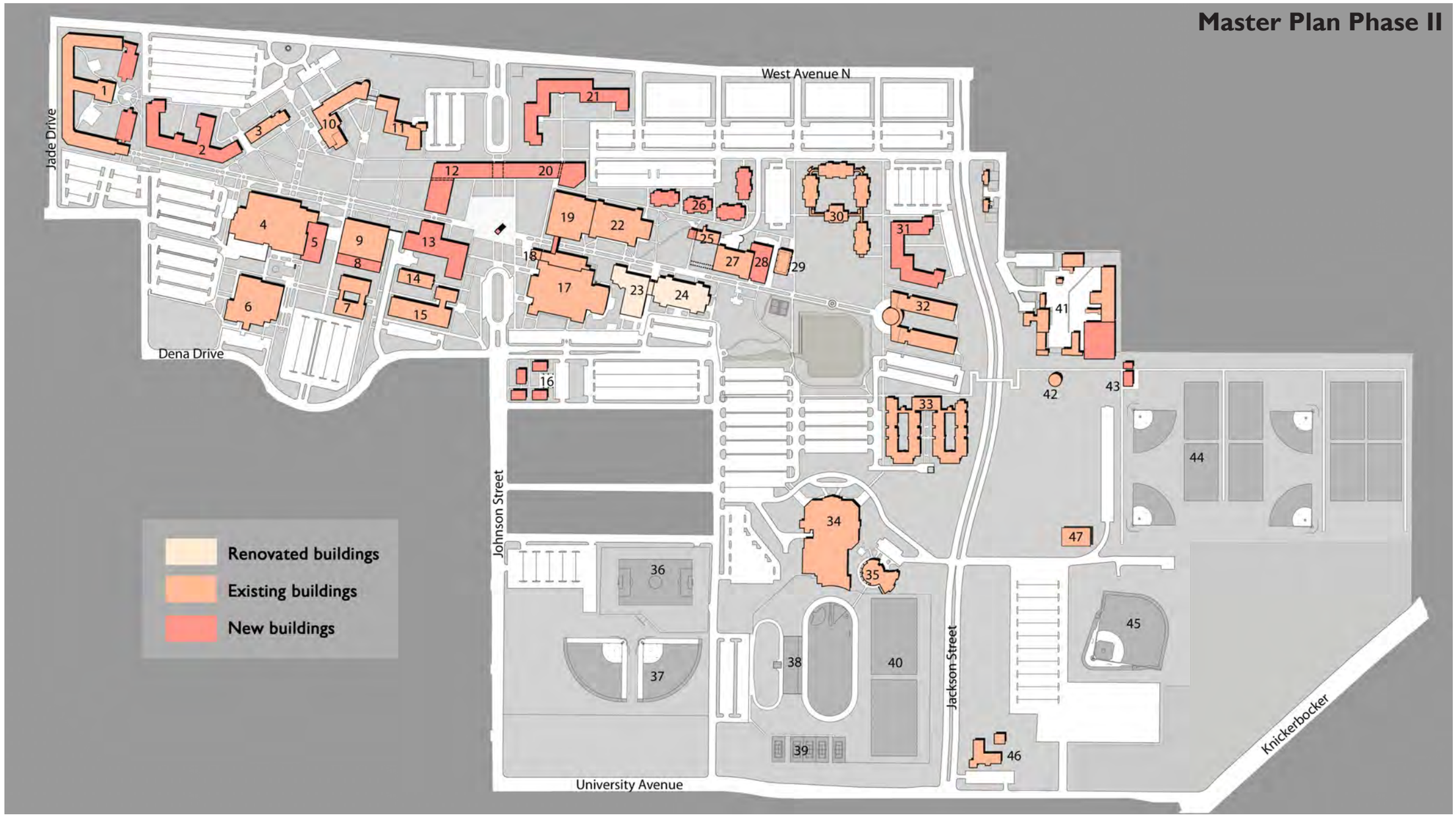
1 Centennial Hall
2 Carr Hall
3 Hardeman Student Services Center
4 University Center
5 General Services
6 Carr Education-Fine Arts Building *
7 Academic Building *
9 Porter Henderson Library
10 Mayer Administration Building *
(Renovate Auditorium)
11 One-Stop Center
(Administration/Student Services)
14 Science III
15 Cavness Science Building *
16 Campus Religious Centers
17 Center for Human Performance
18 CHP Addition
19 Nursing/Education Building
(Academic Building I)
20 -
22 Vincent Nursing-Physical Science Building *
23 Math-Computer Science Building *
24 Rassman Building
25 Central Plant
26 Concho Hall
27 Food Service Center
28 -
29 Pavilion * (Relocate Existing)
30 Plaza Verde I
32 Massie Halls
33 Texan Hall
34 Junell Center/Stephens Arena
35 Fieldhouse
36 Varsity Soccer Field
37 Varsity Softball Complex
38 LeGrand Sports Complex
39 Tennis Courts
40 Varsity Football Practice Field
41 Facilities Management
42 Water Tower
43 -
44 Intramural Fields *
45 Foster Field/Colts Stadium
46 LeGrand Alumni & Visitors Center
47 Norris Baseball Clubhouse

Phase 1 site plan

Gray denotes existing buildings
(asterisk denotes renovations to existing buildings)*
Black denotes new buildings in this phase
(^ denotes long term projects)

Phase II Facilities

1 Centennial Hall (Addition)
2 Housing 1 ^
3 Hardeman Student Services Center
4 University Center
5 University Center Addition
6 Carr Education-Fine Arts Building
7 Academic Building
8 Library Addition
9 Porter Henderson Library
10 Mayer Administration Building
11 One-Stop Center
12 Academic III
13 Science/Academic Building (Academic Building IV)
14 Science III
15 Cavness Science Building
16 Campus Religious Centers
17 Center for Human Performance
18 CHP Addition
19 Nursing/Education Building
20 Academic II
21 Housing 2 ^
22 Vincent Nursing-Physical Science Building
23 Math-Computer Science Building
24 Rassman Building *
25 Central Plant (Expansion)
26 Plaza Verde Phase II
27 Food Service Center
28 Food Service Center Addition
29 Pavilion
30 Plaza Verde I
31 Housing 3 ^
32 Massie Halls
33 Texan Hall
34 Junell Center/Stephens Arena
35 Fieldhouse
36 Varsity Soccer Field
37 Varsity Softball Complex
38 LeGrand Sports Complex
39 Tennis Courts
40 Varsity Football Practice Field
41 Facilities Management (New Warehouse)
42 Water Tower
43 Multipurpose Intramural Facility
44 Intramural Fields
45 Foster Field/Colts Stadium
46 LeGrand Alumni & Visitors Center
47 Norris Baseball Clubhouse



Phase 1I site plan

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Design Guidelines

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Design Guidelines

Introduction

The Design Guidelines are intended to provide for an aesthetically coherent campus, through the advocacy of a framework of architectural and other physical design elements. The guidelines presented in this document represent an update to the original Design Guidelines published in 2005, and are especially important as they present information on the University's commitment to sustainable design.

Purpose

Useful architectural guidelines are not a prescriptive list of requirements and limitations. Rather, guidelines are the result of an analysis of existing practices intersected by recommendations for strengthening and clarifying the elements already present on campus. While portions of these guidelines do set out fairly strict codes for certain aspects of campus development, most of the guidelines should be viewed as principles which can be incorporated into projects in many different ways. For example, while the recommendations for brick types and colors should be followed to the letter for most, if not all, projects, the more abstract principles for siting a building with regard to the mall should be interpreted appropriately for each individual building.

As ASU grows toward the goals outlined in this master plan, the pressures of available land, limited funds, and increasing needs will influence the design and construction of new facilities. Expedient solutions to these demands and the scattered aesthetic responses of many different designers must not be allowed to dominate new development as they have many college campuses. It is the responsibility of each designer who works on the ASU campus to build upon the strengths of the campus.

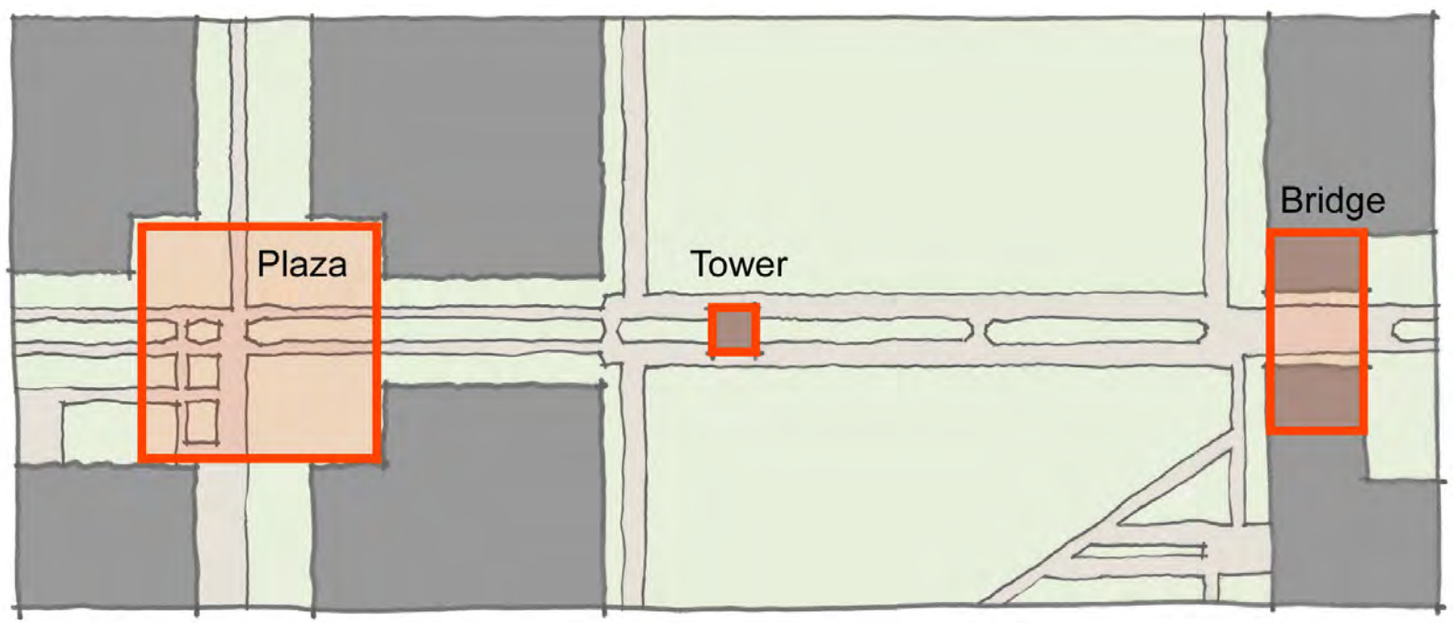
These design guidelines provide an aesthetic structure for future projects, and adherence to these guidelines will produce a unified, cohesive campus.

ASU's campus is rare in that it has been developed in a consistent manner even without a formal set of guidelines. That consistency means that these guidelines are to some extent a codification of existing campus practices such as building materials and overall building forms. This is a relatively minor part of these guidelines, however; more importantly, these guidelines and the master plan together describe the spatial and organizational principles of a future campus which will retain ASU's unique qualities yet will create a richer, more active place.

Relationship of Buildings to the Mall and Open Space

Pedestrians are the heart of campus activity. Without foot traffic, campuses are little more than suburban collections of buildings surrounded by parking lots. The ASU mall is the most important conduit of pedestrian traffic, and so it should be more than a walk lined with buildings. Relationships between buildings and the mall should be symbiotic - the buildings should help form the mall, and the mall should enhance the buildings. The proportions, activity, and appearance of the mall should be primary considerations for every new building project.

The width and rectilinear outline of the mall should not be inviolate. In fact, buildings should enliven the walkways by penetrating the simple, plain edges of the mall. Points of visual interest should be established along the mall in order to provide focus and relief. This may be done with building elements that span the mall or singular elements that are inserted into it. For example, a chime and clock tower would provide visual and sonic interest, and would be both a marker and point of orientation for people on campus and beyond.



Elements which can be used to interrupt the homogeneity of the mall

The mall

One of the most crucial aspects of a cohesive campus atmosphere is the establishment of active, attractive outdoor spaces. Buildings should, in places, compress the mall to create these spaces and to give a sense of enclosure. Without well-defined borders, edges, and enclosures that create subsets of spaces within it, the mall is merely an attractive means to get from one place to another, not a generator of social activity.

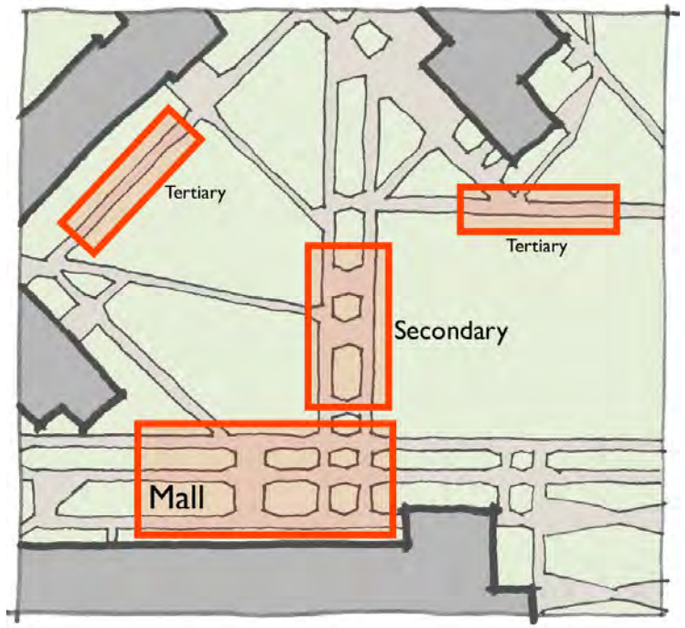
Most of the length of the mall consists of a doubled walkway separated by a strip of grass. For reasons of continuity, this pattern should be continued in future extensions to the mall. The total width of the mall, including grassed areas between the walkways, ranges from 30 to 60 feet wide. Should new major connecting walkways similar to the mall be established, consideration should be given to designing them to correspond in size and laout with existing mall.

Other Walks

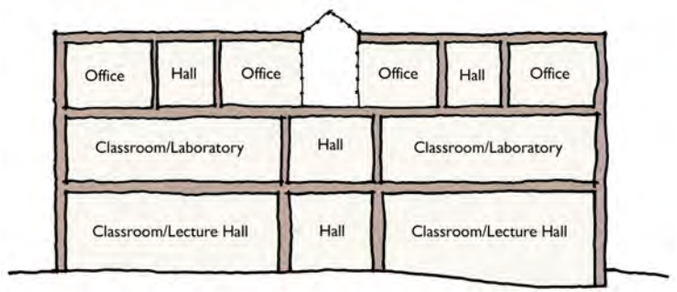
Other walkways on campus bear relation to the mall, but they differ in their size, their layout, and how they relate to the buildings and spaces around them. Existing walks are almost exclusively concrete with a pebble finish. New walks should be broom-finish concrete except for locations where special circumstances dictate other paving methods. Other walks can be classified into two types as follows:

Secondary Walks: Walk systems which generally run at right angles to the mall. These walks connect major points and consist of doubled walkways along most of their length. They are 25 to 40 feet in total width, including grassed areas between separate walkway portions. Secondary walks are not nearly as long as the mall itself, but are more extensive than the tertiary walks which serve to connect buildings to parking lots and to one another.

Tertiary Walks: Short, single walks which connect between buildings or to parking lots. They are five to ten feet wide, depending on how heavily they are used.



Different walkway types



Uses at different levels

Vertical Building Organization

Academic buildings, housing, and administrative buildings should not exceed three levels in height. Overall building heights should be 50 feet or less. The floor heights of new buildings should also correspond with those of existing buildings so that the overall scale of new buildings is compatible with that of existing buildings. Different types of uses are best accommodated on particular levels as follows:

First Level: Pedestrian circulation, large classrooms, lecture halls, and building services

Second Level: Classrooms, laboratories, some offices

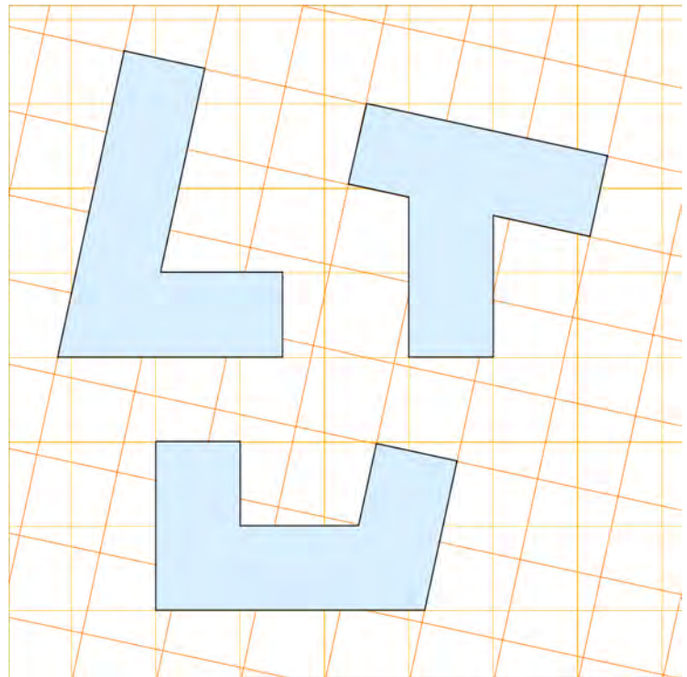
Third Level: Faculty and administration offices

This breakdown of uses obviously cannot apply directly to non-academic buildings, but the logic behind this organization can be used. Heavily-used areas like auditoriums, gymnasia, and other gathering spaces should be located on the ground floor. Smaller gathering rooms like dance studios, conference rooms, and laboratories should be located on second levels. Third levels should be reserved for offices and low-use spaces. This organization will reduce travel times between classes and will minimize the number of elevators and other costly vertical circulation elements.

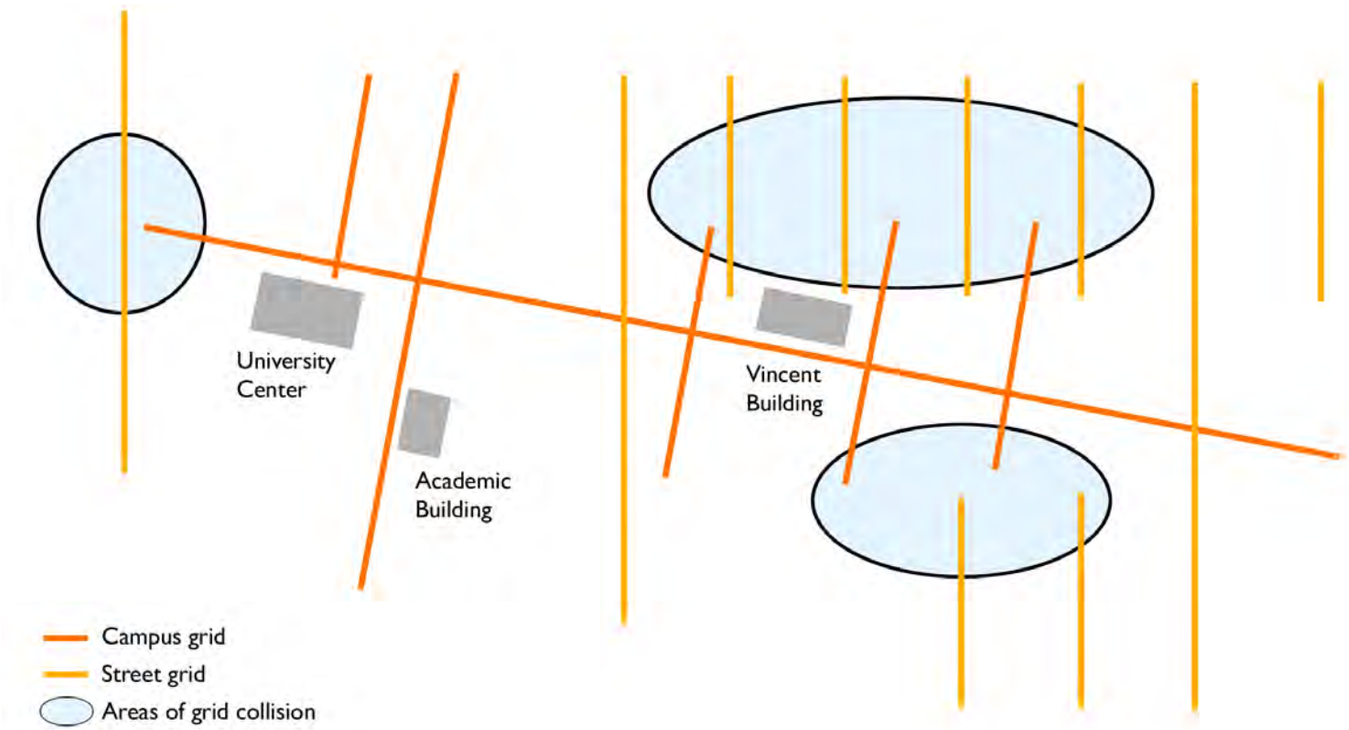
Building Shapes

The mall, and therefore most of the ASU campus, is rotated relative to the street grid which surrounds the campus. Because most ASU buildings front the mall and do not have frontage on the surrounding streets, building shapes have responded only to the mall. As the campus expands into new areas around the edges of campus, the design of buildings will be affected by both grids. In order to respond appropriately to both the existing ASU campus and the buildings around the university, shapes of buildings near the intersection of the campus grid and the street grid should reflect both grids. This will also maximize the area useable for buildings.

Building shapes should not be complex. In most cases, building shapes should be modified versions of simple shapes like "L," "U," and "T." The conjunction of grids and the built response to that juxtaposition will create more interesting spaces and will engender more appropriate architectural responses to both the existing campus and its surroundings.



Building shapes at grid collisions



Campus axes

Facade Organization

Some expression of building structure should be apparent from the façade. Buildings should delineate structural columns through the presence of masonry piers, by the modulation of the wall plane, or through a series of openings that relate to the building's structure. Window openings in masonry walls should be organized by the structural system into combinations of smaller openings within bays. Horizontal elements which are inserted into the façade, such as windows and grilles, must not extend for lengths which exceed those of the building's structural bays without some expression of the supporting structure.

Buildings should be visually organized into separate base and body portions, as shown in the top element of the illustration to the right. This will give new buildings a sense of scale which is not apparent in all existing campus buildings. Multi-story arcades and vertically undifferentiated façades can have an alienating affect upon pedestrians - without a visual reference to lend scale to wall surfaces, buildings can seem cold and unaccommodating.

Arcades

Arcades along the edges of buildings provide shelter from sun, wind, and rain. They are not merely functional spaces, however; they can also help animate the edges between buildings and the mall. Arcades form intermediate zones between interior and exterior spaces that can extend the usage of the building outside in good weather, and can temper the extremes of temperature in poor weather. Where possible, the sides of buildings inside arcades should be glazed. Opaque interior arcade walls should be washed with light. Arcades are also prime locations for artwork or architectural crafts.

Examples of façade organization

Arcades should be no taller than the first level of the building to which they are attached. The warmth and animation that an arcade gives a building's exterior can be lost if the arcade is scaled to relate to the height of the building rather than to the height of a person. Any shelter that the arcade provides would also be compromised by inappropriate scale.

Arcade at the Vincent Building

Glazing

New campus buildings should have more glazing than most of the existing campus buildings – 20 to 33 percent of the exterior wall surface should be glazed, with an emphasis on areas at ground level to open buildings up to the mall. This is particularly important in buildings which serve social functions. Transparency should be incorporated at active areas like cafes, student recreation facilities, and performing arts spaces.

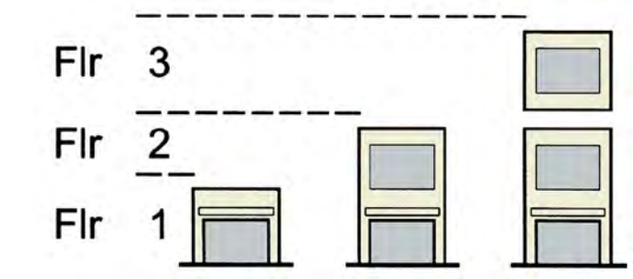
Example façade with 30% glazing

Increased use of glazing will also help to reduce the need for artificial lighting. Higher levels of natural light in classrooms and offices create more inviting spaces for students, staff, and faculty in addition to reducing energy requirements. Care should be taken, however, to ensure that large glazed areas have a minimal detrimental impact on energy efficiency. Glazing should be low-e and/or insulated as determined by the project designers, and glazing should be shaded and shielded to reduce direct exposure to sun and wind as necessary.

Heavily tinted, colored, or reflective glass should not be used. The transparency of glass is just as important as is the color rendering performance of lighting. Where additional protection from sun is needed, options such as overhangs, arcades, and solar shades should be investigated.

Entries

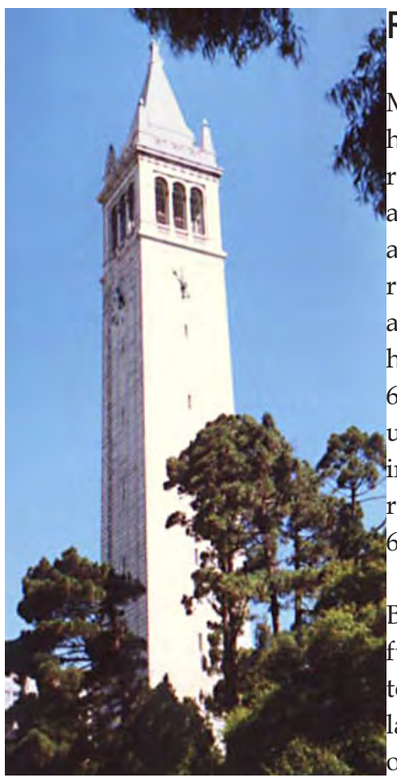
The shape and location of building entries should give strong visual clues about their functions. Main building entrances should be immediately obvious to pedestrians from the form of the entrance itself. Building signage should support that appearance, but signage should not be necessary in order for visitors to locate a main building entrance. Main entrances should be oriented toward the mall, not toward parking lots at the rear or sides of buildings.



One- two- and three-story entries

Entrance to the Hardeman Building

The scale of entrances is also important. While the need to assign architectural significance to an entrance may be satisfied by using large-scaled building elements, it is important to also maintain a relationship between the scale of the entry and the people who use it. This can be accomplished, for example, by inserting a single-story entry within a multi-story element. The design and scale of entries should also reinforce the body-base organization described in the "Façade Organization" section.



Sather Campanile at Berkeley

Roof Articulation

Most buildings at ASU have low-slope built-up roofs, and new large academic buildings should as well. Relatively narrow one- to two-story academic buildings may have hipped roofs. A 6:12 pitch should be used. Residential buildings should have hipped roofs with pitches of 6:12.

Buildings with unique functions are exceptions to these rules, particularly when the function of those buildings dictates certain roof types. A central tower or other campus icon, a future theater, and even certain types of student services buildings should be visually prominent in ways which general academic buildings should not. This may be accomplished in part through roof articulation. Hipped roofs with steeper pitches than 6:12 or gabled roofs should be considered.

Materials and Colors

There are many types of brick used on campus, but most fall into a narrow range of color and size. Future buildings should be constructed with bricks of similar color and size, and designers of new buildings should pay particular attention to the types used in nearby buildings. In the absence of a prevailing brick example, the brick on the Administration Building should be used as an exemplar.

White stucco is used on many campus buildings either as an accent or as a primary façade element. This use should not be continued. Designers should refer to the examples set by the Hardeman Building and the Administration Building rather than to buildings such as the Henderson Library or the Academic Building. Brick should be the dominant building material, and stone or cast stone, rather than stucco, should be used as an accent material to set off the brick. The overuse and misuse of stucco on campus buildings detracts from the warmth and visual strength of brick.

There are relatively few other materials used on campus buildings. As noted in the "Specialized Buildings" section, however, the use of other materials on special buildings may serve to emphasize the distinctive role of those buildings. Any contrast with typical campus materials should be done deliberately, not simply for the sake of difference, and should enhance existing buildings through its dissimilarity. Paving and other hardscape materials are addressed in the "Site Furniture and Hardscape" section.

Brick with cast stone accents at the Hardeman Building

Cast stone accents on the Administration Building

ASU's existing color palette is dominated by the brick used on most buildings. While there are multiple types of brick used on various campus buildings, brick on new buildings, and therefore the color palette of new buildings, should center on the color of the brick on the Administration Building. As with materials and roof types, special buildings may depart from this color palette, but any departure should be done carefully and with full recognition of the intent and consequences of such a decision.

Public Art and Architectural Craft

Public art should be incorporated into building projects at ASU. Each project's art program should be initiated as early as possible in the process of building design to ensure that appropriate measures are taken for the installation of art pieces. Certain building types (a theater, for example) are particularly suitable for the inclusion of public art. A campus committee has been established to direct and encourage the inclusion of public art in projects at ASU, and the integration of this committee with the building process should start at the very beginning of each building project.

Public art as a component of courtyards, plazas, and even walkways will make spaces more lively and interesting. A variety of types of art including sculpture, decorative sconces, fountains, and site-specific installations are all possibilities. More prominent art should be placed in prominent spaces, but where buildings or plazas themselves are the focus, art installations should enhance, rather than detract from, the overall composition.

Decorative wall sconces

Residence Halls

One of the primary determinants of the level of activity of campus life is on-campus housing. Well-executed housing will attract and retain students, while substandard housing will have an adverse impact both on recruitment efforts and on the retention of students who live in campus housing.

Campus housing should not just provide places for students to live, but should create an environment for learning which students cannot obtain anywhere else. For example, common areas should be located close to and under the same roof as student rooms and suites so that students are encouraged to gather and socialize. The building should have a common entry point which will serve as the primary point of information dissemination.

Residence halls should have outdoor space for student use

Housing should have landscaped exterior areas - courtyards, plazas, green areas, or informal playing fields - for use by student residents.

A variety of different room and suite types should be built over time as students' preferences change so that all students are well accommodated. Provision should be made for handicapped access to all parts of the building, even if accessible units are located in specific areas. Larger housing sites should have dining located near or perhaps even attached to the housing. Expensive construction types are not required; rather, the suitability of the design to the creation of a collegiate atmosphere is of paramount importance. Materials should bear correspondence to those used for academic buildings, though the forms and to some extent the materials of the residence halls should be distinct from the academic buildings. For example, exterior insulation and finish systems may be used in place of some brick.

As there will be a high level of activity around campus housing both day and night, security is a primary concern. There should be transparency in housing common areas to promote visibility. Access to the facilities should be well controlled. Walkways to and around the housing should be well illuminated and free of brush which might obscure vision. Shrubs and other low plants should be a maximum of approximately 24 inches high, and trees should be trimmed clear to a minimum height of seven or eight feet, as appropriate to the type of tree.

Specialized Buildings

Certain types of campus buildings require special materials or dimensions, or should otherwise stand out from the rest of the campus. Facilities like galleries, theaters, and towers have a civic and campus-wide aspect to their use that suggests a special approach to the design, siting, and materials of the building.

The location of a specialized building can be as important as is the form of the building. Certain buildings, particularly those which serve large groups such as theaters and concert halls, should open onto courtyards, plazas, and other outdoor spaces which can be used for gathering and to extend the functionality of lobbies. Sites for special buildings should reflect the symbolic importance of those buildings. Depending on the usage of specialized buildings, they may be sited near the heart of campus or near other buildings which support the use of that building.

The flexibility with materials, forms, and methods which are applicable to specialized buildings does not mean that the designers of those buildings are free to ignore the standards laid out in these guidelines or to approach building siting in a manner which disregards surrounding buildings. Quite the opposite is true, in fact. The understanding required to meaningfully and appropriately go beyond established principles is much more profound than that which is necessary to simply follow them. Because of their divergence from the norm, specialized buildings will attract attention. The design of these buildings should use this prominence to acknowledge the existing fabric of the campus while incorporating new elements which will help to emphasize the buildings' symbolic importance.

Gathering space outside a small theater

Other Guidelines

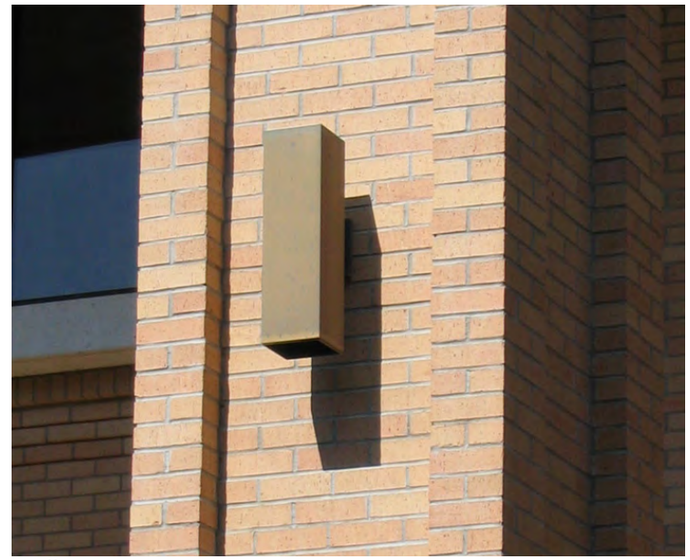
Exterior Lighting

Lighting is an important part of the campus environment both for reasons of safety and of appearance. Good lighting will create a welcoming atmosphere, which is an important part of generating nighttime campus life. Handcrafted sconces and other building-mounted fixtures are more appropriately scaled for pedestrians than tall light poles and should be used where possible. Lighting should be enhanced in areas which are relatively heavily used at night, such as at the Super Slab and around the library, and well-lit connections should extend from these areas to housing and food service facilities.

Lamps should be selected for color-rendering performance and for efficiency. Those which render colors poorly, such as sodium vapor lamps, should not be used despite their better efficiency. Lamps should have a color rendering index value of 78 or above. This includes metal halide and daylight and warm fluorescent lamps. Low and high pressure sodium should not be used for general outdoor lighting. Lamp types should be standardized as much as possible to provide even lighting and to minimize the costs associated with maintaining many different types of lamps. Lamp replacement should be done on a schedule, rather than on an as-needed basis, to ensure that replacements are all of the same type.

Pole-mounted lighting fixtures should be standardized both for new projects and for replacement of existing fixtures. The campus currently has at least six types of light standards. This number should be reduced to perhaps two or three which can be used appropriately in different situations. Taller light standards with unobtrusive fixtures can be used to provide overall low fill light levels in large spaces, but pedestrian walks and plazas should be lit by fixtures on standards of twelve feet or less. Poles along walkways and in plazas should be spaced to achieve light levels which range from one to five footcandles. Light levels should at no point vary more than 4:1 within a 100 square foot area. Lamps should be 70 to 120 watts, depending upon conditions. Wall-mounted sconces cannot provide large amounts of general-purpose light, but by highlighting architectural elements, sconces can help to define spaces. Exposed lamps are not allowed, and glare should be eliminated.

Good lighting heightens the interest of spaces at night, but it also makes people feel safe. Encouraging this feeling of safety is not simply a matter of increasing the amount of light in a space. Far from it, actually, as high nighttime light levels often create glare and shadows which contribute to a feeling of insecurity. Safe lighting consists of applying low, but very even levels of light to areas like parking lots and walkways, and slightly higher levels of light to plazas and areas immediately outside buildings. Measured light levels should at no point exceed a 4:1 ratio within an area of 100 square feet, and light levels should be between one and five footcandles. Higher light levels can and should be cast on building exteriors, as this provides the impression of brightness without negatively affecting night-adapted vision.

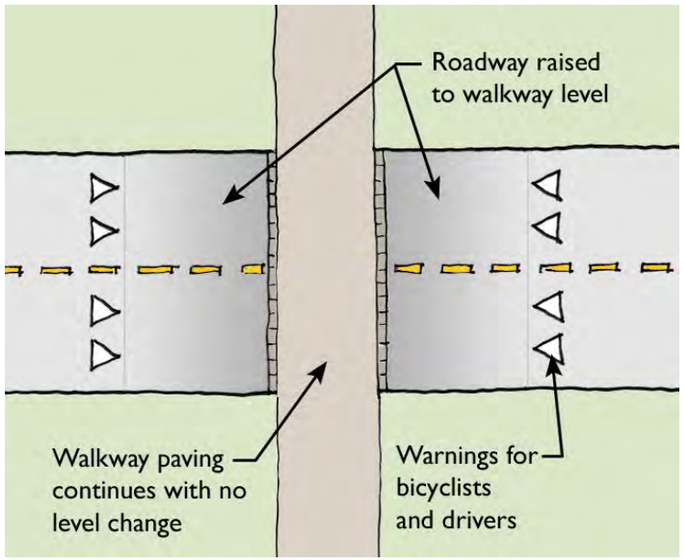


Wall sconce

Vehicular Circulation

As indicated in the master plan, vehicular circulation through campus will be reduced. The campus should be a primarily pedestrian place. The placement of loading docks and service drives should be carefully considered to reduce their impact on the pedestrian character of the campus. Similarly, vehicular drop-offs internal to campus should be implemented only where necessary, and even then, should be designed to minimize intersections with pedestrian walks. Drop-offs should be located at the ends of pedestrian walks at the perimeter of campus.

As befits a pedestrian-centric campus, roadways on campus should be sized to provide only the necessary space



Raised pedestrian crossing

for vehicles to circulate, not to encourage traffic flow. Travel lanes should be no more than 11 feet wide. Where low to moderate levels of traffic are expected, lanes may be as narrow as ten feet wide.

Parking lanes should be used in moderation. They provide extra parking capacity and slow traffic in adjacent travel lanes, but they take up valuable right-of-way which might be better utilized as pedestrian walks and green space. Parking lanes can also create traffic problems at class change times as students obstruct traffic by waiting for spaces. Where used, parking lanes should be eight feet wide (on moderately trafficked streets) or seven feet wide (on lightly trafficked streets).

Pedestrian crossings should be prominently marked and designed to make drivers aware that they are crossing a pedestrian thoroughfare. Raised intersections and distinctive surfacing, as illustrated, may be used at heavily-used crossings. Care should be taken to avoid obstructing bicycle traffic, however, and all crossings must comply with the Texas Accessibility Standards.

Mechanical Equipment

Mechanical and other building-mounted equipment should not be directly evident to those in close proximity to buildings. Where possible, it should be screened from the view of those at greater distances as well. Auditory screening is no less important than visual screening; mechanical equipment should be located and shielded to minimize sonic intrusion for pedestrians around buildings as well as for those inside the buildings. Heavy materials such as brick and stone perform significantly better than foliage or wood enclosures at reducing sound, so those types of materials are preferred. Enclosures for mechanical equipment should be composed as part of the architectural design of the building.

Wall-mounted air supply and exhaust grilles must be located and sized in order to fit the design of the building. Continuous horizontal grilles must not extend uninterrupted for lengths which exceed the length of the structural bays of the building without an expression of supporting structure. Fresh air intakes should not be placed near trash containers, loading docks, service drives, or


Site screening behind the Vincent Building

emergency generator exhausts. Building air exhaust and laboratory exhausts should be located away from fresh air intake locations so that exhaust air is not pulled back into the building. Laboratory exhaust stacks should be clustered together when possible, should be kept away from building edges, and should be painted a muted gray color in order to blend with the sky.

Landscape

There are many notable trees on the ASU campus. While the new buildings which will be required to accommodate future ASU students, this will unfortunately eliminate some trees. Specimen trees, where "specimen" is loosely defined as a large, old, particularly well-formed, visually significant, or rare tree, should be preserved wherever possible. As construction projects do remove specimen trees, they should be replaced by native saplings of three

Oaks at the ASU campus

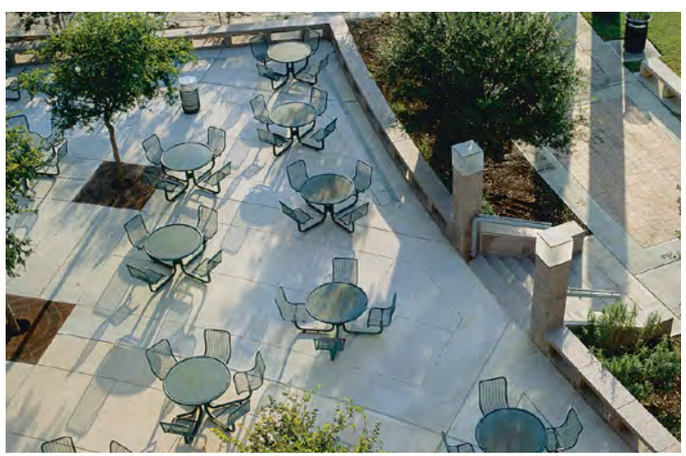
caliper inches or larger. Replacement of large trees should continue as older stock dies or becomes unhealthy, and new trees should be added as ASU's property expands. Non-native trees such as palms should be avoided.

ASU has well-developed and carefully maintained planting beds. New projects should generally include the same types of plant materials and planting beds as previous projects. Future plant choices should be made with water conservation in mind, though plantings in special locations may require more water-intensive plants. Plantings should not be limited to areas along the mall and near buildings; they are just as important in parking lots and along the edges of campus. Landscaped areas should be used to define campus borders, particularly where those edges and corners are not otherwise held by buildings. Landscaping should be incorporated into the design of parking lots along with walkways and other pedestrian-centric features.

The university should also explore possibilities for water retention and gray water reuse in conjunction with new projects. As regulations regarding storm water retention and detention become more stringent, options for using this water for irrigation will continue to become more feasible.

Site Furniture and Hardscape

Site furniture should be standardized on several types. As existing furniture deteriorates, it should be replaced with a designated style, and new construction should specify this style as well. High quality painted metal or teak furniture should be selected; these types will minimize maintenance and will be more comfortable than concrete furniture. Furniture should, as now, be located along the mall and other major pedestrian paths. Trash containers should be placed throughout the campus, including near and in parking lots.



Steel and/or teak furniture should be selected

Paving materials for new pedestrian walkways should be broom-finish concrete. This need not be universally applied to plazas, courtyards, and other outdoor spaces, however. For example, large paved plazas may be paved with a material which contrasts or coordinates with the concrete in order to prevent those spaces from becoming dull. Split-face Dryden limestone, for example, is more appropriate for large plazas where vast expanses of concrete would be monotonous. Courtyards, particularly any courtyards interior to buildings, may be paved with materials such as limestone which coordinate with the materials used on the building.

Accessibility

All new site improvements and buildings must comply with the Texas Accessibility Standards. Accessible paths should not be mere adjuncts to main walks; accessibility should be designed into projects from the beginning of the process. As the ASU campus does not have significant grade changes, site walks should incorporate stairs only as secondary elements.

Sustainability

Awareness of environmental topics and interest in energy and resource conservation has become a significant issue in building construction. While many opportunities are available only at the level of building design, and not at the master planning level, there are also many situations which can be addressed on a site-wide basis. The LEED system of certification provides a framework for establishing environmentally sound projects. Even if certification is not pursued, the LEED framework can still be a guide, and designers should be held to it as a means of evaluating design choices.

The credits in the Sustainable Sites (SS), Water Efficiency (WE), Energy and Atmosphere (EA), and Materials and Resources (MR) sections of the LEED Resource Guide are a good starting point for site-wide issues. However, blindly following the LEED criteria is not sufficient. A thoughtful designer can and should adapt design responses to particular sites and programs in order to achieve more than can be encompassed in a points-based system. The following addresses several pertinent LEED credits with ASU-specific commentary; not all sections are applicable, so not all are included.

SS Prerequisite 1: Construction Activity Pollution Prevention

The concerns addressed by this prerequisite are actually state law – stormwater pollution prevention plans are required for all projects over a given surface area.

SS Credit 4: Alternative Transportation

As ASU's population grows, alternative means of transportation will become more important. Public transportation connections should be sought in order to provide connections to the campus. Bicycling on campus should be encouraged by incorporating bicycle storage and shower facilities in and near appropriate campus buildings. Additionally, the feasibility of using alternative fuel, including compressed natural gas, for campus vehicles should be investigated.

Parking capacity for the future campus has been sized based on current usage. As more students live on or close to campus, their need for personal vehicles may be diminished. ASU should encourage on-campus students to do without personal vehicles and off-campus students to carpool whenever possible. Preferred parking spaces for carpooling students should be established. If such programs are successful in reducing parking demand, fewer parking spaces than called for in the master plan should be built.

SS Credit 5: Site Development

This credit is intended to conserve natural areas, to restore damaged areas, and to promote biodiversity. ASU has no greenfield sites on campus, but previously developed sites can achieve this credit by protecting at least 50% of the site (excluding the building footprint) or 20% of the total site area (including the building footprint), whichever is greater.

SS Credit 6: Stormwater Design

Impervious cover creates stormwater runoff. Minimizing impervious cover – buildings, hardscape, and other paving – can reduce stormwater detention requirements and limit polluted runoff. The campus green can play a part in coping with runoff, but impervious paving should be limited in order to reduce the size of the problem in the first place. Pervious asphalt, porous concrete, and pavers can all reduce runoff.

SS Credit 7: Heat Island Effect

Heat islands are localized areas of higher heat caused by dark paving and lack of shade, like asphalt parking lots. Planting trees in parking areas and hardscape to achieve 50% shade, retaining existing tree cover, and lighter-colored paving materials can all minimize this effect and qualify for credits. Also, using high-reflectance materials on roofs or vegetated roofs can also ameliorate the heat island effect.

SS Credit 8: Light Pollution Reduction

Minimizing light pollution will primarily benefit the school by reducing energy costs. Exterior lighting systems should be carefully designed to place light only where it is needed and only in the amounts which are required. The notes about future campus lighting take these considerations into account.

WE Credit 1: Water Efficient Landscaping

Future landscaping on campus should be selected to minimize watering requirements. Further, usage of collected rainwater can reduce consumption of potable water. The ponds proposed in the master plan are intended in part to fulfill this part of a water-efficient strategy.

WE Credit 2: Innovative Wastewater Technologies

Reduction of potable water use is also the intent of this credit. Water-conserving fixtures such as low-flow or composting toilets and use of non-potable water in sewage conveyance are options.

WE Credit 3: Water Use Reduction

With the use of low flow urinals and toilets, reductions in potable water usage can be obtained. A reduction of 40% can result in four points towards LEED certification.

EA Prerequisite 1: Fundamental Commissioning of Building Energy Systems

Commissioning is intended to ensure that as-built conditions match designers' intentions. The sophisticated HVAC and controls systems of modern buildings – especially those common in LEED-certified buildings – require coordination and confirmation of operation. Because of this, commissioning is a requirement for LEED certification and a best practice for building construction.

EA Prerequisite 2: Minimum Energy Performance

Credits can be achieved by improving energy performance beyond a certain minimum; this prerequisite sets that minimum. Also, the state of Texas mandates that all new buildings meet the requirements of ASHRAE 90.1. This mandate requires that all new state buildings use at least 14% less energy than a base building as described in ASHRAE 90.1 Appendix G. There are several different paths to compliance with this prerequisite.

EA Prerequisite 3: Fundamental Refrigerant Management

This prerequisite requires that no CFC-based refrigerants are used in HVAC equipment.

EA Credit 1: Optimize Energy Performance

Credits can be achieved beyond the baseline set by EA Prerequisite 2 by using various strategies to reduce energy use. This credit encompasses all available planning and technological solutions to reductions of energy use, from multi-paned low-e glazing, to solar hot water sys-

tems, to cutting-edge heat reclamation equipment. The architectural guidelines in this document provide structure for some of these items, but the majority must be determined by architects and engineers at the time of design.

Recent building projects at ASU have incorporated insulated concrete form (ICF) construction, high-tech glazing systems, superinsulation, and other strategies to reduce energy usage. The performance of these ideas should be analyzed and used in new building projects if they prove useful.

EA Credit 2: On-site Renewable Energy

Renewable energy systems like solar, geothermal, and wind reduce demands on fossil fuels. Attaining the various levels of renewable energy production in this credit call for varying levels of investment, and institutional and system policies toward this type of investment should be used as a guide for how and when this type of technology is incorporated into projects. ASU has the advantage of looking at energy production as a system which can affect the entire campus instead of on a project-by-project basis.

EA Credit 6: Green Power

More than any other credit, this one is a simple tradeoff of dollars for LEED credit. This credit involves the purchase of power from renewable sources, which many utilities now offer for a higher price. Usage of this credit should be weighed against the potential to save money in the long run by instead purchasing more efficient equipment or other strategies.

MR Prerequisite 1: Storage and Collection of Recyclables

ASU has a campus recycling committee and strategies to collect recyclable materials in place. The recycling program should be continued and expanded as possible.

MR Credit 1: Building Reuse

One of the most basic strategies to conserve energy is to conserve buildings. The set of sub-points in this credit are targeted at extending the lives of buildings, and where this is financially feasible and sensible for the university, this should be (and frequently is) done. However, considerations of changing building usage, the investments required to maintain and make older buildings accessible and safe, and long-term university strategies should also be considered.

MR Credit 2: Construction Waste Management

Building construction produces a great deal of waste, and sending that waste stream to recycling or re-using construction materials where possible limits the amount that must be sent to landfills. This credit should be explored on a project-by-project basis; depending on the type of construction and the contractor, management of waste can be very feasible.

MR Credit 3: Materials Reuse

Even when buildings cannot be feasibly renovated or reused, their materials often can. Structural elements, brick, furniture, certain types of flooring, and finish materials like doors, frames, and paneling can all be salvaged and re-used on new projects.

MR Credits 4,5,6: Recycled Content, Regional Materials, and Renewable Materials

Building projects should use materials which have a low environmental impact whenever possible. Materials which do not emit chemicals as they cure and age contribute to healthier conditions inside buildings. Products which are made from recycled material encourage future recycling and in many cases require less energy to produce. Materials which are manufactured locally do not require expensive and pollution-causing transportation and are more cost-effective in many cases.

Other ASU Sustainability Strategies

Condensate Collection

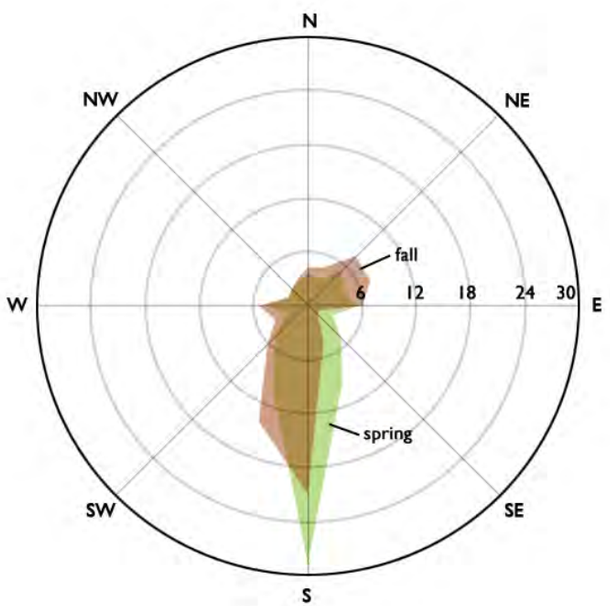
Condensate from HVAC systems should be collected and utilized for irrigation or other non-potable water uses. Collection can occur in tanks at individual buildings, or through a campus-wide strategy.

Shading Structures

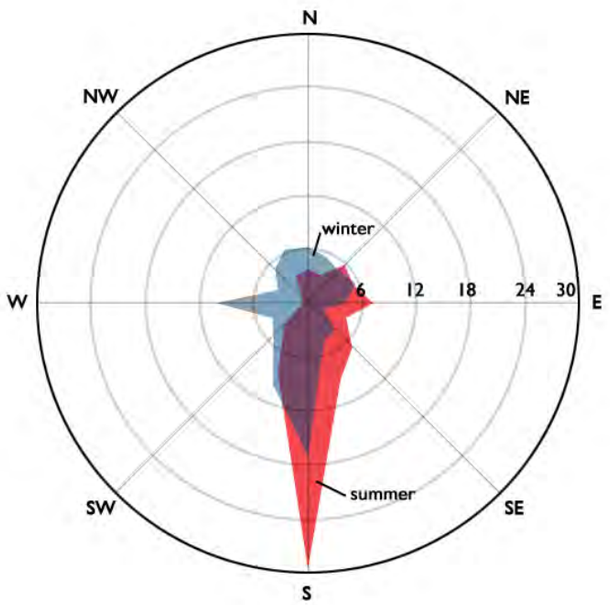
Windows should be shaded wherever possible. Shades can either be applied individually to windows or they can be large structures or extensions of roofs which shade a larger area of glass. Designers should investigate both horizontal and vertical shades, as they can both be effective depending on exposure. Wind uplift is a consideration – shades should be designed to resist winds per code requirements.

Rainwater Collection

ASU does not receive a great amount of annual rainfall, but rainwater should be collected for later re-use in order to minimize irrigation requirements. This issue can be pursued in individual building projects as well as in a campus-wide system. The designers of each project should research the viability, cost, and benefits of implementing rainwater collection, storage, and distribution for irrigation. One way to begin this process without overburdening any particular project with system-wide costs would be to require individual projects to collect enough water to supply most of the needs of the landscaping installed in that project. The lessons learned in those projects should dictate whether it is to ASU's benefit to implement campus-wide systems.



Fall/spring wind rose



Winter/summer wind rose

Building Orientation

The footprints of buildings are somewhat determined by the master plan, but the massing and fenestration of those buildings are resolved by individual designers. The way that building masses are disposed and how windows are placed on those masses can have a considerable effect on building performance. Designers should investigate ways to locate the largest amounts of glass on north and shaded south faces.

Prevailing wind directions should also influence how buildings and outdoor spaces are oriented. Summer winds tend to come from the south, so that exposure should be open.

How to read a wind rose:

Wind roses are graphs showing from which direction winds come during a certain period. These wind roses are broken up by the four seasons, and two seasons are shown on each graph. Wind roses are frequency graphs – a greater distance from the center of the graph indicates a greater frequency of wind from that direction in the period shown.

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Space Analysis

Table of Contents of This Chapter

Space Analysis

Introduction

The Space Analysis provides the foundation for the physical planning decisions made in the creation of the Master Plan Update. It quantifies and organizes space requirements, provides insight into the utilization of space, and aligns projected space needs with projected enrollment.

This section consists of three major elements:

- Demographics and Enrollment Projections
- Space Utilization Analysis
- Space Projections – Education and General (E&G) Space
- Space Projections – Non Education and General (Non E&G) Space

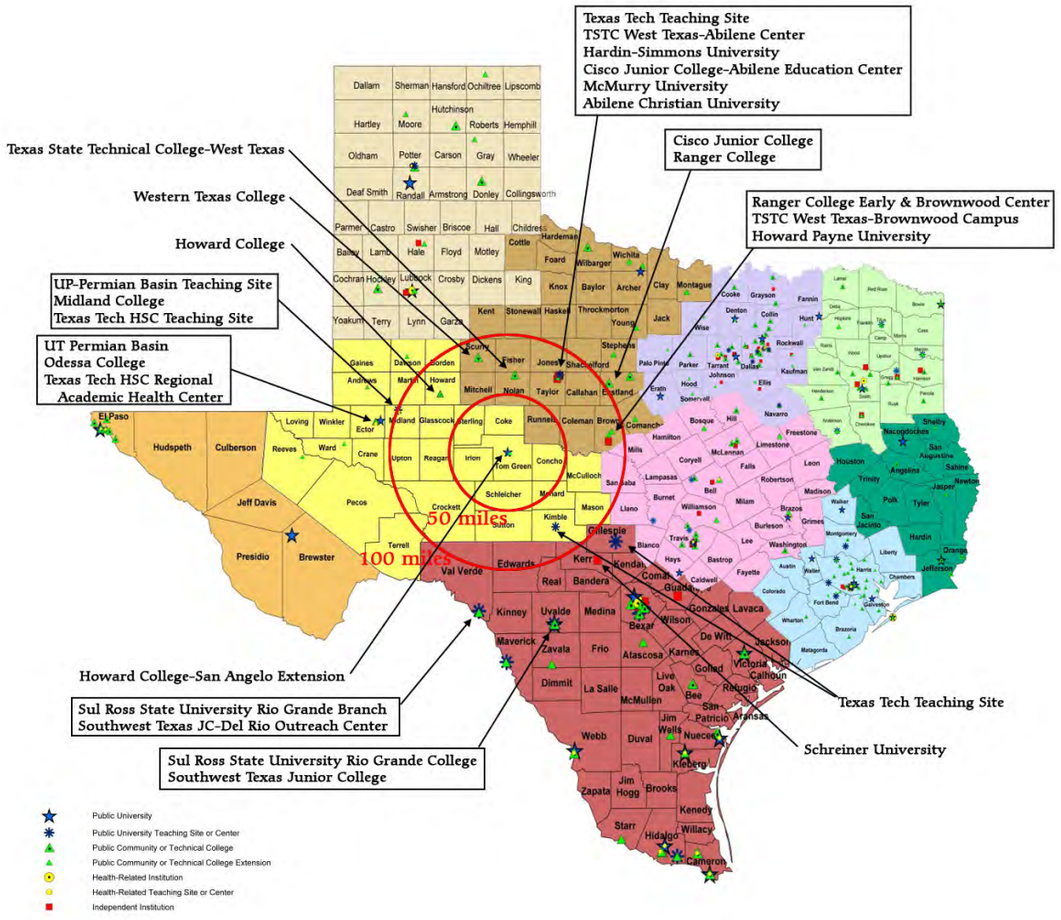
Please note that enrollment and population figures were based on Fall 2009 data.

Demographics and Enrollment Projections

Other Institutions in the Region

There are only two higher educational institutions within a 50-mile radius of San Angelo: Angelo State University and Howard College – San Angelo Extension. Sixteen institutions, including satellite campuses, are located within a 100-mile radius area such as Abilene Christian University and Hardin-Simmons University. The University of Texas of the Permian Basin is located in the west Texas region outside of the 100-mile radius.

Higher Educational Institutes Near San Angelo



Source: Texas Higher Education Coordinating Board

In this document, demographics are considered using Fall 2009 enrollment as the current student enrollment.

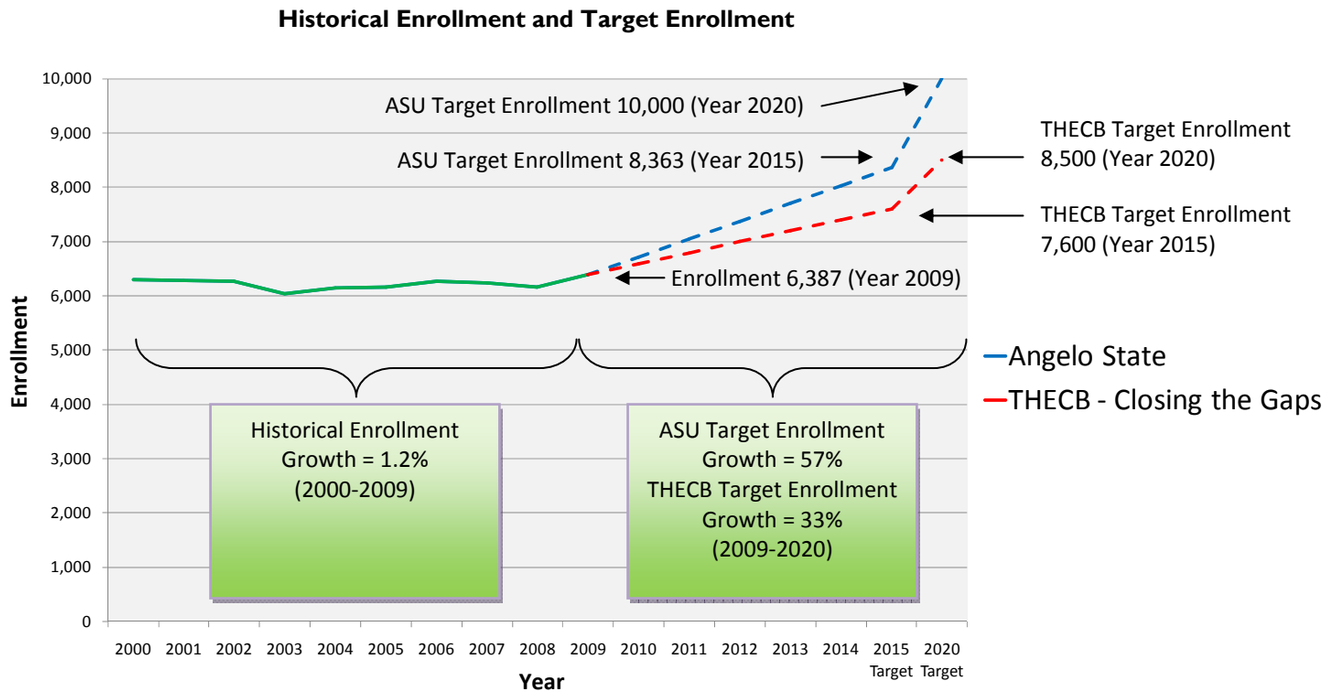
Historical Enrollment and Target Enrollment

The University has had a very steady enrollment history for the last 20 years. Student enrollment is currently around 6,400 and the percent change in enrollment between 2000 and 2009 has been 1.2%.

Angelo State University has developed ambitious enrollment goals for the next ten years leading to a target enrollment of 10,000 by 2020. The Texas Higher Education Coordinating Board, as part of their *Closing the Gaps* initiative directed at closing educational gaps in Texas student participation, success, excellence and research, has set a target enrollment for Angelo State University of 8,500 by 2020.

The University anticipates accelerated growth for the future in order to meet their enrollment goals. An annual percent change of approximately 5.7% per year between 2009 and 2020 is required to meet the 10,000 enrollment goal by 2020. Cumulated target growth for the next 10 years will be 57%.

Angelo State University enrollment goals are set in conjunction with the Texas Tech University system.

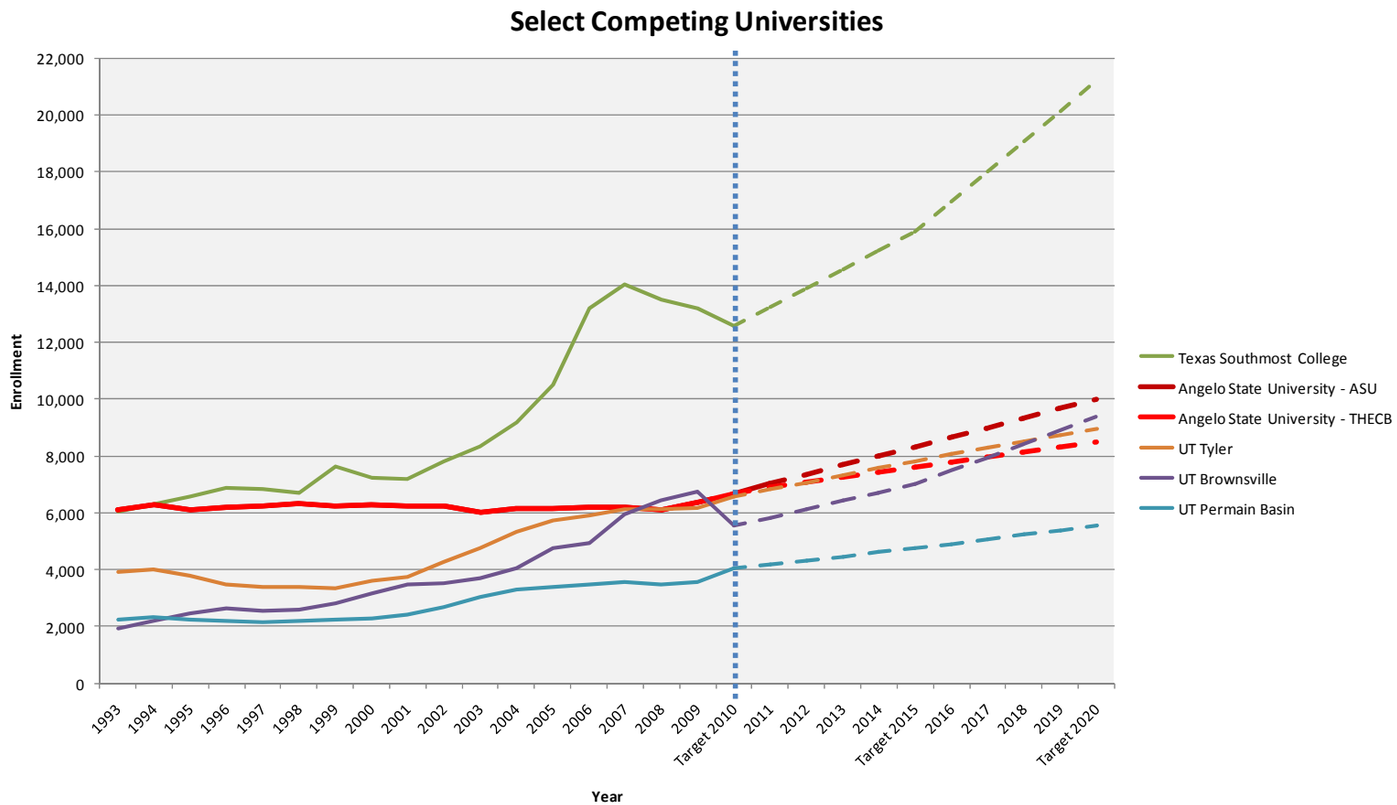


Source: Texas Higher Education Coordinating Board – Closing the Gaps & Angelo State University – Fact Book

Peer and Competing Institution Historical Enrollments and Projections

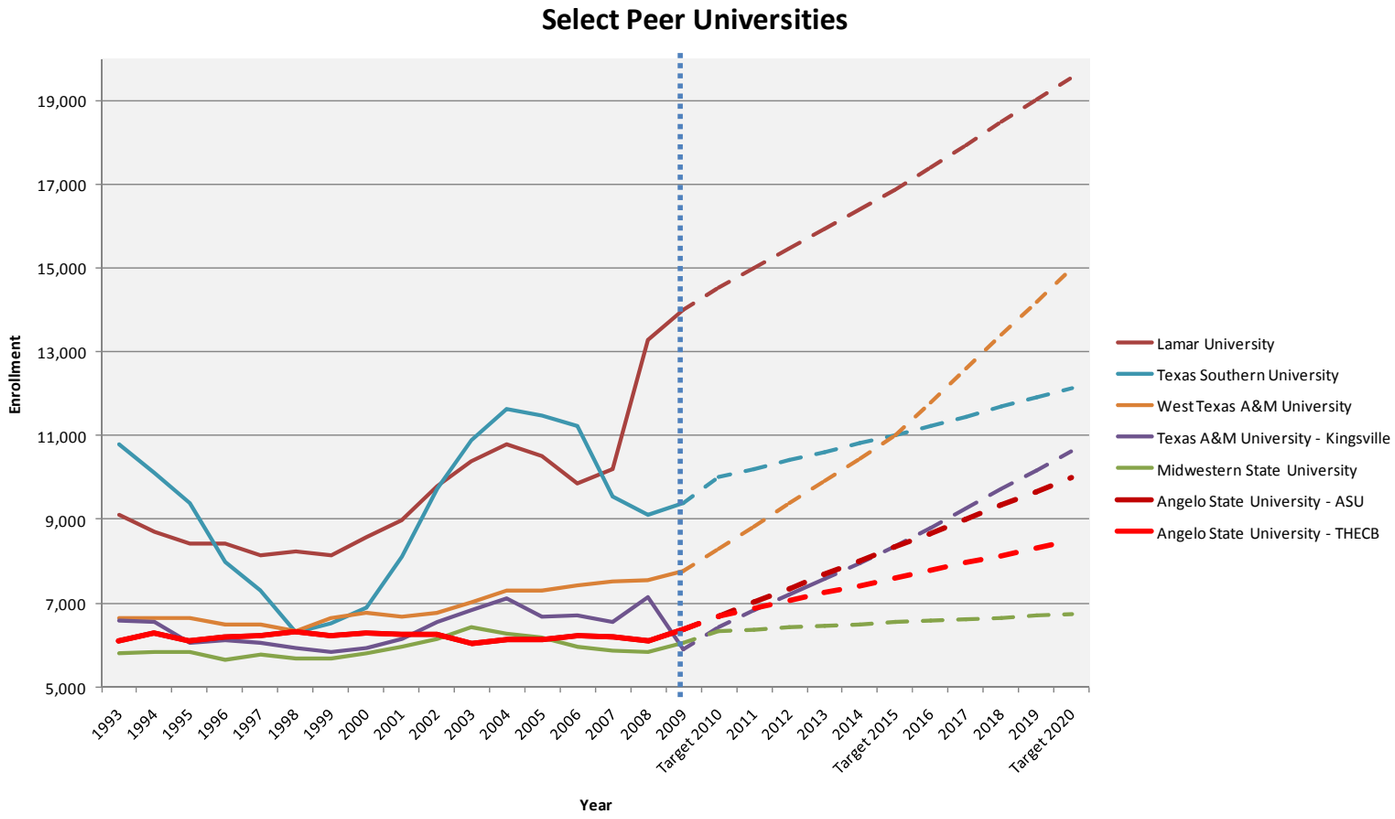
The peer and competing institutions' enrollment targets presented in this section are based on the Texas Higher Education Coordinating Board's *Closing the Gaps* initiative adopted in October 2000. The enrollment targets are based on meeting set goals for increasing student enrollment, improving student academic success, increasing nationally recognized programs or services, as well as growing research and development to close the gap between Texas higher education and other leading states.

Angelo State enrollment has stayed fairly steady in the last several years, with a slight enrollment jump recently. In order to reach enrollment goals, the University has determined that it will need to improve student retention and also increase enrollment. Improving student services, focusing on scholastic departments of distinction, and drawing students from a larger geographical region will aid in increasing and maintaining student enrollment.



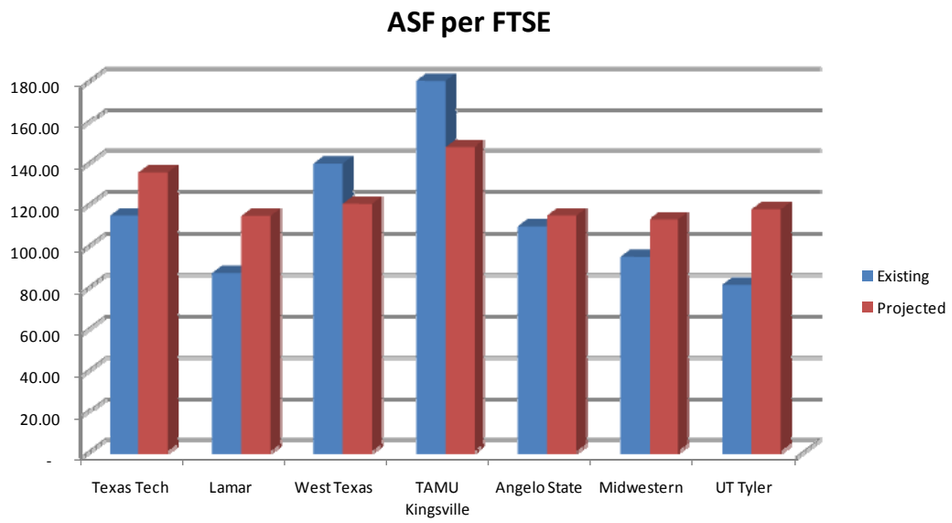
Selected Peer Universities

Similar-sized universities to ASU experienced steady enrollment in the past with the exception of Texas Southern University and Lamar University whose enrollment fluctuated greatly. Texas Southern University experienced a large enrollment dip in the late 90's with a significant spike in enrollment culminating in 2004. Lamar University has experienced significant enrollment growth beginning in the 2000 and continuing today. Texas A&M University, Kingsville experienced a steep enrollment drop in the last few years but enrollment has picked up again. The Texas Higher Education Coordinating Board, as part of the *Closing the Gaps* initiative, has set target enrollments through 2020 that would require significant spikes in enrollment for universities to meet target.



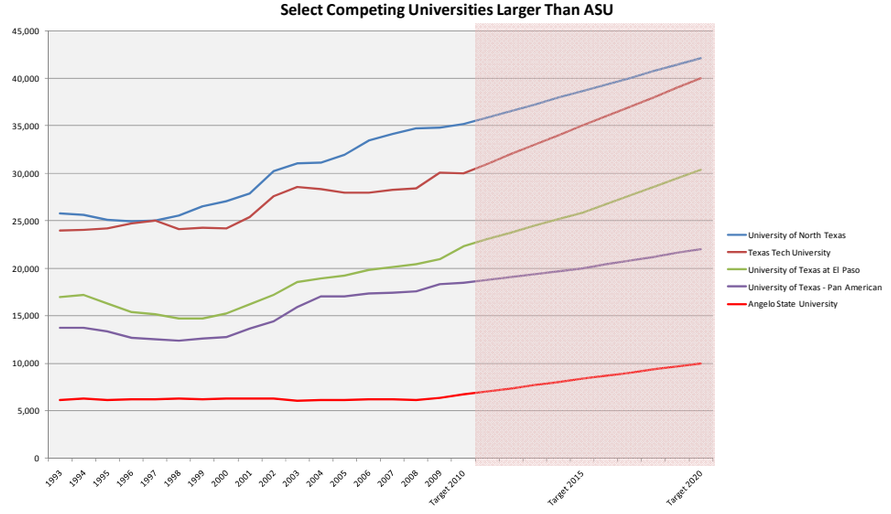
Institution	Growth Since 1993	10 Year Growth	Target 5 Year Growth	Target 10 Year Growth
Angelo State University	4.5%	2.5%	31.2%	56.8%
Lamar University	53.8%	71.7%	20.6%	39.8%
Midwestern State University	4.3%	6.2%	8.2%	11.5%
Texas A&M University - Kingsville	-10.3%	1.0%	41.7%	80.4%
Texas Southern University	-13.0%	44.0%	17.2%	29.2%
West Texas A&M University	17.0%	16.8%	41.6%	93.1%

Source: Texas Higher Education Coordinating Board, Closing the Gaps



Selected Competing Universities Larger than ASU

The competing universities larger than Angelo State University shown in the chart to the right experienced a slight decrease in enrollment in the late 1990's. At that time, they anticipated 10% or higher growth in the next decade. They have experienced significant cumulative growth over the last 10 years well above the 10% projection made in the 1990's. This was a common trend among many higher education entities in Texas during this period. Angelo State's enrollment during this time has remained steady and did not experience an enrollment dip in the 1990's.



Source: Texas Higher Education Coordinating Board, Closing the Gaps

Enrollment Target Observations

Angelo State University's goal of 10,000 student enrollment will include both on and off campus student growth. Existing on-line programs are anticipated to grow significantly and anticipated new programs in security studies will add to on-line enrollment. When calculating future space needs, on-line student enrollment was taken into account.

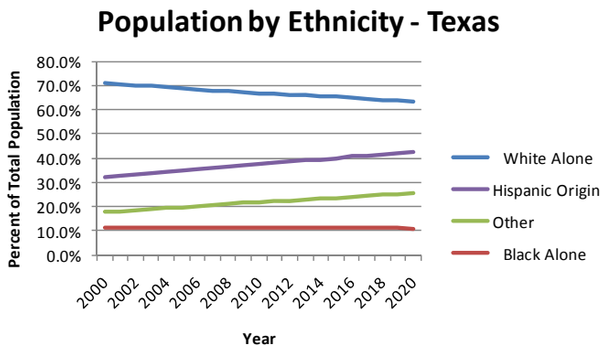
In order to meet enrollment goals, the majority of scholastic programs are anticipated to experience high graduate student growth in the future (between 15-27%). Individual departments do not anticipate enrollment declines. Providing expanded student services, both academic and leisure, is in process. In addition, recruitment and retention will be improved. An emphasis on promoting programs of distinction, as well as developing a security studies program will also increase enrollment.

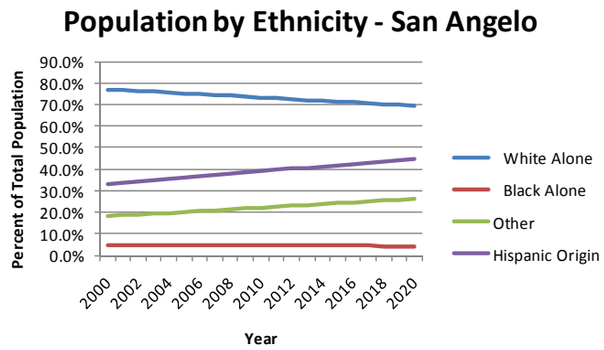
Historical Population Change for the City, County and State

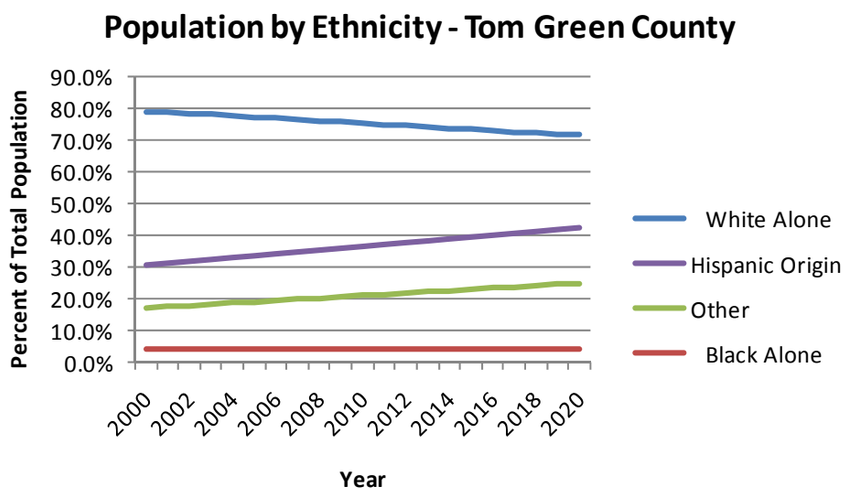
Population in the City of San Angelo, Tom Green County and the State of Texas has grown in the last century, although compared to the State, the City and County after the 1970's growth started slowing down. For example, the growth rate of the City and County between 1970 and 2000 was around 40% while that of the State of Texas is nearly 90%.

Population by Ethnicity

The following charts show projected population by ethnicity for the state, county, and city. San Angelo's population ethnicity is anticipated to mirror the state and county.





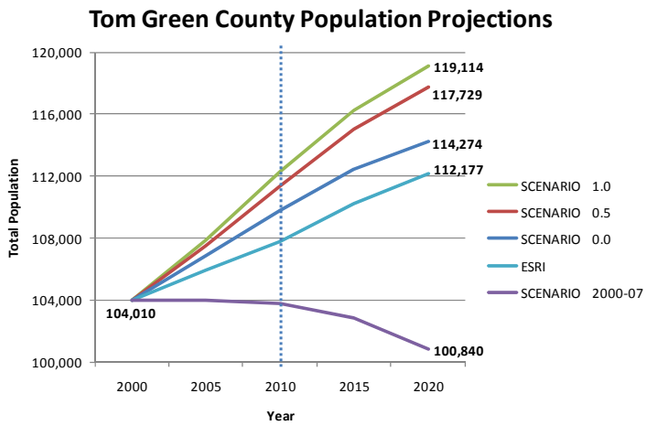


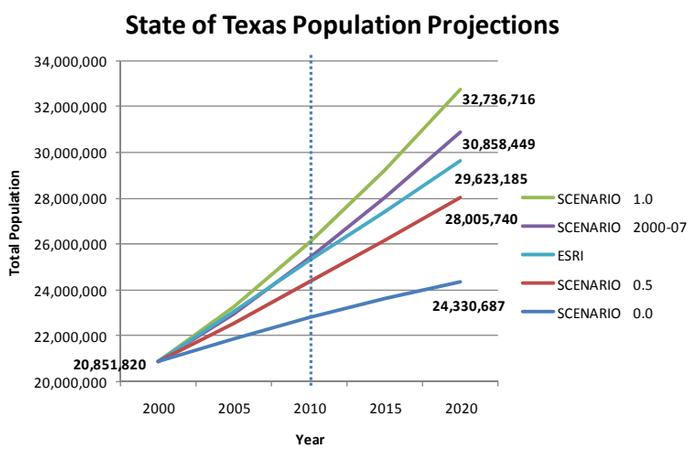
Source: SA Research

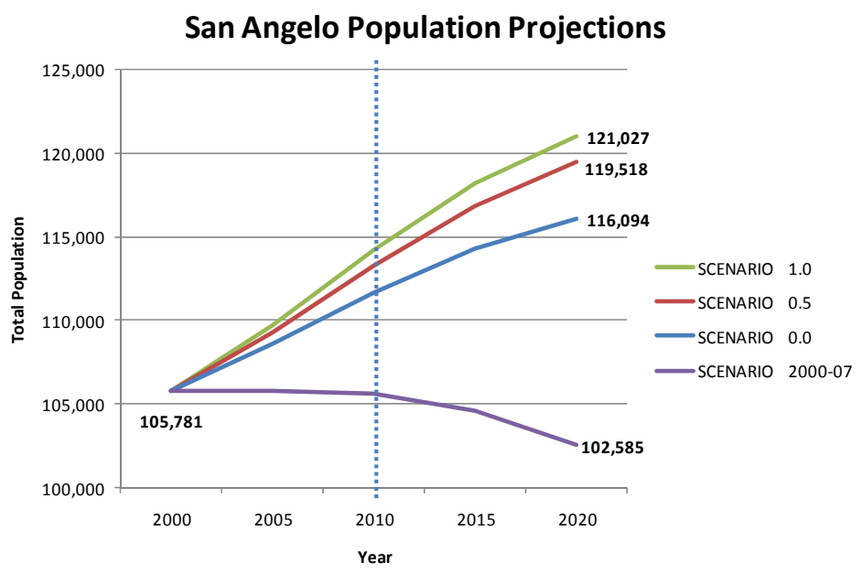
Population Projection for the State, County, and City

Population for the State of Texas is projected to grow to approximately 30 million by 2020. Several methodologies for projecting population have been used to show a range of possible growth scenarios in the charts on this page.

Regional demographics will impact the University's student enrollment. Students originating from Tom Green County comprise approximately 25% of first time degree seeking students at ASU. Approximately 12% of first time degree seeking students are from the surrounding 20 counties. The remainder of the students are primarily from other Texas cities not included in the calculations above. A limited number of students, less than 10%, come from other states or foreign countries. One trend in enrollment is that a greater number of students are coming from beyond Tom Green and the surrounding counties. This reflects an effort on the part of the University to broaden its enrollment base. In general, population projections support the possibility of increasing enrollment at ASU enough to meet goals.



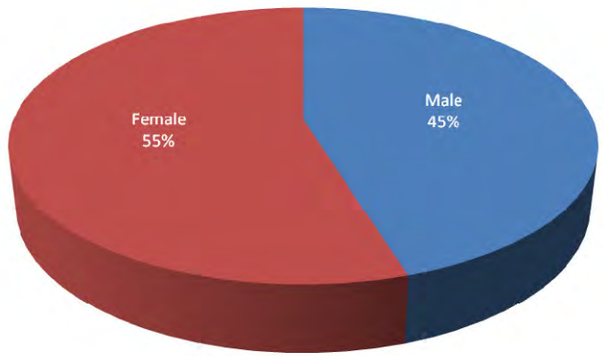




Source: Texas State Data Center and Office of the State Demographer; SA Research

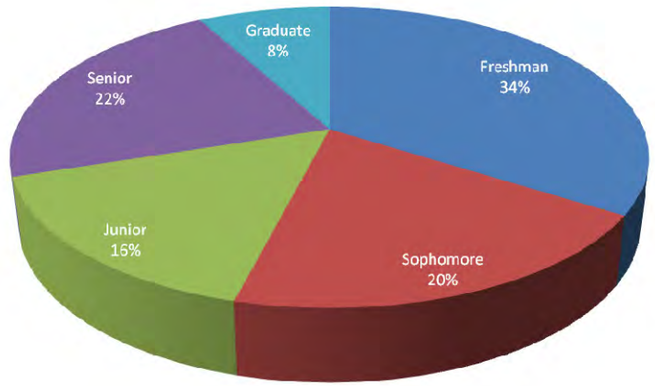
Enrollment by Gender

The University has 55% female and 45% male first time degree seeking students. This ratio has stayed fairly constant over the last ten years and is similar to ratios found in other Texas public universities.



Enrollment by Level

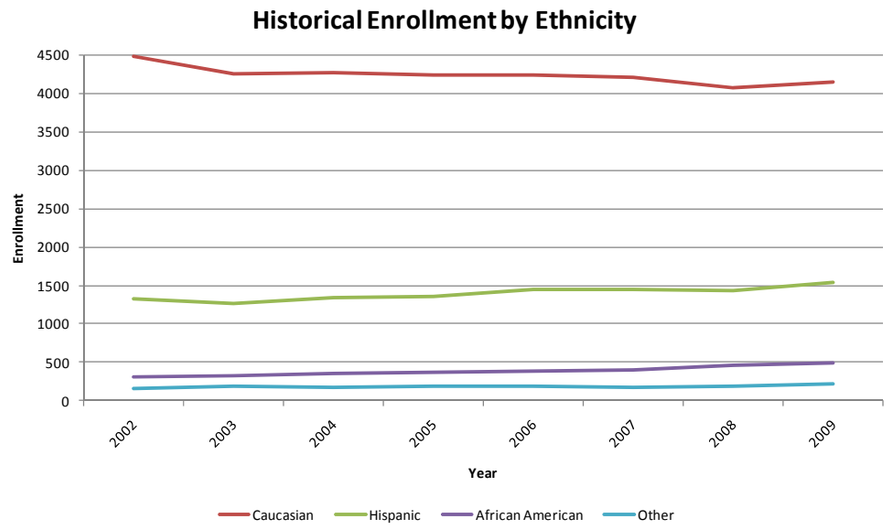
The University has a high freshman population. It is 33% of total students. Sophomores, juniors and seniors are distributed at 21.6%, 16.6%, and 23.8% respectively. Total undergraduate students are about 92% while post baccalaureate and masters are 3%. This distribution of undergraduate to graduate students has changed slightly in the last five years. Previously there were 90% undergraduates to 10% graduates; whereas five years ago nearly half of the freshman population never made it to their sophomore year. This number is improving.



Historical Enrollment by Ethnicity

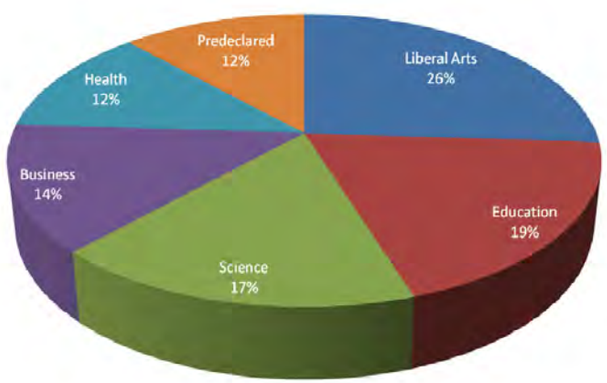
White (non-Hispanic) students comprised 64.8% of the total student population in fall 2009, down from 70% in the fall of 2003. Hispanic students have continued to increase in the same period comprising 24.2% of total students. Black (non-Hispanic) and other ethnicity groups comprised approximately 11% of the student population. This follows the trend in other Texas public universities.

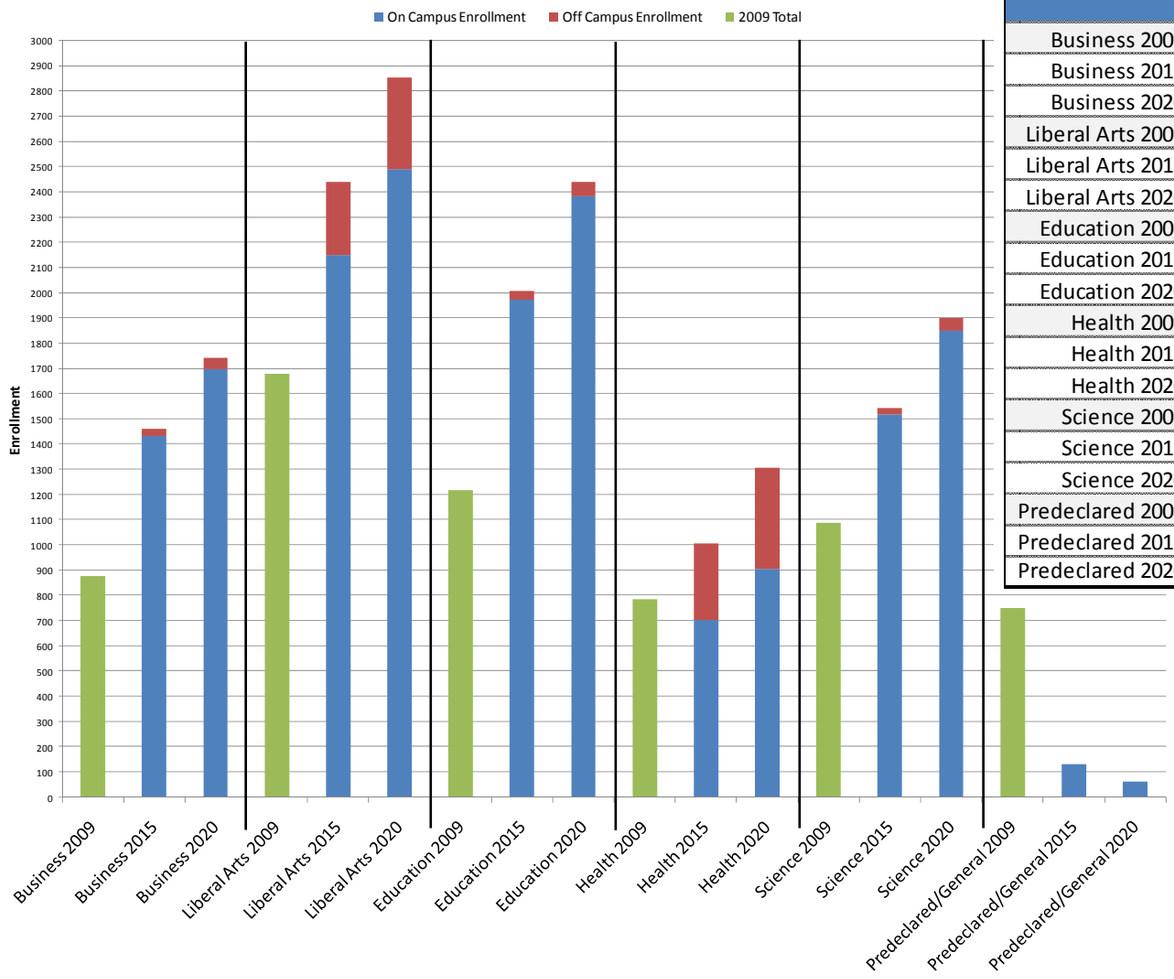
Ethnic groups with high growth rates in Texas public universities are black (non-Hispanic), Hispanic, Asian or Pacific Islander and non-resident alien. White (non-Hispanic) population has had a slow increase for the past several years. Angelo State University shows similar ethnic growth.



Student Enrollment by College and Department

The College of Liberal and Fine Arts has the largest number of students, 26% of the total. The Liberal and Fine Arts College offers lower level core curriculum, naturally resulting in an increased percentage of students, however their total percentage is down from 41% in 2005. The remaining students are fairly evenly divided between the remaining colleges, ranging between 12% and 19% of the total. Twelve percent of students fall into the Predeclared category. The University has a goal to eliminate this enrollment category if possible.





	Total
Business 2009	876
Business 2015	1461
Business 2020	1740
Liberal Arts 2009	1677
Liberal Arts 2015	2440
Liberal Arts 2020	2854
Education 2009	1218
Education 2015	2005
Education 2020	2439
Health 2009	783
Health 2015	1005
Health 2020	1305
Science 2009	1086
Science 2015	1543
Science 2020	1900
Predeclared 2009	748
Predeclared 2015	129
Predeclared 2020	62

Source: Angelo State University

Target Enrollment Goals

The University has identified departmental enrollment goals in order to reach the campus goal of 10,000 students within the next ten years. These enrollment goals are illustrated in the following tables. Programs identified as programs of distinction have been highlighted in red.

Target Enrollment – Graduate Students

(Total)

DEPARTMENTS	2003	2004	2005	2006	2007	2008	2009	Target 2015	Target 2020	Annual Pct Change 2009-2020
GRADUATE STUDENTS										
Accounting, Economics, Finance	12	14	15	17	18	20	19	41	58	18.66%
Agriculture	12	14	16	18	19	27	21	40	70	21.21%
Biology	8	11	14	17	19	14	15	48	51	21.82%
Communication, Mass Media, Theatre	10	9	8	7	9	10	12	36	48	27.27%
Curriculum and Instruction		0	0		38	157	191	406	555	17.33%
English	10	10	11	11	15	15	13	26	36	16.08%
General Studies/Interdisciplinary Studies				2			1	0	0	-9.09%
History	4	5	7	8	8	8	12	13	18	4.55%
Kinesiology	7	11	15	19	13	18	21	40	54	14.29%
Management and Marketing	26	32	37	43	36	31	35	69	94	15.32%
Nursing	11	21	32	42	43	60	52	167	228	30.77%
Political Science*	8	10	12	14	9	7	6	262	318	472.73%
Psychology, Sociology, and Social Work	27	37	47	57	50	37	48	99	139	17.23%
Physical Therapy	33	41	48	56	59	52	56	86	117	9.90%
Teacher Education	53	85	117	149	94	37	26	27	36	3.50%
Total Graduate Students	221	300	379	460	430	493	528	1360	1822	22.28%
** Includes anticipated new programs.*										

Target Enrollment – Graduate Students

(On-Campus Students)

DEPARTMENTS	2003	2004	2005	2006	2007	2008	2009	Target 2015	Target 2020	Annual Pct Change 2009-2020
GRADUATE STUDENTS										
Accounting, Economics, Finance	12	14	15	17	18	20	19	41	56	17.70%
Agriculture	12	14	16	18	19	27	21	40	70	21.21%
Biology	8	11	14	17	19	14	15	48	51	21.82%
Communication, Mass Media, Theatre	10	9	8	7	9	10	12	36	48	27.27%
Curriculum and Instruction		0	0		38	157	191	406	546	16.90%
English	10	10	11	11	15	15	13	26	36	16.08%
General Studies/Interdisciplinary Studies				2			1	0	0	-9.09%
History	4	5	7	8	8	8	12	13	18	4.55%
Kinesiology	7	11	15	19	13	18	21	40	54	14.29%
Management and Marketing	26	32	37	43	36	31	35	69	94	15.32%
Nursing	11	21	32	42	43	60	52	0	0	-9.09%
Political Science*	8	10	12	14	9	7	6	13	18	18.18%
Psychology, Sociology, and Social Work	27	37	47	57	50	37	48	99	135	16.48%
Physical Therapy	33	41	48	56	59	52	56	86	117	9.90%
Teacher Education	53	85	117	149	94	37	26	27	36	3.50%
Total Graduate Students	221	300	379	460	430	493	528	944	1279	12.93%
** Does not include anticipated new programs.*										

Target Enrollment - Undergraduate Students

(Total)

DEPARTMENTS	2003	2004	2005	2006	2007	2008	2009	Target 2015	Target 2020	Annual Pct Change 2009-2020
UNDERGRADUATES										
Accounting, Economics, Finance	286	273	261	248	253	239	250	404	478	8.29%
Agriculture	86	145	204	263	264	258	252	360	411	5.74%
Art and Music	204	196	187	179	176	178	176	184	222	2.38%
Chemistry and Biochemistry	155	141	127	113	109	110	121	166	201	6.01%
Biology	316	302	287	273	283	275	296	366	431	4.15%
Communication, Mass Media, Theatre	135	197	260	322	329	345	364	505	536	4.30%
Curriculum and Instruction							9	59	76	67.68%
Computer Science	210	181	153	124	108	102	113	222	299	14.96%
English	529	385	240	96	93	104	133	171	198	4.44%
History	309	250	190	131	139	143	162	183	210	2.69%
Kinesiology	284	400	516	632	628	612	532	805	939	6.95%
Mathematics	419	311	203	95	89	88	114	174	236	9.73%
Modern Languages	153	125	96	68	65	59	47	61	85	7.35%
Management and Marketing	296	437	579	720	734	677	572	947	1110	8.55%
Nursing	122	253	384	515	515	525	675	752	960	3.84%
Physics	219	191	163	135	146	128	154	167	201	2.77%
Political Science	293	284	275	266	219	204	220	253	293	3.02%
Psychology, Sociology, and Social Work	429	407	386	364	397	431	484	647	751	5.02%
Teacher Education	319	384	448	513	503	468	438	668	779	7.08%
predeclared				748	758	716	747	129	62	-8.34%
Total Undergraduate Students	4764	4862	4959	5805	5808	5662	5859	7223	8478	4.06%
Total Student Enrollment	4985	5162	5338	6265	6238	6155	6387	8583	10300	5.57%

Target Enrollment – Undergraduate Students

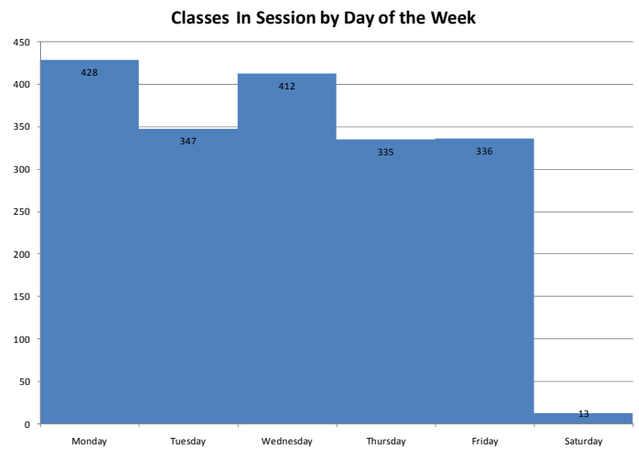
(On-Campus Only)

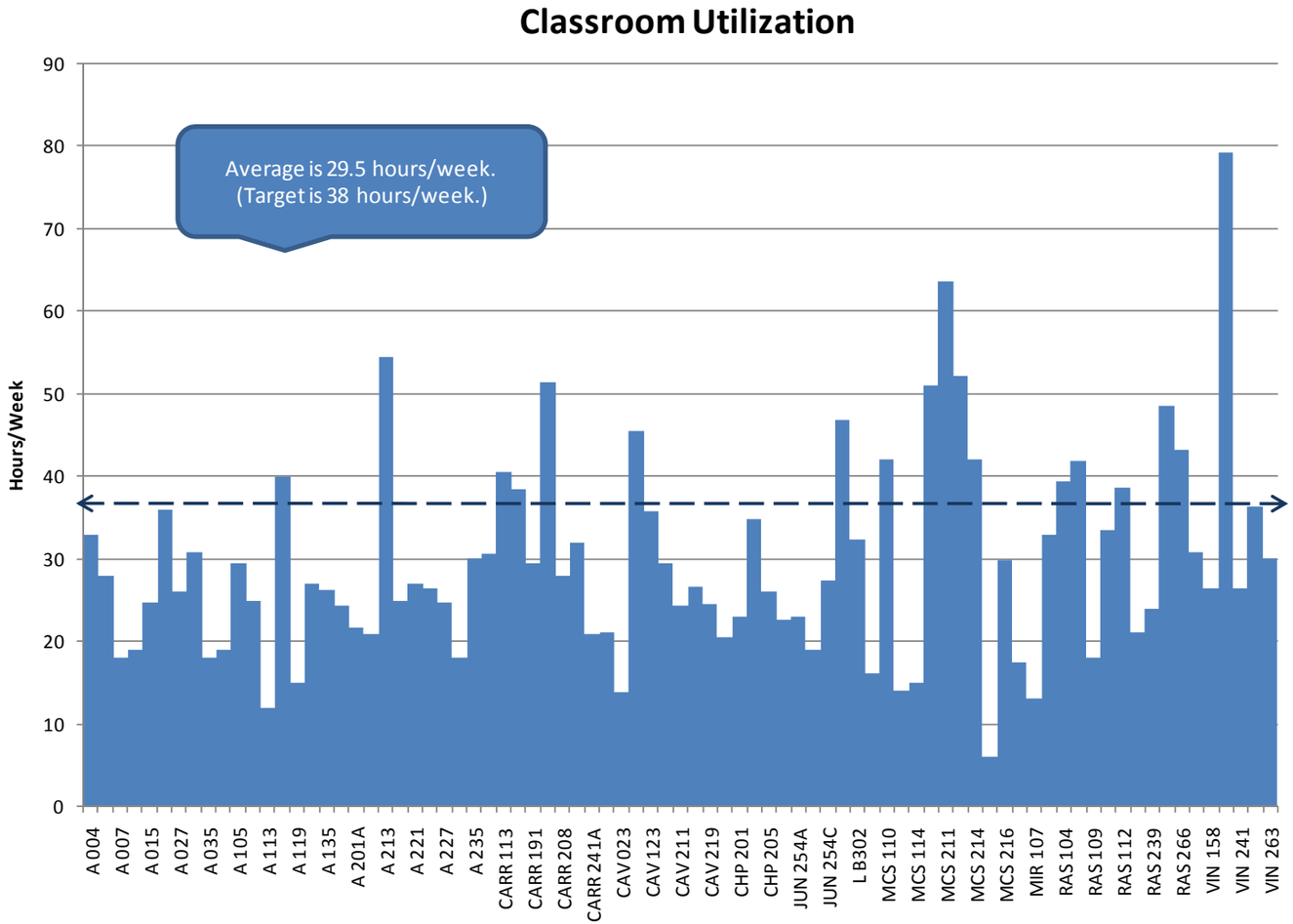
DEPARTMENTS	2003	2004	2005	2006	2007	2008	2009	Target 2015	Target 2020	Annual Pct Change 2009-2020
UNDERGRADUATES										
Accounting, Economics, Finance	286	273	261	248	253	239	250	375	437	6.80%
Agriculture	86	145	204	263	264	258	252	360	411	5.74%
Art and Music	204	196	187	179	176	178	176	184	222	2.38%
Chemistry and Biochemistry	155	141	127	113	109	110	121	166	201	6.01%
Biology	316	302	287	273	283	275	296	366	431	4.15%
Communication, Mass Media, Theatre	135	197	260	322	329	345	364	462	476	2.80%
Curriculum and Instruction							9	25	29	20.20%
Computer Science	210	181	153	124	108	102	113	197	249	10.94%
English	529	385	240	96	93	104	133	171	198	4.44%
History	309	250	190	131	139	143	162	183	210	2.69%
Kinesiology	284	400	516	632	628	612	532	805	939	6.95%
Mathematics	419	311	203	95	89	88	114	174	236	9.73%
Modern Languages	153	125	96	68	65	59	47	61	85	7.35%
Management and Marketing	296	437	579	720	734	677	572	947	1110	8.55%
Nursing	122	253	384	515	515	525	675	617	787	1.51%
Physics	219	191	163	135	146	128	154	167	201	2.77%
Political Science	293	284	275	266	219	204	220	253	293	3.02%
Psychology, Sociology, and Social Work	429	407	386	364	397	431	484	647	751	5.02%
Teacher Education	319	384	448	513	503	468	438	668	779	7.08%
predeclared				748	758	716	747	129	62	-8.34%
Total Undergraduate Students	4764	4862	4959	5805	5808	5662	5859	6957	8107	3.49%
Total Student Enrollment	4985	5162	5338	6265	6238	6155	6387	7901	9386	4.27%

Space Utilization Analysis

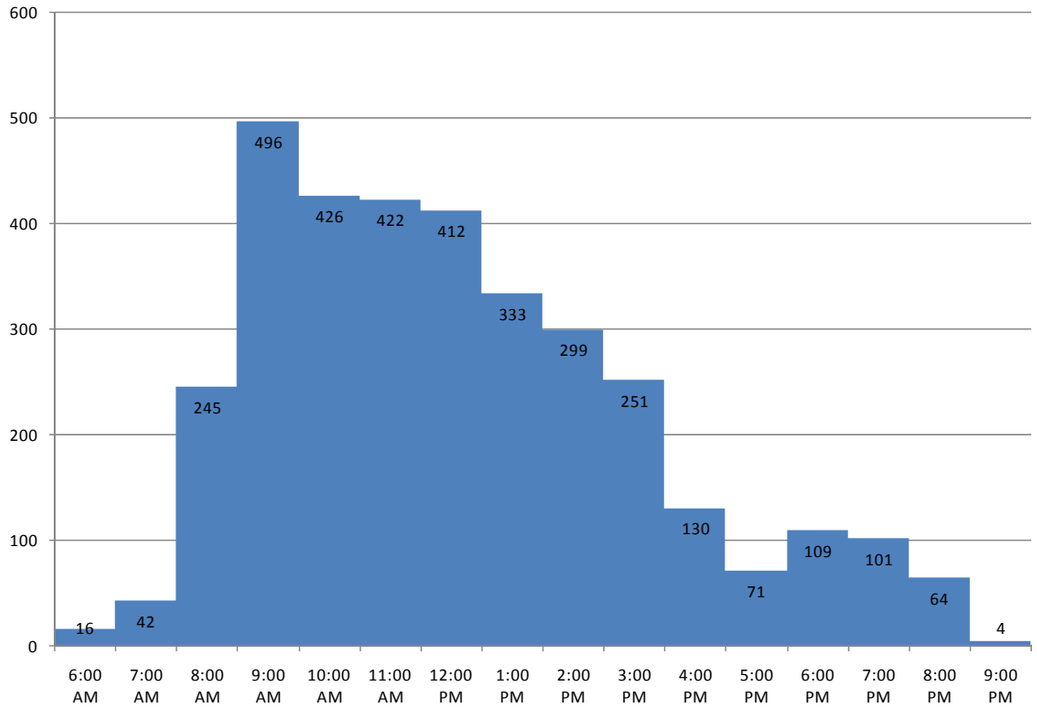
Classroom Utilization

The following pages contain graphs illustrating utilization findings.





Mon-Sat Classes



Classrooms with Usage Over THECB Target - 38 hours/week (lab and class hours included)		
Room	***Total Hours/Week***	***Subjects***
RAS 112	38.6	CRIM, GOVT
RAS 104	39.3	ACC, ECO, FIN
A 115	40	GOVT, PSY, SOC, SWK, USTD
CARR 113	40.6	ED, EPSY, GER, RDG, SPED
RAS 105	41.8	ACC, AS, BUSI, CHEM
MCS 110	42	MATH
MCS 214	42	MATH
RAS 266	43.2	BA, MGT, MIS, MKT, MSC
CAV 100* (24 hrs/week of labs)	45.4	BIO, CHEM
LB301	46.8	COMM, JOUR
RAS 265	48.6	BA, IBUS, MGT, MKT, MSC, USTD
MCS 210	51	MATH
CARR 192	51.4	CI, ECH, ED, EPSY, RDG, USTD
MCS 212* (1 hr/week of labs)	52.2	MATH
A 213	54.4	PSY,SOC, SWK
MCS 211* (45 hrs/week of labs)	63.6	MATH
VIN 238	79.2	NUR,RNSG
* Indicates a classroom in which both labs and classes are held		

Classrooms with Usage <15 hours/week (lab and class hours included)	
Room	***Hours/Week***
MCS 215	6
A 113	12
MIR 107*	13 (all hours are lab hours)
CAV 023*	14 (7.8 lab hours)
* Indicates a classroom in which both labs and classes are held	

Average Utilization by Building		
	Classrooms	Lab
Academic Building	26	n/a
Carr Fine Arts	34	19
Cavness	27	15
CHP	27	22
Junell	23	n/a
Library	40	45
MCS	33	17
Mir Center	15	n/a
Rassman	34	35
Science III	31	17
Vincent	40	22
Target	36	25
Average Utilization	30	26 with proration/20 without proration

General Classroom Utilization Notes

- Library spaces are being highly utilized
- Classrooms in Vincent are highly utilized
- Lowest utilization of classrooms is in the Mir Center (this is because these classrooms are being used for labs)
- There is spare capacity in the academic building classrooms
- Rassman labs are very well utilized

Average Classroom Station Size by Building			
Classrooms	Stations	Total ASF	ASF/Station
103-Cavness	549	8955	16.3
107-Academic	1125	20970	18.6
108-MIR Center	84	2490	29.6
109-Library	64	2051	32.0
110-CHP	240	3800	15.8
112-CARR Fine Arts	368	7514	20.4
113-Rassman	466	9902	21.2
114-Vincent	242	5159	21.3
115-MCS	638	11619	18.2
118-Junell	150	3872	25.8
120-Science III	26	1034	39.8
Campus	**3952**	**77366**	**19.6**

Classroom Comments

The University is utilizing classroom spaces for laboratory use. This lowers the overall classroom utilization rates. For example, there are 261 weekly hours of labs scheduled in 26 classrooms. Ten classrooms are being used more than 50% of the time for lab use and 2 classrooms are used exclusively for labs.

Conversely, there are classroom hours scheduled in labs. There are 325 weekly hours of classroom hours scheduled in 18 labs. Sixteen labs are being used more than 50% of the time for class use and 6 labs are used exclusively as classrooms.

These statistics indicate that an assessment of room use designations is warranted. A more in-depth study of classroom and lab assignments is required. Finally, 238 weekly hours of classes and labs are being taught in spaces that are not designated as classrooms or labs.

Classroom Utilization Observations

Studying the utilization of classrooms has revealed that both classroom and lab utilization numbers can be increased by matching labs and classrooms to their most appropriate spaces. More importantly, the real focus for Angelo State University should be to ensure their spaces are being scheduled to their best and highest use, and to identify shortages of space where they actually occur, rather than where they are perceived to be. The University has already begun to address this issue and is working to increase not only their utilization of classrooms and labs, but also increase the use of available room capacity in each space.

If classes that are taught in labs are relocated to classroom spaces, and labs are utilized for laboratory teaching only, lab utilization will actually rise above THECB targets.

Classroom Demand Analysis

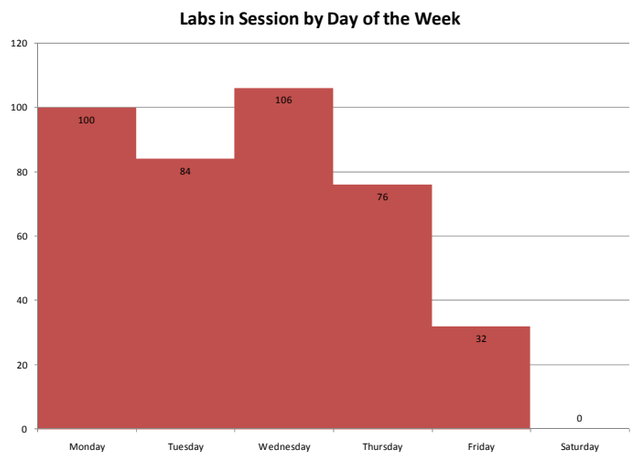
The chart to the right looks at the total number of sections being taught and the total required room periods, it then looks at available rooms and their capacity and tabulates how many of each size room is required. The chart then compares the required number of rooms of each size with available/existing rooms. It appears that Angelo State University has an excess of available classrooms, but the sizes of these classrooms may not be ideal. "Right-sizing" of classrooms to meet demand at particular capacities, and to reduce classrooms with tablet arm desks is reduced.

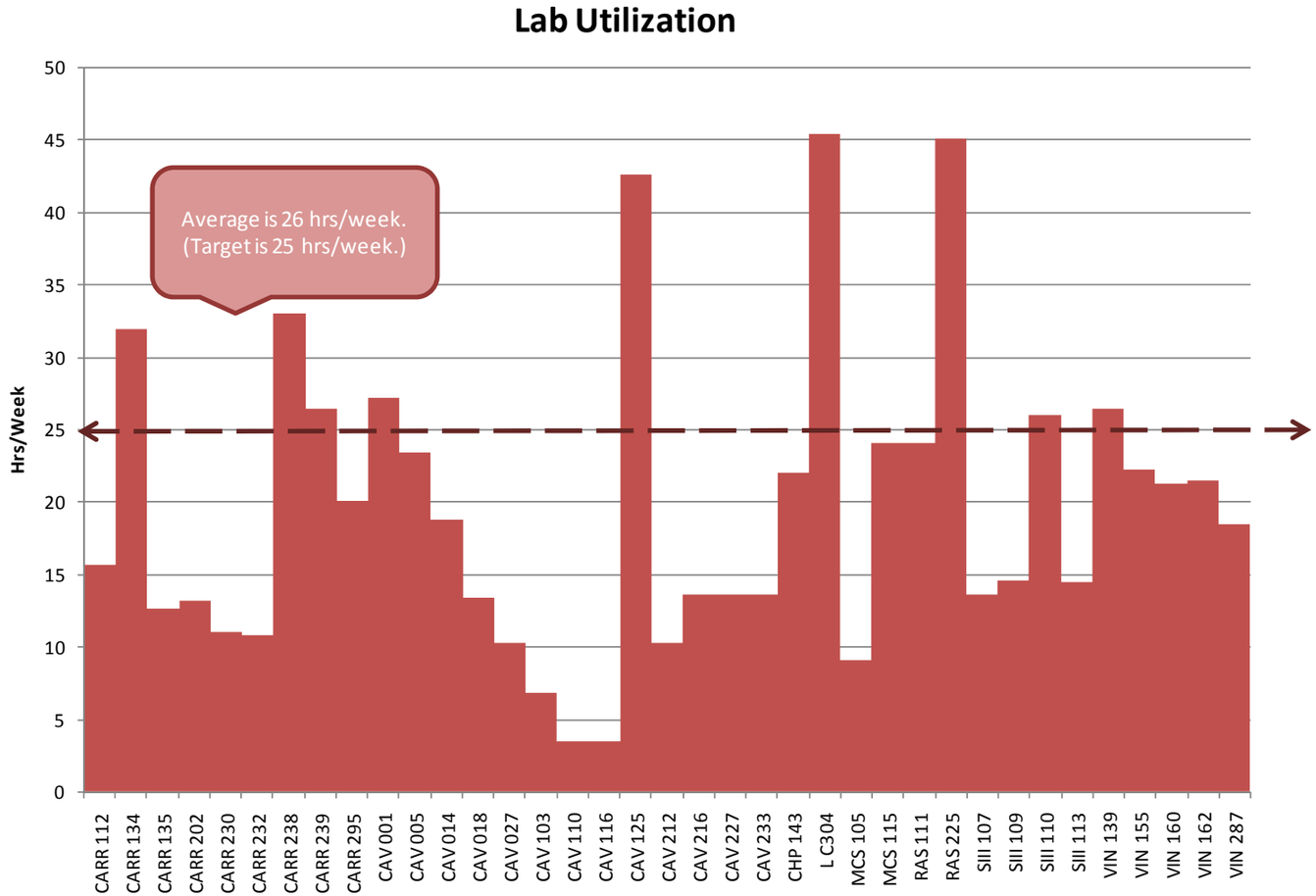
Classroom Demand Analysis

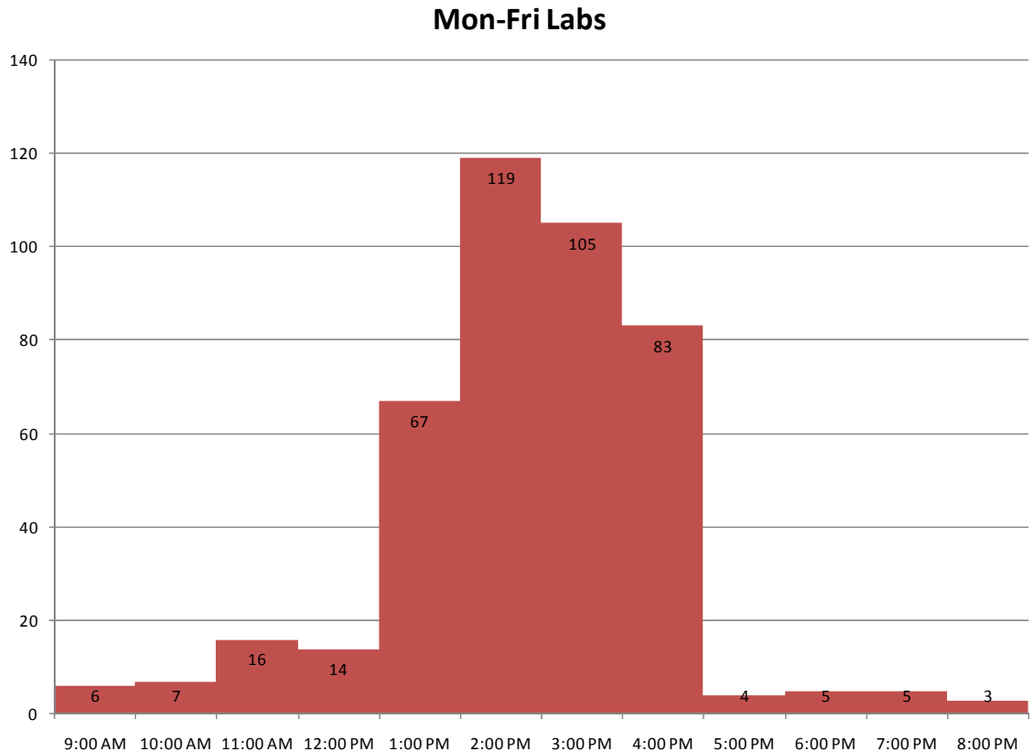
SECTION SIZE	TOTAL SECTIONS	TOTAL REQUIRED ROOM PERIODS	MAXIMUM ROOM CAPACITY	TOTAL REQUIRED ROOMS	NO. OF AVAILABLE ROOMS	BALANCE
001 - 016	1,480	380	20	10	2	(8)
017 - 032	14,710	1,260	40	34	34	0
033 - 044	6,260	581	55	16	32	16
045 - 059	3,050	254	70	7	5	(2)
060 - 076	350	51	90	2	3	1
077 - 099	170	32	110	1	2	1
100 - 142	260	47	150	2	1	(1)
143 - 190	0	10	200	1	0	(1)
191 - 213	0	0	225+	0	2	2
TOTALS	26,280	2,615		73.0	81.0	8.0

Laboratory Utilization

The following pages contain graphs illustrating laboratory utilization findings. Laboratory utilization was discussed in the previous classroom utilization section.







Labs with Usage Under THECB Target - 25 hours/week (lab and class hours included)

Room	*Total Hours/Week*	*Subjects*
CAV 110	3.4	Biological Sciences/Life Sciences - Biology, General
CAV 116	3.4	Biological Sciences/Life Sciences - Biology, General
CAV 103	6.8	Biological Sciences/Life Sciences - Biology, General
MCS 105	9	Computer and Information Sciences - General
CAV 027	10.2	Biological Sciences/Life Sciences - Biology, General
CAV 212	10.2	Physical Sciences - Chemistry, General
CARR 232	10.8	Visual and Performing Arts - Art, General
CARR 230	11	Visual and Performing Arts - Music, General
CARR 135	12.6	Visual and Performing Arts - Art, General
CARR 202	13.2	Visual and Performing Arts - Art, General
CAV 018	13.4	Biological Sciences/Life Sciences - Biology, General
CAV 216	13.6	Physical Sciences - Chemistry, General
CAV 227	13.6	Physical Sciences - Chemistry, General
CAV 233	13.6	Physical Sciences - Chemistry, General
SIII 107	13.6	Biological Sciences/Life Sciences - Biology, General
SIII 113	14.4	Physical Sciences - Chemistry, General
SIII 109	14.6	Biological Sciences/Life Sciences - Biology, General
CARR 112	15.6	Education - General
VIN 287	18.46	General Use
CAV 014	18.8	Biological Sciences/Life Sciences - Biology, General
CARR 295	20	Visual and Performing Arts - Music, General
VIN 160	21.2	Physical Sciences - Physics, General
VIN 162	21.4	Physical Sciences - Physics, General
CHP 143	22	Health Professions - Physical Therapy
VIN 155	22.2	Physical Sciences - Physics, General
CAV 005	23.4	Biological Sciences/Life Sciences - Biology, General
MCS 115	24	Computer and Information Sciences - General
RAS 111	24	Computer and Information Sciences - General

Average Lab Station Size by Building

Labs	Stations	Total ASF	ASF/Station
103-Cavness	392	15200	38.8
109-Library	30	1308	43.6
110-CHP	8	1114	139.3
112-CARR Fine Arts	325	11137	34.3
113-Rassman	62	2717	43.8
114-Vincent	250	6501	26.0
115-MCS	36	1758	48.8
120-Science III	96	4902	51.1
Campus	**1199**	**44637**	**37.2**

Space Projections – E&G

The Texas Higher Education Coordinating Board (THECB) developed a space planning tool for higher educational institutions. The space planning model is designed to predict necessary Education and General (E&G) space based on the number of full-time student equivalent (FTSE) and other parameters. The space projection is calculated by five factors: teaching, library, research, office and support spaces. The space planning model used in this study is available through the THECB web page. Spaces that are not considered as E&G were calculated separately and are discussed in a later section.

According to the most current THECB projection based on fall 2009 information, the University has approximately 19,000 assignable square feet (ASF) in surplus as a total. This space projection indicates the University has an adequate amount of space to meet their academic missions at this time; however, the THECB calculations do not take into account the age and functionality of existing space. Additionally, if the school does grow to 10,000 students, a significant amount of additional space will be needed.

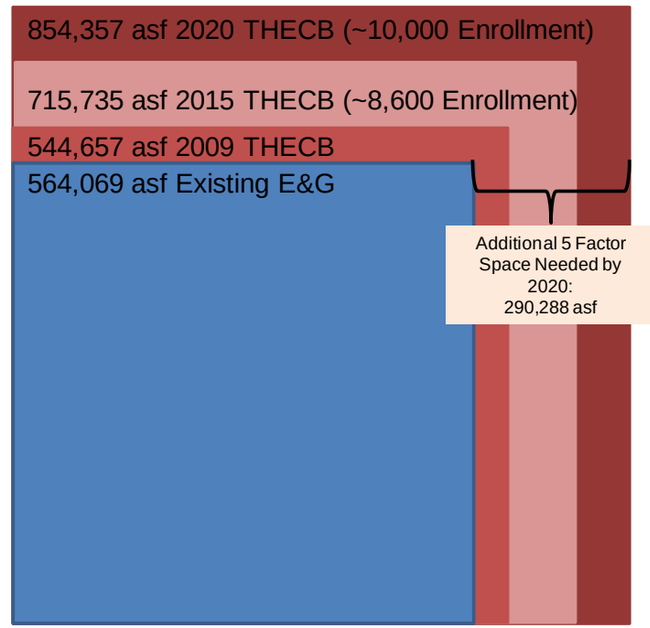
By THECB 5 Factor Room Type (ASF)	Existing	2009	Approx. Enrollment 8,600 2015	Approx. Enrollment 10,000 2020
Teaching	293,285	273,762	352,774	421,462
Research	25,496	15,163	19,766	23,372
Office	134,533	127,472	183,237	224,589
Support	42,786	44,972	59,097	70,543
Library	67,969*	83,288	100,860	114,391
Angelo State University Total	**564,069**	**544,657**	**715,735**	**854,357**

** Much of the library first floor has been off-line for construction.*

Angelo State requested an evaluation of space needs broken down by each college. This will allow them to assess the footprint of each school and how it affects the overall campus needs.

THECB Calculations by College (5 Factor Spaces Only)	2009	Approx. Enrollment 8,600 2015	Approx. Enrollment 10,000 2020
College of Business	49,378	81,196	95,882
College of Education	62,873	104,056	124,657
College of Liberal and Fine Arts	132,893	174,282	202,647
College of Nursing and Allied Health	48,501	57,014	73,710
College of Sciences	95,518	134,210	170,114
Predeclared and General Studies	27,235	5,019	2,412
Library	83,288	100,860	114,391
Support	44,972	59,097	70,543
Angelo State University Total (ASF)	**544,657**	**715,735**	**854,357**

In order to accommodate a student enrollment of 10,000, the University will need to gain over 290,000 assignable square feet of E&G space. This does not take into account the additional support (Non-E&G) space that will be required as well.



This chart was developed as a tool for the University. It details E&G space need by college. It links enrollment goals for each year through 10,000 students with the colleges' anticipated enrollment figures by headcount and FTE. This will allow ASU to look at space needs in conjunction with actual enrollment in addition to anticipated enrollment. That way if one college grows faster or slower than anticipated, their space needs can be adjusted accordingly.

	Existing	2009 Enrollments			THECB Projection	2010 Enrollments			THECB Projection	2011 Enrollments			THECB Projection	2012 Enrollments			THECB Projection
(5 Factor Spaces Only)		Head Count	ASU FTE	THECB FTE	2009	Head Count	ASU FTE	THECB FTE	2010	Head Count	ASU FTE	THECB FTE	2011	Head Count	ASU FTE	THECB FTE	2012
College of Business	9,264	882.00	816.40	735.90	49,378	978.50	905.99	815.92	54,681	1,075.00	995.58	895.95	59,984	1,171.50	1,085.17	975.97	65,287
College of Education	17,024	1,653.00	1,130.10	1,001.10	62,873	1,382.50	1,237.76	1,094.84	69,737	1,507.00	1,345.42	1,188.59	76,601	1,631.50	1,453.08	1,282.33	83,464
College of Liberal and Fine Arts	57,957	1,258.00	1,561.70	1,395.50	132,893	1,784.17	1,672.48	1,497.00	139,791	1,915.33	1,783.26	1,598.50	146,689	2,046.50	1,894.04	1,700.00	153,587
College of Nursing and Allied Health	26,206	811.00	678.10	582.10	48,501	843.33	696.85	602.77	49,920	875.67	715.59	623.43	51,339	908.00	734.34	644.10	52,758
College of Sciences	103,884	1,077.00	1,036.40	961.50	95,518	1,154.67	1,110.35	1,029.42	101,967	1,232.33	1,184.31	1,097.34	108,415	1,310.00	1,258.26	1,165.26	114,864
Predeclared and General Studies		700.00	641.90	567.40	27,235	604.83	554.63	490.26	23,532	509.67	467.36	413.12	19,830	414.50	380.10	335.98	16,127
Library	67,969				83,288				86,217				89,145				92,074
Support	42,697				44,972				47,326				49,680				52,035
Angelo State University Total	325,001	6,381.00	5,864.60	5,243.50	544,657	6,748.00	6,178.06	5,530.22	573,170	7,115.00	6,491.52	5,816.93	601,683	7,482.00	6,804.98	6,103.65	630,196
Exist. Non-Depart. and Classroom Space	239,068																
	564,069																

		2013 Enrollments			THECB Projection	2014 Enrollments			THECB Projection	2015 Enrollments			THECB Projection	2016 Enrollments			THECB Projection
		Head Count	ASU FTE	THECB FTE	2013	Head Count	ASU FTE	THECB FTE	2014	Head Count	ASU FTE	THECB FTE	2015	Head Count	ASU FTE	THECB FTE	2016
College of Business		1,268.00	1,174.76	1,056.00	70,590	1,364.50	1,264.35	1,136.02	75,893	1,461.00	1,353.94	1,216.04	81,196	1,516.80	1,403.89	1,260.63	84,133
College of Education		1,756.00	1,560.74	1,376.07	90,328	1,880.50	1,668.40	1,469.82	97,192	2,005.00	1,776.06	1,563.56	104,056	2,091.80	1,848.05	1,625.54	108,176
College of Liberal and Fine Arts		2,177.67	2,004.82	1,801.50	160,486	2,308.83	2,115.60	1,903.00	167,384	2,440.00	2,226.38	2,004.50	174,282	2,522.80	2,300.19	2,070.30	179,955
College of Nursing and Allied Health		940.33	753.08	664.76	54,176	972.67	771.83	685.43	55,595	1,005.00	790.57	706.09	57,014	1,065.00	837.12	747.86	60,353
College of Sciences		1,387.67	1,332.22	1,233.18	121,313	1,465.33	1,406.17	1,301.10	127,761	1,543.00	1,480.12	1,369.02	134,210	1,614.40	1,548.15	1,431.63	141,391
Predeclared and General Studies		319.33	292.83	258.84	12,424	224.17	205.56	181.70	8,722	129.00	118.29	104.56	5,019	115.60	106.01	93.70	4,498
Library					95,003				97,932				100,860				103,567
Support					54,389				56,743				59,097				61,387
		7,849.00	7,118.44	6,390.36	658,709	8,216.00	7,431.90	6,677.08	687,222	8,583.00	7,745.36	6,963.79	715,735	8,926.40	8,043.41	7,229.67	743,459

		2017 Enrollments			THECB Projection	2018 Enrollments			THECB Projection	2019 Enrollments			THECB Projection	2020 Enrollments			THECB Projection
		Head Count	ASU FTE	THECB FTE	2017	Head Count	ASU FTE	THECB FTE	2018	Head Count	ASU FTE	THECB FTE	2019	Head Count	ASU FTE	THECB FTE	2020
College of Business		1,572.60	1,453.84	1,305.22	87,070	1,628.40	1,503.79	1,349.81	90,008	1,684.20	1,553.74	1,394.40	92,945	1,740.00	1,603.69	1,438.99	95,882
College of Education		2,178.60	1,920.05	1,687.51	112,296	2,265.40	1,992.05	1,749.49	116,416	2,352.20	2,064.05	1,811.47	120,537	2,439.00	2,136.05	1,873.44	124,657
College of Liberal and Fine Arts		2,605.60	2,374.01	2,136.10	185,628	2,688.40	2,447.83	2,201.90	191,301	2,771.20	2,521.65	2,267.70	196,974	2,854.00	2,595.47	2,333.50	202,647
College of Nursing and Allied Health		1,125.00	883.66	789.63	63,692	1,185.00	930.21	831.40	67,031	1,245.00	976.75	873.16	70,370	1,305.00	1,023.30	914.93	73,710
College of Sciences		1,685.80	1,616.17	1,494.24	148,572	1,757.20	1,684.19	1,556.85	155,753	1,828.60	1,752.22	1,619.45	162,933	1,900.00	1,820.24	1,682.06	170,114
Predeclared and General Studies		102.20	93.72	82.84	3,976	88.80	81.43	71.98	3,455	75.40	69.14	61.12	2,934	62.00	56.85	50.26	2,412
Library					106,273				108,979				111,685				114,391
Support					63,676				65,965				68,254				70,543
		9,269.80	8,341.46	7,495.54	771,184	9,613.20	8,639.51	7,761.42	798,908	9,956.60	8,937.56	8,027.30	826,632	10,300.00	9,235.61	8,293.18	854,357

Space Projections – Non E&G

In addition to the Academic, or E&G space the University will require, there are a series of important associated and support spaces known as non E&G space. For the purposes of this report, IT areas, housing, dining, administration/student services, student recreation space, athletics, and storage spaces are included under this definition.

IT

The IT group has been squeezed for space as the information revolution has led to the need for server space, space for those that tend the servers and equipment, as well as space for programmers. They will also need additional space to help execute the mandate to provide more courses on line. Given IT already occupies space in the MCS building, it makes sense to allow them to grow in that location. As new classrooms are renovated or constructed in other master-plan-proposed projects, it is recommended that MCS classrooms be replaced in these other projects so that IT can expand in the building.

Housing

Housing recommendations are summarized in the Executive Summary in the Appendix. The full Housing Study is published under separate cover.

Dining

Dining space needs were calculated according to CEFPI guidelines, which suggest a shortfall of about 15,000 GSF when the University reaches its enrollment goals. Additions to the existing University Center and Food Service Center are recommended as the major facilities to fulfill this need. A small snack bar in the CHP would also provide some food in a more central location, and take advantage of the activity already present in that location.

Administrative/Student Services Space

Services needed by students for enrollment and other critical functions are located in multiple buildings and have inadequate space. It is estimated that about 25,000 GSF is needed to establish a One Stop Center at the University, consolidating enrollment services, financial aid, the Bursar's office, and other important functions in a single location, and reducing or eliminating the need for the temporary buildings now in use.

Recreation Space

The intramural fields are in poor condition, with little or no lighting for night time play. Given the high degree of participation in intramurals at ASU, expanding and updating of the existing fields is highly recommended. A small locker and shower facility would also be needed. In addition, indoor student lounge and study spaces are recommended to be expanded to address the needs of an expanding student body. Student organization space is also greatly needed. An expansion of the University Center is suggested to address these needs, as well as the dining service discussed above. The University Center expansion is estimated at approximately 27,000 GSF.

Athletics

Athletics is in fairly good shape, except for storage. It is recommended that they be provided a portion of the Warehouse facility discussed below.

Warehouse Facility

Many functions at ASU are short of storage space. A large warehouse, at about 25,000 GSF should assist with these growing storage needs.

% Increase	Current Space	Additional Space		Total Space (ASF)	% Increase Over Existing Space	% of 2020 THECB Projections
		New	Backfill			
College of Business	9,264	16,000	6,400	31,664	241.80%	30.25%
College of Education	17,024	58,167		75,191	341.68%	44.05%
College of Liberal and Fine Arts	57,957	84,200	8,000	150,157	159.08%	66.93%
College of Nursing and Allied Health	26,206	55,334		81,540	211.15%	97.70%
College of Sciences	103,884	54,000	12,000	121,284	16.75%	76.31%

Building Blocks February, 16 2011

Project	Phase	Back Fill/ Renovate ASF	Back Fill/ Renovate GSF	New ASF	New GSF	Remarks	
New Academic Building I	1			70,000	108,000	46,000 asf Nursing (includes 2,000 asf Classroom), 20,500 asf Education (Includes 2,000 asf of Classroom); 1,500 asf Collaboration Space; 2,000 CHR Majority to Agriculture with one Physics lab	
Backfill Vincent	1	12,000	16,000			College of Liberal and Fine Arts	Or leave Education as is in addition to space in
Backfill Carr	1	8,000	11,000			Create larger Classrooms	
Right Size Classrooms in Academic Building	1					For College of Sciences: use Science III as surge space during renovation, right size labs; new/additional space for Sciences included in Phase 2 as well	
Renovate Cavness	1					54,000 asf for Sciences (including 34,000 asf for Math and Computer Science and 3,000 asf of Classrooms); 16,000 asf for Business (Including 2,000 asf for Classrooms); 1,000 asf for Collaboration Space	
New Academic Building II	2			70,000	108,000	11,000 asf for Wellness Center (Includes 5,000 asf Clinic and Counseling, 3,500 asf Student Lounge, 2,500 asf Snack Bar); 9,334 asf PT (Allied Health); 12,000 asf Athletics; 37,667 asf College of Education	2,000 asf of snack bar will suffice
New Academic Building III - Kinesiology Building (with PT, Athletics, Wellness)	2			70,000	108,000	College of Liberal and Fine Arts	
New Academic Building IV	2			84,200	140,000	College of Business	
Backfill Rassman	2	6,400					
Angelo State University Total - E&G		**26,400**	**27,000**	**294,200**	**464,000**		
Non E&G Spaces							
Reassign First Floor MCS Classroom Space to IT	1	2,000				Use new Academic Building and right sized existing Academic Building classrooms to replace	
Housing - Complete Plaza Verde I	1					250-300 Beds	
Add Dining to Food Service Center	1			10,000	15,000	To serve Plaza Verde I and Campus Green users	
Administration/Student Services (Addition or New)	1			16,000	25,000		
Backfill Remaining First Floor MCS Classroom Space with IT	2	1,600				Do not reassign tiered lecture hall; approximately 3,600 asf total of classroom space (Phase 1 + 2) will go to IT	
Add to University Center (Include Dining)	2			17,500	27,000	10,000 of dining, 5,000 asf student lounge space, 2,500 student government and organization space	
Housing - Acquire Apartments or Plaza Verde II	2						
Wellness Snack Bar (in New Academic Building III)	2					2,000-2,500 asf of snack bar	
Expand Physical Plant/Warehouse for Storage	2			20,000	25,000		
Parking				1,103,857	1,327,276	At approximately 8,600 enrollment = 3,326 total spaces required; at approximately 10,300 enrollment, 4,029 total spaces required	

Note: Will need approximately total (new and existing) 57,200 asf of food service space for 10,300 enrollment.

Conclusion

The intent of the space analysis is to highlight the challenges and opportunities that stand before the University with respect to space needs. On the one hand, the projected deficit of space when student enrollment reaches 10,000 students, at nearly 300,000 ASF, is somewhat daunting; but on the other hand, there are opportunities to improve utilization of existing space.

For example, additional dynamics impacting teaching space at ASU involve the gradual evolution of faculty preference to teach in rooms that enable more collaboration among students, and in some cases have more flexible layouts. These changes generally involve the substitution of tables and chairs for tablet arm desks. This has caused a reduction in capacity of affected classrooms, since the table and chair layout needs more space than the tablet arms. At the same time, there has developed a need for larger classes, spawned by increased enrollment. So although the University has made great strides in utilization of classrooms in the last few years, further progress is stymied by the reduced need for an inventory of small classrooms, coupled with the evolving pedagogy which effectively reduces the capacity of existing classrooms.

The Master Plan Update proposes that many of these smaller classrooms be converted to appropriate size in a series of remodel projects which join them together to create fewer but larger classrooms (Academic Building remodel), reassign them to IT use (Rassman), or remodel them in backfill projects enabled by the provision of new academic buildings (Vincent, Carr, MCS). These efforts should be coordinated with the arrival of the new buildings to assure adequate inventory of appropriate classroom sizes, and improved utilization.

Another of the University's key goals is to improve science facilities. The key science facility on campus, the Cavness Science building, was constructed in 1968, and has not received any major renovation in the ensuing 43 years. Life safety and building codes, accessibility codes, and hazardous material codes have all moved ahead while Cavness has remained as is. Functionally, enrollment suggests smaller laboratories than those originally constructed. The Master Plan Update proposes a replacement or renovation of Cavness, depending on academic priorities and funding realities in the future. In an ideal world, Cavness would be replaced, providing a state-of-the-art facility without the hardship displacement of existing departments entails in a renovation project. On the other hand, the renovation, though more difficult, might be more economically feasible. Either approach would provide the University with the opportunity to improve utilization of their key science facility.

With respect to future space needs as projected by the THECB model, the University has requested that future needs be aligned with a particular enrollment rather than with a point in time. The planning horizon extends to 2020 when enrollment is expected to reach 10,300 (headcount). Interim space needs have been aligned with enrollment. For example, when enrollment reaches a headcount of 8,216, the University space needs, according to the THECB model, will increase to 687,222 ASF, an increase of approximately 22%. Ten interim levels of enrollment and projected space have been provided for the University's use, broken down by College and by type of space.

Phasing of Master Plan projects has been proposed (see Chapter Two), with programs of distinction given high priority. Both E&G and non E&G projects have been prioritized into two distinct phases.

The Space Analysis aspires to provide invaluable information to ASU as the University copes with growing enrollment and the associated need for additional space, and at the same time strives to improve utilization of existing space.

Budget Estimate

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Budget Estimate

Introduction

Costs provided with the Master Plan Update are construction costs only, and do not include other project costs such as A/E fees, furniture, fixtures and equipment, or testing. A contingency of 15% has been assumed for each project, as well as a 1% add-on for LEED requirements; but costs are shown in today's dollars, without escalation. Cost estimates are based on a broad understanding of the elements of each proposed project, and not on a detailed program.

The projects identified in Phase I are expected to have a construction cost of approximately $105 million, plus some portion of the estimated $40 million in infrastructure cost. Phase II projects are more costly, with an expected construction cost of approximately $192 million, plus the remaining portion of the $40 million in infrastructure costs. It is important to note that, although costs for the planned future closing of Johnson Street, including the new plaza, have been incorporated, proposed traffic calming measures have not been estimated as there are many options and approaches that might be taken, and are not developed at this time.

It is recommended that each project be programmed, and that the cost estimate updated at that time.

Budget Summary

PHASE I		ESTIMATE
1 - New Academic Building for Nursing and Education	$	24,910,000
2 - Backfill Vincent (Renovate Vacated Nursing Space for Agriculture)	$	2,600,000
3 - Backfill Carr (Reno. Vacated Education Space for Liberal and Fine Arts)	$	1,790,000
4 - Renovate Cavness	$	17,150,000
5 - Right Size Academic Classrooms	$	3,740,000
6 - Reassign MCS (IT) Space	$	790,000
7 - Administration / Student Services	$	6,530,000
8 - Phase I Student Housing (Plaza Verde)	$	35,000,000
9 - Massie Halls Connector	$	2,680,000
10 - Snack Bar / Activity Space on Mall	$	1,140,000
12 - Improve Existing Intramural Fields	$	4,680,000
13 - Renovate Existing Auditorium	$	3,820,000
TOTAL PHASE I	$	104,830,000

PHASE II		ESTIMATE
1A - New Academic Building II	$	31,050,000
1B - New Academic Building III	$	25,270,000
1C - New Academic Building IV	$	31,280,000
2 - Backfill Rassman	$	1,400,000
3 - Library Expansion	$	8,420,000
4 - University Center Expansion	$	8,290,000
5 - Addition to Food Service Center	$	4,580,000
6 - Demolish Concho, Phase II Student Housing (Plaza Verde II)	$	33,180,000
7 - Demolish Existing and Build 4 New Campus Religious Centers	$	3,430,000
8 - New Warehouse	$	2,550,000
9 - Sitework / Infrastructure - Phase II	$	40,150,000
10 - New Intramural Facility	$	2,810,000
TOTAL PHASE II	$	192,410,000

ALTERNATE OPTIONS:		
Phase I - Replace Cavness in lieu of Renovation	$	24,280,000

Budget Details

SCOPE OF WORK	QTY	UNIT	UNIT COST	EXTENSION	SUBTOTAL
1 - New Academic Building Nursing and Education				108,000	gsf
Building Earthwork	27,000	sf	$ 12.00	$ 324,000	
Foundation	27,000	sf	$ 18.00	$ 486,000	
Superstructure	108,000	sf	$ 28.00	$ 3,024,000	
Exterior Skin - Brick 60%	24,120	sf	$ 15.00	$ 361,800	
Exterior Skin - Glass 30%	12,060	sf	$ 80.00	$ 964,800	
Exterior Skin - Accents 10%	4,020	sf	$ 40.00	$ 160,800	
Solid Skin CMU Backup, Waterproofed	28,140	sf	$ 18.00	$ 506,520	
Stairs	240	risers	$ 650.00	$ 156,000	
Roofing	27,000	sf	$ 15.00	$ 405,000	
Thermal and Moisture Protection	108,000	sf	$ 5.00	$ 540,000	
Conveying	8	stops	$ 45,000.00	$ 360,000	
Fire Suppression	108,000	sf	$ 2.50	$ 270,000	
Fire Pump	1	ea	$ 60,000.00	$ 60,000	
Plumbing	108,000	sf	$ 6.00	$ 648,000	
HVAC	108,000	sf	$ 16.00	$ 1,728,000	
Electrical	108,000	sf	$ 15.00	$ 1,620,000	
Communications	108,000	sf	$ 1.00	$ 108,000	
Electronic Safety and Security	108,000	sf	$ 1.00	$ 108,000	
Upgrade for Above Ceiling Utility Flexibility	108,000	sf	$ 4.00	$ 432,000	
Interior Construction:					
Nursing	44,000	asf	$ 70.00	$ 3,080,000	
Education	18,500	asf	$ 70.00	$ 1,295,000	
Classrooms	4,000	asf	$ 65.00	$ 260,000	
Collaboration Space	1,500	asf	$ 60.00	$ 90,000	
CITR	2,000	asf	$ 90.00	$ 180,000	
Circulation / Common Areas	17,500	asf	$ 45.00	$ 787,500	
Restrooms	3,600	asf	$ 126.00	$ 453,600	
Other Space	16,900	sf	$ 45.00	$ 760,500	
Sub Total					$ 19,169,520
Contingency	15.0%				$ 2,875,428
LEED Requirements	1.0%				$ 220,449
Contractor Mark-Ups	12.0%				$ 2,645,394
TOTAL ACADEMIC BUILDING I					$ 24,910,791

SCOPE OF WORK	QTY	UNIT	UNIT COST	EXTENSION	SUBTOTAL
2 - Backfill Vincent (Renovate Vacated Nursing Space for Agriculture)				16,000	gsf
Renovations	16,000	sf	$ 125.00	$ 2,000,000	
Sub Total					$ 2,000,000
Contingency	15.0%				$ 300,000
LEED Requirements	1.0%				$ 23,000
Contractor Mark-Ups	12.0%				$ 276,000
TOTAL BACKFILL VINCENT					$ 2,599,000

3 - Backfill Carr (Renovate Vacated Education Space for Liberal and Fine Arts)				11,000	gsf
Renovations	11,000	sf	$ 125.00	$ 1,375,000	
Sub Total					$ 1,375,000
Contingency	15.0%				$ 206,250
LEED Requirements	1.0%				$ 15,813
Contractor Mark-Ups	12.0%				$ 189,750
TOTAL BACKFILL CARR					$ 1,786,813

4 - Renovate Cavness				82,500	gsf
Renovations	82,500	sf	$ 160.00	$ 13,200,000	
Sub Total					$ 13,200,000
Contingency	15.0%				$ 1,980,000
LEED Requirements	1.0%				$ 151,800
Contractor Mark-Ups	12.0%				$ 1,821,600
TOTAL RENOVATE CAVNESS					$ 17,153,400

SCOPE OF WORK	QTY	UNIT	UNIT COST	EXTENSION	SUBTOTAL
4B - Replace Cavness				82,500	gsf
Demolition	82,500	sf	$ 6.00	$ 495,000	
Building Earthwork	41,250	sf	$ 12.00	$ 495,000	
Foundation	41,250	sf	$ 18.00	$ 742,500	
Superstructure	82,500	sf	$ 23.00	$ 1,897,500	
Exterior Skin - Brick 60%	14,616	sf	$ 15.00	$ 219,240	
Exterior Skin - Glass 30%	7,308	sf	$ 80.00	$ 584,640	
Exterior Skin - Accents 10%	2,436	sf	$ 40.00	$ 97,440	
Solid Skin CMU Backup, Waterproofed	17,052	sf	$ 18.00	$ 306,936	
Stairs	120	risers	$ 650.00	$ 78,000	
Roofing	41,250	sf	$ 15.00	$ 618,750	
Thermal and Moisture Protection	82,500	sf	$ 5.00	$ 412,500	
Conveying	2	stops	$ 45,000.00	$ 90,000	
Fire Suppression	82,500	sf	$ 2.50	$ 206,250	
Fire Pump	1	ea	$ 60,000.00	$ 60,000	
Plumbing	82,500	sf	$ 6.00	$ 495,000	
HVAC	82,500	sf	$ 16.00	$ 1,320,000	
Electrical	82,500	sf	$ 15.00	$ 1,237,500	
Communications	82,500	sf	$ 1.00	$ 82,500	
Electronic Safety and Security	82,500	sf	$ 1.00	$ 82,500	
Upgrade for Above Ceiling Utility Flexibility	82,500	sf	$ 4.00	$ 330,000	
Interior Construction:					
Wet Labs	24,750	asf	$ 225.00	$ 5,568,750	
Offices	8,250	asf	$ 70.00	$ 577,500	
Classrooms	24,750	asf	$ 65.00	$ 1,608,750	
Circulation / Common Areas	8,250	asf	$ 45.00	$ 371,250	
Restrooms	4,125	asf	$ 126.00	$ 519,750	
Other Space	4,125	sf	$ 45.00	$ 185,625	
Sub Total					$ 18,682,881
Contingency	15.0%				$ 2,802,432
LEED Requirements	1.0%				$ 214,853
Contractor Mark-Ups	12.0%				$ 2,578,238
TOTAL CAVNESS REPLACEMENT					$ 24,278,404

SCOPE OF WORK	QTY	UNIT	UNIT COST	EXTENSION	SUBTOTAL
5 - Right Size Academic Classrooms				23,000	gsf
Renovations	23,000	sf	$ 125.00	$ 2,875,000	
Sub Total					$ 2,875,000
Contingency	15.0%				$ 431,250
LEED Requirements	1.0%				$ 33,063
Contractor Mark-Ups	12.0%				$ 396,750
TOTAL RIGHT SIZE ACADEMIC CLASSROOMS					$ 3,736,063

SCOPE OF WORK	QTY	UNIT	UNIT COST	EXTENSION	SUBTOTAL
6 - Reassign MCS (IT) Space				4,860	gsf
Renovations	4,860	sf	$ 125.00	$ 607,500	
Sub Total					$ 607,500
Contingency	15.0%				$ 91,125
LEED Requirements	1.0%				$ 6,986
Contractor Mark-Ups	12.0%				$ 83,835
TOTAL REASSIGN MCS					$ 789,446

7 - Administration / Student Services				25,000	gsf
Building Earthwork	25,000	sf	$ 12.00	$ 300,000	
Foundation	25,000	sf	$ 16.00	$ 400,000	
Superstructure	25,000	sf	$ 25.00	$ 625,000	
Exterior Skin - Brick 60%	6,300	sf	$ 15.00	$ 94,500	
Exterior Skin - Glass 30%	3,150	sf	$ 80.00	$ 252,000	
Exterior Skin - Accents 10%	1,050	sf	$ 40.00	$ 42,000	
Solid Skin CMU Backup, Waterproofed	7,350	sf	$ 18.00	$ 132,300	
Stairs	-	risers	$ 650.00	$ -	
Roofing	25,000	sf	$ 15.00	$ 375,000	
Thermal and Moisture Protection	25,000	sf	$ 5.00	$ 125,000	
Conveying	-	stops	$ 40,000.00	$ -	
Fire Suppression	25,000	sf	$ 2.50	$ 62,500	
Fire Pump	1	ea	$ 40,000.00	$ 40,000	
Plumbing	25,000	sf	$ 6.00	$ 150,000	
HVAC	25,000	sf	$ 16.00	$ 400,000	
Electrical	25,000	sf	$ 15.00	$ 375,000	
Communications	25,000	sf	$ 1.00	$ 25,000	
Electronic Safety and Security	25,000	sf	$ 1.00	$ 25,000	
Upgrade for Above Ceiling Utility Flexibility	25,000	sf	$ 4.00	$ 100,000	
Interior Construction	25,000	sf	$ 60.00	$ 1,500,000	
Sub Total					$ 5,023,300
Contingency	15.0%				$ 753,495
LEED Requirements	1.0%				$ 57,768
Contractor Mark-Ups	12.0%				$ 693,215
TOTAL ADMINISTRATION / STUDENT SERVICES					$ 6,527,778

SCOPE OF WORK	QTY	UNIT	UNIT COST	EXTENSION	SUBTOTAL
8 - Phase 1 Student Housing (Plaza Verde I)					
Student Housing	1	ls	$ 35,000,000.00	$ 35,000,000	
TOTAL PHASE I STUDENT HOUSING					$ 35,000,000

9 - Massie Halls Connector				7,500	gsf
Connector / Amenity Space	7,500	sf	$ 275.00	$ 2,062,500	
Sub Total					$ 2,062,500
Contingency	15.0%				$ 309,375
LEED Requirements	1.0%				$ 23,719
Contractor Mark-Ups	12.0%				$ 284,625
TOTAL MASSIE HALLS CONNECTOR					$ 2,680,219

10 - Snack Bar / Activity Space on Mall				5,000	gsf
Snack Bar / Activities	5,000	sf	$ 175.00	$ 875,000	
Sub Total					$ 875,000
Contingency	15.0%				$ 131,250
LEED Requirements	1.0%				$ 10,063
Contractor Mark-Ups	12.0%				$ 120,750
TOTAL SNACK / ACTIVITY SPACE					$ 1,137,063

SCOPE OF WORK	QTY	UNIT	UNIT COST	EXTENSION	SUBTOTAL
12 - Improve Intramural Fields				5,000	gsf
Re-Work Existing Fields (Re-Grade / Irrigation / Sod)	360,000	sf	$ 7.00	$ 2,520,000	
New Field Lighting at Existing Fields (4 Softball + 8 Intramural Fields)	48	ea	$ 22,500.00	$ 1,080,000	
Sub Total					$ 3,600,000
Contingency	15.0%				$ 540,000
LEED Requirements	1.0%				$ 41,400
Contractor Mark-Ups	12.0%				$ 496,800
TOTAL INTRAMURAL FACILITY					$ 4,678,200

13 - Renovate Auditorium - 419 Seats				10,000	gsf
Demolition of Theater Rigging and Equipment	10,000	sf	$ 20.00	$ 200,000	
ADA Upgrades	10,000	sf	$ 18.00	$ 180,000	
Theater Renovations	10,000	sf	$ 65.00	$ 650,000	
Theater Seating	419	seats	$ 375.00	$ 157,125	
Interior Construction	10,000	sf	$ 175.00	$ 1,750,000	
Sub Total					$ 2,937,125
Contingency	15.0%				$ 440,569
LEED Requirements	1.0%				$ 33,777
Contractor Mark-Ups	12.0%				$ 405,323
TOTAL AUDITORIUM RENOVATIONS					$ 3,816,794

SCOPE OF WORK	QTY	UNIT	UNIT COST	EXTENSION	SUBTOTAL
1A - New Academic Building II				108,000	gsf
Building Earthwork	27,000	sf	$ 12.00	$ 324,000	
Foundation	27,000	sf	$ 18.00	$ 486,000	
Superstructure	108,000	sf	$ 28.00	$ 3,024,000	
Exterior Skin - Brick 60%	24,120	sf	$ 15.00	$ 361,800	
Exterior Skin - Glass 30%	12,060	sf	$ 80.00	$ 964,800	
Exterior Skin - Accents 10%	4,020	sf	$ 40.00	$ 160,800	
Solid Skin CMU Backup, Waterproofed	28,140	sf	$ 18.00	$ 506,520	
Stairs	240	risers	$ 650.00	$ 156,000	
Roofing	27,000	sf	$ 15.00	$ 405,000	
Thermal and Moisture Protection	108,000	sf	$ 5.00	$ 540,000	
Conveying	8	stops	$ 45,000.00	$ 360,000	
Fire Suppression	108,000	sf	$ 2.50	$ 270,000	
Fire Pump	1	ea	$ 60,000.00	$ 60,000	
Plumbing	108,000	sf	$ 6.00	$ 648,000	
HVAC	108,000	sf	$ 16.00	$ 1,728,000	
Electrical	108,000	sf	$ 15.00	$ 1,620,000	
Communications	108,000	sf	$ 1.00	$ 108,000	
Electronic Safety and Security	108,000	sf	$ 1.00	$ 108,000	
Upgrade for Above Ceiling Utility Flexibility	108,000	sf	$ 4.00	$ 432,000	
Interior Construction:					
Sciences	51,000	asf	$ 163.00	$ 8,313,000	
Business	14,000	asf	$ 70.00	$ 980,000	
Classrooms	5,000	asf	$ 65.00	$ 325,000	
Collaboration Space	1,000	asf	$ 60.00	$ 60,000	
Circulation / Common Areas	17,750	asf	$ 45.00	$ 798,750	
Restrooms	3,600	asf	$ 126.00	$ 453,600	
Other Space	15,650	sf	$ 45.00	$ 704,250	
Sub Total					$ 23,897,520
Contingency	15.0%				$ 3,584,628
LEED Requirements	1.0%				$ 274,821
Contractor Mark-Ups	12.0%				$ 3,297,858
TOTAL ACADEMIC BUILDING II					$ 31,054,827

SCOPE OF WORK	QTY	UNIT	UNIT COST	EXTENSION	SUBTOTAL
1B - New Academic Building III				108,000	gsf
Building Earthwork	27,000	sf	$ 12.00	$ 324,000	
Foundation	27,000	sf	$ 18.00	$ 486,000	
Superstructure	108,000	sf	$ 28.00	$ 3,024,000	
Exterior Skin - Brick 60%	24,120	sf	$ 15.00	$ 361,800	
Exterior Skin - Glass 30%	12,060	sf	$ 80.00	$ 964,800	
Exterior Skin - Accents 10%	4,020	sf	$ 40.00	$ 160,800	
Solid Skin CMU Backup, Waterproofed	28,140	sf	$ 18.00	$ 506,520	
Stairs	240	risers	$ 650.00	$ 156,000	
Roofing	27,000	sf	$ 15.00	$ 405,000	
Thermal and Moisture Protection	108,000	sf	$ 5.00	$ 540,000	
Conveying	8	stops	$ 45,000.00	$ 360,000	
Fire Suppression	108,000	sf	$ 2.50	$ 270,000	
Fire Pump	1	ea	$ 60,000.00	$ 60,000	
Plumbing	108,000	sf	$ 6.00	$ 648,000	
HVAC	108,000	sf	$ 16.00	$ 1,728,000	
Electrical	108,000	sf	$ 15.00	$ 1,620,000	
Communications	108,000	sf	$ 1.00	$ 108,000	
Electronic Safety and Security	108,000	sf	$ 1.00	$ 108,000	
Upgrade for Above Ceiling Utility Flexibility	108,000	sf	$ 4.00	$ 432,000	
Interior Construction:					
Wellness	6,000	asf	$ 85.00	$ 510,000	
Clinic and Counseling	5,000	asf	$ 70.00	$ 350,000	
Student Lounge	3,500	asf	$ 65.00	$ 227,500	
Snack Bar	2,500	asf	$ 133.00	$ 332,500	
Allied Health	9,334	asf	$ 83.00	$ 774,722	
Athletics	12,000	asf	$ 83.00	$ 996,000	
College of Education	37,667	asf	$ 60.00	$ 2,260,020	
Circulation / Common Areas	19,000	asf	$ 45.00	$ 855,011	
Restrooms	3,600	asf	$ 126.00	$ 453,600	
Other Space	9,399	sf	$ 45.00	$ 422,944	
Sub Total					$ 19,445,217
Contingency	15.0%				$ 2,916,783
LEED Requirements	1.0%				$ 223,620
Contractor Mark-Ups	12.0%				$ 2,683,440
TOTAL ACADEMIC BUILDING III					$ 25,269,059

SCOPE OF WORK	QTY	UNIT	UNIT COST	EXTENSION	SUBTOTAL
1C - New Academic Building IV				140,000	gsf
Building Earthwork	35,000	sf	$ 12.00	$ 420,000	
Foundation	35,000	sf	$ 18.00	$ 630,000	
Superstructure	140,000	sf	$ 28.00	$ 3,920,000	
Exterior Skin - Brick 60%	27,000	sf	$ 15.00	$ 405,000	
Exterior Skin - Glass 30%	13,500	sf	$ 80.00	$ 1,080,000	
Exterior Skin - Accents 10%	4,500	sf	$ 40.00	$ 180,000	
Solid Skin CMU Backup, Waterproofed	31,500	sf	$ 18.00	$ 567,000	
Stairs	240	risers	$ 650.00	$ 156,000	
Roofing	35,000	sf	$ 15.00	$ 525,000	
Thermal and Moisture Protection	140,000	sf	$ 5.00	$ 700,000	
Conveying	8	stops	$ 45,000.00	$ 360,000	
Fire Suppression	140,000	sf	$ 2.50	$ 350,000	
Fire Pump	1	ea	$ 60,000.00	$ 60,000	
Plumbing	140,000	sf	$ 6.00	$ 840,000	
HVAC	140,000	sf	$ 16.00	$ 2,240,000	
Electrical	140,000	sf	$ 15.00	$ 2,100,000	
Communications	140,000	sf	$ 1.00	$ 140,000	
Electronic Safety and Security	140,000	sf	$ 1.00	$ 140,000	
Upgrade for Above Ceiling Utility Flexibility	140,000	sf	$ 4.00	$ 560,000	
Interior Construction:					
College of Liberal and Fine Arts	84,200	asf	$ 70.00	$ 5,894,000	
Circulation / Common Areas	21,050	asf	$ 45.00	$ 947,250	
Restrooms	3,600	asf	$ 126.00	$ 453,600	
Other Space	31,150	sf	$ 45.00	$ 1,401,750	
Sub Total					$ 24,069,600
Contingency	15.0%				$ 3,610,440
LEED Requirements	1.0%				$ 276,800
Contractor Mark-Ups	12.0%				$ 3,321,605
TOTAL ACADEMIC BUILDING IV					$ 31,278,445

2 - Backfill Rassman				8,640	gsf
Renovations	8,640	sf	$ 125.00	$ 1,080,000	
Sub Total					$ 1,080,000
Contingency	15.0%				$ 162,000
LEED Requirements	1.0%				$ 12,420
Contractor Mark-Ups	12.0%				$ 149,040
TOTAL BACKFILL RASSMAN					$ 1,403,460

SCOPE OF WORK	QTY	UNIT	UNIT COST	EXTENSION	SUBTOTAL
3 - Library Expansion				30,000	gsf
Demolition / Tie-In Modifications	30,000	sf	$ 4.00	$ 120,000	
Building Earthwork	30,000	sf	$ 12.00	$ 360,000	
Foundation	30,000	sf	$ 18.00	$ 540,000	
Superstructure	30,000	sf	$ 28.00	$ 840,000	
Exterior Skin - Brick 60%	4,536	sf	$ 15.00	$ 68,040	
Exterior Skin - Glass 30%	2,268	sf	$ 80.00	$ 181,440	
Exterior Skin - Accents 10%	756	sf	$ 40.00	$ 30,240	
Solid Skin CMU Backup, Waterproofed	5,292	sf	$ 18.00	$ 95,256	
Stairs	72	risers	$ 650.00	$ 46,800	
Roofing	30,000	sf	$ 15.00	$ 450,000	
Thermal and Moisture Protection	30,000	sf	$ 5.00	$ 150,000	
Conveying	2	stops	$ 40,000.00	$ 80,000	
Fire Suppression	30,000	sf	$ 2.50	$ 75,000	
Fire Pump	1	ea	$ 40,000.00	$ 40,000	
Plumbing	30,000	sf	$ 6.00	$ 180,000	
HVAC	30,000	sf	$ 16.00	$ 480,000	
Electrical	30,000	sf	$ 15.00	$ 450,000	
Communications	30,000	sf	$ 1.00	$ 30,000	
Electronic Safety and Security	30,000	sf	$ 1.00	$ 30,000	
Upgrade for Above Ceiling Utility Flexibility	30,000	sf	$ 4.00	$ 120,000	
Interior Construction	21,000	sf	$ 75.00	$ 1,575,000	
Other Spaces	9,000	sf	$ 60.00	$ 540,000	
Sub Total					$ 6,481,776
Contingency	15.0%				$ 972,266
LEED Requirements	1.0%				$ 74,540
Contractor Mark-Ups	12.0%				$ 894,485
TOTAL LIBRARY EXPANSION					$ 8,423,068

SCOPE OF WORK	QTY	UNIT	UNIT COST	EXTENSION	SUBTOTAL
4 - University Center Expansion				27,000	gsf
Demolition / Tie-In Modifications	27,000	sf	$ 4.00	$ 108,000	
Building Earthwork	27,000	sf	$ 12.00	$ 324,000	
Foundation	27,000	sf	$ 18.00	$ 486,000	
Superstructure	27,000	sf	$ 28.00	$ 756,000	
Exterior Skin - Brick 60%	3,618	sf	$ 15.00	$ 54,270	
Exterior Skin - Glass 30%	1,809	sf	$ 80.00	$ 144,720	
Exterior Skin - Accents 10%	603	sf	$ 40.00	$ 24,120	
Solid Skin CMU Backup, Waterproofed	4,221	sf	$ 18.00	$ 75,978	
Stairs	72	risers	$ 650.00	$ 46,800	
Roofing	27,000	sf	$ 15.00	$ 405,000	
Thermal and Moisture Protection	27,000	sf	$ 5.00	$ 135,000	
Conveying	2	stops	$ 40,000.00	$ 80,000	
Fire Suppression	27,000	sf	$ 2.50	$ 67,500	
Fire Pump	1	ea	$ 40,000.00	$ 40,000	
Plumbing	27,000	sf	$ 6.00	$ 162,000	
HVAC	27,000	sf	$ 16.00	$ 432,000	
Electrical	27,000	sf	$ 15.00	$ 405,000	
Communications	27,000	sf	$ 1.00	$ 27,000	
Electronic Safety and Security	27,000	sf	$ 1.00	$ 27,000	
Upgrade for Above Ceiling Utility Flexibility	27,000	sf	$ 4.00	$ 108,000	
Interior Construction					
Dining	10,000	sf	$ 90.00	$ 900,000	
Food Preparation	4,000	sf	$ 185.00	$ 740,000	
Student Lounge	5,000	sf	$ 65.00	$ 325,000	
Student Government and Organization	2,500	sf	$ 70.00	$ 175,000	
Other Spaces	5,500	sf	$ 60.00	$ 330,000	
Sub Total					$ 6,378,388
Contingency	15.0%				$ 956,758
LEED Requirements	1.0%				$ 73,351
Contractor Mark-Ups	12.0%				$ 880,218
TOTAL UNIVERSITY CENTER EXPANSION					$ 8,288,715

SCOPE OF WORK	QTY	UNIT	UNIT COST	EXTENSION	SUBTOTAL
5 - Addition to Food Service Center				15,000	gsf
Demolition / Tie-In Modifications	15,000	sf	$ 4.00	$ 60,000	
Building Earthwork	15,000	sf	$ 12.00	$ 180,000	
Foundation	15,000	sf	$ 18.00	$ 270,000	
Superstructure	15,000	sf	$ 28.00	$ 420,000	
Exterior Skin - Brick 60%	2,700	sf	$ 15.00	$ 40,500	
Exterior Skin - Glass 30%	1,350	sf	$ 80.00	$ 108,000	
Exterior Skin - Accents 10%	450	sf	$ 40.00	$ 18,000	
Solid Skin CMU Backup, Waterproofed	3,150	sf	$ 18.00	$ 56,700	
Stairs	-	risers	$ 650.00	$ -	
Roofing	15,000	sf	$ 15.00	$ 225,000	
Thermal and Moisture Protection	15,000	sf	$ 5.00	$ 75,000	
Conveying	-	stops	$ 40,000.00	$ -	
Fire Suppression	15,000	sf	$ 2.50	$ 37,500	
Fire Pump	1	ea	$ 40,000.00	$ 40,000	
Plumbing	15,000	sf	$ 6.00	$ 90,000	
HVAC	15,000	sf	$ 16.00	$ 240,000	
Electrical	15,000	sf	$ 15.00	$ 225,000	
Communications	15,000	sf	$ 1.00	$ 15,000	
Electronic Safety and Security	15,000	sf	$ 1.00	$ 15,000	
Upgrade for Above Ceiling Utility Flexibility	15,000	sf	$ 4.00	$ 60,000	
Interior Construction - Dining	15,000	sf	$ 90.00	$ 1,350,000	
Sub Total					$ 3,525,700
Contingency	15.0%				$ 528,855
LEED Requirements	1.0%				$ 40,546
Contractor Mark-Ups	12.0%				$ 486,547
TOTAL ADDITION TO FOOD SERVICE CENTER					$ 4,581,647

6 - Demolish Concho, Phase II Student Housing (Plaza Verde II)					
Demolition of Concho	1	ls	2,500,000.00	2,500,000	
Student Housing	490	beds	$ 47,000.00	$ 23,030,000	
Sub Total					$ 25,530,000
Contingency	15.0%				$ 3,829,500
LEED Requirements	1.0%				$ 293,595
Contractor Mark-Ups	12.0%				$ 3,523,140
TOTAL DEMO CONCHO, PHASE II STUDENT HOUSING					$ 33,176,235

SCOPE OF WORK	QTY	UNIT	UNIT COST	EXTENSION	SUBTOTAL
7 - Relocate Campus Religious Centers					
Demolish Existing Religious Centers	12,800	sf	10.00	128,000	
Replace with New:					
Building Earthwork	12,800	sf	$ 12.00	$ 153,600	
Foundation	12,800	sf	$ 12.00	$ 153,600	
Superstructure - Wood Framing System	12,800	sf	$ 14.00	$ 179,200	
Exterior Skin - Brick 60%	8,640	sf	$ 15.00	$ 129,600	
Exterior Skin - Glass 30%	4,320	sf	$ 80.00	$ 345,600	
Exterior Skin - Accents 10%	1,440	sf	$ 40.00	$ 57,600	
Exterior Sheathing, Waterproofed	14,400	sf	$ 6.00	$ 86,400	
Roofing	12,800	sf	$ 15.00	$ 192,000	
Thermal and Moisture Protection	12,800	sf	$ 5.00	$ 64,000	
Fire Suppression	12,800	sf	$ 2.50	$ 32,000	
Fire Pump	4	ea	$ 8,000.00	$ 32,000	
Plumbing	12,800	sf	$ 5.00	$ 64,000	
HVAC	12,800	sf	$ 12.00	$ 153,600	
Electrical	12,800	sf	$ 11.00	$ 140,800	
Communications	12,800	sf	$ 1.00	$ 12,800	
Electronic Safety and Security	12,800	sf	$ 1.00	$ 12,800	
Interior Construction:	12,800	sf	$ 55.00	$ 704,000	
Sub Total					$ 2,641,600
Contingency	15.0%				$ 396,240
LEED Requirements	1.0%				$ 30,378
Contractor Mark-Ups	12.0%				$ 364,541
TOTAL RELIGIOUS CENTERS					$ 3,432,759

SCOPE OF WORK	QTY	UNIT	UNIT COST	EXTENSION	SUBTOTAL
8 - New Warehouse Space				25,000	gsf
Building Earthwork	25,000	sf	$ 12.00	$ 300,000	
Foundation	25,000	sf	$ 8.00	$ 200,000	
Superstructure - Metal Building Frame	25,000	sf	$ 14.00	$ 350,000	
Exterior Skin - Brick 30%	3,510	sf	$ 15.00	$ 52,650	
Exterior Skin - Glass 10%	1,170	sf	$ 45.00	$ 52,650	
Exterior Skin - Metal Siding 60% - Included in Pre-Engineered Cost	-	sf	$ 40.00	$ -	
Exterior Insulation / Inboard Wall Finishes	11,700	sf	$ 5.00	$ 58,500	
Roofing - Metal Roof - Included in Pre-Engineered Cost	-	sf	$ 15.00	$ -	
Thermal and Moisture Protection	25,000	sf	$ 3.50	$ 87,500	
Fire Suppression	25,000	sf	$ 2.50	$ 62,500	
Fire Pump	1	ea	$ 12,000.00	$ 12,000	
Plumbing	25,000	sf	$ 3.50	$ 87,500	
HVAC	25,000	sf	$ 9.00	$ 225,000	
Electrical	25,000	sf	$ 10.00	$ 250,000	
Communications	25,000	sf	$ 0.50	$ 12,500	
Electronic Safety and Security	25,000	sf	$ 0.50	$ 12,500	
Interior Construction:	25,000	sf	$ 8.00	$ 200,000	
Sub Total					$ 1,963,300
Contingency	15.0%				$ 294,495
LEED Requirements	1.0%				$ 22,578
Contractor Mark-Ups	12.0%				$ 270,935
TOTAL WAREHOUSE SPACE					$ 2,551,308

9 - Sitework / Infrastructure - Phase II					
Site Demolition	1	ls	$ 200,000.00	$ 200,000	
Site Grading	1,327,276	sf	$ 2.00	$ 2,654,552	
Site Utilities	1,327,276	sf	$ 4.50	$ 5,972,742	
Landscaping	265,455	sf	$ 5.00	$ 1,327,276	
Hardscape	265,455	sf	$ 18.00	$ 4,778,194	
Signage	1	ls	$ 300,000.00	$ 300,000	
Above Ground Chilled Water Plant Expansion	5,000	sf	$ 275.00	$ 1,375,000	
Water Tower	1	ea	$ 350,000.00	$ 350,000	
Plaza Tower	625	sf	$ 850.00	$ 531,250	
Johnson Street Removal	22,500	sf	$ 20.00	$ 450,000	
Johnson Street Plaza	22,500	sf	$ 45.00	$ 1,012,500	
Paving / Curbs	1,327,276	sf	$ 9.00	$ 11,945,484	
Sub Total					$ 30,896,998
Contingency	15.0%				$ 4,634,550
LEED Requirements	1.0%				$ 355,315
Contractor Mark-Ups	12.0%				$ 4,263,786
TOTAL SITEWORK / INFRASTRUCTURE					$ 40,150,648

SCOPE OF WORK	QTY	UNIT	UNIT COST	EXTENSION	SUBTOTAL
10 - New Intramural Facility				5,000	gsf
Locker and Restroom Facility	5,000	sf	$ 210.00	$ 1,050,000	
New Fields with Lighting	2	ea	$ 555,000.00	$ 1,110,000	
Sub Total					$ 2,160,000
Contingency	15.0%				$ 324,000
LEED Requirements	1.0%				$ 24,840
Contractor Mark-Ups	12.0%				$ 298,080
TOTAL INTRAMURAL FACILITY					$ 2,806,920

UNIT COST WORKSHEET

STORAGE BUILDOUT

Finishes	200	sf	21.00	4,200
Wood, Plastics and Composites	200	sf	-	-
Specialties	200	sf	-	-
Equipment	200	sf	-	-
Furnishings	200	sf	-	-
Special Construction	200	sf	-	-
Fire Suppression	200	sf	2.00	400
HVAC	200	sf	8.00	1,600
Electrical	200	sf	6.00	1,200
Communications	200	sf	2.00	400
Electronic Safety and Security	200	sf	1.00	200
			$ 40.00	8,000

CLASSROOM BUILDOUT

Finishes	500	sf	16.00	8,000
Wood, Plastics and Composites	500	sf	6.00	3,000
Specialties	500	sf	10.00	5,000
Equipment	500	sf	2.00	1,000
Furnishings	500	sf	4.00	2,000
Special Construction	500	sf	8.00	4,000
Fire Suppression	500	sf	2.00	1,000
HVAC	500	sf	12.00	6,000
Electrical	500	sf	10.00	5,000
Communications	500	sf	3.00	1,500
Electronic Safety and Security	500	sf	2.00	1,000
			$ 75.00	37,500

LOCKER / DRESSING BUILDOUT

Finishes	800	sf	23.00	18,401
Wood, Plastics and Composites	800	sf	1.00	800
Specialties	800	sf	5.00	4,000
Lockers	40	ea	325.00	13,000
Benches	6	ea	400.00	2,400
Equipment	800	sf	1.00	800
Furnishings	800	sf	1.00	800
Special Construction	800	sf	-	-
Fire Suppression	800	sf	2.00	1,600
HVAC	800	sf	15.00	12,000
Electrical	800	sf	10.00	8,000
Communications	800	sf	3.00	2,400
Electronic Safety and Security	800	sf	2.00	1,600
			$ 83.00	65,801

HIGHER ELECTRIC LOAD SPACE BUILDOUT

Finishes	200	sf	21.00	4,200
Wood, Plastics and Composites	200	sf	1.00	200
Specialties	200	sf	3.00	600
Equipment	200	sf	1.00	200
Furnishings	200	sf	1.00	200
Special Construction	200	sf	4.00	800
Fire Suppression	200	sf	2.00	400
HVAC	200	sf	8.00	1,600
Electrical	200	sf	10.00	2,000
Communications	200	sf	3.00	600
Electronic Safety and Security	200	sf	2.00	400
			$ 56.00	11,200

RESTROOMS

Finishes	800	sf	23.00	18,401
Wood, Plastics and Composites	800	sf	1.00	800
Specialties	800	sf	15.00	12,000
Equipment	800	sf	1.00	800
Furnishings	800	sf	1.00	800
Special Construction	800	sf	-	-
Fire Suppression	800	sf	2.00	1,600
Plumbing	20	fixt	2,100.00	42,000
HVAC	800	sf	15.00	12,000
Electrical	800	sf	10.00	8,000
Communications	800	sf	3.00	2,400
Electronic Safety and Security	800	sf	2.00	1,600
			$ 126.00	100,401

RESTROOM / SHOWER BUILDOUT

Finishes	800	sf	23.00	18,401
Wood, Plastics and Composites	800	sf	1.00	800
Specialties	800	sf	15.00	12,000
Equipment	800	sf	1.00	800
Furnishings	800	sf	1.00	800
Special Construction	800	sf	-	-
Fire Suppression	800	sf	2.00	1,600
Plumbing	18	fixt	2,100.00	37,800
HVAC	800	sf	15.00	12,000
Electrical	800	sf	10.00	8,000
Communications	800	sf	3.00	2,400
Electronic Safety and Security	800	sf	2.00	1,600
			$ 121.00	96,201

SNACK BAR BUILDOUT

Finishes	200	sf	21.00	4,200
Wood, Plastics and Composites	200	sf	8.00	1,600
Specialties	200	sf	15.00	3,000
Equipment	200	sf	1.00	200
Furnishings	200	sf	1.00	200
Special Construction	200	sf	8.00	1,600
Fire Suppression	200	sf	2.00	400
Plumbing	200	sf	18.00	3,600
Grease Trap	1	ea	6,000.00	6,000
HVAC	200	sf	12.00	2,400
Electrical	200	sf	10.00	2,000
Communications	200	sf	3.00	600
Electronic Safety and Security	200	sf	2.00	400
			$ 131.00	26,200

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Appendix I - Consultant Reports

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Appendix I: Consultant Reports

Introduction

This section describes campus infrastructure and how it will support the Master Plan. It includes a report for each subject made by specialized sub-consultants. The 2005 Centennial Master Plan included detailed studies for each discipline. The reports in this section are intended to be an update to the previous studies. The reports in this section include an analysis of the existing infrastructure, how well it currently serves the campus, and recommendations required to accommodate the developments proposed in the Master Plan update.

A summary of an ASU student housing study is included in this section. The full report will be published separately.

Mechanical, Electrical and Plumbing Assessment Report

I. Introduction

A. Report purpose and scope: This report provides an overview of existing Central Plant capacities and services to campus facilities. This report also provides a preliminary assessment of projected MEP (Mechanical, Electrical, & Plumbing) loads that may be realized upon phased implementation of the Centennial Master Plan 2028 facilities additions.

B. CNG Engineering reviewed the following information sources for the purpose of developing this report

1. A draft issue of the Centennial Master Plan 2028, dated March, 2011.

2. A draft version of the proposed Building Blocks, dated March 1, 2011. This includes the following proposed buildings/ additions breakdown:

a) Academic Building I = 108,000 GSF

b) Academic Building II = 108,000 GSF

c) Academic Building III = 108,000 GSF

d) Academic Building IV = 140,000 GSF

e) 92,000 GSF of building expansion to existing support buildings:

(1) Dining@ Food Service 15,000 GSF

(2) Administration/ Student Services 15,000 GSF

(3) University Center 27,000 GSF

(4) Expand physical Plant/ Warehouse 15,000 GSF

3. As-built drawing of the Central Plant: One Line Diagram, dated 5/10/2010

4. A tour of the existing Central Plant facility and utility tunnel

5. Interviews with Facilities Engineering staff

C. Limitations: The condition and capacities of the MEP equipment and systems are as noted from existing or record documents, or as observed during visual inspection. This report is not intended to be used as a basis for design or guideline for future projects. Any information contained herein should be independently verified by the Engineer of record for accuracy at the time such work is initiated.

D. Any information contained herein should be independently verified by the Engineer of record for accuracy at the time such work is initiated.

II. Existing MEP Systems

A. Central Plant and utility tunnel infrastructure -

1. The central plant serves most campus buildings including:

a) Most Academic and Administrative Facilities (Approximately 10 buildings)

b) Houston Harte University Center, General Services Building, and the Food Service Center

c) Junell Center/ Stevens Arena

d) Carr Residence Hall.

2. The utility tunnel infrastructure consists of a cast concrete structure below the East-West spline of the campus. The tunnel contains chilled water and hot water piping for HVAC loads along with domestic hot water piping. The piping infrastructure (pipes, valves, supports, and insulation) requires periodic maintenance and their condition should be evaluated during the design and planning of new building or additions that require modifications to these piping systems. Some utility piping between the utility tunnel and outlying buildings is directly buried.

B. Description, general arrangement, and capacities of each MEP utility system:

1. Chilled Water Plant - The water cooled, chilled water plant consists of three, 1,000 Ton chillers and two, 500 Ton chillers with a total capacity of 4,000 Tons. The cooling towers are masonry fill, site-built concrete structures with 8 cells and fans. Each of the chillers has dedicated pumping systems.

2. Heating Hot Water Systems - The heating hot water system consists of two, 1,000 Hp gas boilers converted to heating hot water boilers, each with input capacity of 2,929,100 Btuh. Total capacity of this system is rated at 58,582,000 Btuh. Each of the four heating hot water boilers is supported by a pump to pressurize hot water piping service to various buildings along the utility tunnel.

3. Domestic Hot Water Systems

   a) The domestic heating hot water system consists of four, 2,000,000 Btuh, modern gas boilers with dedicated pumps which deliver water to two domestic hot water holding tanks. Three pumps supply domestic hot water from the tanks for service to the buildings along the utility tunnel from the central plant. The current campus domestic hot water peak demand is estimated at 4,500,000 Btuh. The current Food Service peak demand is estimated at 2,125,000 Btuh. The system capacity is rated for 8,000,000 Btuh.

   b) Food service hot water - Two modern gas boilers, each with a capacity of 1,500,000 Btuh with water softeners, provide 140F hot water to the Food Service Functions. The system capacity is rated for 3,500,000 Btuh.

4. Electrical

a) Site electrical distribution is provided from utility owned, underground distribution circuits to serve each facility building. The primary utility voltage is reduced to the service voltage, typically 480/Y277V, 3 Ph., 4W, at each building by a utility owned, pad mounted transformer. The associated metering equipment is also owned and maintained by the electric utility. Easements associated with the buried primary distribution exist both below the pedestrian walkway spline and near the perimeter of some buildings.

b) Central plant electrical

(1) Distribution is provided from three, 2,500 kVA utility transformers. This equipment is located in a utility service yard, accessed from a ramp and approximately 25' below the finished grade of the plaza. There is no space within the limits of the utility service yard for additional equipment. The three utility transformers each serve service disconnects consisting of a single section switchboard with weatherproof enclosure. The switchboard disconnects are bolted pressure contact switches with ground fault system rated at 4,000 amps. Each of these disconnects serve 4,000 amp distribution switchboards, located in an adjacent, interior electrical room.

(2) The electric utility does not bill based on peak demand. Historically there has been an issue with capacity of one of the three switchboards at the central plant, Switchboard #2. The main breaker tripped on an overload condition. In researching the cause of this overload, it was decided to commission a study of the electrical distribution system at the central plant to develop a more accurate one-line diagram. Walker Engineering produced one-line diagrams of the central plant distribution, dated May, 2010. The second phase of this effort is to have an engineer review the load distribution and recommend changes that ensure that none of the equipment has connected loads beyond the rated capacity and re-distribute loads as necessary to result in more equal loads for the three switchboards. That phase has not been funded or implemented so the potential for overload on that system still exists.

III. Master plan campus growth

A. Capacities required to be added.

1. The table below provides a summary of estimated system requirements to support the proposed growth plan:

SYSTEM TYPE	EXISTING CAPACITY	EXISTING DEMAND (APPROX.)	PROPOSED ACADEMIC BLDGS	PROPOSED SUPPORT BLDGS	PROPOSED RESIDENTIAL BLDGS (NET)	ESTIMATED TOTAL SYSTEM DEMAND	NOTES
AREA (SF)	-	-	464,000	92,000	499,800		
CHILLED WATER (TONS)	4,000	2,000	1,400	325	1,360	5,100	1
HEATING HOT WATER (Mbh)	58,580	22,000	9,250	1,900	11,000	44,200	1
DOMESTIC HOT WATER (Mbh)	8,000	4,000	928	184	1,760	6,900	2, 3
DOMESTIC HOT WATER - FOOD SERVICE (Mbh)	3,000	2,125	-	-	-	2,200	4

NOTES:

1 CAPACITY ADDED IN NEW CENTRAL PLANT

2 REFER TO THE RECOMMENDATIONS PORTION OF THIS REPORT FOR COMMENTARY.

3 ADDED DOMESTIC HOT WATER REQUIREMENTS SHOULD BE SERVED BY EQUIPMENT LOCAL TO THE BLDG.

4 FOOD SERVICE HOT WATER REQUIREMENTS SHOULD BE ADEQUATELY SERVED BY EQUIPMENT AT THE EXISTING CENTRAL PLANT.

B. Recommendations to obtain the required MEP utility system capacities:

1. New Central Plant

a) Description

(1) Chilled Water Plant - 3,000 net Tons of chilled water systems capacity consisting of:

(a) Two @ 1,000 Ton, and Two @ 500 Tons, water cooled, centrifugal chillers,

(b) Variable primary chilled water pumping systems with VFD pump controllers

(c) The piping would be interconnected to the existing chilled water piping loop.

(2) Heating Hot Water Boilers - 7,500,000 net Btuh capacity

(a) Three @ 2,500,000 Btuh, gas fired condensing boilers

(b) Variable primary heating hot water pumping system with VFD pump controllers.

(c) The piping would be interconnected to the existing heating hot water piping loop.

(d) Note: Although the existing boilers have sufficient capacity to accommodate the proposed growth plan needs, the addition of a heating hot water system at a new Central Plant allows for reduced pumping costs and greater maintenance flexibility.

(3) Electrical

(a) Three pad mounted transformers, each serving a distribution switchboard, nominally rated at 2,500 amps.

b) Location

(1) Access to utility tunnel – If the new Central Plant is in close proximity to the utility tunnel, the construction cost and pump horsepower requirements may be reduced.

c) Other Central Plant Design Considerations

(1) Redundant Design - Net design capacity of the plant allows for full redundancy by using multiple chillers and boilers with total installed capacity of 150% of the projected needs. Advantages include:

(a) Redundancy of the new systems for improved reliability.

(b) Backup for some existing Central Plant equipment capacity.

(c) Smaller equipment allows efficient operation at partial load conditions.

(d) Phased construction - Only part of the capacity may be required during the early stages of implementation of the Centennial Master Plan. Space and piping infrastructure should be provided during an early phase; however, some of the equipment build-out may be deferred.

(2) An underground installation of the Central Plant has several benefits, including:

(a) Access to piping systems within utility tunnel.

(b) Less noise in the pedestrian/ public areas.

(c) A less visible utility infrastructure. Utility transformers, cooling tower facilities, and boiler flues will be above grade and may be screened.

2. Extension of the Utility Tunnel to connect the new central plant via loop piping is recommended. Tertiary piping from the utility tunnel to buildings may be buried.

3. Additional MEP Infrastructure recommended at new buildings:

a) Domestic Hot Water – Local domestic hot water capacity may be available for most or all proposed building needs from the existing Central Plant, however, the perceived savings of using that capacity will result in less redundancy on the existing system and the cost of piping may offset a large portion of distributed or local equipment cost savings. Furthermore, passive solar water heating may be cost effective as an alternative energy strategy.

b) Electrical - New buildings will be provided with dedicated utility transformers, metering and service equipment. Capacity for some planned expansion of existing buildings may be available from the existing service equipment, however, we recommend that an electric service upgrade remain budgeted until the impact of the proposed load on those systems may be confirmed.

C. Other Recommendations

1. Existing Central Plant –

a) Verify the capacity of the existing electrical system to operate all of the chilled water facility equipment at the rated load. Review the description of the electrical systems infrastructure at the existing Central Plant, hereinabove.

b) Operate the existing Central plant chilled water systems at not more than 3,000 Tons, allowing for use of the most efficient equipment, system redundancy, and the largest chiller to go offline for maintenance or failure.

IV. Summary and Additional Recommendations

A. Conclusions – A Central Plant for chilled water and heating hot water is recommended to support the proposed campus growth because it provides a centralized location for major equipment operation and maintenance while allowing less overall installed capacity than would be required if it were provided at each building. Large system equipment generally has a longer lifespan and greater efficiency compared to the type of equipment typically provided at buildings locally.

B. The existing central plant does not have space to readily expand and accommodate the quantity of equipment provided, and major construction at that facility would inevitably require extended interruption of vital utility services.

C. A new central plant should therefore be constructed at a location that will allow it to interconnect to the existing central plant via the utility tunnel. This would provide redundancy for the aging equipment at the campus's original central plant.

D. Early phases of construction may be provided by existing spare utility system capacity within the existing Central Plant, however, the following two concerns should be considered:

1. Provide budget for a thorough condition assessment or possible re-commissioning of some existing central plant equipment and infrastructure.

2. Identify and allocate land space and potential piping pathways for a new central plant location as a priority concern in planning and make this part of the development strategy.

Traffic Report

Executive Summary

For several years, Angelo State University has been investigating approaches to provide a more pedestrian friendly campus and to better connect the campus residential and academic sides. This effort has increasingly coincided with the effort to establish a plan to deal with the major traffic crossing point on Johnson Street between Vanderventer Street and Dena Drive. The Building Block planning process presented in the University Master Plan Update, where future space projection needs are defined, is discussed elsewhere in this Master Plan Update. Legislative appropriation requests are made in this manner to identify core functions and essential services.

Building Blocks represent a prioritized series of programs most important to fund and at what amount. Developing the Building Block set also requires assumptions of a long-term conceptual layout of the campus. This report identifies some of the issues with regard to street access, parking, and context-based

Johnson Street Through Campus

Traffic studies extending back to at least 2005 have proposed partial or complete closure of the section of Johnson Street through campus, and a 2008 study prepared scenarios that half (50%) and all (100%) through traffic motorists will select a different route once traffic calming devices are in place on Johnson Street. The study predicted a large portion of the traffic diverted from Johnson Street would use Jackson Street. The key intersections in the study area were computed to have level of service (LOS) "D" or better with selective traffic control improvements. The consultants provided no construction cost estimates.

The 2005 Master Plan identified Johnson Street as the primary campus point of conflict between pedestrians and vehicles, severing the main pedestrian central route and interrupting the campus core. The report states that the long, thin layout of the academic/administrative core is well suited to vehicle access, but the impingement of city streets also presents problems of pedestrian access. While perceived as an accommodation to the long-term plan of the University by providing space for footprints of proposed buildings and landscape features crossing the Johnson Street segment, ultimate closure will resolve the most evident functional traffic problem facing the campus.

To be fully carried out, the Building Block recommendations may require the choice of ultimate through traffic closure for Johnson Street over traffic calming. While both the University and City of San Angelo are concerned about subsequent traffic impact on arterial roadways and neighborhood streets that a closure may have, the experience of other communities may provide helpful perspective.

Several years ago, the Metro-Dade County Public Works Department and Metropolitan Planning Organization received street closure requests sufficient to prompt a moratorium and study of the issues surrounding traffic flow modification associated with neighborhood street closures [Castellone, Anthony J. and Hasan, Muhammed M."Neighborhood Traffic Management: Dade County, Florida's Street Closure Experience," (January 1998) p. 28, Washington: ITE Journal]. The study revealed that *municipal officials and local neighborhood representatives* identified certain main macroscopic issues when addressing street closure requests.

- Diverted traffic volumes resulting in degraded LOS on adjoining neighborhood, arterial, or collector streets;
- Degradation of emergency services' access and response time; and
- Degradation of other services such as school buses, public transit, mail delivery, and trash collection

The *general public* was more interested about microscopic problems that they perceive to adversely the neighborhoods' way of life, including

- Excessive vehicle speeds within residential neighborhoods;
- Cut-through traffic;
- Excessive amounts of traffic;
- Increase in accidents;
- Safety of pedestrians and bicyclists;
- High truck traffic; and
- Impact on property valuation.

As a result of lack of or inadequate before-after studies, consultants have found many of these issues to be identified after a particular street closure has been implemented rather than during the planning or proposal stage. While no less impacting upon a neighborhood, the microscopic effects are more difficult to anticipate and quantify in advance of a closure.

In 2005 and 2008, the University commissioned studies that included investigation of South Johnson Street and other streets passing through and adjacent to the campus. Where it passes through campus, Johnson Street was identified as a key point of interest where academic building groups are divided, established pedestrian paths interrupted, and line of sight altered. Despite efforts to control vehicular traffic with pedestrian crossings, traffic signals, and warning signs, Johnson Street continues to function as an arterial roadway whose primary function is to connect with the city's arterial street network, carrying as much traffic as demand requires.

The 2005 study, included in the Centennial Master Plan 2028, approached traffic assessment with the conventional level of service analysis approach, which has at its basis the maximization of vehicle traffic capacity at expense of other travel modes. Conventional thoroughfare design is driven by traffic demand and level of service objectives. The design process usually begins with functional classification (primary arterial, secondary arterial, collector, local) and number of lanes. Except for urban or rural setting, these fundamental criteria are independent of the surrounding context. This *mobility-focused process* influences the rest of the process. Thoroughfares governed by functional classification, design standards, and number of lanes result in a predetermined configuration ensuring the thoroughfare is designed and maintained regardless of its context. This can be a source of conflict with the community because the thoroughfare design may not be compatible with its surroundings or fail to address community concerns and interests.

At that time, the section of Johnson Street that passes through campus was considered for three options: *reduction of number of lanes, grade separation, and closure*, with consideration for context with the surrounding area a lesser concern. The 2005 master plan contained recommendations that pedestrians and bicyclists be kept out of the thoroughfare to reduce conflict zones. This type of planning allows the existing/forecasted traffic characteristics of Johnson Street to define its existence, until traffic volumes and speed increase to a point where expensive or politically difficult mitigation may be required. Parts of Johnson Street leading into campus may also be optimized for vehicle mobility rather than for context, leading many motorists unknowingly and unintended into a choke point at the middle of campus. Conversely, some more suitable thoroughfares may be underutilized for their context. Physical changes made at other intersections outside the campus zone can affect traffic at this key section. This illustrates the potential disadvantages of partial application of traffic calming/closure.

Key issues related to traffic included pedestrian and vehicular access, parking capacity and location, campus visual quality and arrival experience, and options for Johnson Street and other surrounding city streets. The stated purpose of the traffic assessment report was to propose recommendations to ASU and the City of San Angelo for the purpose of reducing traffic/pedestrian interaction in and adjacent to the campus, particularly along Johnson Street where it bisects campus. While the term "traffic calming" was briefly mentioned, development of the three alternatives was based largely on travel demand/level of service analysis. Vehicle mobility was a primary influence of planning the past and current configuration of Johnson Street and other thoroughfares. When less traffic at the campus

pedestrian crossings is desired, vehicle throughput has nevertheless been maximized to suite the available right-of-way.

In general, engineers and planners had reasons to maintain the *traditional approach to street design*:

- Established road design standards foster safer highways and minimize liability
- Thoroughfare plans discourage variation in street sections along certain routes
- Potential for vehicle-pedestrian-bicycle conflict was to be avoided
- Increasing traffic volumes over time encouraged capacity optimization at expense of other modes
- Stakeholder interests were often not required to be part of the planning process
- Alternate solutions require more involvement with local interests and may require designs that interact with features outside right of way
- Designs, policies, and case studies for multi-modal solutions were not available

The 2008 stand-alone traffic engineering study, while providing additional level of service results within a study area around campus, recommended street geometric, traffic control device, signal timing, and traffic calming measures if Johnson Street were closed partially or completely to through traffic. However, the number of intersections receiving recommended treatment was widened. This study reported that ASU and City of San Angelo officials, along with other stakeholders, agreed with the recommendation of 13 potential traffic calming solution locations for Johnson Street and the adjoining residential areas. These solutions would calm traffic on Johnson Street and reduce the traffic impact on other roadways due to the two scenarios of 50 percent and full (100 percent) closure of Johnson Street. While the half-traffic scenario is of interest from an analytic point of view, the report did not explain how the through traffic would be reduced incrementally. Johnson Street, having average daily traffic (ADT) in excess of 10,000 from Kickerbocker Road to Avenue N, is classified as minor arterial, placing it above local and collector status. Guidelines for the Dade County program recommend closure of roadways no higher than local collector, so a traffic study to include road classification is recommended. Not an exact science, traffic calming alone may not provide the desired control of reduction in volume.

An identified concern is the effect of diverted traffic from the Johnson Street closure on campus streets, namely west to Rosemont Drive via Dena Drive, and east to Jackson Street via University Avenue (Alternative No 3 in 2005 Master Plan). While the 2008 traffic report provides mitigation for this condition, the locations lie further from campus. Cross-town traffic will tend to follow current paths until directed to new paths with improvements, so these on-campus routes will experience elevated traffic volumes, despite nominal measures. Traffic that originates from the Knickerbocker Road, Avenue N, and Beauregard Avenue corridors and beyond must be recognized as part of the problem. The measures recommended in the 2008 study will effectively direct this traffic to the more appropriate, broad Jackson Street corridor, which should be reclassified from collector to arterial.

The 2008 study reported that ASU was involved in an extensive campus improvement program at the time and did not desire to implement any traffic calming solutions. Some of the traffic calming improvements adjacent to campus could possibly be identified as University improvements, but the priority off-campus improvements will require other participation. To provide further evaluation of the recommendations, construction cost estimates are needed, along with identified funded sources.

Context-Based Solutions

The design of a roadway thoroughfare helps define context as much as adjacent land uses and buildings. While conventional thoroughfare design emphasizes vehicle capacity and access using functional capacity, traffic volume, and speed as determinants for design parameters, in practice the surrounding context of land uses and buildings has often not been considered until recently. According to Federal Highway Administration, Context Sensitive Solutions (CSS) is a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic and environmental resources, while maintaining safety and mobility." Adopted by Texas Department of Transportation and many municipalities, CSS expands the design process by integrating thoroughfares into their surroundings, where urban thoroughfares are designed to support

the activities of the adjacent land uses, whether existing or as a goal for the future. Texas communities such as City of Austin and City of San Antonio have endorsed the CSS concept and established programs to gradually create a network of roads that serve all uses. These programs provide a systematic consideration of all users needs, providing more safe travel options.

Current urban thoroughfare design practice requires recognition of both context and thoroughfare design. Along with functional class, four *context zones* are defined for different parts of cities and towns, emphasizing the characteristics that create walkable communities. By identifying and working with different context zones, the planner and designer can learn to work with important non-transportation features that define context in urban areas such as land use, site design, and building design along the thoroughfare. Thoroughfares within and adjacent to the Angelo State University campus would benefit from a CSS process assessment. The 2008 study's stated primary purpose was to determine the traffic impact of calming Johnson Street, to investigate potential solutions to mitigate that traffic impact, to recommend roadway and traffic control modifications to improve traffic flow on the arterial streets, and to calm traffic in the residential areas. While traffic calming often provides the basic elements, the CSS approach seeks to balance transportation and land use, providing compatibility of the street facility with the buildings, landscaping, and pedestrian/bicycle paths around it. The actual cross section will have continuity with adjacent street sections (right of way line, lane widths, median/no-median), but particular physical characteristics will vary.

Once the principal thoroughfares of American towns, *main streets* are usually short segments of arterial or collector streets, often only a few blocks in length. They are within a grid of local streets serving the commercial center of town. Particularly valuable and appealing in a university campus environment, where it might otherwise be created artificially as a "food court," a quality main street can be created or retained with the use of CSS in design. The roadway designer needs to consider certain factors to create an appropriate main street environment, often balancing traffic handling capacity with pedestrian friendliness and economic development goals. Care in the design of the traveled way, roadside, and intersections can create a highly productive experience. A section of West Avenue adjacent to campus may be a candidate for this feature. Collaboration with City of San Angelo staff, property and business owners, neighborhood groups, and other stakeholders will be necessary to develop this concept.

CSS applies as much for major thoroughfares in urban areas where vehicle mobility is a priority as it does to the traditional urban areas discussed above. The objectives of designing *mobility priority thoroughfares* remain the same as traditional urban thoroughfares – to balance all modes of travel in a safe, functional, and cost-effective manner – but the design tradeoffs favor the movement of vehicles. Pedestrian, bicycle, and transit (where present) user needs in vehicle mobility priority areas are addressed through the provision of minimal facilities. Thoroughfares can be designed with different priorities in mind, as a street with vehicle and bicycle mobility is desirable with no on-street parking.

The benefit of applying CSS to the Johnson Avenue corridor at campus will be to provide a more pedestrian friendly campus and to better connect the residential side of the campus with the academic side. While the City of San Angelo is concerned with the traffic impact of diverted traffic from Johnston Street upon other arterial roadways and the surrounding residential areas, ultimately a citywide assessment of corridors may be suggested to complement the City of San Angelo *2005 Bicycle and Pedestrian Master Plan* and *2010-2015 Capital Improvement Plan*, as well as Texas Department of Transportation projects programmed and planned for the area. ASU has been developing a plan for non-motorized transportation infrastructure, defining the need for new and widened sidewalks, on- and off-street bicycle paths, and bicycle lanes in and around campus.

Parking

Angelo State University campus is characterized by access to student parking near academic buildings. Parking is spread relatively uniformly across campus, with a concentration of general student parking in a large lot to the north/northwest of the Junell Center/Stephens Arena. The 2005 Centennial Master Plan remarks that the parking supply seems to be more than sufficient for its current number of students, noting that the ratio of parking permits to parking spaces is a significantly lower ratio than other universities.

In today's automobile-oriented urban environment, parking lots have become an omnipresent feature of

the landscape. As such, the design and layout of parking lots has become a common topic of concern for planning new facilities. As the demand for parking spaces grows, space near the most popular facilities such as the Academic Building will grow increasingly scarce. A master plan should provide a long-term strategy for reducing dependency on campus vehicular traffic.

For ASU to become a safe, inviting, convenient, and pedestrian-oriented campus, pedestrians are served through a network of paths that safely and comfortably link campus destinations. ASU has pedestrian paths and courtyards to build major pedestrian zones providing a scenic route through campus with few interruptions by vehicles.

Vehicles have their place on campus within the network of campus paths, but, with few exceptions, campus neighborhoods can be planned to be free of all but essential service, transit, and emergency vehicles. Parking is sited along campus perimeters to reduce the numbers of vehicles entering interior campus streets. The speed and volume of traffic can be designed and managed to be appropriate to safeguard pedestrian movement.

The application of CSS can relieve the pressing need for proximity of campus parking lots to buildings. Enhanced pedestrian access usually translates into greater pedestrian mobility, enabling flexibility in situating lots in previously undesirable, more distant locations. Better access routes by foot means that security, while often enhanced from increased lighting along roads and greater foot traffic, should nevertheless be evaluated. Less interruptions for vehicle traffic gives the walker an impression of less distance and walking time to the lot.

The most current Building Block proposal has a goal to arrive at an overall space strategy to support 10,000 students, up from the current 6,381. The ultimate build-out of the Master Plan calls for new construction of four new academic buildings, in square feet gross floor area:

Academic Building I = 108,000 GSF

Academic Building II = 108,000 GSF

Academic Building III = 108,000 GSF

Academic Building IV = 140,000 GSF

There will also be a total of 92,000 GSF of expansions to existing support buildings. The master plan is based on projected enrollment of 8,583 by 2015 and 10,300 by 2020 (current enrollment = 6,381). As such, the building blocks show a total of 3,326 parking spaces required by 2015 and a total of 6,000 spaces required by 2020. This challenge must be balanced with the simultaneous competition for new parking spaces, as demand approaches supply.

Regarding parking needs, the computed "Total Stalls Occupied in Peak Period" from "Parking Generation Rates" [Institute of Transportation Engineers, 4th Ed.] from the enrollment number, for suburban university, school population, is as follows.

In Year 2015, 2,832 stalls will be occupied on an average weekday, with 85th percentile of 3,262 stalls.

In Year 2020, 3,399 stalls will be occupied on an average weekday, with 85th percentile of 3,914 stalls.

Civil Engineering and Environmental Report

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ENGINEERS & SURVEYORS

Proposed Improvements

Angelo State University has projected the campus growth through 2020. The proposed improvements will require upgrades and extensions to the existing potable water sanitary sewer and drainage systems. Campus growth is expected to include the following:

- Four new academic buildings of approximate gross square footages (GSF) of 108,000; 108,000; 108,000; and 140,000 respectively, for a total of 464,000 GSF of new buildings.
- In addition, existing buildings (university center, administration, theater, food service, and housing) will be expanded by an approximate 92,000 GSF.
- Parking improvements will also be required to accommodate the additional campus population.
- The addition of 556,000 GSF to the campus will create higher demands on the existing utilities.

The following sections will provide a general discussion on the expected upgrades required to the water, sewer, and drainage systems:

Water

The City of San Angelo provides water service to San Angelo State University thru water mains around and through the campus. There is an existing water tank on campus that is empty because it leaks. There are multiple master meters that serve the campus.

There are fire hydrants located throughout the campus. A number of buildings have fire pumps.

The campus is currently experiencing pressure problems with the possibility of not being able to provide the required pressure/volumes for fire protection. The proposed improvements will increase demand on the water systems and these water systems should be upgraded to ensure adequate water service.

The pressure issue can be addressed by providing a new water tank for the campus. University staff has commented on the need to replace the out of service tank at another location.

With the addition of a new water tank, the existing pressure issues are expected to be resolved. Sizing the tank for the expansions outlined above will ensure that the new facilities will have adequate water availability. At the time of planning the necessary water and fire lines will need to be extended to the new facilities as needed.

Sewer

The City of San Angelo provides sanitary sewer service to the campus. There are multiple lines that run thru the campus. These lines appear to be adequate for the existing and future expansion of the campus.

As the proposed improvements are designed, sewer services will be extended to tie into the available sewer system.

Drainage

With the addition of impervious cover from the proposed buildings, building expansions, and parking lots, runoff quantities are expected to increase. The campus currently drains to the east-southeastern corner of the property. This lower area of the campus is where athletic and recreation fields are located. This area will lend itself to the construction of a retainage pond designed to lessen the impact from the addition of impervious cover associated with the proposed improvements. It will be the goal of the university to size retention or detention facilities that will control the amount of stormwater to predevelopment rates. This will ensure that downstream drainageways, which appear to be at or over capacity, will not receive additional runoff volumes from the university's expansion.

Similar to the water and sanitary sewer systems, the stormwater improvements associated with each of the proposed additions will be part of the design plans at the time of planning. At that time, the designer will ensure that runoff from the development is directed to the planned retention or detention facilities as necessary.

Streets

Johnson Street, Jackson Street, and Rosement Drive are major city streets that cut thru the campus in a north/south direction. The city's east/west streets that service the campus are West Avenue, University, Dean Drive, and Vanderventer Avenue.

It is expected that as the university grows it will transition into a more pedestrian/bicycle intensive campus. This is a trend that will make for a safer and less congested learning environment. Planning for this has begun as Angelo State has studied closing Johnson Street. However, further discussion with the City of San Angelo needs to occur.

Parking

Parking will be expanded with these improvements. As the school grows existing parking facilities in the center of the campus are expected to move to the outer perimeter of the university to allow for building expansion and to keep in harmony with a more pedestrian campus that may discourage automobile traffic through the campus nucleus.

Technology Infrastructure Report

DATACOM DESIGN GROUP LLC

Overview

Angelo State University has a strategic mission of providing undergraduate and graduate education and research. This master plan is based on projected enrollment of 8,583 by 2015 and 10,300 by 2020 (current enrollment = 5,530 FTE's), with over 2,000 residing on campus. The goal is increase the total student population to 10,000 by 2020. It is estimated that a total of approximately 1034 faculty/staff will be required by 2015, and over 1260 by 2020.

As outlined previously, the plan calls for new construction of four new academic buildings that range from 108,000 to 248,000 GSF.

In addition, there will be a new or renovated Administration Building, four Housing buildings (three 400 bed and one 500 bed buildings), an addition to the UC building, a food service facility.

As such, the campus planners, through The Information Resources Strategic Plan, will update the communications infrastructure utilizing design guidelines and future procurement decisions for ensuring that there is a robust communications network on the campus. To that end, this portion of the document will examine the distribution systems for voice, data, video, CATV, and security.

Campus Technology Distribution

The campus technology distribution systems on campus consist of multi-pair copper (telephone trunk lines), hard line coaxial Community Access TV (CATV), multi-strand single mode, and multi-strand multi mode fiber.

Voice Distribution

ASU has not implemented a centralized voice communications system. The campus is in the process of transition to a centralized digital Voice services Over Internet Protocol (VoIP), with the switch located in the Rassman building (building 11 on attached campus plan), and located in the center of the campus. Those buildings that have not been converted are served with separate key systems (telephone switches) that are provided and maintained by Verizon. The copper cables for these systems are owned, installed, and maintained by Verizon in a separate duct bank that essentially runs parallel to the duct bank and tunnel system owned by ASU. This configuration makes it difficult for ASU to have ownership of their voice communications, and creates delays for moves, adds, and changes requested by campus users.

Data Distribution

The main Ethernet core distribution switches for data services are in the main communications room for the campus (campus distributor), located in the Rassman building. These services are distributed via multi-fiber backbone cables, using a combination of single mode and multi mode fiber optic cable. The multi mode cables are the older 62.5ų (micron) variety.

Community Antenna Television (CATV)

ASU does not distribute CATV signals from a main campus head-end. All building CATV connections are owned, installed and maintained by Cox Cable. These cables are run in conduit pathways shared with Verizon and ASU. There are no current plans to modify the existing distribution system or change the service provider.

Planning for the Future

In the hierarchical system of signal transmission the determining factor to consider in cable design and installation is the size of the files and processing power needed to run the applications at reasonable speeds with (short or non-existent wait times). Applications such as Voice over IP (VoIP), video-streaming, and teleconferencing are pushing data communication rates to unprecedented levels in enterprise networks. As signals travel towards the data switches from users, and from the switches to other switches up the line, more and more signals are aggregated on the switch circuits being transported by the cable, therefore requiring higher speeds so as not to create bottlenecks. The term backbone or trunk cabling refers to cabling that is transporting signals from many devices back to a 'core switch' or server. Backbone cables therefore must be able to carry signals at higher speeds than required by a user's device. The 'faster' a switch is, the more it costs, and the fastest switches are those designed for single mode fiber.

As noted above the fiber cabling installed in the campus is single mode and 62.5µm multi mode. The

outline below of the fiber types will be instructive in future planning for campus cable installation.

Fiber Types and Capacities - Background

Definitions:

• SPEED: The rate at which fiber optic networks operate – from mega bits up into the gigabits per second (Gbit/s).

• BANDWIDTH: The information carrying capacity of a cable. This is identified by the frequency (mega Hertz) per kilometer. Multi mode fiber has a large carrying capacity when compared to copper cables, and single mode fiber has significantly more capacity than multi mode fiber.

• DISTANCE: The length digital signals can be transmitted without degrading to the point where they need to be "refreshed" or strengthened by electronics.

• Attenuation: The decrease of signal strength over distance (kilometer, or km).

• Fiber Size: Measured in micro-meters or microns (µm)

• 'E': Ethernet - A Local Area Network signaling model that uses Data Link Layer and Physical Layer Specifications and is based on carrier sense multiple access with collision detection.

Single mode fiber (most devices use 2 fibers for one transmission circuit) with a diameter of 8.3 to 10 microns, has one light mode of transmission (one frequency) that transmits the digital signals, utilizing the 1310 or 1550 nano or billionth of a meter (nm) wavelengths. Single mode fiber provides a higher transmission rate and up to 50 times more distance than multi mode.

Multi mode fiber has a larger diameter, with common diameters in the 62.5 µm and 50 µm range (in the US the largest installed base is the older 62.5 µm). The smaller 50 µm fiber gives better information carrying capacity over greater distances than the older 62.5 µm fiber.

Enterprise environments (in buildings as opposed to along roads on poles or underground in conduit/manhole systems) present network challenges, including limited space and tight bends, high connection density, and components that get handled frequently. Multi mode fibers are ideally suited for these conditions because the VCSELs (Vertical Cavity Surface Emitting Lasers) as compared to single mode fiber laser switches, offer significantly lower costs for transceivers, connectors, and connector installation while meeting and exceeding the bandwidth and reliability requirements for many users who have demanding network needs (very large files, streaming video, etc.). Therefore, since distances within a building rarely approach 550 meters (1804 feet), *optimized* multi mode fiber should be the choice for these applications.

The following table depicts the older type of 62.5µm multi mode fiber versus the newer graded index 50µm and single mode fibers.

Fiber Types and Information Carrying Capacity by Distance

Core/Cladding	Attenuation	Bandwidth	Applications/Notes
Multi Mode Graded-Index			
	@ 850/1300nm	@ 850/1300nm	
50/125 microns	3/1 dB/km	500/500 MHz-km	LASER-rated for GbE LANs
50/125 microns	3/1 dB/km	2000/500 MHz-km	Optimized for 850 nm VCSELs
62.5/125 microns	3/1 dB/km	160/500 MHz-km	Most Common LAN fiber
Single Mode			
	@ 1310/1550 nm		
8-9/125 microns	0.4/0.25 dB/km	High ~100 Tera hertz	Telco/CATV/ Long high speed LANs
Multi Mode Step-Index			
	@850 nm	@850 nm	
200/400 microns	4-6 dB/km	50 MHz-km	Slow LANs & Links

Short and Long Term Goals for Backbone Infrastructure

When considering how best to accommodate future technology transmission needs an analysis of installed cable plant, its capacity, and its ability to support future transmission requirements should be considered. In addition, an analysis of the pathway system in which the cables are installed should be conducted.

As noted in "Optimizing Network Traffic," which is part of the Microsoft Press Notes From the Field series (http://www.microsoft.com/mspress/), network planning can be compared to designing a town's road system. In both, you need to understand who is using which routes, how large batches of traffic are (and can be), where journeys start, where they stop, and how all of these things vary over time. If a road system doesn't have enough lanes, traffic jams up and people get delayed and testy; if each road has 20 lanes, you can stop worrying about traffic jams and start worrying about bankruptcy. If you under-size the network, things slow down and eventually stop. People get delayed and unhappy. If

you over-size it, you waste money and invite other problems.

While proper network capacity planning (like road planning) starts with careful capacity measurement and is encouraged, the best procedures on how to conduct good analysis are beyond the scope of this master plan technology narrative. However, the most basic way to tell if a network cable and switch system is inadequate is if there are regular reports from users about 'how slow' the network is. While inexpensive, this method is not encouraged as the sole arbiter of network planning. For more informed judgments, traffic analysis with devices and software designed for these purposes is a must.

Service Area of Backbone Infrastructure

As indicated in the attached drawing, the campus communications infrastructure is comprised of single mode and multi mode fibers which are installed in a tunnel and conduit system along a central east-west axis around which a number of the campus buildings cluster (with a 'spur' of buildings that run to the south). Hand holes provide pulling points for the cabling prior to entering the buildings.

The multi mode fiber is, for the most part not used for signal transport, with single mode fiber carrying the aggregated data streams back to the Rassman Building. This strategy was implemented when the newer OM3 and OM4 cables were not available, and made sense at the time. A deviation from this plan would need to be based on hard data about network traffic for different times of the day and month. However, as indicated below, there are real cost savings in utilizing the newer multi mode cable and associated switches.

Existing Conditions

Tunnel – The main tunnel that runs east west and south of Vanderventer Avenue has virtually unlimited cable capacity. There are a few areas in the tunnel that the ladder tray holding the communication cabling is full with cables falling off the tray. In terms of housekeeping, it is recommended that the cables in these areas be inventoried and removed if unneeded, and at the least be placed back on the tray. It should also be noted that the National Electric Code beginning in 2002 requires that cabling be removed if it is abandoned. The NEC defines abandoned as cables that are no longer connected to hardware at their terminus or that are not labeled 'for future use'. Practically speaking, cabling that is old, not connected to any piece of active equipment, and yet labeled with the 'for future use' is still considered abandoned and should be removed. This NEC requirement can cause budgets for buildings that will be renovated to increase, so careful consideration about the cable removal should be implemented when planning building remediation.

Conduit between buildings – As reflected in the table in the following pages, the conduits between buildings are generally 4" in diameter with most if not all in use. This is significant in as much as it is often difficult to impossible to install cabling in a conduit once even small cables have been installed. For shorter runs that are straight, it is possible to install additional cable. It is recommended that a plan be developed and implemented to ensure that existing conduit pathways can be reused in the future. This typically entails a cable inventory, with abandoned cables tagged and slated for removal.

Angelo State ITS department has indicated that the existing multi mode cable is going to be abandoned, if not already abandoned. For those fiber runs that are no longer in use, it is recommended that a plan be put in place for the removal of the cables. As a part of that plan, it is also recommended that additional pathways be placed within the conduits in the form of fabric innerduct (photo below). This innerduct comes in multiples of 3 cells. Depending on the conduit's current fill, 3 to 6 additional cells may be able to be placed in the conduits, thus extending the life of the conduits and delaying the need for costly trenching to add conduits.

Picture 1 – Fabric Innerduct

Expanding the Service Area

As outlined in the 2005/6 Master Plan technology section, new construction should be planned with adequate conduit connectivity that will provide redundant pathways to buildings and areas of the campus. That is, new conduit and hand hole/manhole pathways will need to be of sufficient size and number to accommodate adding cabling

over decades. It is easy to lose sight of the fact that a building's life cycle is in multiple decades, and planners now will not often be at the campus for any building's full life cycle. To address these life cycle issues, the industry has adopted standards that show four (4) 4" conduits to each building from a local manhole. At the very least, it is recommended that two (2) 4" conduits be installed to each building with a minimum of 6 cells of fabric innerduct in one of the conduits. While upfront costs for the fabric is more than hard walled innerduct, the fabric innerduct is significantly less expensive than adding conduits to a duct bank. It should also be noted that a 4" diameter conduit can only accommodate 3 hard walled innerducts, thus providing only ½ to 1/3 of the capacity that fabric innerduct can provide.

Sizing the main conduit duct bank can be more of an educated 'guess' than hard calculation since the quantity of conduit pathways back to the campus core (Rassman) would be dependent on the number of buildings that will eventually be added to any particular area. As a starting point, however, it is recommended that two (2) conduits be allocated in the main conduit system for each new building. The minimum number would be one conduit for every building, again filled with at least 6 cells of fabric innerduct. The reticence of facilities' planners to dig up streets or between building conduit runs to add conduits not only stems from the high cost of doing so, but also the disruption it causes to the campus in terms of traffic flow and manpower utilization to supervise the new construction.

Cable between buildings - In terms of layout or topology of the cabling system, it is recommended that the campus continue to think in terms of a hub and spoke or hierarchical star cabling configuration. In this topology, there is a main hub (Rassman) and sub or mini hubs in outlying buildings that extend or regenerate the network. The advantage of this type of system is that all buildings will not require direct cable feeds from Rassman thus limiting the need for much larger conduit (and manhole) duct banks out of Rassman over the entire campus, as well as limiting the number of long and large fiber cable runs. The disadvantage is that the 'mini-hub' buildings become critical to extending the data/voice signals to more outlying buildings. Should there be a power outage at one of the mini-hub buildings, everything downstream goes 'down' until the power condition is ameliorated. A remedy to this scenario is to have redundant pathways from/to the mini-hub and other buildings that would allow the rerouting of the signals around the problem area.

Copper Voice Cable – Installed and managed by Verizon. Will become less and less utilized as the university converts to VoIP digital transmission.

Single mode fiber – As evidenced by the table below, most of the campus network connectivity is provided by single mode fiber. The advantage to this plan is that there is virtually unlimited bandwidth for network traffic. As noted above, single mode fiber switches are more expensive than the multi mode VCSEL switches. While the VCSEL switch was originally developed for 10, 40, and eventually 100 Gb/s network speeds that will be required in the data center, these speeds and the distances that they can transport 10 Gb/s network traffic (550 meters or 1800 feet) lend themselves to consideration for 'close' inter-building backbone traffic. For the longer cable runs that will require single mode fiber, it should be noted that there are new choices for single-mode fiber. The options include a bend insensitive full spectrum single mode fiber that offers more transceiver options, more bandwidth, and is less sensitive to handling of the cables and patch cords than conventional single mode fiber.

Multi mode fiber – Multi mode fiber gives you high bandwidth at high speeds as compared to copper (old Telco T-1s, for example). For a campus the size of Angelo State's, with the campus core centered on Rassman and within the 1800 feet limit for 10Gb/s transmission (short-reach campus installation), OM4 fiber is suited for relatively inexpensive trunk cable aggregation. For longer distances, the OM4 fiber can also provide good inter-building transport capacity beyond the campus core to distances up to 1000m (3281 ft) for data rates at 1Gb/s. However, since the ultimate build-out of the campus may extend the campus beyond he 1800 foot limit for 10Gb/s (and in a number of cases already has), single mode fiber seems the most prudent option. That is, single mode fiber is best used for distances exceeding 550 meters when the aggregated bandwidth requirements for an area of campus exceed 1Gb/s.

A note on the two types of multi mode fiber: Mixing of 62.5-µm and 50-µm fiber is not recommended unless an electronics interface is inserted into the link. In order to prevent mixing fiber types (causing transmission problems) the recommended scenario is to separate 50-µm from 62.5-µm with active electronics, such as a switch, router, or simple media converter.

Table 1. Angelo State Campus Conduit and Manhole (TMH) Distribution

Start Location	End Location	#Conduits	Conduits In Use	Size of Conduits
TMH1	Rassman East	3	3	4"
TMH1	Central Plant (under20/24)	3	2	4"
TMH1	TMH2	3	3	4"
TMH2	TMH3	3	3	4"
TMH3	TMH4	3	3	4"
TMH4	TMH5	3	3	4"
TMH5	TMH6	3	3	4"
TMH6	TMH7	3	3	4"
TMH7	Junell	3	3	4"
TMH7	Multipurpose press box	1	1	4"
TMH4	TMH8	3	3	4"
TMH8	Texan MDF	6	5	4"
TMH8	TMH9	7	5	4"
TMH9	Texan IDF	1	1	4"
TMH9	TMH10	6	4	4"
TMH10	Texan IDF	2	2	4"
TMH10	TMH11	4	2	4"
TMH11	Women's Massie	1	1	4"
TMH11	TPB12	2	2	4"
TPB12	TPB13	2	1	4"
TPB13	Alumni	1	1	4"
TPB13	TPB14	1	1	4"
TPB14	VIP House	1	1	2"
TPB14	Facilities	1	1	4"
Rassman West	Tunnel	6	5	4"
Tunnel	MCS East	2	2	4"
Tunnel	MCS West	4	4	4"
Tunnel	CHP	2	2	4"
Tunnel	Clinic	2	1	4"
Tunnel	Cavness	2	2	4"
Tunnel	TMH22	2	2	4"
Tunnel	TMH21	2	2	4"
TMH21	TMH23	2	2	4"
TMH23	TMH24	2	2	4"
TMH24	Admin Tunnel	2	2	4"
TMH22	Library	2	2	4"
TMH23	TMH25	2	1	4"
TMH25	TMH26	2	1	4"
TMH26	TMH27	2	1	4"
TMH29	Hardeman	2	1	4"
TMH27	GSB	2	1	4"
GSB	Carr Hall	1	1	4"
TMH27	TMH28	2	1	4"
TMH28	Centennial Village	1	1	4"
TMH28	TMH30	2	1	4"
TMH30	UC	2	1	4"
TMH30	TMH32	2	1	4"
TMH32	TMH33	2	1	4"
TMH33	Carr (EFA)	2	1	4"

Table 2. Angelo State Campus Fiber Cable Distribution

Start	End	Fibers in use	Total Fibers	Type of Fiber	Notes
Rassman	Concho Hall	8	24	MM	
Rassman	Centennial Village Hall	8	12	SM	
Rassman	Women's Massie	0	24	MM	
Rassman	Women's Massie	8	12	SM	
Rassman	Vincent	0	24	MM	
Rassman	Vincent	4	12	SM	
Rassman	Cavness	0	24	MM	
Rassman	Cavness	4	12	SM	
Rassman	Library	0	24	MM	1
Rassman	Library	10	24	SM	2
Rassman	Library- 3rd Floor	0	24	SM	3
Rassman	Library- new MDF	4	24	SM	4
Rassman	Central Plant	4	24	MM	
Rassman	Academic	0	24	MM	
Rassman	Academic	4	12	SM	
Rassman	CHP	0	24	MM	
Rassman	CHP	4	12	SM	
Rassman	UC	0	24	MM	
Rassman	UC	4	12	SM	
Rassman	Hardeman	0	24	MM	
Rassman	Hardeman	4	12	SM	
Rassman	Administration	0	24	MM	
Rassman	Administration	4	12	SM	
Rassman	Carr (EFA)	0	24	MM	
Rassman	Carr (EFA)	4	12	SM	
Rassman	Carr Hall	0	24	MM	
Rassman	Carr Hall	8	12	SM	
Rassman	MCS 3rd Floor	12	12	SM	5
Rassman	MCS main	6	24	MM	6
Rassman	MCS main	4	12	SM	7
Rassman	Clinic	0	24	MM	
Rassman	Clinic	8	12	SM	
Rassman	Junell	4	12	SM	
Rassman	Texan	12	12	SM	
Rassman	Facilities	4	12	SM	
Texan	Alumni	4	12	SM	
Women's Massie	Vanderventer	6	6	MM	
Women's Massie	Men's Massie	8	24	MM	
Facilities	Reidy building	4	12	SM	
Rassman	Herrington	4	12	SM	8

Notes	
1	Old MDF, will migrate out of this closet in 2011 or 2012
2	Old MDF, will migrate out of this closet in 2011 or 2012
3	Fiber will be installed early 2011, connections to Suddenlink MAN and internet are made here
4	Newer larger MDF coming on line December 2010
5	This is where the Texas State Data Center is located. ASU servers & equipment is housed here. Also, internet connections through AT&T and LEARN are here.
6	MDF for building drops
7	MDF for building drops
8	This installation is in progress eta December 2010, most of the run is aerial

Campus Expansion Plans

The main cable distribution path for the mid and west portion of campus is on an east-west axis in the utility tunnel. The tunnel ends about the mid point of Rassman to the east and about 300 feet west of Johnson Street. Conduits exit the tunnel at various points in all directions. To the south and east, conduits leave Rassman (#11) directly. The conduits that leave Rassman and the Data Center and campus core data switches in MCS (#11) enter the tunnel, run along a cable tray, and then exit to the destination buildings.

Conduit and Cable 'Fill' Capacity

The tables above show that many of the existing conduits are full and no new (or very few) cables can be installed. While this may at first seem alarming (and in some cases is), the tables also show that the fiber utilization rate is often low or moderate. This means that new circuits may be added for network capacity on existing fiber. The primary data distribution cable is single mode. The old 62.5 micron multi mode is legacy and is not utilized as backbone (high speed trunk) cable.

While the majority of the proposed expansion is to the north of the tunnel, the buildings generally lay along the east-west axis. This is good as it will be easier to add pathways (manholes and conduits duct banks) while disturbing existing infrastructure minimally.

The campus strategy thus far in the cable and conduit system has generally been to add the minimum number of conduits needed in the near term, and to feed some buildings from other buildings with cable. Both solutions can be problematic in the mid to long term. For the conduits, it is very expensive to add new conduits at a later date. For cable, if a building is fed through another 'upstream' building, and that building is demolished to make room for a new building, the 'downstream' building will go out of service unless a new cable and pathway is added prior to the demolition and construction: Thus adding to the cost of the new construction.

The major conclusions and recommendations that can be made from the new plan and the existing distribution system are:

- The campus should consider adding a major duct bank from the tunnel north along Johnson Street past the large (248 K gsf) Academic building to a point near the proposed new Housing building.
- It is recommended that the duct bank be a minimum of six (6) 4" diameter conduits with manholes set just to the south of the Academic Building and near the Housing buildings.
- The new Admin Building could then be fed from the Theater's MDF with either single mode or the new OM4 multi mode fiber for a very high capacity backbone. Or if desired, from the Academic building, though this would be a longer conduit run.
- Add a cable tray in the tunnel to accommodate new cables and possibly capture some of the cables that are overflowing the existing cable tray.
- Utilize the new duct bank construction to the east from Rassman to provide service to the new 500 bed Housing building and also to the new Food Service addition to the existing Food Service Building. It is not clear at this point if manholes or pull boxes are going to or have been set at these locations in the duct bank under construction to the east (refer to campus map and conduit distribution). If no pull boxes have been designed into the duct bank, they should be added.

Conclusion

Angelo State's communications infrastructure consists of a system of pathways (conduits and manholes and smaller hand holes) and copper and fiber cable. The copper cables are installed and maintained by Verizon for the voice phone service. This system is being gradually converted to a digital voice (VoIP) network owned and operated by the campus. The data network cabling consists of older multi mode fiber cables and newer single mode cables. The multi mode cables are gradually being phased out and replaced by the higher bandwidth carrying capacity single mode cables.

Most if not all of the existing conduits in the campus pathway infrastructure are full or have cables in them. Many of the cables are the older 62.5 µm multimode cables. It is recommended that the conduit system be cleared as much as possible of these cables and fabric innerduct be installed in the conduits in order to extend the useful life of the system without the need for more trenching and conduit installation.

For new construction, it is recommended that at least one conduit for each new building contemplated for a sector of the campus be installed in a main trunk conduit feeder system. Two conduits in this trunk would be preferable. For buildings, it is recommended that four conduits be installed from an adjacent manhole, with two conduits as an absolute minimum. In all cases it is recommended that at least six (6) cells of fabric innerduct be installed in at least one conduit in any new conduit system whether a trunk line, or to a building.

Network data switches increase in cost as their power to transmit digital packets increases in speed. Single mode fiber switches are therefore more expensive than multi mode switches. A new multi mode 50 µm fiber cable (OM4) now on the market that can transport data at 10 Giga bits per second speeds is available. The VCSEL switches that can utilize this fiber type are less expensive than the single mode switches while still able to transmit very high data rates for up to 1800 feet. It is recommended that this fiber type be considered for installation with single mode fiber for all new buildings on campus that are within the 1800 foot limit of the 10Gb/s speeds. It is also recommended that the campus ITS do a study on the cost to install the new multi mode cables to buildings that are nearing their installed fiber capacity and that would be within the 1800 cable feet distance from Rassman so that VCSEL switch can be utilized.

Student Housing Report

As part of the Angelo State University Master Plan being prepared by Ford Powell & Carson with Facility Programming and Consulting, Facility Programming was engaged to prepare a study of student housing intended to validate the market acceptance, projected demand, financial performance, timing, and scale of future housing facilities.

During this study, the consultants and University determined that the housing system faces a severe structural operating deficit that must be corrected prior to even considering new facility investments. To specifically address this critical issue, the housing study was delayed and Anderson Strickler, LLC was engaged to prepare a Student Housing Financial Plan.

It is the conclusion of the financial plan that, even with aggressive action, the housing fund will not stabilize before fiscal year 2018. Until at least that time development opportunities are limited, and during this period all facility investments should be contingent on the financial health of the fund and the financial performance of the investment.

In this context, the following report reviews and provides observations on a variety of aspects of the housing program, projects future demand, and summarizes opportunities for future development providing scenarios for inclusion in the Master Plan. However, this report defers to and quotes where appropriate the Student Housing Financial Plan by Anderson Strickler for financial analysis and does not suggest the scale or timing of future projects as the opportunity to execute projects will be defined almost entirely by the actions of the University and the financial health of the housing system.

Student Perception of Residential Programs

The resident satisfaction survey indicates overall resident satisfaction is at goal. Both staff and the quality of the facilities ranked above goal and the satisfaction with the dining services was the only factor significantly lower than goal. Through both surveys and focus groups, students are consistently positive on the performance of the housing program, especially noting the performance of the RAs and the effort made to keep people included in activities.

When viewing survey results sorted by hall, there is a correlation between high satisfaction with staff and higher scores both overall and on other unrelated factors including physical factors such as facility condition or configuration. This indirectly reinforces the high value students place on positive staff and student interaction.

However, surveys and focus groups also indicated that students do not believe the residence halls enhanced the learning experience and, in spite of "quiet hour" designations, the students do not believe the dormitories are an effective place to study. As one upperclassmen noted: "Most of the time people don't go to the halls to study. They go to play games, talk, watch TV, be on the computer…not to do work."

Student surveys and focus group comments indicate that students of all classes appreciate the importance of living on-campus for the freshman year. Further the students recognize the importance of the freshman year as critical to successful transition from home to the university.

The students have a very strong sense of hierarchy and upper classmen repeatedly stressed housing areas and rules for freshmen were not appropriate for them. It is obvious to all classes that the vast majority of juniors and seniors choose to live off-campus, and this pattern of behavior is the expected social norm. The most often mentioned reasons for moving off-campus included cost, rules and restrictions, lack of desire to live among or have freshmen roommate, as well as the cost, low quality and repetitiveness of the meal plan. Upper class students living off-campus offered suggestions to keep more upper class students on-campus, but indicated there is little the university could provide that would have influenced their decision.

Focus group participants supported the construction of designated freshmen dormitories, and students in double occupancy rooms directly and indirectly supported the configuration as increasing socialization. Many students suggested or endorsed providing a hierarchy designating specific dorms or floors for freshmen, sophomores, and upperclassmen.

The Existing Residence Halls

Angelo State Residential Programs are dedicated to providing learning communities beginning with the university's first year success program. Primary first year housing areas include Plaza Verde, Carr Hall, both Massie Halls, and portions of Centennial Village. These halls offer roommates, a very high staff to student ratio, and extensive programming designed to assure student success and interaction.

Returning students benefit from halls dedicated to sophomore and above students, including Texan Hall, Vanderventer Apartments, and portions of Centennial Village. These halls provide more emphasis on leadership and increasing levels of independence. Texan Hall offers single occupancy suites while Vanderventer are double room apartments.

The existing halls are generally in good condition with the exception of Concho Hall. With two large halls built within the last 10 years, Texan (2003) and Centennial Village (2008), that provide over 1,000 beds, over half of the university's capacity is in effectively new facilities. In addition, the completion of Plaza Verde I in August of 2011, adds 416 new beds. Unlike most peer institutions in the region, the University is able to provide a high quality program in generally consistently high quality facilities as Anderson Strickler observes "unburdened by the mid-century dormitories that populate most institutions."

The current housing inventory is almost evenly divided between double occupancy semi-suites, which are appropriate for freshmen, and single occupancy suites, appropriate for all students, but often reserved for upper division students. The current inventory, with the addition of Plaza Verde I, is well distributed between unit types and provides appropriate flexibility to meet demand.

Peer Institution Observations

ASU's investment in new and renovated facilities allows the University to offer units and buildings of quality comparable or above peers, as well as the highest bed to enrollment ratio, allowing a higher proportion of students to live on-campus.

Primarily by allowing Concho Hall to "flex" between single and double occupancy, ASU has been able to both meet demand and maintain high occupancy in the fall semester. However, retention is a problem and ASU has among the highest levels of occupancy decline from fall to spring semester.

Responding to student preferences, all new construction at ASU over the last decade has been in suite or super suite configuration. ASU does not offer traditional units (community bath) which offer a low cost option at peer institutions.

All peers, with limited exceptions, require freshmen to live on-campus. In addition to ASU, two of the four peers effectively require sophomores to live on-campus although policy guidelines vary and are often determined by age and credit hours completed.

ASU offers the lowest combined cost of tuition, fees, and basic meal plan among peer institutions. Recognizing that housing costs vary widely according to building and unit selection, ASU is very competitive in overall pricing.

Although a popular configuration with students, university housing representatives at peer institutions strongly believe single occupancy rooms isolate freshmen students. Representatives at peer institutions cite increasing isolation, no sense of community or connection to the University, and lower academic performance as negative factors for freshmen in single occupancy rooms.

As peer universities look forward and plan new construction projects they are designing residence halls that attempt to balance student's desire for privacy with the desire of university representatives to assure social integration, a sense of community, and academic success. Many new halls in design and construction create "pods" of rooms around common areas, often double occupancy but configured to allow privacy, within learning communities.

San Angelo Housing Market Observations

The demographics of the area of San Angelo within a five-mile radius of the University suggest a stable, slow growing population that is relatively poor compared to the U.S. average. Likely accelerated by the downturn in the economy and following a national trend, the number of households in the area is declining relatively rapidly. This is important as household creation is a major factor in demand for housing units.

The median housing value and rent are very low compared to national averages. Housing options are readily available with a base rent of as little as $300 per month per bed. The negative household creation and low median housing value suggest inexpensive housing will be readily available for the foreseeable future.

Rental revenue is well below rates required to support new construction and there has been very limited new construction in the multi-family housing for many years. The units that have been added are designed and marketed to serve specific markets such as university and military students or age 55+. Two student-oriented complexes have been recently constructed providing a total of 984 beds. These complexes market directly to ASU upper class students with a significant emphasis on freedom, lifestyle and amenities. Units are currently offered at a base rent in the low to mid $400s per bed per month, although actual cost is higher when additional services such as electricity and telecommunication are included. The rental rates at these complexes compare to the rates at ASU Student Housing.

The local marketplace offers the University little or no opportunity to construct and provide apartments for upper class, married, and graduate students without significant direct and/or indirect financial subsidy although acquiring an existing complex could be financially viable if purchased inexpensively. However, all market data suggests a substantial supply of readily available, inexpensive housing will be available for the foreseeable future. Cost, lifestyle, social perception, and patterns of behavior all suggest limited demand for on-campus or university owned apartments and demand should be carefully measured to assure adequate demand at financially viable rental rates.

University Goals

The University has set a goal to achieve a certified enrollment of 10,000 by the year 2020. In tandem with this University Goal, there is an internal Housing Goal to increase the retention of upperclassmen in on-campus housing as well as support the new First Year Experience Initiative. Specific measurable goals include:

Increase sophomore retention to 65%

House 70% of all Freshmen and Sophomores on-campus by 2020

House 7% of all Juniors on-campus by 2020

House 5% of all Seniors on-campus by 2020

Demand Analysis

Two firms, Facility Programming and Anderson Strickler, prepared projections of future demand based on the University's stated goals and initiatives to increase enrollment, improve student retention, and increase the number of transfer students.

Both scenarios assume Headcount Enrollment increases to 10,000 by 2020 and approximately three quarters of freshmen students will live on-campus. The Facility Programming scenario assumes more sophomores will live on-campus (70% vs. 50%). The Anderson Strickler analysis assumes a higher proportion of Juniors (25% vs. 7%) and Seniors (10% vs 5%) will live on-campus. If the University achieves the projected enrollment of 10,000, the Anderson Strickler analysis projects demand for 3,571 beds and the Facility Programming analysis projects demand for 3,941 beds compared to the inventory after completion of Plaza Verde, Phase I, and the demolition of Concho Hall of 2,052.

Both scenarios require the University to maintain existing policies mandating freshmen and sophomore students live on-campus. If these policies are revised to remove this mandate, demand should be expected to decrease significantly.

Both scenarios present theoretical demand based on assumptions for future enrollment, capture rates, and University policies. Actual demand is highly dependent on the University meeting these assumptions.

Financial Analysis

The following quote from Student Housing Financial Plan prepared by Anderson Strickler describes both the current financial difficulty facing the housing program and the suggested solution.

"The housing fund faces a structural operating deficit that, if not corrected, will deplete the housing Reserve Fund by fiscal year 2014. Operating expenses and scheduled debt service exceed revenues by $824,000 in fiscal year 2011 and will rise to nearly $2 million in fiscal year 2020. If left uncorrected, the Reserve Fund deficit will be nearly $10 million by fiscal year 2020."

Even if additional demand for more housing can be identified, before the University can even consider building new housing, it must correct its deficit operation. This can be accomplished by increasing revenues at a 2% faster rate annually than operating expenses (e.g., 5% for revenue, 3% for expenses) plus freezing current University overhead and non-operating transfers at their current level. Additional relief could also be gained from delaying the demolition of Concho Hall and the associated debt service of $400,000 a year."

Development Opportunities

Anderson Strickler

Near-term development opportunities hinge on ASU's abilities to first establish cost controls and increase rents as set forth in the section on Current Financial Position. Once this is accomplished, the University's options for increasing bed capacity before fiscal year 2018-19 are limited to renovation of Concho Hall or the construction of new beds at a break even position. Renovation has the benefit of maintaining lower rents but constraining ASU to the existing unit type and an older building. New construction would allow more desirable unit types, but would have to be achieved at a lower cost of construction than for Plaza Verde. While quality may suffer, it is a trade-off that must be considered if ASU is not in a position to subsidize room rates.

Facility Programming

The following development opportunities are dependent on the University correcting its operational deficit and either only developing projects that are self-supporting or delaying projects the fund has positive cash flow or the fund balance to subsidize construction.

Modifications to Existing Residence Halls

Renovate Concho Hall – As noted by Anderson Strickler, while "by no means an attractive option…the renovation – rather than the replacement – of Concho Hall is one means of increasing capacity while keeping rents at a more affordable level." This option, with a financial analysis, is presented in the Student Housing Financial Plan.

Construct "Connector" between Robert and Mary Massie Halls – As noted in the Existing Conditions chapter, Robert and Mary Massie Halls each offer a limited range of support areas. The construction of a connecting building between these halls could provide an opportunity to upgrade the package of amenities offered in these older buildings as well as potentially to provide a location for additional rooms.

Additions to Existing Residence Halls

Plaza Verde, Phase I, was planned and is being constructed with infrastructure for a Phase II with approximately 500 additional beds. Constructing Phase II, with a program of spaces dominated by beds and further leveraging the investment in infrastructure and support facilities constructed in Phase I, should be incrementally less expensive to build and operate than standalone new construction hall.

Similarly, and with the same incremental savings possible in construction and operating costs, Centennial Village, currently configured to resemble the letter "E" could have two wings added to create an "8".

Acquisitions

The acquisition of existing housing properties presents several difficult dilemmas. The only mandated and historically significant demonstrated demand for housing is provided by freshman and sophomore students. However, these students require

the most significant support from the University and are least suited to reside in a potential acquisition. Even if purchased at a favorable price, it would be difficult and expensive to provide a service level consistent with existing facilities.

Focus groups, student surveys, and historical experience suggest very limited demand from upper class and graduate students for on-campus housing. In addition, readily available and very affordable options exist in the marketplace.

As noted by Anderson Strickler, "a potential acquisition must still provide the type of units that meet the needs of the students and the University's vision for the housing program. Similarly, it is important that the physical condition of the facility and its location be carefully considered. Opportunistic acquisitions should satisfy the same (financial) requirements that ASU has for projects it develops."

New Construction

Two factors suggest new construction at a new location is unlikely for a significant period of time. First, the Student Housing Financial Plan indicates that even with aggressive actions to improve financial performance, long-term development opportunities are only likely after FY 2018-19. Second, the scenarios for likely more cost effective incremental additions described above could add over 1,000 additional beds providing mechanisms to meet a majority of demand in the interim.

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