The Texas A&M University System
RELLIS Campus Master Plan
February 2018
Most of all, RELLIS is a reflection of the unique nature of the Texas A&M System. Where else would you find 11 universities and seven state agencies — a diverse group of individuals and missions — under one leadership, united with a focus on education, research, and service?

While this Master Plan represents our best attempt to foresee what RELLIS can become, I am particularly excited the RELLIS vision is flexible enough to pursue opportunities that we cannot predict today.

RELLIS is already off to a fast start and the Texas A&M System has the talent and resources to maintain our momentum. We are limited only by our imagination and our ability to attract partners who share our commitment to the values reflected in the name: Respect, Excellence, Loyalty, Leadership, Integrity, and Selfless Service.

John Sharp
Chancellor of The Texas A&M University System
The Texas A&M University System’s RELLIS Campus has a long history of living out the values its name symbolizes. And in so doing, for the past 75 years it has been a place where new technologies are created and innovated, where leaders are educated and trained, and where ideas that transform our world are born and tested. Building on its rich history as a former military training base that was critical to our nation’s security, we are now recreating the RELLIS Campus into a living-laboratory where research and discovery, education and training, and collaboration with public and private partners are encouraged and enabled by world-class, 21st century spaces, facilities, and technologies.

The 2018 RELLIS Campus Master Plan defines this new vision by framing the concepts for the future use and development of the physical environment of the campus as well as the collaborative character and spirit it is intended to embody. A prime objective throughout this process has been to ensure that as the campus evolves over time it encourages and enables our students, faculty, and partners to reach higher levels of success as they embark on paths to new discoveries through Innovation, Education, and Transformation.

The 2018 Campus Master Plan will serve as the principal planning document for the ongoing near-term improvements as well as the future long-term development of the campus. This plan is also intended to serve as a foundation for this vision while enabling changes to the plan over time to allow us to capture future opportunities that we have yet to envision today.

I want to thank my colleagues, Mrs. Yvonne Bryant, Mr. James Bright, Mr. Kevin McGinnis, and Dr. James Nelson, for their support and engagement throughout this process. Likewise, I appreciate the invaluable input and thoughtfulness provided to this effort by the executive advisory committee as well as the nine focus groups that participated in the development of this plan. The members of these groups worked hard to ensure that we took into consideration the various activities and functions ongoing and planned at the RELLIS campus, and integrated these disparate needs into a cohesive and collaborative framework supporting them all.

Finally, I want to thank and commend the leadership of Chancellor John Sharp, Chancellor of The Texas A&M University System, and Dr. M. Katherine Banks, Vice Chancellor and Dean of the College of Engineering. Their vision, dedication, and support for this transformational effort were the foundation for the success we have enjoyed and the catalyst for our future successes to come. This new 2018 RELLIS Campus Master Plan will enable us to embark on this exciting journey and will serve as our compass as we chart our path into the future.

John Barton
Associate Vice Chancellor and Executive Director of the RELLIS Campus
Executive Summary

PURPOSE AND CONTEXT
The 2018 RELLIS Campus Master Plan is a planning effort that focuses on supporting The Texas A&M University System as a national leader in high-tech research, innovation, training, and technological development. Key aspects of this plan focus on supporting and guiding campus organization, build-out development, open space networks, facility programming, and improving social amenities located within the campus.

Issues considered in this 20-year planning horizon anticipate enrollment growth, increased teaching and research demands, future transportation needs, sustainability, and economic growth. A campus-wide advisory committee included multiple stakeholders which helped shape the strategic goals that will guide the physical development of the campus during the life of the 2018 master plan. The changes presented in this plan are intended to transform the largely undeveloped 1,877 acres of land into a multi-institutional research, testing, and workforce development campus that directly benefits society at large.

CAMPUS ORGANIZATION & DEVELOPMENT
In 2017, The Texas A&M University System developed a long-term vision 20-year conceptual plan for campus growth that accommodates its unique array of educational and research programs while meeting the needs of potential intensive investments.

Currently, RELLIS has approximately 500,000 gross square feet but may grow by up to eight million new gross square feet to fully support the A&M System’s growth needs. This vision shows a scenario of 4.9 million additional gross square feet that builds flexibility into the projected facilities as well as undetermined infill development. This master plan identifies five development districts with unique attributes to accommodate this anticipated growth. Each development district is defined in terms of maximum development potential. The districts are defined as:

• Central Core
• Perimeter
• Advanced Training/Testing
• Secure Training/Testing
• Flex Public/Secure Perimeter

The Central Core provides the highest intensity and diversity of uses and amenities. Other districts support more focused needs of the various research, training, and testing initiatives active on the campus.

SUPPORTING DOCUMENTATION
Design Guidelines are provided to outline design-related elements such as aesthetics or materiality and are intended to supplement the more technical Facility Design Guidelines that the A&M System has in place. Appendices outline supporting documentation that deliver the additional details and specifications to guide future development.

THE NEXT 20-YEARS
There will be many challenges but numerous unique opportunities to advance the standards of development that help guide RELLIS as a reputable institution throughout the 21st Century.
Projected conditions of 20-year build out:
1 Central Core District
2 Perimeter Research Facilities
3 Historic Commemoration Marker
4 Training/Testing District
5 Student Housing
6 Data Center
7 Proving Grounds
8 Flex/Secure Partnerships
9 Secure Partnerships
10 Advanced Testing and Training Area
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Introduction

1.1 Purpose

1.2 Process and Participants
1.1 PURPOSE

With the RELLIS Campus, The Texas A&M University System has identified the opportunity to create a new paradigm for the future of basic and applied research, technology, development, and education.

“It is a big idea and it is important that The Texas A&M University System nurture big ideas. It is only through big ideas like this that Texas can achieve its goals for higher education.”

John Sharp
Chancellor of The Texas A&M University System

Formerly known as the Riverside Campus, this 1,877-acre, largely undeveloped site is being transformed as the A&M System RELLIS Education and Research Campus (RELLIS Campus). Located just eight miles from the Texas A&M University (Texas A&M) College Station campus, the site has long been used by the university and system members as a site for world-class research, technology development, and workforce training. The long term development of the site offers an unparalleled opportunity to establish a unique, creative, collaborative, and sustainable campus for the future.

This RELLIS Campus Master Plan (hereafter referred to as the master plan) is intended to guide the A&M System’s future development at RELLIS, defining the vision for immediate and long term development and for the supporting infrastructure that will be needed. The campus currently accommodates a wide range of uses such as research in agricultural and life sciences, veterinary medicine, and various engineering and training activities. The aircraft runways, a residual from the previous Bryan Army Air Field and Bryan Air Force Base, activated during World War II and the Korean War, respectively, provide facilities for vehicle and infrastructure testing as well as law enforcement and security training. Over time, some of these uses will be retained, while others will be replaced or augmented with academic programs and institutes, research entities, partner agencies and companies, and other collaborators.
In 2016, the A&M System decided to rename the Riverside campus RELLIS and began to prepare a new plan in response to growing pressure for new facilities and site development. This master plan was undertaken in response to the desire to bring the latest thinking on environments that will support collaboration and accommodation of the wide range of current and potential partners on the site.

The first plan for the Riverside Campus was prepared in 1988, and was intended to provide guidance to transition this purpose built former military site into a modern master planned campus, focusing on the redevelopment of the eastern portion of the site. The 2004 Campus Master Plan for Texas A&M University, which was concerned with the lands on and contiguous to the College Station campus, noted regarding the Riverside Campus:

“The primary purpose of the land and facilities located at the Texas A&M University’s Riverside Campus is to support the mission of Texas A&M University and the A&M System components headquartered on the College Station campus.”

In 2013, in recognition of the unique resource that is the Riverside Campus, a new plan was prepared that envisioned a future of growth and innovation. This plan was particularly oriented to provide opportunities for teaching space, research, service, and training activities that could not be accommodated on the other College Station campus of Texas A&M due to the scale of space required or to uses not suited to more intensely populated sites. The plan also encouraged celebration of the rich history of the site and retention of original characteristics, where possible, in conjunction with long term redevelopment and renewal.

In 2016, the A&M System decided to rename the campus RELLIS and began to prepare a new plan in response to growing pressure for new facilities and site development. The A&M System supported a $150 million investment in the site as part of an initiative to create a 21st Century research and learning environment. This master plan was undertaken in response to the desire to bring the latest thinking on environments that will support collaboration and accommodation of the wide range of current and potential partners on the site.

The planning process included collaboration with multiple committees and stakeholders including a master plan executive committee. In addition, informational meetings and workshops were held with a variety of stakeholders including:

- Blinn College
- Texas A&M University
  - College of Agriculture & Life Sciences
  - College of Architecture
  - College of Veterinary Medicine
  - Industrial Distribution
- Joint Library Facility (The Texas A&M System and The University of Texas System)
- Texas A&M Engineering Extension Service (TEEX)
- Texas A&M Transportation Institute (TTI)
- Texas A&M Engineering Experiment Station (TEES)

The planning process involved extensive analysis of existing conditions, opportunities, and constraints ranging across relevant disciplines such as site utilities, transportation, and parking. Additional consideration included smart technology integration, site security, workforce training, sustainable development strategies, and resilience, such as potential flooding and stormwater management.

Multiple land use plan alternatives were prepared and reviewed, with final selection as documented in this report. The work occurred over approximately one year.
MASTER PLAN PROJECT TIMELINE

FIGURE 1.4

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| Work Session #2       | Presentation of Phase A-1 Findings   | Review of Plan Alternatives              | 2nd Draft Master Plan Submission |
| Work Session #3       |                                      | Review of Plan Alternatives              | Presentation to Regents |
| Work Session #4       |                                      | Presentation of Draft Plan               |                              |
| 1st Draft Master Plan | Submission                           |                                        |                              |
| 2nd Draft Master Plan | Submission                           |                                        |                              |
| Presentation to Regents |                                   |                                        |                              |

| Works Session #1       | Site Investigation                   | Stakeholder Interviews                  | 1st Draft Master Plan Submission |
| Work Session #2       | Presentation of Phase A-1 Findings   | Review of Plan Alternatives              | 2nd Draft Master Plan Submission |
| Work Session #3       |                                      | Review of Plan Alternatives              | Presentation to Regents |
| Work Session #4       |                                      | Presentation of Draft Plan               |                              |
| 1st Draft Master Plan | Submission                           |                                        |                              |
| 2nd Draft Master Plan | Submission                           |                                        |                              |
| Presentation to Regents |                                   |                                        |                              |
Background

2.1 Regional Context
2.2 Site Context
2.3 Campus History
2.4 Bryan Army Air Field Features
2.5 Current Programs and Facilities
2.1 Regional Context

The RELLIS campus lies in the Brazos Valley, midway between the four largest metropolitan areas of the state: Houston, Dallas-Fort Worth, Austin, and San Antonio.

The RELLIS campus sits at the intersection of State Highways 21 and 47 with primary access from State Highway 47. The campus immediately adjoins the western city limits of Bryan, a community with a population of about 76,000. The Texas A&M University campus is located in College Station, approximately eight miles away. Texas A&M is the largest employer in the area and has an enrollment of over 60,000 students. Growth of Texas A&M since its founding has played a major role in the continuing growth and prosperity of the county and nearby cities.

Various plans prepared for the City of Bryan and Brazos County are expected to support the long term growth and success of the RELLIS campus.

CITY OF BRYAN BLUEPRINT 2040 2016 COMPREHENSIVE PLAN

The plan highlights recommendations and actions pertaining to various city policies and programs including: Land Use, Municipal Services, Economy, Wellness, Education, Community Appearance, Transportation, Parks and Recreation. This is a guide for Bryan’s future physical growth expressed through goals, objectives, and policies of relevance to RELLIS.

CITY OF BRYAN WEST AREA PLAN

A 4,546 acre sub-area plan calls for new residential/retail growth, trails/open space, and transportation improvements as part of a new urbanist mixed-use development plan.

BRAZOS COUNTY HIGHWAY EXPANSION

The plan shows what Brazos County’s roadway network could look like in 2050 to handle the projected population growth of the metro area, including extension of State Highway 47 to the north.

The Texas Department of Transportation is also planning to upgrade US 190 to become Interstate 14, which would run through Brazos County.

TEXAS A&M HEALTH SCIENCE CENTER AND COLLEGE OF MEDICINE

The Texas A&M Health Science Center (TAMHSC) merged with Texas A&M University on July 12, 2013. TAMHSC offers programs on a “distributed” (geographically dispersed) model with one such location down the road from the RELLIS Campus.

CITY OF BRYAN COUNTY EXPO EXPANSION

A $3 million dollar expansion includes a greater capacity for large events and multiple events at one time.
2.2 Site Context

The RELLIS Campus is defined by State Highway 21 to the north, State Highway 47 to the east, Kuder Road and Pitts Road to the west, and Goodson Bend Road and the Brazos River to the south.

The 1,877-acre campus is located in the prairie grasslands of central Texas. The predominant natural features on the site include the Brazos River and large areas of vegetation. The site currently has nearly 900 acres of pasture. Within the core area of the campus, large oak trees surround an old baseball field and line streets such as Bryan Road, providing the campus with an existing mature tree canopy in some locations. Areas of thick brush exist on the southeast portion of campus, near a retention pond, and between runways of the original air field.

The built form of the campus is dominated by the air field, which consists of three 5,000-foot runways, two 7,000-foot runways, and a 4,500-foot apron that is approximately 500-feet wide. A partial grid of streets is situated to the east of the runways, with five north-south avenues and six east-west streets. Existing structures on campus comprise just under 500,000 square feet of area, with significant additional facilities in construction, design, or programming stages.
2.3 Campus History

The RELLIS Campus has a distinguished history and retains many reminders of its role in World War II and later as a facility supporting Texas A&M University. Many of its original features and remnant sites are worthy of retention and celebration going forward in the 21st Century.

“As we embrace the future, it is important to remember the past and the role that the Bryan Army Air Field played in the history of our country and our community.”

JOHN SHARP
CHANCELLOR OF THE TEXAS A&M UNIVERSITY SYSTEM

In 1942, based on the recommendation of a Chamber of Commerce committee, a site of approximately 1,870 acres was acquired by the federal government to support the war effort. First known as the Army Air Force Flying School, and later as the Bryan Army Air Field (AAF), the base was used to train pilots and instructors for World War II. The base was mainly wood-frame structures on concrete slab or wall foundations built to last just a few years. The base included areas for administration offices, classrooms, housing, hangars, and recreational facilities. After the war ended, the base was listed as inactive and officially stopped flight training in 1947. As of 2016, 38 buildings and structures, in various states of repair, remained from the Bryan AAF.

In 1951, the newly reformed United States Air Force opened Bryan Air Force Base (AFB) at the decommissioned Bryan AAF. This time the focus was training pilots for the Korean War and later for the Berlin Crisis. During the war, the base was noted for not segregating African American officers at a time when most southern cities (including Bryan) were still segregated. The base used many existing buildings from the Bryan AAF and constructed another 33 to expand the facilities, including larger hangers, housing quarters, and education buildings. The base was closed in 1961, the land was declared surplus, and in 1962 the General Services Administration leased the property to the A&M College of Texas. In 1963 the College was renamed Texas A&M University. In 1982 the entire site became the property of the university system.
SMART CONNECTED CAMPUS

FIGURE 2.4 (All) Plan of the then Bryan AFB and AAF.

1943

1953

1960
2.4 Bryan Army Air Field Features

After a complete building assessment by AmaTerra Environmental in 2016, and voluntary coordination with the Texas Historical Commission (THC), five properties are found to be eligible for listing in the National Register for Historic Places: the original headquarters, the aircraft engine shop, a hangar, and two cadet quarters.

**BUILDING 6502** AIRCRAFT ENGINE SHOP
Built in 1955 as an engine shop, Building 6502 has a concrete foundation with CMU walls and large metal frame windows at various levels around the building. There are multiple wooden bay doors on the east and west façade. It is significant due to its associated military use and distinctive characteristics of a building type. Building 6502 is scheduled to receive a commemoration plaque as coordinated with THC.

**BUILDING 8007** HEADQUARTERS
Building 8007 was constructed in 1943 as a U-shaped wood-frame building on a raised concrete foundation wall. It was originally the post headquarters for the Bryan AAF and later reused as the headquarters for the Bryan AFB. Building 8007 was removed in 2017 and is scheduled to receive a commemoration plaque as coordinated with THC.

**BUILDING 8031** HANGAR
Built in 1953, Building 8031 is a large hangar with corrugated steel siding and a barrel vault roof. There are additions to the main building and some alterations to the original bay doors. It is significant due to its associated military use and distinctive characteristics of a building type.

**BUILDINGS 8474/8475** CADET QUARTERS
Built in 1943, Buildings 8474 and 8475 were rectangular, wood-frame buildings on concrete foundations. With gabled roofs and fiberboard siding, the cadet quarters were simple buildings with noted military history. In addition to hundreds of residents during its wartime history, these quarters housed African American servicemen in the 1940s during the era of segregation of the armed forces. These buildings were removed in 2017 and are scheduled to receive commemoration plaques as coordinated with THC.

In addition to the five properties to be commemorated on the campus, the following three properties were identified as significant to the history of the campus and will each receive a commemorative plaque:

**BUILDING 7006** CHAPEL
The campus' chapel will be renovated in recognition of the site's role of training pilots for World War II.

**BUILDING 7077** CONTROL TOWER
The control tower is located next to the airfield apron and is a prominent and unique feature on campus.

**BUILDING 7090** TTI HANGAR
A wood framed hangar with wood trusses, the facility originally had a large sliding fold up door that slid into two large door pockets. It has been renovated and reused by TTI for their proving grounds operations.
FIGURE 2.5  Key View of Bryan Army Air Field Buildings

- Building 7090: Hangar
- Building 6502: Aircraft Engine Shop
- Building 8474: Cadet Quarters
- Building 7077: Control Tower
- Building 8007: Headquarters
- Building 8031: Hangar
- Building 7006: Chapel
2.5 Current Program and Facilities

The RELLIS Campus is currently home to a diverse group of users and facilities for research, training, test beds, and proving grounds. Among them are the following:

**TEXAS A&M AGRILIFE RESEARCH JANICE AND JOHN G. THOMAS HONEY BEE FACILITY**
The Janice and John G. Thomas Honey Bee Facility (Apiary Inspection Service) is one component of the Texas A&M University Agriculture program that focuses on research and teaching regarding honey bee biology and management. Research interests revolve around the behavioral ecology of honey bee colonies, as well as pollination and beekeeping practices.

**TEXAS A&M UNIVERSITY COLLEGE OF AGRICULTURE AND LIFE SCIENCES INSTRUCTIONAL MATERIALS SERVICE (IMS)**
During the past fifty years, IMS has developed standards-based agriculture curriculum covering a wide range of topics related to agriculture. IMS provides agricultural educators with quality, up-to-date, and customizable materials that can easily be used in the classroom and are aligned with Texas Essential Knowledge and Skills (TEKS) standards.

**PASTURES**
The pastures on the RELLIS Campus support teaching and research in selected departments within the College. The foci are animals (grazing) and pasture management (fire).

**TEXAS A&M AGRILIFE EXTENSION SERVICE PHILIP J. HAMMAN TERMITE CONTROL TRAINING SCHOOL**
This facility is one component of the The Philip J. Hamman Termite Control Training School that was developed to teach correct and proper treatments to termite control practitioners. The classes include lectures, field laboratories, and practical training with current termite control and inspection equipment. Students learn to apply appropriate technologies and proven methods that protect structures from termite invasion.

**ON-SITE SEWAGE FACILITIES (OSSF)**
The OSSF is an outdoor facility that provides training on technologies available for managing wastewater so practitioners can make informed decisions when selecting, operating, and maintaining their onsite wastewater treatment system.

**TEXAS A&M UNIVERSITY COLLEGE OF ARCHITECTURE AUTOMATED FABRICATION AND DESIGN LAB**
The Automated Fabrication and Design Lab (also known as Architecture Ranch) is the College of Architecture's large-scale research and fabrication lab. It is dedicated to the advancement of student, faculty, and industry projects. The lab utilizes the latest industry and research driven technologies to provide a hands-on learning environment for its students. The lab also provides complete project fabrication and engineering services for all colleges within Texas A&M.

**TEXAS A&M CENTER FOR MARITIME ARCHAEOLOGY AND CONSERVATION**
The mission of the Center for Maritime Archaeology and Conservation (CMAC) is to keep Texas A&M in the forefront of nautical, maritime, and underwater archaeology research. Its areas of expertise are in artifact conservation and underwater mapping technology. CMAC has incorporated several varied laboratories specializing in various research areas and aspects of nautical archaeology.

**TEXAS A&M ENGINEERING EXPERIMENT STATION (TEES) ENERGY SYSTEMS LABORATORY**
The Energy Systems Laboratory (ESL) focuses on energy-related research, energy efficiency, and emissions reduction. Some specialized areas are optimization of commercial and industrial building operations, known as Continuous Commissioning®; enhancing overall energy efficiency in buildings through research, simulation, data analysis and outreach; conducting research and calibrated testing on HVAC systems; measurement and verification of energy savings for commercial buildings; and energy efficiency in industrial facilities.

**PROCESS ENGINEERING RESEARCH AND DEVELOPMENT CENTER**
The Process Engineering Research and Development Center (PERDC) develops processes for converting agricultural crops and biological materials into functional food, feed and industrial ingredients, and for using these materials in industrial and consumer products. The center also conducts research in recovering valuable components from by-products and in the treatment of processing waters and wastes.
COASTAL ENGINEERING LABORATORY
The Coastal Engineering Laboratory brings ocean and estuarine environments into a laboratory setting where engineers, researchers, and educators can tackle the most challenging problems of near-shore, offshore, and estuarine regions.

CENTER FOR AUTONOMOUS VEHICLES AND SENSOR SYSTEMS’ FLYING RANGE
The mission of the Center for Autonomous Vehicles and Sensor Systems (CANVASS) is to unify research and development of autonomous vehicles and systems for the purpose of better serving the state and nation. CANVASS is a joint venture of TEES and the Texas A&M University Dwight Look College of Engineering. CANVASS is a multi-laboratory center with investigators in various departments within the college administered through the aerospace engineering department. CANVASS facilitates engineering education and is a major conduit for the autonomous-systems engineering workforce of Texas. Its primary research interest is unmanned aircraft systems.

AUTONOMOUS VEHICLE SHOP
The Autonomous Vehicle Shop’s mission interests of research include Model Based Control, Embedded Systems, and Software Engineering for Mechatronic Systems, Mechatronic System Safety, and Reliability Modeling and control of roll-to-roll manufacturing systems and autonomous vehicles, robotics, and control of large-scale nonlinear dynamic systems.

SOLAR POWER FACILITY
The solar test bed benefits the University and students by providing facilities to study photovoltaic energy, energy conversion, and to collect data that is incorporated into research, graduate and undergraduate teaching, and the broader impact of community outreach. This facility was previously located on the roof of Neetum Steed athletic building before the renovations of the Kyle Field Stadium.

TEXAS A&M ENGINEERING EXTENSION SERVICE (TEEX) INFRASTRUCTURE TRAINING & SAFETY INSTITUTE (ITSI)
CODE ENFORCEMENT
The Code Enforcement program provides both basic and advanced training to industry professionals covering the proper administration of local programs using best practices and guidelines established by the Texas Department of State Health Services. Training includes housing, construction, property maintenance, occupancy levels, electrical and fire safety, zoning codes, and proper signage regulations covering agricultural, residential, and industrial zones.

CERTIFIED SAFETY AND HEALTH OFFICIAL (CSHO)
The program serves the needs of industry professionals as a significant safety and health professional designation. CSHO program targets those industry professionals with responsibility for worksite safety and supervision to include related inspections and audits. The CSHO program is comprised of two tracks: construction and general industry. Certifications aid in safety and health career advancement.

CRITICAL INFRASTRUCTURE SAFETY
TEEX Infrastructure Training and Safety Institute and National Emergency Response and Rescue Training Center provide customized courses and technical assistance for critical infrastructure sectors. These prepare individual responders and jurisdictions to plan for and react collectively in the event of a terrorist act or natural disaster, as well as prepare for the recovery process following an incident.

ENVIRONMENTAL, HEALTH, AND SAFETY
Environmental, Health, and Safety (EHS) provides industry professionals training focused on current federal and state environmental laws. Courses include safety training for all related industries and continuing education opportunities specific to the EHS industry. TEEX EHS area covers several certificate programs, which include the Certified Safety and Health Official, Environmental Technician, Healthcare Workplace Safety, and Public Sector Safety & Health Fundamentals.

ELECTRIC POWER
The Electric Power program provides a complete set of technical courses and safety training for industry professionals ranging from entry level to seasoned professionals. Training is provided to private industry and local agencies covering fundamentals of electricity and introductory concepts to advanced training and leadership topics. Customized technical training is available covering safety and technical aspects of electrical power equipment.
HEALTH CARE
Protecting and monitoring the health and safety of the workplace during daily operations requires a full spectrum of programs. This broad range of specialized courses provides industry professionals with both technical training and continuing education, while meeting environmental, health, and safety training needs across all skill levels.

HEAVY EQUIPMENT
The Heavy Equipment program provides construction, utilities, and oil production industry personnel training for scraper, bulldozer, motor grader, front-end loader, excavator, dump truck, crane, or other heavy equipment. The program provides operators basic and advanced skills to safely operate machinery in all environments. It also provides hands-on training for all skill levels including work zone safety, excavation safety, confined space entry, and preventative maintenance.

OIL AND GAS/PETROCHEMICAL
This program provides industry professionals with high quality, business-relevant comprehensive topics ranging from wellhead operations and production to transportation of finished product. It provides the latest technical innovations to ever-changing regulatory requirements, all to support the world’s energy production needs. It encompasses environmental laws and regulations, health and safety courses, heavy equipment operations, instructor development, leadership and supervision, and OSHA-authorized courses.

AUTHORIZED BY OSHA
The program provides the knowledge and skills necessary to create a safe workplace for employees and to maintain voluntary compliance with OSHA regulations. Instructor expertise in construction, disaster management, general industry, hazardous materials, instructor development, leadership and supervision, maritime, oil and gas/petrochemical and safety. In addition, more advanced training and specialty courses are available.

SCHOOL BUS TRANSPORTATION
The TEEX School Bus Transportation program trains qualified school district drivers to serve as behind-the-wheel instructors. Candidate instructors demonstrate driver proficiency, receive best practices through instructor-led presentations, and perform practice teaching assignments. Hands-on training at the RELLIS Campus includes bus safety inspections, field evaluations of driver competencies, parallel parking, and precision backing.

TELECOMMUNICATIONS
The Telecommunications program provides industry professionals current training in ever-changing advanced technology. Telecom professionals must be knowledgeable in fiber optics, cable splicing, telephony, and the deployment of telecommunication services, and need to stay current surrounding all industry-specific updates. Training covers not only introductory aspects but comprehensive technical topics: supervisory development and disaster management for electric power systems.

TRANSPORTATION AND HIGHWAY SAFETY
The program provides industry professionals working on or near Texas Department of Transportation roadways and Federal Highway Administration sponsored projects safety training, including work zone traffic control, traffic collision incident, school bus operations, or continuing education provided to transportation engineers. Proper training helps ensure safe decisions are made regardless of the environment.

WATER AND WASTEWATER
The program provides basic and advanced technical training solutions to industry professionals across the State of Texas. Additionally, it provides basic and advanced licensing training and delivers federally funded Critical Infrastructure Safety technical training to plant personnel. As a result of TEEX industry expertise, many courses conducted at the RELLIS Campus are approved for credit and licensing by the Texas Commission on Environmental Quality.

OSHA-AUTHORIZED OUTREACH TRAINERS
The OSHA Outreach Training Program is an integral part of occupational safety and health training. Individuals completing a one-week OSHA trainer course are authorized to teach 10-hour and 30-hour courses in construction or general industry safety and health hazard recognition and prevention. Authorized trainers can receive OSHA course completion cards for their students.

NATIONAL UNMANNED AIRCRAFT SYSTEMS CREDENTIALING PROGRAM
The program is tailored for U.S. commercial service providers and public safety organizations utilizing small unmanned aircraft systems (UAS). Part 107/ Certificate of Authorization from the Federal Aviation Administration (FAA) is required to operate in the national airspace system. Completion enables companies to validate FAA regulations compliance for commercial UAS ventures and demonstrate safe flight and enhanced safety management systems.
TEXAS A&M ENGINEERING EXTENSION SERVICE (TEEX) LAW BUILDING AND TRAINING AREA

LAW ENFORCEMENT
TEEX Law Enforcement program provides licensing by Texas Commission on Law Enforcement with the latest techniques and instructional training for crash reconstruction, forensic crime scene investigation, or police weapons and tactics training. Courses include: jail training, public safety telecommunications, forensic science, and security training for Texas Private Security Training for noncommissioned officers.

LAW ENFORCEMENT CORRECTION
TEEX Corrections Academy trains individuals to work successfully and effectively in a correctional setting. The program provides affordable learning experiences for aspiring and advancing correctional officers, and classes include physical skills training. Training provides knowledge and skills to effectively carry out duties and maintain control within a jail environment, including basic self-defense and inmate handling techniques.

FORENSICS
Criminal justice professionals seeking enhanced skills can select among several certificate programs offered through the Texas Forensic Science Academy. Forensic Technician, Forensic Investigator Levels I & II, Major Crimes Investigator, and Property and Evidence Management are approved by the International Association for Identification and the International Association of Bloodstain Pattern Analysts and accredited by the Texas Commission on Law Enforcement.

EXPLOSIVES AND ORDNANCE TRAINING (EOT)
Explosives training for Law Enforcement courses deliver specialized instruction for members of tactical response units, such as special weapons, tactics teams, and public safety bomb squads. Ordnance Removal and Remediation courses are the first and only civilian UXO Technician I course certified by the Department of Defense Explosive Safety Board.

EMERGENCY VEHICLE OPERATION
Proper operation of an emergency vehicle is critical for police officers and public safety. Participants become familiar with terminology, driving skills, and liability issues related to operating a police vehicle. Exercises enhance an officer’s ability to operate a vehicle during an emergency situation by teaching personal and vehicle control limitations.

CRITICAL INFRASTRUCTURE PROTECTION
The program promotes readiness and disaster preparedness, safety, security, and community resilience in disaster situations through training to strengthen and maintain secure, functioning, and resilient critical infrastructures. Topics include threat and risk assessment, risk mitigation, resource investment, preparedness planning, and other disaster management subjects, which prepares personnel in emergency and public services operations and critical infrastructure sectors.

EMERGENCY COMMUNICATIONS
Effective communication in stressful situations is vital for emergency responders. Courses prepare telecommunications personnel to effectively serve their departments and communities by teaching communication skills, call classification and procedures, strategies for handling difficult callers, stress management, and Spanish 9-1-1, among other topics. The program provides training requirements for the Texas Commission on Law Enforcement Basic Telecommunicator Proficiency Certificate.

SUPPORT SERVICES FOR ADMINISTRATORS, TEACHERS, AND STAFF
During an emergency on school campus – violence, terrorism, or an emergency event – the first actions taken by school administrators and teachers can minimize any potential loss of life. An effective emergency plan is critical to ensuring administration’s actions are easily and correctly conveyed to emergency personnel improving response time and immediate students and employee protection.

SECURITY OFFICER TRAINING
The program provides training required for non-commissioned security officers in the State of Texas across a range of specialized areas. Certifications approved by the Texas Private Security Bureau include public safety supervisor, infrastructure protection, and school safety for managing critical incidents in higher education, such as violence prevention and sport event risk management.
SPORTS AND SPECIAL EVENTS MANAGEMENT
The program provides large-scale emergency event training for incident management, crowd and evacuation management, crisis information management, and developing capability to operate in multi-agency collaborations. Training is targeted to personnel in campus administration/emergency management; athletic department management; campus, local and state law enforcement and emergency management; local fire and emergency medical services; and large venue management/operations.

TEXAS A&M TRANSPORTATION INSTITUTE (TTI) TTI SEDIMENT AND EROSION CONTROL LABORATORY
TTI’s Sediment and Erosion Control Laboratory (SEC Lab) provides the transportation industry with a research and performance evaluation program for roadside environmental management. The program includes stormwater quality improvement, erosion and sediment control, and vegetation establishment and management in this 19-acre, full scale, indoor/outdoor facility.

TTI PROVING GROUNDS RESEARCH FACILITY
The TTI Proving Grounds has long been a place where TTI has conducted world-class research, technology development, and testing in areas such as roadside safety, crash testing, traffic engineering, emissions, sediment and erosion control, pavements and materials, structures, roadside signs and markings, and more recently, connected and automated vehicles.

TTI ROADSIDE SAFETY AND PHYSICAL SECURITY PROGRAM
At the TTI Proving Grounds, researchers in this program develop and test highway-safety devices, such as crash cushions, guardrails, breakaway signs, and barrier systems. Researchers in the program also test perimeter-security devices to prevent or control vehicles entering or exiting sensitive sites, such as U.S. embassies, power plants, refineries, and military installations.

TTI CENTER FOR COMPUTATIONAL MECHANICS
Researchers in this Federal Highway Administration-designated center, headquartered at the RELLIS Campus, use state-of-the-art analytical tools to accurately model crash tests on dedicated high-speed computers. These techniques enable researchers to design better, most cost-effective safety hardware at a lower cost to research sponsors by predicting how vehicles and safety devices will perform in collisions.
FIGURE 2.7
PLANNED PROGRAMMATIC USES
The following new facilities are planned as early projects to launch the new era for the RELLIS Campus.

ALLIANCE ACADEMIC COMPLEX - A&M SYSTEM
The multi-institutional center will provide space for A&M System institutions to offer a wide variety of curricula. TEES, TTI, TEEX and industry partners will utilize the facility for continuing education, short courses and professional development programs. Students and faculty at this center will have the opportunity to become involved in the research and technology development projects occurring at the RELLIS Campus.

ALLIANCE ACADEMIC COMPLEX - BLINN COLLEGE
The local community college, Blinn College, will be expanding to a facility at the RELLIS Campus to allow students to learn cutting-edge, high-demand skills in an environment that encourages collaboration between public institutions and private companies. This co-location will allow Blinn College students to transfer seamlessly to leading universities throughout the A&M System.

TEES STATE HEADQUARTERS BUILDING
This approximately 75,000 square-foot facility will house all TEES administrative activities along with offices and labs associated with several TEES research centers including the Texas Center for Applied Technology (TCAT) and the Mary Kay O’Connor Process Safety Center. It will be located in the TEES Complex along State Highway 21.

TEES/TTI CENTER FOR INFRASTRUCTURE RENEWAL (CIR)
The 135,573 square-foot CIR facility is a joint initiative of TTI and TEES and will be completed in March 2018. The facility will include laboratories to reduce cost and extend infrastructure safety, resiliency, and durability, as well as prepare for the introduction of connected and autonomous transportation.

TEES INDUSTRY LAB
This facility will bring together industry with TEES researchers to explore all aspects of cyber-physical technologies. Robotics, autonomous and connected vehicle technologies, and associated cyber security will be the subjects for this facility.

MIKE AND BEVERLY ROWLETT INDUSTRIAL DISTRIBUTION CENTER
This center will include the Thomas and Joan Read Center for Distribution Research and Education, as well as the Global Supply Chain Laboratory and the Talent Incubator. Combined, these programs constitute the largest Industrial Distribution program in the U.S. and conduct applied research, consortia and professional development programs. The facility will be located in the TEES Complex adjacent to Industrial Distribution Building #2, housing their Read Center, Global Supply Chain and Logistics Lab, and Capstone Research.

TEEX TRAINING FACILITIES
New and expanded training facilities will be developed for instruction and certifications in law enforcement, public safety, municipal and power utilities, and heavy equipment operations. These facilities will be located in the Training/Testing area or the Secure Training/Testing area as required.

TEXAS A&M TRANSPORTATION INSTITUTE (TTI) HEADQUARTERS BUILDING
The new 179,381 square-foot TTI headquarters will house research facilities and meeting, collaboration, and office spaces for approximately 450 College Station-based researchers, staff, and students. Building occupancy is slated for Spring 2019.

TTI RETROREFLECTIVITY VISIBILITY LABORATORY
This drive-in laboratory, which will be relocated to the TTI Headquarters, is used to test retroreflective materials and coatings, lights, and other technologies designed to provide improved nighttime and inclement weather visibility for roadway users.

TTI DRIVING SIMULATOR
The Driving Simulator, which will also be relocated to the TTI Headquarters, provides measurements of drivers’ responses to roadway situations, in-vehicle technologies, and driving-related tasks. Researchers can test a wider variety of roadway geometries and traffic conditions than are feasible in a test-track or field study.
CURRENT CONDITIONS AND PROJECTS IN PLANNING, DESIGN, AND CONSTRUCTION

FIGURE 2.8

Current conditions and projects in planning, design, or construction as of February 2018
1   East Entrance Roundabout
2   RELLIS Parkway
3   Academic Surface Parking Lot
4   Blinn College Phase 1
5   Alliance Academic Complex - A&M System Phase 1
6   Road/Infrastructure Improvements
7   Central Utility Plant (CUP)
8   TTI Headquarters
9   Center for Infrastructure Renewal (CIR)
10  Future TEES Complex
The Vision for RELLIS

3.1 The Vision for RELLIS
3.2 Guiding Values and Principles
3.3 Campus Organizational Concepts
Located 15 minutes from the Texas A&M University campus in College Station, the RELLIS Campus builds upon, complements and supports the strengths of the A&M System with the goal of becoming one of the nation’s leading “smart” collaborative innovation and research clusters.

“The investment could be a game-changer for the region. It will bring technology companies and major investment to our community as well as economic opportunity to our residents. We appreciate the chancellor’s strategic vision and we look forward to assisting the A&M System with the implementation.”

— NANCY BERRY  
MAYOR OF COLLEGE STATION, 2010-2016

The characteristics of an innovation campus are distinct and unique from conventional real estate development. Employees, researchers, and tenants today value connectedness and collaboration. In order for the campus to be competitive, RELLIS will provide not only superior research facilities, but also a healthy work environment, a sense of community, and the collegiality desired by today’s faculty, researchers, and students. In addition to teaching and research facilities, student housing, training facilities, and testing grounds, the long term program will include other supporting uses: labs, studios, incubator space, flex spaces, retail, dining, conference and expo, and a variety of housing types.

RELLIS will also be a model smart campus, where technologies are tested and utilized to benefit the campus and its efficient operations. A smart campus is a learning and research community that is maximizing the use of existing and emerging information and technology to contribute to the well-being of the community in significant and fundamental ways. A smart campus is, by definition, an innovative campus and one that will attract high quality partners.

To support this smart, collaborative, mixed use environment, the campus will feature a unified central area with a public realm that includes urban amenities such as a pedestrian oriented streetscapes, an ample and connected bicycle network, a variety of parks, plazas, and recreation fields. Public open space will be designed for use by students, faculty, staff, visitors, and neighbors, encouraging their activation and use throughout the day beyond the hours of the normal workday. Students, staff, and faculty in particular will be able to enjoy a walk or jog through a connected open space network, or enjoy the outdoors taking a coffee break or having lunch on a park bench, open lawn area between Airfield Drive and 6th Street, or under a shade tree in a plaza. Cafés with outdoor seating are encouraged along primary streets and adjacent to open spaces to inspire informal gathering where people can share ideas.

In addition to supporting the livelihood and success of RELLIS through specific campus design principles, it will be equally important to execute that goal in a manner that is environmentally sustainable at the global, regional, and local level. RELLIS will also be developed with concepts of resiliency and sustainability in mind. This will encompass the use of the latest clean and renewable energy technologies, design of individual buildings, as well as outdoor spaces, and will extend to supporting infrastructure and operations.
EXISTING AND NEAR-TERM CAMPUS ACTIVITIES
DEVELOPMENT PRINCIPLES

Building from the six core values that define the name RELLIS, six development principles were established for the RCMP that guide the decision-making process for future campus organization and development structures.

Flexibility

The development of RELLIS will occur over many years and while the core mission will remain, the specific tenants, users, and the focus of many activities may evolve. It is especially important to put in place a development framework that can adapt to changing facilities and operations while retaining the coherence and uniqueness of the campus environment.

Unique Image

The large RELLIS Campus still retains much of the character of its historic origins, with a grid street layout and several Bryan AAF and Bryan AFB buildings on a grassland prairie site. Capitalizing on this unique character while adding state-of-the-art new facilities will help to create a memorable environment that will be attractive to researchers, students, and staff and will aid in recruitment and retention.

Smart Campus

As RELLIS grows, it will have the opportunity to create a “smart” campus: one that utilizes smart technologies for buildings (e.g., low embodied carbon, advanced controls, low VOC), campus (e.g., smart grid, water efficiency, and recycling), and systems to operate and connect (e.g., autonomous shuttles, high tech security systems), and be a site for not only development but also testing and embodying emerging practices.

Innovation and Collaboration

The 21st century has seen the successful evolution of innovation environments based on collaboration and cooperation. Whether in urban environments or on a large campus site such as RELLIS, investing in elements that support these trends can support a special RELLIS Campus culture.

Connection to the A&M System

The RELLIS Campus has long been a location where Texas A&M has conducted world-class research, technology development, and workforce training in areas such as vehicle safety, traffic engineering, law enforcement training, biological materials processing, robotics, and unmanned aerial systems. In the future, this relationship will be strengthened and additional partners will benefit from this connection.

Sustainability and Resilience

The RELLIS Campus will embrace planning and design for sustainability and resilience. The long term development of the campus can model appropriate practices in energy, building design, site landscape, and stormwater management. The campus can also be an important learning environment for best practices to address environmental and economic needs.
3.3 CAMPUS ORGANIZATIONAL CONCEPTS

Four fundamental concepts establish the long term pattern for development of the RELLIS Campus. These concepts will ensure the functionality of some of the most valuable and intensively used parts of the campus and will affect the long term capacity and suitability of the entire site. These concepts are:

- Modifications to the proving and training grounds for efficiency
- Enhancing the grid of streets as a pattern for growth
- Focusing amenity and activity zones in areas with the highest concentration of facilities and population
- Using campus edges and entries to communicate the RELLIS brand.

PROVING & TRAINING GROUNDS MODIFICATIONS

To maximize the long term flexibility of the RELLIS site, proposed improvements to the existing runway system consist of strategic connections and enhancements to existing areas, and the addition of elements to consolidate the overall footprint, as shown in this diagram.

A. RUNWAY REMOVAL
B. ADD TRACK LOOP AND SAFETY AREA
C. ENHANCE/SECURE FLIGHT LINE ROAD
D. RELOCATE UXO PROGRAM
E. ADVANCED TESTING AND TRAINING AREA

FIGURE 3.1
STREET GRID
The Bryan AAF and Bryan AFB facilities – administration, barracks, and other buildings - were organized in a traditional fashion around a grid of streets. This grid allowed easy access throughout the developed areas of the site by vehicle or on foot, and allowed for the efficient movement of equipment and supplies.

The remnant grid will be expanded as both a vehicular and a pedestrian/bicycle network, connecting destinations throughout the eastern portion of the site and allowing for flexibility in modes and means of access. Some portions of the grid may be limited to pedestrian or bicycle access while others may be multi-modal. The grid also provides a convenient framework for establishing larger parcels for development on the west side which can be further subdivided in response to specific program needs over time.

New streets will be provided as shown in the accompanying diagram:

A. PUBLIC STREET EXTENSION
B. SECURE STREET EXTENSION
C. PARKWAY STREET EXTENSION
D. NEW CAMPUS ENTRANCES

FIGURE 3.2
AMENITY AND ACTIVITY ZONES

Key components of innovative environments today are the amenities and activities that enhance the experience of the on-site population and encourage interaction and socializing. This is much more challenging on a large campus than in an urban environment. At RELLIS, these amenities and activity uses will need to be concentrated the Central Core but conveniently located to attract the entire campus population. They are intended to take the form of pedestrian streets, parks, plazas, and collections of active uses such as:

- Conference or event spaces for campus tenants or outside groups
- Food and coffee venues (including space for food trucks and other special events)
- Health, wellness and recreation facilities
- Performance or special event spaces, indoors and out, for campus-wide or regional events
- Cultural facilities such as museums or galleries

The accompanying diagram shows key amenity zones and uses:

A. AMENITY ZONE
B. ACTIVITY ZONE
C. MULTI-USE PATH
EDGES AND ENTRIES

The natural prairie setting of RELLIS provides a compelling image for the campus, one which is juxtaposed with and yet complementary to the complex technologies and research that RELLIS is known for and will continue to accommodate.

The edges of the campus, retained in their natural, grassland and forested form, will be an important visual image for the campus to nurture. Vistas into the campus and views of the major facilities along the north edges of the site offer the contrasting research campus image.

Campus entries are prime locations for major campus signage and elements that celebrate the history of the site or point to the cutting edge research being done. Special treatments of these entries will be important investments for the campus.

An approach to treatments of the edges and entries are shown in this diagram:

**A. MANICURED EDGES**

**B. MAINTAINED EDGES**

**C. NATURAL EDGES**
Plan Elements

4.1 Smart Campus Approach
4.2 Land Use and Development
4.3 Open Space
4.4 Transportation and Parking
4.5 Utilities and Infrastructure
4.6 Safety and Security
4.1 SMART CAMPUS APPROACH

The RELLIS smart campus will be an innovative research and teaching environment that makes a conscious effort to use information and technology to advance and improve the efficiency, productivity and well-being of The Texas A&M University System and larger society in significant and fundamental ways. As a testing, training, and research site, it will make a unique contribution to the evolution of campuses, cities, and environment.

OBJECTIVES

RELLIS will be both a smart campus and a living laboratory, where technologies are tested and used to benefit the campus by creating educational opportunities in future curricula, for Agriculture and Life Sciences, Engineering Departments, Urban Planning, Architecture and Landscape Architecture, System Management, and Facility Operations. Collaborations through public, private, and dual partnerships will have the following objectives:

• Strengthen Interdisciplinary Collaboration
• Solicit Knowledge Transfer
• Enhance Opportunities for Implementation
• Enhance Campus Planning Capabilities
• Extend “Smart Campus” to Broader Community
• Test Emerging Technologies
• Incorporate New Technologies into Curriculum
• Advance Research Goals

APPROACH

Through its research activities as well as the implementation and management of its own campus, RELLIS will help drive the adoption of innovative practices, make optimal use of existing facilities and systems, integrate user-facing and back-end technologies, and engage researchers, organizations, and external partners to make informed and collaborative decisions in an increasingly interconnected world.

STRATEGIC FOCUS AREAS

Rapidly advancing technology offers numerous improvements and areas of opportunity. The following primary focus areas take into account the broader picture in how existing and planned assets at RELLIS can be used to positively impact the campus in far-reaching ways. Campuswide focus areas include, but are not limited to:

• Energy Efficiency
• Information Technology
• Infrastructure & Mobility
ANTICIPATED BENEFITS
Anticipated benefits from smart innovations at RELLIS will capitalize on the opportunities afforded by advanced technologies and information management to support research while they also simultaneously:

• Reduce Operating Costs
• Increase Funding Opportunities
• Enable New Partnerships
• Develop Intellectual Property
• Enhance Regional Entrepreneur Ecosystem
A smart campus is also uniquely positioned to be a sustainable and resilient campus. Sustainability and smart technologies will be core considerations for all new site and facility developments.

One of the core goals for the RELLIS Campus is to develop into a smart campus at the forefront of new technology research and implementation. As projects are developed and programmed, integrated smart technology features should be incorporated into the overall campus network wherever possible.

A core component of developing a “smart campus” is to consider sustainable features in site improvements that provide future benefit in reducing dependencies and vulnerabilities while increasing the campus resilience. Due to the modest existing built footprint, the campus currently enjoys a relatively low heat island effect. As building density increases, new developments should strive to maintain this low heat island effect to limit the increased effect on building cooling systems and promote outdoor comfort. From a stormwater management standpoint, development should minimize impervious cover to assist in the infiltration of water and reduce excess runoff.

Smart campus opportunities extend beyond buildings to streets, utilities, open spaces, maintenance, and other campus components. Smart technologies provide opportunities for research on any of the components through data gathering and analysis. Non-secure data should be gathered at a central location for use as a research tool for the institution. If technology solutions are not incorporated from the onset of new projects, pathways should be integrated for ease of future implementation.

Innovative practices and new technologies should be incorporated in the public realm, such as smart lighting, digital parking systems, and stormwater drainage. Innovative, co-share office concepts can also be expanded to the public realm. This may include common, shared amenities that encourage idea sharing and cross-pollination among disciplines, including dining areas, outdoor plazas, large presentation spaces, expo space, conference rooms, and fitness centers. Programming and events foster a research development atmosphere through speaker series, business development classes, patent assistance, and similar activities.

Smart campus development is also important at the district planning level. As buildings aggregate, designs should work toward the incremental development of district systems for stormwater, parking, low energy lighting, fiber, and energy. Car and bike share facilities and coordinated shuttle systems can reduce the vehicular trips and increase the efficiencies of movement throughout the campus. Lot and block patterns should be created that can be adapted to academic, research, office, retail, and residential uses to respond to market conditions over time.

Due to the rapid changes in technology development, it is difficult to predict the precise needs and specific components to be used on campus in the future. However, there are core elements that create the “backbone” for a smart campus:

- Central data facility to gather, store, analyze, monitor, and access “big data” from campus sensors.
- Flexible corridors for the connection to buildings and campus sensors and devices with the ability to add new connections as technologies change with low cost and low disruption. Empty conduits should be included with all underground installations.

Among the activities that will ensure RELLIS succeeds as a smart research and education campus are the following:
A. Keep Data Management Flexible
• Gather, store, analyze, monitor and access data from buildings, campus sensors, and devices.
• Promote the ability to add new connections as technologies change with low cost, low disruption methods.

B. Enhance Student Experience and Success
• Advance the usability and support for campus technologies.
• Promote transferability for education and research through hands on learning classrooms:
  ◦ Create partnerships with business and government.
  ◦ Promote student innovation and entrepreneurship.
• Engage the student community:
  ◦ Students can be users, testers, designers, developers of future services while bringing their vision, creativity and skills.
  ◦ Organize participatory hackathons.

C. Connect User Systems
• Use connected devices (Raspberry Pi, Arduino, etc.)
• Implement sensors (motion, access, distance, humidity, temperature)

D. Create Collaborative Teams
• Engage campus stakeholders through the CIO to share interests and visions for a smart campus.
• Create a facilities and IT partnership, monthly coordination calls, quarterly updates.
• Establish a smart campus seminar/conference to anticipate future needs:
  ◦ Quality and efficiency of campus operations
  ◦ Services for the academic life plus services for socializing, moving around, sharing events, signaling problems
  ◦ Any service that makes students’ lives easier

E. Advance Safety, Security, and Efficiency
• Identify vulnerabilities, configuration, and testing focusing on operations and security.
• Advance efficient monitoring of information.
• Create standards for risk management.
• Reduce campus operating costs.

F. Create Revenue Through Advanced Research
• Identify & define common infrastructure standards.
• Promote connected vehicles.
• Translate research into practical solutions that address the needs of the campus, local communities, the nation, and the world at large.

G. Market Research and Usage of Campus Proving Grounds
• Team up with videographers and storytellers to gain interest in research at RELLIS.
EXAMPLES OF SMART TECHNOLOGIES

CAMPUS/ENERGY EFFICIENCY

- **Complete Building Documentation**
  - Building Information Modeling (BIM): Design, contractor updates, BIM to Computerized Maintenance Management System (CMMS) support and condition assessment
  - Gather and store data from all systems building sensors
  - Building Management System
  - Lighting & HVAC systems
  - Building/room entry/exit
  - Elevators
  - Meters – electric, water, chilled water
  - Exceed ASHRAE 90.1–2013 or 2015 IECC as adopted by the State Energy Conservation Office.
  - Implement the TAMUS owned Continuous Commissioning® Process in all buildings
  - Evaluate and include energy efficiency measures that minimize LCC with 4% discount rate
  - Identify appropriate areas for Photovoltaic (PV) arrays
  - On site power generation –
    - PV, wind, footfall panels, micro grid, peak offset
  - Smart Grid – voltage regulation, distributed generation, metering and demand response

- **Water Management**
  - Demand Metering
  - Condensate – return for make-up, irrigation
  - Greywater Plumbing - On site reuse
  - Total Water Management, monitoring, condensate, potable, chilled, runoff
INFORMATION TECHNOLOGY

• Stress Testing for Natural Disasters
  ◦ Measure preparation, impact, response, recovery, re-occurrence (tornado, flood, drought, extreme rain, wind)
  ◦ Measure interaction of all systems, impacts to productivity
  ◦ Create scenarios and alternative plan options

• Energy
  ◦ Rooftop solar PV arrays
  ◦ Battery banks
  ◦ Innovative/electrochromic glazing

• Geospatial Mapping
  ◦ Asset Management of Geographic Information System (GIS) of all infrastructure – Level B or A accuracy

• Economic Analysis
  ◦ Measure Return of Investment (ROI), alternate solutions comparison

• Health and Well-being
  ◦ Particulate monitoring for improved health and compliance to standards
  ◦ Waste management, OpEx reductions, usage-based pricing

• Campus Alert System
  ◦ Create message boards, mobile applications, sirens

MANUFACTURING & PROCESS ENGINEERING

• Discrete Manufacturing R&D and Prototyping
  ◦ Automation and intelligence
  ◦ Additive manufacturing
  ◦ Analytics and sensors
  ◦ Connected and collaborative operations
  ◦ Integration with legacy systems and processes
  ◦ Clean energy, high-efficiency manufacturing
  ◦ Component prototype development and test
  ◦ Pre-commercialization prototyping
  ◦ Discrete manufacturing test beds
  ◦ Flexible and responsive to industry

• Process Engineering R&D
  ◦ Automation and intelligence
  ◦ Additive manufacturing
  ◦ Connected and collaborative operations
  ◦ Waste and water processing
  ◦ Fuel from waste
  ◦ Food processing
  ◦ Process development and prototyping
  ◦ Integration with legacy systems and processes and process test beds
  ◦ Clean processes
  ◦ Flexible and responsive to industry
  ◦ Build on existing capability and facility

TRANSPORTATION & MOBILITY

• Complete Streets
  ◦ Measure pedestrian, bicycle, auto – green roads
  ◦ Reduce wait times

• Mobility/Traffic Flow Simulations
  ◦ Install mobile sensing of campus vehicles, road conditions, air quality, pipe leaks
  ◦ Measure growth congestion, option analysis, mode choices
  ◦ Parking location assistance
  ◦ Install electric vehicle charging
  ◦ Congestion reporting
  ◦ Install and monitor bike share system
  ◦ Parking, increased compliance and faster search times
  ◦ Automated vehicle paths / shuttles
The plan for RELLIS is intended to guide the future placement of buildings in areas that are compatible with their roles and with needed adjacencies and functional requirements. Despite having an extensive site available for long term development, there are particular constraints that will drive the campus configuration for the near future. These constraints are a combination of existing uses and infrastructure developed on the campus that continue to serve as key elements of ongoing robust research, testing, and training programs as well as the wide diversity of uses on the site. Some of these uses have clients or activities that require limiting access to casual visitors or those not associated with those activities.

The primary components of the RELLIS plan follow and include:

- Proving and training grounds modifications
- Development districts
- Long term development capacity
- Illustrative development plan

PROVING & TRAINING GROUNDS MODIFICATIONS
The runways and apron elements associated with the earlier Bryan AAF currently accommodate a wide range of testing, training, and research activities that contribute to the RELLIS brand and renown. Given the importance of this complex and the need to retain and improve these facilities, three alternative strategies to retaining the uses were explored. They included:

- Keeping the current configuration
- Optimizing the current layout with additional specialized components
- Significantly reconfiguring and reorienting the layout so as to consolidate it and maximize flexibility for the remainder of the RELLIS site.

SELECTED CONCEPT (CONCEPT 1 - ENHANCED)
FIGURE 4.2
The land use plan illustrates a combination of concepts 1 and 2. Much of the existing runways are retained, while strategic enhancements are included to create the necessary testing capabilities, such as a continuous driving loop and the relocation of the training course.
Three alternative strategies to retaining the use of the proving grounds were explored during the planning process. They include:

**CONCEPT 1**
This option proposes retaining the runways and supporting uses as currently configured, with minor modifications. Since the runway complex extends quite far west on the site, this option means that most future development would be focused on the east side of the campus, with additional development possible around the periphery of the RELLIS site. This is the most cost effective option initially, but is the least flexible and least efficient over the long term.

**CONCEPT 2**
In this scenario the facility is significantly reconfigured to optimize its utility and somewhat reduce its footprint. The apron is retained, while the diagonal runway elements are removed. This option would also add paved surfaces that are particularly configured to meet test protocols. While this option improves the usability and versatility of the facility, it would prove costly and would still occupy a significant land area in the middle of the campus.

**CONCEPT 3**
Option three relocates and reconstructs the track and testing areas to the southwest portion of the RELLIS site, and includes is an optimally designed test track area and also has the advantage of relocating the facility out of the center of the site. The result is a much larger contiguous development area extending from the eastern grid area to the west, which would allow a more campus-like environment for more of the site. This would be the most expensive option explored.
RELIS MASTER PLAN

PROVING AND TRAINING GROUNDS ACTIVITIES

CRASH TESTING

SEDIMENT AND EROSION CONTROL LABORATORY

MACHINE VISIONING & LANE STRIPE DURABILITY TESTING

AUTOMATED PLATOON TESTING
PERIMETER VIEW OF PROVING AND TRAINING GROUNDS

FIGURE 4.4

TRAINING GROUNDS

PROVING GROUNDS
DEVELOPMENT DISTRICTS
The unique layout of RELLIS and the various existing uses that will remain suggest a district approach to assigning locations for future land uses. While the districts are identified to guide the location of certain types of mutually compatible land uses, they are not intended to rigidly constrain site decision-making, although some uses will clearly benefit from co-location. The district approach also provides opportunities for varying levels of accessibility or security as needed to certain uses.

The five districts at the RELLIS Campus and their primary suitable uses are discussed below.

Central Core
The Central Core will be the most walkable area of the campus and will have the highest population concentrations and density of buildings. Included in this area are the academic campuses for Blinn College and the Texas A&M RELLIS Alliance Academic Complex, which will include teaching and support facilities for both. It includes pedestrian-oriented streets that will also support multi-modal transportation options.

The expanded grid proposed for the Central Core provides a convenient and flexible way to organize this district. The grid also provides a logical way to distribute development parcels that can vary in size and location and respond to particular adjacency requirements. Parcels can be configured to include an entire block of the grid or smaller portions. The parcelization also suggests patterns for supplemental mid-block pedestrian connections that can connect nearby and related uses.

These connections also facilitate access to campus amenities such as food service or recreation by the entire campus population.

The Central Core may include academic facilities, compatible research uses, student housing, retail, and recreation uses, creating a mixed use destination on the campus.

Perimeter
The Perimeter district lies at the edges of campus on the east and north. Today it accommodates research facilities under construction, including the Center for Infrastructure Renewal, TTI Headquarters, and the TEES Complex. This zone provides high visibility from State Highways 21 and 47. Accessible from both highways through major entries and via the RELLIS Parkway, it has proximity to the major academic facilities of Blinn College and the A&M System. It also allows convenient access to the amenities of the Central Core.

The Perimeter district is suitable for a range of research and office uses, and is also suitable for a range of support or related uses such as housing, recreation, or retail near the primary campus entrance.

Training/Testing
This district currently accommodates a variety of training facilities managed by TEEX and other institutional agencies. Remnants of the original grid of streets remain in this area, so its development pattern may be expanded. This will provide the district with good accessibility to the Central Core and its mix of amenities.

While some facilities within it are secure, the Training/Testing district does not require the more significant security features of other parts of campus. As a result, it can accommodate a wide range of training programs, workforce development, and research uses.

Secure Training/Testing
The Secure Training/Testing area is focused on the former airfield and test tracks as well as surrounding lands to the south and west. It provides a secure, relatively remote site where training, testing, or research can occur for emerging technologies, such as autonomous vehicles, or where expensive equipment can be secured. The area will be accessible from RELLIS Parkway on the north, as well as from a future entry road to the west. This zone shares an edge with the Flex Public/Secure Perimeter district, indicating that depending on demand, either zone can expand or contract to accommodate new users.

Flex Public/Secure Perimeter
The Flex Public/Secure Perimeter area provides land that can either be added to the Secure Training/Testing area or provide expansion for the Perimeter zone, based on long-term demand. Access to this area can be from a new entry at the western edge of campus at Kuder Road or from the northern entry, off State Highway 21. A secure perimeter can be adjusted as needed over time.
LONG-TERM DEVELOPMENT CAPACITY

The RELLIS Campus is a unique and valuable resource within the A&M System and will provide extensive capacity for development of research, training, and teaching facilities for decades to come. While it is difficult to precisely project the pace of interest in the campus and development, the development capacity of the site can be calculated.

As projects are realized in the short to medium term, there are many sites and a tremendous amount of land to consider as siting decisions are made. For the foreseeable future, surface parking will be used, and there will be little incentive to implement taller or more intensive developments.

Over the long term, as sites become scarce and the campus is successful in attracting the wide range of anticipated users, there will be more incentive to develop at higher densities. In the very long term, it is likely that some previously developed facilities, low in density and with surface parking, may be replaced or redeveloped at higher intensities. At that point it may become cost effective to construct parking structures, freeing up surface parking lots as additional development sites.

Although the campus is large enough to accommodate an enormous development program at low densities, there are several reasons to consider certain areas for higher densities and to plan for a long term future with more development:

- The framework of the campus should be planned to consider and support higher densities of development in the long term without compromising or requiring the replacement of infrastructure such as roads and utilities.
- Providing amenities such as food and recreation require adequate populations and accessibility to be successful. Ensuring that access to amenity zones is easy and that long term development patterns will continue to support this accessibility is important.

The plan shown in Figure 4.6 indicates the developable acreage of each district on the campus. As discussed earlier, each district has a purpose and a range of programs that are particularly suitable for it. Some are low in intensity, such as the proving and training grounds in the Secure Training/Testing area, where there will be few structures needed to serve the programs accommodated here. Conversely, the Central Core will include facilities for teaching and student housing, which are frequently developed at higher densities.

A variety of financing approaches will need to be explored to ensure that capital for infrastructure can be made available and that maintenance of this large, multi-user site can be achieved at a high standard.
Figure 4.6: Capacity Areas Diagram

- Public Central Core Area
- Public Perimeter
- Flex Public/Secure Perimeter
- Training/Testing Area
- Secure Training/Testing Area
- Security Fence/Buffer
Table 4.1 utilizes the developable acreages of each district and projects a possible development capacity in gross square feet of built space. The Floor Area Ratio (FAR) is a representation of development density. This measure describes the ratio of development square footage against the square footage of site area. A 1.0 FAR means that on a one acre site (43,560 square feet) there would be 43,560 square feet of development. This could be implemented as a full site one story building or a four story building occupy ¼ of the site. A .25 FAR means that on a one acre site there would be one quarter, 25%, development program of the acreage of the site, or 10,890 square feet.

At lower densities, .20 to .50 FAR, surface parking lots are typically provided, since there is ample ground area, and buildings are typically only one or two floors in height. Above .50 FAR, buildings tend to be higher and parking is often provided in structures.

Research campuses typically increase their densities over time. Often beginning with lower density buildings, as they become more successful and attract more tenants, land becomes more scarce and development intensifies. In some cases, such as Stanford Research Park and Research Triangle Park, growth after many decades can evolve to include uses never previously anticipated, such as employee housing or extensive retail and conference facilities. University campuses tend to be of a higher density than research parks, especially as demands for enrollment growth occur without land for acquisition. For reference the Texas A&M College Station main campus has a density over twice that of its Research Campus.

As shown in the accompanying table, a baseline or moderate estimate of the amount of future development on the RELLIS campus could easily result in an additional 2-8 million square feet of facilities. In the long term, the campus has a capacity that could easily exceed 8 million or more square feet with 0.5 FAR.

### CAPACITY TABLE

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<th>AREA</th>
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<th>0.33 FAR (GSF)</th>
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<td>TOTAL</td>
<td>2,340,000</td>
<td>2,960,000</td>
<td>8,100,000</td>
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20-YEAR BUILD-OUT AT 0.17 FAR

FIGURE 4.8

- Potential Future Facilities
- Secure Area Development
- Infill Development
- Existing Buildings
- District Boundaries
- Security fence/buffer
ILLUSTRATIVE PLAN

The Illustrative Development Plan shows a future for the campus where nearly 4.9 million gross square feet of development have been implemented. This development scenario, while only illustrative, suggests ways in which growth could be guided to create a coherent image and critical mass that will help make RELLIS a preferred destination for innovation.

20 Year Potential Build-out

The Illustrative Development Plan demonstrates how this significant amount of development still represents a fraction of what the campus could accommodate. Although a significant number of buildings are shown, much of the developable area remains in open space, and all parking is shown in surface lots. Improvements to open space, road and utility infrastructure, thresholds, and signage systems will be required throughout the development timeline in order to support campus functionality and to attract future partners and entities. Strategies to identify appropriate implementation approaches and timing will be important to campus success.

Managing the development pattern in the Central Core will be particularly important. This is where the majority of the supporting amenities and active uses should be located near students, researchers, and visitors. Special events, conferences, and recreation can enliven this area and attract all campus users as well as outside parties.

Establishing a coherent development pattern on the west side of the campus is important as well. While unlikely to support the same density of use or activity as the mixed use Central Core, this zone can accommodate major research partners and can include significant usable open space for tenants.

LONG-TERM VISION

To realize the master plan, the A&M System will need to be proactive in pursuing partnerships with private owners, developers, agencies, and other private and public entities.

The A&M System will need to establish an array of financial and district management tools, and identify the risk with private developers by making strategic capital investments. Innovative finance tools and partnerships represent a new type of public-private partnership for academic institutions beyond what may be considered traditional practices.

The master plan defines goals, program needs, public realm improvements, and the associated requirements of accommodating public-private partnerships, commercial/retail, student housing, and other community benefits. The next steps toward realizing this plan involve exploring funding options, including, but not limited to: City, Regional, State, and Federal contributions. At the time that development begins to take shape, each district will be evaluated separately.

Because campus needs are constantly changing, the exact phasing of developments are not explicitly shown. However, a broader framework has been set into place to create a path towards responsible and innovative growth. Adopting the master plan is a critical step, though not the final step, to achieving a successful vision. Each step will require its own approvals, with checks and balances along the way.

“The think there is a lot of potential collaboration being in an engineering-centric campus—particularly when you’ve got world-class leaders like the Texas A&M Transportation Institute, the Texas A&M Engineering Extension Service, the College of Engineering and all these different folks out there.”

PHILLIP RAY
VICE CHANCELLOR FOR BUSINESS AFFAIRS

<table>
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<tr>
<th>AREA</th>
<th>ACRES (AC)</th>
<th>BUILT AREA (%)</th>
<th>PLANNED (FAR)</th>
<th>COMBINED (GSF)</th>
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<td>11%</td>
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</tbody>
</table>
Projected conditions of 20-year build out:
1. Central Core District
2. Perimeter Research Facilities
3. Historic Commemoration Marker
4. Training/Testing District
5. Student Housing
6. Data Center
7. Proving Grounds
8. Flex/Secure Partnerships
9. Secure Partnerships
10. Advanced Testing and Training Area
4.3 OPEN SPACE

The RELLIS Campus occupies a classic central Texas prairie grasslands location. Extensive grasslands dominate the site, punctuated by stands of large oaks. The Brazos River adjoins the campus, and the site slopes gently to meet it and its tributary streams. Some street trees and other vegetation screening has been added at various times in the history of the site, particularly in the eastern area and adjoining the runways.

The RELLIS open space plan builds on this context by retaining important or memorable vegetation, particularly tree stands, and by locating land uses and site development in such a way as to respect the site’s prairie character while also introducing a more campus-like environment to what are planned to be the most heavily populated areas.

The plan for RELLIS takes some cues from surrounding communities. Bryan-College Station has its own unique character that offers a unique palette that begin to include easier access to public transit and a more comfortable, attractive pedestrian environment. In order to create a pedestrian focused RELLIS Campus in the Central Core Area, the plan includes a variety of social amenities and services including recreation fields and opportunities for small-scale retail and office spaces, shared-startup spaces, and a wellness center. The land use strategy for RELLIS intends to provide places for social interaction around key district spaces within a comfortable walking distance of all facilities in order to encourage people to engage and inhabit the public realm and to enjoy neighborhood serving amenities and services without needing to use their cars.

The open space framework consists of several parts:

- Central Core pedestrian realm improvements will create an attractive walkable environment focused in the heart of the campus.
- Developed landscapes in the Central Core and elsewhere will provide outdoor opportunities for gathering, casual conversation, and recreation.
- The prairie grasslands will remain in less developed areas and between development zones and will include drainage courses and stormwater detention ponds as features and multi-modal trails for recreation and connections between districts.
- Entry landscapes will provide an enhanced visual experience and wayfinding for visitors and all RELLIS users.
- Circulation and parking related landscapes will include street trees and landscaped setbacks.

EXISTING SITE ASSETS

The RELLIS Campus occupies a classic central Texas prairie grasslands location. Extensive grasslands dominate the site, punctuated by stands of large oaks. The Brazos River adjoins the campus, and the site slopes gently to meet it and its tributary streams. Some street trees and other vegetation screening has been added at various times in the history of the site, particularly in the eastern area and adjoining the runways.

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OPEN SPACE TYPOLOGIES DIAGRAM

FIGURE 4.10

PLAZAS
MAINTAINED LANDSCAPE
DEVELOPED LANDSCAPE
NATURAL LANDSCAPE
BUFFER AREA
HARDSCAPE
DISTRICT BOUNDARIES
MULTI-USE PATH
Elements of the design of these two pedestrian malls can include:

- Special lighting
- Unique seating including seating areas, seat walls, and grassy areas
- Building frontages that are transparent, providing visibility to dining, and active destinations such as wellness
- Durable and attractive paving, different from that of standard streets, that signals the pedestrian priority of the corridor
- Special plantings for seasonal color and ornament, while retaining a preference for native plantings where possible.

As illustrated in Figure 4.12, the 4th Street Mall is envisioned to be designed for pedestrian use while allowing emergency and limited service access. With intensive plantings of trees for shade and with seating and gathering spaces, it will be a place to meet, have lunch outdoors, or study throughout the day. Activities such as food truck events can occur on or adjoining the mall. It can also be a location for other special events and gatherings. Lined with active uses such as food, retail, and recreation, such as a wellness center, it will become an attractive destination for the entire campus population.

Central Core Public Realm Improvements
Treatment of the public realm will be particularly important in establishing the character of the RELLIS Campus. The most intensively used outdoor public realm spaces will be located in the Central Core, but additional special places should occur in other development districts.

Pedestrian Malls
Avenue C and 4th Street in the Central Core will be the primary campus pedestrian circulation routes. They will connect the academic buildings of Blinn and the A&M System with other facilities in the area, which may be additional academic, institutional, or industry partners. They will also include amenities such as conference, food and drink, event, and recreation facilities, uses that are particularly suited to a higher density pedestrian-oriented zone.

As illustrated in Figure 4.12, the 4th Street Mall is envisioned to be designed for pedestrian use while allowing emergency and limited service access. With intensive plantings of trees for shade and with seating and gathering spaces, it will be a place to meet, have lunch outdoors, or study throughout the day. Activities such as food truck events can occur on or adjoining the mall. It can also be a location for other special events and gatherings. Lined with active uses such as food, retail, and recreation, such as a wellness center, it will become an attractive destination for the entire campus population.
PEDESTRIAN MALL

SEATING AREA
DEVELOPED LANDSCAPES
Developed landscapes in the Central Core and elsewhere will include parks and plazas, recreation fields, and usable spaces between or connecting buildings. In general, buildings set back from the streets just enough to allow planting along the pedestrian sidewalks, while maintaining street-focused entries to buildings. Street trees throughout the area and in parking lots will help provide shade for pedestrians.

RELLIS Plaza
Figure 4.14 illustrates a possible treatment of a plaza located between Airfield Drive and 6th Street. This plaza would lie in front of a major retail/dining complex located in the Central Core. As shown, the plaza fronts a grassy park surrounding the campus chapel, providing space for informal recreation or lawn seating that could be the location for an informal concert. The plaza would provide outdoor seating for adjoining food or coffee establishments, bookstore, or other campus amenities. With special lighting, art, or commemorative materials, the plaza would be a unique gathering space for all campus users.

Alliance Academic Complex
As shown in Figure 4.15, the Central Core would include a wide variety of developed landscapes. The Alliance Academic Complex with both A&M System and Blinn College facilities will include plazas and open spaces connecting buildings, with another plaza at the intersection of Avenue C and 4th Street. These spaces will provide seating and opportunities for studying and gathering outside of the academic buildings themselves.

Central Core Park
Across the core to the west and adjoining Avenue C, a park is provided in the location of the old baseball field. This park would serve an important infrastructure use by providing a natural setting for stormwater detention while incorporating a multi-use trail, connecting uses to the north of the Central Core and other destinations to the south and east.
FIGURE 4.15 Key view of Central Core detail area
STUDENT HOUSING
The design of student housing and their sites will be a particularly important consideration at RELLIS. Since the growth of on campus housing is likely to be incremental, it will be important to provide an attractive environment from the beginning that will support student success in this atypical academic setting.

Undergraduate Housing Area
The underlying goal of the illustrative student housing diagram of buildings and open space, Figure 4.17, is to show a living/learning environment that supports undergraduate students academically and socially. By clustering a network of common open spaces at the ground level, there are alternative venues for students’ daily living activities (dining, studying, exercising, socializing, etc.) - giving each resident a choice of venue. Collectively, this should generate chance encounters among the community’s residents that help to build a stronger sense of community.

Buildings are located close to the street to create more of a contiguous, semi-urban neighborhood out of the two blocks of housing that will fit in with the active Central Core. Drop-off areas are provided for shuttle vans, ride-sharing, and car-sharing. Street trees should be provided which can extend into the site, as well as be used in adjoining parking lots. Seating would be provided at covered entries for waiting and a secured entrance to accommodate multiple gatekeeping technologies.

Ground level common open spaces wrap central gardens to create a sense of enclosure and identity for the complex. The ground level plan creates an open, casual atmosphere where rooms, circulation, and garden spaces can be open or closed to each other as desired - establishing a strong relationship between indoor and outdoor spaces. Loggia-like corridors can be wide enough to furnish, and together with common spaces and gardens, can be open to each other.

The residential buildings are laid out to optimize site density and to maintain visual privacy between buildings, while offering extended views of the campus at large from the residential levels. Residential buildings are envisioned as four or five stories accommodating at least 150 beds per building.
TABLE 4.3 Snapshot of graduate/guest housing information.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Area</td>
<td>25 AC</td>
</tr>
<tr>
<td>Parking Ratio/Bed</td>
<td>0.65/Bed</td>
</tr>
<tr>
<td>Number of Apartment Bldgs.</td>
<td>6</td>
</tr>
<tr>
<td>TOTAL BEDS</td>
<td>+/-1,500</td>
</tr>
</tbody>
</table>
Upper-Division/Guest/Visitor
A secondary residential opportunity is provided southeast of the Central Core, envisioned as an academic community for upper-division and graduate students, visiting faculty or researchers, and institutional guests. The location provides a proximity to the campus' primary functions while allowing options for retreat. Both apartment-style and townhouse options are portrayed in the conceptual layout.

Apartments and townhouses are shown situated at the edge of the campus grid along Bryan Road and to the east of an expanded retention area. The location along Bryan Road allows an opportunity for a presence on a primary campus green space. Each block provides easy access to recreational space such as a multi-purpose trail and a stormwater retention area provides a visual amenity for the area.

For this type of housing, more privacy is typically desired. Units intended for families or older student might include a yard or porch. Shared outdoor space can be provided adjacent to lounge, laundry, or study areas. Informal recreation – basketball courts or grass fields – can also be provided depending on the intended desires of the target population.

Depending on the ultimate program for this type of housing and the demand for additional campus amenities, a retail or other mixed use site might be provided off Goodson Bend Road to the east of the housing area. This could be used for short stay housing, convenience retail, school, child care, or other uses and could be integrated with the housing as a small village.

REFERENCE PHOTOS
FIGURE 4.19

STUDENT HOUSING AREA DETAIL

FIGURE 4.20

Main Entrance
Retail/Infill Development
Townhome Housing

By the Numbers

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site 1 Area</td>
<td>15 AC</td>
</tr>
<tr>
<td>Site 2 Area</td>
<td>9 AC</td>
</tr>
<tr>
<td>Total Site Area</td>
<td>24 AC</td>
</tr>
<tr>
<td>Parking Ratio/Bed</td>
<td>0.65/Bed</td>
</tr>
<tr>
<td>Number of Apt. Bldgs.</td>
<td>2</td>
</tr>
<tr>
<td>Number of Townhouse Bldgs.</td>
<td>60</td>
</tr>
<tr>
<td>TOTAL BEDS</td>
<td>+/-500</td>
</tr>
</tbody>
</table>

TABLE 4.4 Snapshot of graduate/guest housing information.

FIGURE 4.20 Key view of Central Core detail area
TEES COMPLEX
There are opportunities throughout the campus where developed open space will provide needed usable space for the RELLIS population. As an example, the TEES Complex, located in the Perimeter zone along State Highway 21, provides a new hub for the Texas A&M Engineering Experiment Station and some of its RELLIS functions. The complex is anchored by a new TEES State Headquarters building that pairs with the Center for Infrastructure Renewal to frame an important campus threshold from the highway. This complex as a whole will house research, academic, and administrative functions for the agency.

INDUSTRIAL DISTRIBUTION BUILDING
Though not located directly in the campus core, the site has an opportunity to form a mini-campus with both interior and exterior gathering spaces and a strong sense of place for the TEES agency. The plan shows an arrangement of two industrial distribution buildings and an infill site along the entry road from State Highway 21, just south of the headquarters. This presents a glimpse of the institution’s activity to visitors entering the campus, while the clustering of the facilities creates semi-enclosed plazas for outdoor functions and a formal entry to the headquarters building. An infill building site for future TEES use is located at the northwest corner of the complex. This building site provides another high-visibility location along State Highway 21 and buffers the internal pedestrian-oriented spaces from the highway itself.
TABLE 4.5 Snapshot of graduate/guest housing information.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Area</td>
<td>15 AC</td>
</tr>
<tr>
<td>POTENTIAL GSF</td>
<td>175,000 GSF</td>
</tr>
</tbody>
</table>

FIGURE 4.22 Key view of Central Core detail area
SECURE PARTNERSHIP AREAS
The area west of the proving grounds presents a large zone for a variety of partnership opportunity sites. This area may be secure or open, depending on demand from specific users. Site access may be via RELLIS Parkway or from new entries from State Highway 21 and from Kuder Road.

In order to establish a sense of identity for this development area, a central boulevard is suggested which will provide clear addressing for these sites. Generous landscaping on the boulevard will establish a corporate campus style identify. Setbacks may be generous but should include trails and walkways to support movements between sites and for recreation. A central dining or recreation site might be provided in this area. Development on each site should include shaded and generously landscaped outdoor spaces and connections suitable to the Brazos Valley climate.

Parcels in this area can be larger than those in the Central Core and can vary in size to suit many needs. The secure campus may to be the location of a future data center partnership for the campus. This may be a phased facility with a significant long-term build-out potential. Sites near the proving and training grounds will provide quick and easy access to this important research and testing amenity, and some facilities may be afforded direct access from inside RELLIS Parkway. A new BTU substation is proposed at the west entry, which will provide additional electrical capacity for the campus build-out, particularly for functions such as the data center.

EXAMPLES OF COMMONS IN SECURE AREA
By the Numbers

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Area</td>
<td>200 AC</td>
</tr>
<tr>
<td>Smallest Parcel Size</td>
<td>5 AC</td>
</tr>
<tr>
<td>Largest Parcel Size</td>
<td>30 AC</td>
</tr>
<tr>
<td>Average Parcel Size</td>
<td>18 AC</td>
</tr>
<tr>
<td>Potential Capacity</td>
<td>1,250,000 GSF</td>
</tr>
</tbody>
</table>

Figure 4.23: Key view of Central Core detail area

Table 4.6: Snapshot of graduate/guest housing information.
PRAIRIE GRASSLANDS AND ENTRY LANDSCAPES

Areas outside of the Central Core and other more intensively developed areas will continue to be visually defined by the native prairie grasslands of central Texas.

This landscape approach will involve minimal intervention and a reliance on native species wherever feasible. Once established, the grassland areas will be:

- Low maintenance
- Allow for efficient stormwater management
- A learning and research environment for the habitat and ecology of the central Texas prairie
- Contribute to the unique image of RELLIS while contrasting with the smart technologies and innovative research occurring on site

The grasslands will be merged with a naturalistic stormwater management strategy, with drainage flowing naturally to the south and southwest through the RELLIS site, restricted periodically by stormwater detention ponds.

Multi-use trails will be integrated into the grassland environment, winding throughout the RELLIS site and providing a recreational amenity for all site users. These trails will also connect to the Central Core and other parts of campus and will provide an opportunity for circulation throughout campus by bicycle as well as walking.

At the primary RELLIS entries from State Highways 21 and 47, the entry roads will be enhanced with more intensive vegetation and special signage. The entry from State Highway 47 will be the primary visitor entry as a divided boulevard: Airfield Drive. As it approaches the developed parts of campus it diverges to aligns with and provide view of the green mall that includes the Chapel. Street trees will enhance the pair of roadways. Other entries will receive special treatment but at a less extensive level, and all entries should maintain the focus on the prairie appropriate landscape while introducing elements that increase their visibility to passers-by.
GENERAL STREET AND PARKING LANDSCAPE
Where appropriate, streets should include street trees and sidewalks to allow pedestrian access. Ideally sidewalks are set back from the roadway to buffer pedestrians from passing traffic.

Parking lots should include trees for shade and should avoid large, uninterrupted areas of asphalt paving. Larger lots should be subdivided by smaller-scaled bioswales and pedestrian pathways every two parking bays. Larger collector bioswale elements should be incorporated at the block-scale between multiple parking areas.

EXAMPLES OF PARKING AREAS
4.4 TRANSPORTATION AND PARKING

The RELLIS Campus has a unique opportunity to integrate many of the “smart” technologies that it researches and tests into its everyday operations, especially as it relates to transportation and parking. Autonomous vehicles – including private vehicles and transit – will likely be a part of the near term RELLIS future. In addition, providing multi-modal transportation at RELLIS will be increasingly important as the campus expands and students and others value the use of alternate modes. A good framework exists as a foundation for that growth.

In support of this rapidly changing transportation future, the campus is planned to support a flexible, multi-modal transportation network that will provide safe and comfortable access for pedestrians, bicyclists, transit riders, and the full range of vehicle types. The open space and street network will be designed to allow for safe, comfortable bicycle and pedestrian connections to existing open space facilities and set the stage for future connections beyond the campus borders. The electronic infrastructure that will support emerging transit technologies will expand even more and become integral to life at RELLIS.

STREET NETWORK

A fundamental strategy for RELLIS is to create an urban framework that encourages a walkable and multi-modal development pattern closely integrated with the open space system. This system consists of a street hierarchy that includes:

• Primary and secondary vehicular streets
• Pedestrian priority streets or malls
• Loop or perimeter circulation connecting with primary campus entries
• Limited access roads that serve the secure districts of the site

Wherever possible, the roadway network will be extended in a grid pattern. There are numerous advantages to the grid:

• The alignment of a street grid reduces opportunity for merging and weaving.
• The grid provides more driving options in terms of travel paths, thus dispersing traffic better and reducing traffic “loaded” streets.
• The ease of understanding and navigating a grid street network aids in traffic flow.
• Aligning streets in a grid pattern makes it easier to get to the same place via various optional paths.
• The alignment with the cardinal direction makes it easier to know which direction you are traveling.
• The grid can improve visibility of cyclists and pedestrians, particularly near intersections.

Primary and Secondary Streets

Primary and secondary streets will include wide sidewalks, pedestrian scale materials and street lighting, generous landscape zones, and shade trees to create safe, comfortable pedestrian connections.
CENTRAL CORE PEDESTRIAN REALM
The Central Core, which will accommodate students, retail uses, and other higher intensity land uses, will have a correspondingly higher level density of population and pedestrian activity. Characteristics of this area will include:

• A block pattern - approximately 400’x400’ and 400’x800’ - that facilitates pedestrian movements with its walkable scale
• An active pedestrian network that will connect academic, residential, retail, and recreational destinations
• An environment that will encourage people to walk between destinations and enjoy the surrounding environment

The 4th Street pedestrian mall plays a major function as part of the pedestrian and open space system with an emphasis on bringing people through the site, connecting Blinn, the RELLIS Alliance Academic Complex, research, and commercial areas within the Central Core. Upon implementation of the shuttle system, a significant number of students are expected to arrive via shuttle from Bryan, the Texas A&M campus, and other parts of College Station. Shuttle bus stops will be included in the Central Core and will become a primary pedestrian entrance to the campus.

RELLIS PARKWAY
The loop perimeter road will be extended further west and may ultimately connect as many as four entrances to the campus from the surrounding highway system, providing easy access and keeping many vehicles out of the pedestrian priority zones.

LIMITED ACCESS ROADS
Certain areas of the campus on the west and south will have activities that will not be accessible by the general public. The perimeter of these areas will be fenced and entry will be secured at a limited number of entry points.

MULTI-MODAL TRAILS
Complementing the street network will be pedestrian and bicycle trails and walkways in the open spaces of the campus that will provide informal connections and recreation. The campus bicycle network capitalizes on proximity to residential, commercial, recreational, and academic uses by providing a multi-modal loop around campus. The multi-modal campus loop path is incorporated into the perimeter landscape, creating a safe and continuous bicycle connection that links students, faculty, staff, and visitors to the campus core and transit/shuttle systems. It also highlights that RELLIS values a healthy and sustainable lifestyle. Future parking structures should include dedicated areas for both long-term and short-term bicycle parking to keep them out of the weather whenever possible. On campus trails will ultimately be connected to the regional bicycle system.

SHUTTLE
It is important to plan for shuttle access to-and-from the campus once students begin to regularly attend classes at RELLIS. Space for shuttle stops and shelters should be designed into the streetscape along shuttle routes.

• The A&M System should work with Texas A&M Transportation Services and regional jurisdictions to bring future shuttle routes through RELLIS.
• Provide opportunities to integrate bus systems.
• The Brazos Transit District serves the Bryan – College Station area.
• A detailed transit needs study should be conducted to determine desire orientation and destination points on campus.
• Using TTI’s expertise, there is an opportunity to explore using smaller (10 passenger) autonomous shuttle buses that continuously circulate in the core campus.

PARKING
In the future, surface parking should be consolidated whenever possible into lots shared among multiple uses. These lots should not be located along or accessed from pedestrian streets or malls. They should also be screened to minimize the visual impact of vehicles. Parking supply should be carefully measured to not greatly exceed demand so that paved surfaces, which can be heat islands and produce unnecessary stormwater runoff, are minimized.

In the long term, as development densities increase in various portions of the campus, parking structures may become feasible and desirable. They should be designed to be minimally visually intrusive, generally located behind or adjacent to buildings and buffered with vegetation. Structures should contain shared car parking and charging stations.

Each parking structure or surface parking area should be strategically located to encourage people to walk along the streets before entering their intended destination, thereby activating the public realm.
TRANSIT CIRCULATION DIAGRAM
FIGURE 4.27

NORTH ENTRANCE

EAST ENTRANCE

SOUTH ENTRANCE
TRANSPORTATION DEMAND MANAGEMENT

Though the RELLIS Campus today has ample space to develop parking facilities and accommodations for single-occupant vehicles, opportunities to implement transportation demand management (TDM) strategies in the near-term can provide efficiencies and potential cost savings for the campus as it builds out and the population increases. TDM strategies are those that increase the overall transportation system efficiency by shifting movement from single occupant vehicles (SOV) modes to other forms of transportation or that shift trips out of peak periods.

TDM includes various programs, both for the campus transportation system as well as the physical organization of the campus. These strategies are used to encourage pedestrian and bicycle activity, use of shuttle services, car share/rideshare use, or off-peak travel times. Users are influenced by many factors, but some key themes are the length of travel time, incentives, convenience, and cost.

The size of the RELLIS Campus, coupled with the types of research spaces, will require some vehicular movement around the campus. However, the plan adopts a number of land use strategies that will encourage walking and bicycling:

- The clustering of buildings within the Central Core and along dedicated pedestrian routes will encourage users to walk between buildings rather than getting in a vehicle. Prioritizing the adjacency of primary building entries to each other over the adjacency to parking facilities provides additional incentive.

- Dedicated bicycle lanes on transit streets within the core and on multi-use paths to connect various campus zones outside of the core will link many campus destinations, create better bicycle safety and comfort, and will encourage bicycle use for movement around the campus. Trees along bikeways will provide additional shading and cooling comfort for these paths, which is beneficial during the extreme heat of the Texas summers.

The following TDM strategies may be used on the campus to encourage alternate forms of movement to and around the campus for certain users:

- As the campus population grows, pedestrian streets can be given priority at intersections with transit and vehicular streets. For these pedestrian streets, crossings should be maintained at the elevation of the pedestrian zone. This will cause vehicles to slow at these intersections and may further encourage pedestrian activity around the core area.

- Implementing a bike share program on the campus can provide users with an opportunity to use a bicycle without the need to own, maintain, or store it. The Texas A&M College Station campus operates a bike share program that allows users to pick up bicycles from various locations. Riders can pay either by the hour or join the program through annual memberships. Bike share locations on the RELLIS Campus should be placed in easily accessible areas with high concentrations of campus population, such as the Blinn and RELLIS Alliance Academic Complex area in the Central Core or the TEES Complex and CIR in the Perimeter zone.

- In the future, incorporation of transit streets within the Central Core will provide shuttles with a dedicated route to avoid delays from other vehicles and maintain a predictable schedule. Transit stops for campus shuttles should be placed at convenient locations near campus population centers and given prioritized over parking facilities.

- The Texas A&M College Station campus provides options for car share and rideshare and may be a model for RELLIS. Like bike share, car share provides services to utilize a car only when needed and pick it up from a convenient location on campus. Rideshare offers a social network platform pairing users that can benefit from riding together to between common points.

- Education and incentives programs can be implemented to highlight the benefits of alternate transportation such as car share or rideshare. These may include options such as reduced costs or priority parking locations.
### STREET TYPOLOGIES

**TABLE 4.7**

<table>
<thead>
<tr>
<th>Street</th>
<th>Street Type</th>
<th>Road Width*</th>
<th>Speed**</th>
</tr>
</thead>
<tbody>
<tr>
<td>RELLIS Parkway</td>
<td>Common Use</td>
<td>31’ (each half)</td>
<td>35 mph</td>
</tr>
<tr>
<td>3rd Street</td>
<td>Common Use</td>
<td>25’</td>
<td>30 mph</td>
</tr>
<tr>
<td>4th Street</td>
<td>Pedestrian</td>
<td>25’</td>
<td>N/A</td>
</tr>
<tr>
<td>Airfield Drive</td>
<td>Common Use</td>
<td>31’</td>
<td>30 mph</td>
</tr>
<tr>
<td>6th Street</td>
<td>Common Use</td>
<td>31’</td>
<td>30 mph</td>
</tr>
<tr>
<td>7th Street</td>
<td>Common Use</td>
<td>31’</td>
<td>30 mph</td>
</tr>
<tr>
<td>8th Street</td>
<td>Common Use</td>
<td>31’</td>
<td>30 mph</td>
</tr>
<tr>
<td>Flight Line Road</td>
<td>Secure</td>
<td>31’</td>
<td>30 mph</td>
</tr>
<tr>
<td>Avenue A</td>
<td>Common Use</td>
<td>31’</td>
<td>30 mph</td>
</tr>
<tr>
<td>Avenue B</td>
<td>Transit (Bus/Bicycle)</td>
<td>25’</td>
<td>30 mph</td>
</tr>
<tr>
<td>Avenue C</td>
<td>Pedestrian</td>
<td>25’</td>
<td>N/A</td>
</tr>
<tr>
<td>Avenue D</td>
<td>Common Use</td>
<td>25’-31’</td>
<td>30 mph</td>
</tr>
<tr>
<td>Bryan Road</td>
<td>Transit (Bus/Bicycle)</td>
<td>31’</td>
<td>30 mph</td>
</tr>
<tr>
<td>South Entrance</td>
<td>Common Use</td>
<td>31’</td>
<td>30 mph</td>
</tr>
<tr>
<td><strong>Future Streets</strong></td>
<td><strong>To be determined at time of implementation based on master plan diagrams (Figure 4.25).</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Road widths are measured from back-of-curb to back-of-curb.

**For ease of implementation, the campus may employ signs only at campus entrances indicating a campus-wide speed limit of 30 mph for all roads except RELLIS Parkway.
SERVICE AND EMERGENCY ACCESS
Proper emergency vehicle access throughout campus is essential. While emergency vehicles can use all streets throughout the campus, they will also need to be able to access the pedestrian malls and other lanes or secure roadways. In the case of pedestrian malls, emergency access must be provided at a minimum of 20’ wide and located 15 - 30’ away from a building’s edge for ladder access. The emergency lane/pedestrian walkway can be constructed of concrete or concrete pavers or to lessen their visual impact can be gravel, grass, or pavers, but they must be able to carry an emergency vehicle load.

Service Vehicles will be guaranteed access necessary to maintain campus buildings, landscapes, and amenities. The pathways within the pedestrian realm will be wide enough and have pavement strength sufficient to carry vehicle loads. Service areas for adjacent buildings should be consolidated to the extent possible to minimize the distribution of vehicles within the pedestrian zone. Service vehicles should intrude on the pedestrian malls as little as possible and avoid class changes and other high traffic times.

Transitioning the service vehicle fleet from pickup trucks to electric golf carts for most activities would promote safety and sustainability, as smaller service vehicles are less obstructive in the denser areas of campus. Larger vehicles may be retained for heavy duty or equipment-intensive tasks.
4.5 UTILITIES AND INFRASTRUCTURE

STORMWATER

FLOOD PLAINS
Almost all of the site is located outside of the 100-year flood plain of the Brazos River and its local tributaries, including the Little Brazos River and Thompsons Creek. The flood plain areas shown are designated as Zone A, which indicates they are approximate and that a detailed hydrology and hydraulic study has not been completed for this area. The limits shown correspond to an elevation range of about 240 to 242 feet above sea level. The overall campus ranges in elevation from 238 to 272 feet, with the predominant area of existing development between elevation 260 and 270.

The 100-year flood plain represents the potential flooding impact of a storm event with a 1% chance of occurring in any year. A higher standard of design is recommended for the construction of structures and other flood sensitive improvements which should be placed above elevation 247. Every foot higher than this elevation will provide a greater degree of site resiliency.

Although a large portion of the southwest and south sides of the campus are located below elevation 247, the existing runway pavement and structures contained within the campus are above this elevation.

WATERSHEDS
The existing site has been divided into five watersheds for planning purposes described as follows:

Watershed A (345 acres) contains most of the existing building development areas of the site and will also contain the Blinn College and RELLIS Alliance Academic Complex buildings. This area flows into an existing pond located along Goodson Bend Road on the southeast perimeter of the site before discharging through a large diameter culvert and into a tributary of Thompsons Creek.

Watershed B (66 acres) includes the entrance to State Highway 47 and includes mostly undeveloped area within the eastern portion of the campus. The outlet for this drainage area is through a second culvert under Goodson Bend Road on the southeast perimeter of the site located a short distance north of the Watershed A pond. Stormwater discharges into a tributary of Thompsons Creek.

Watershed C (247 acres) includes the south section of the grid street system. This drainage area has a third point of discharge through a culvert along Goodson Bend Road and into a tributary of Thompsons Creek.

Watershed D (280 acres) consists of the northern portion of the site, including a small portion of the runways. The new buildings and the new entrance along State Highway 21 discharge into this watershed. Stormwater flows west into an existing pond before releasing into a tributary of the Little Brazos River.

Watershed E (929 acres) covers about half of the campus area and includes most of the runways. There are several points of discharge to the south and southwest to the Little Brazos River, and part of this area currently discharges directly into the Brazos River.

SOILS, RAINFALL
Poorly draining soils predominate within the campus boundary. Therefore, infiltration of stormwater runoff is impractical and underdrains must be installed in bio-retention cells, bioswales, or under permeable pavements. With these soils, the volume of runoff resulting from rainfall events is a very high percentage of the total rainfall volume. The 24-hour, 1% chance per year storm event (the “100-Year Storm”) is about 12 inches. About 75-80% of this rainfall will runoff from undeveloped areas. Developed areas will increase the rate of runoff to 85-90% of the total rainfall.

WATERSHED AREAS

<table>
<thead>
<tr>
<th>WATERSHED</th>
<th>AREA (SF)</th>
<th>AREA (ACRE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>15,034,700</td>
<td>345</td>
</tr>
<tr>
<td>B</td>
<td>2,877,600</td>
<td>66</td>
</tr>
<tr>
<td>C</td>
<td>10,780,400</td>
<td>247</td>
</tr>
<tr>
<td>D</td>
<td>12,204,200</td>
<td>280</td>
</tr>
<tr>
<td>E</td>
<td>40,470,800</td>
<td>929</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>81,367,700</strong></td>
<td><strong>1,868</strong></td>
</tr>
</tbody>
</table>
STORMWATER DETENTION

Redevelopment of the RELLIS Campus will result in an increase in impervious surfaces which will increase stormwater runoff rates above the existing site condition. Stormwater detention needs to be provided in a volume sufficient to reduce the proposed stormwater runoff rates to be less than the existing conditions runoff rates.

Watersheds that discharge directly into the Brazos River may be exempted from this requirement. The rationale for the exemption is that there are no other property owners between the RELLIS Campus and the river that will be impacted by an increase in site runoff rates.

Detention provided near the source of new runoff from building roofs and pavements including within bio-retention cells, bioswales, or beneath permeable pavements will reduce the size of the detention ponds located near the campus stormwater outlets. Providing storage in small, widely distributed locations near the sources of runoff also reduces the size of the stormwater conveyance system (pipes and channels) required between the new development and the outlet detention ponds.

STORMWATER MANAGEMENT

Watersheds A and B could be combined with storage provided in a new pond and by enlarging the existing pond by:

- Lowering the normal water level and;
- Expanding the pond footprint.

The new detention storage must be sufficient to not increase runoff rates to downstream areas. Normally, this would require about 0.35 to 0.50 acre feet of storage per acre of new development. About one third of this storage should be located adjacent to newly developed areas within bioswales, bio-retention cells, or other storage cells that contribute about an inch of the detention storage (0.08 acre-feet per acre). The remaining storage would be in the new and expanded ponds at the other site outlets.

Rainwater, stormwater, greywater, and air conditioning condensate should be integrated into the district-wide water management concept. Rainwater and condensate are collected and stored to irrigate green roofs and district right-of-ways and open space. Stormwater is diverted to green infrastructure in the right-of-way where it can be filtered before reaching designated detention ponds and eventual outflow into Thompsons Creek and Brazos River.

Greywater can be harvested and treated separately using a dual plumbing system within buildings with the treated water added to the district-wide irrigation storage. Stored rainwater, condensate, and treated greywater can also be utilized by buildings where a dual-plumbed double piping allows for reuse for toilet flushing. Individual programs will have the opportunity to determine incorporate of greywater systems.

Systems are created to develop a networked, district-level drainage and stormwater quality plan. The following green infrastructure techniques are recommended to be incorporated into both public and private property development. All green infrastructure areas are designed to detain and cleanse stormwater of pollutants, heavy metals and suspended solids, infiltrate water back into the soil, replenish groundwater and aquifers, minimize trash floating into water bodies, and provide dual uses as district amenities.

ASSUMPTIONS

<table>
<thead>
<tr>
<th>100-Year, 24-Hour Rainfall</th>
<th>12 Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runoff Rate Undeveloped</td>
<td>9 Inches</td>
</tr>
<tr>
<td>Runoff Rate Developed</td>
<td>10.8 Inches</td>
</tr>
<tr>
<td>Detention Storage Rate</td>
<td>0.25 Ac-Ft/Acre</td>
</tr>
</tbody>
</table>

TABLE 4.9

<table>
<thead>
<tr>
<th>Area</th>
<th>Existing</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>D</td>
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<td>252.153</td>
</tr>
<tr>
<td>E</td>
<td>696.811</td>
<td>836.174</td>
</tr>
</tbody>
</table>

Note: Detention may not be required for portions of Area E that directly discharge into the Brazos River.
First time on-site use and treatment occurs in a range of applications throughout development and open space typologies. The 1,870 AC site is large, flat, above ground water, and adjacent to Thomp- sons Creek and Brazos River. These unique site qualities permit on-site water storage with occasional outfall to Thompkins Creek and Brazos River during a 10-year storm event only. Economic advantages occur when water reuse potentials are maximized through on-site recirculation systems, reducing stormwater runoff rates, and by selling treated water to off-site properties.
**GREEN INFRASTRUCTURE AND DISTRICT SCALE WATER MANAGEMENT SYSTEMS**

It is recommended that the RELLIS Campus develop a plan for an interconnected district-level green infrastructure (GI) network for stormwater management including provision for stormwater quality, harvesting, conveyance, and storage. A variety of GI methods are recommended to be used within both public and private property areas. GI elements will briefly detain and cleanse stormwater of pollutants including sediment, excess nutrients, toxic metals, and floatable trash before exiting the site. These areas will provide a dual land use as district aesthetic amenities when associated with open space and recreational trails.

A variety of methods used singly or in series with other methods include landscaped systems: filter strips, bioswales, bio-retention, and rain gardens; permeable pavements with or without subsurface storage; and open water or wetland ponds. Vegetated roofs are also recommended when the cost or availability of land justifies the cost.

- Locate bioswale or bio-retention storage elements adjacent to new building roofs and direct the downspout flows into these treatment and storage elements. The storage volume provided in each element should be equal to one inch of runoff over the tributary drainage area with the overflow set at an elevation that will contain this volume. The treatment system shall use landscape vegetation designed to complete the treatment process within 24 hours and restore the pond to the normal design condition, dry bottom or open water.

- Parking lot bioswales should be placed to intercept sheet drainage flows from pavement areas not greater than 125 feet per side. The swales should be designed to contain one inch of runoff from the contributing drainage area with the overflow set at an elevation to contain this volume. The treatment system shall use landscape vegetation as described for bioswales.

- Detention may not be required for Watershed E if a conveyance route can be established within the RELLIS Campus directly into the Brazos River. The GI elements for this watershed will be required for water quality and amenity benefits and will reduce the size of the downstream conveyance systems.

- Stormwater volumes stored within GI elements have a major additional benefit of reducing the size and cost of downstream conveyance channels and pipes. The district-wide plan will outline how the many widely distributed systems will be combined to serve the needs of proposed new areas of development.

- The total volume of required detention storage for a developed area is stored in the combination of GI elements and the outlet ponds. This requirement is established during the final design of this area in conjunction with the district-wide plan. An approximate storage volume for planning purposes can be estimated as follows: multiply the acreage to be developed (or redeveloped) by 0.3. The result is the total detention storage volume in acre-feet. Subtract the volume provided in the GI elements to determine the net remaining volume required in the outlet pond. The site area required to store this volume depends upon the depth of the outfall pipe, ditch, or pond that the developed area will drain into and the depth available for detention storage within the pond. With the GI elements storing one inch upstream, the net remaining detention volume can usually be stored using 4% to 6% of the overall development area.
**WET AND DRY UTILITIES**
The campus is currently expanding to include new administrative buildings, office buildings, academic and research buildings, and additional parking. The purpose of this infrastructure analysis is to identify the future campus peak utility loads and determine the future expansion requirements of the utility production facilities and distribution systems to support the planned growth described below.

**Thermal Utilities**
The current RELLIS Campus site is under construction, adding a Central Utility Plant (CUP), phase 1 of the Blinn College the CIR building. Once phase 1 of the Blinn College and the CIR building is complete, the buildings will be 205,600 square feet with a peak cooling load of 684 tons and 5,950 MBH. The existing plant will initially provide a firm capacity of 3,200 tons of cooling and 18,000 MBH heating. New 24-inch chilled water mains and 12-inch hot water mains will be installed from the new CUP with 12-inch chilled water and 8-inch hot water branches to future buildings.

During the next phase, from 2018 to 2022, the campus is estimated to expand by about 1,000,000 square feet. The expansion will bring the peak cooling load to 2,615 tons and the peak heating load of 16,174 MBH. These buildings will be fed from the CUP.

Once the campus load exceeds the firm capacity of the CUP, the plant will then be expanded. The plant will provide a firm capacity of 4,800 tons of cooling and 36,000 MBH heating.

**Electrical Utilities**
The site is currently being fed from a City of Bryan (CoB) overhead distribution system at 12.47kV, located on the northeast side of the campus. An underground service from the CoB terminal pole consists of a ductbank with two sets of 15kV, 750kcmil AL conductors in 6°C extends to a 2000A switchgear line-up at the new CUP. NEC rating for the ductbank is 710A (approx. capacity of 15MVA).

The CUP switchgear is designed as main-tie-main with provisions for two main incoming feeds and two distribution loops. The first loop is under construction to encompass a majority of the Central Core of buildings. A second loop is proposed to pick up the balance of future construction.

A second CoB 12.47kV substation, located on the west side of the campus, is proposed as the second feed into the CUP switchgear. The addition of the second campus loop will coincide with addition of the second feed. Refer to the electrical site plan for proposed routing of the new ductbanks.

The RELLIS Campus build-out is estimated at about 2,200,000 gross square feet for potential future facilities within the A&M System. Refer to the campus load analysis for a breakdown of building electrical loads.

**Plumbing**
Currently, natural gas is distributed to the campus buildings by the local utility with meters installed at individual buildings. The route for natural gas distribution follows the utility corridor currently being installed as part of the Campus Infrastructure project.

There is also a dedicated piping line in the utility corridor for returning clear water back to the CUP for cooling tower makeup water. This system acts as a water conservation measure and will allow dedicated pumping from each building to reduce domestic water consumption at the central plant.

**CENTRAL UTILITY PLANT (CUP) BUILDING**
EXISTING ELECTRICAL LINES
FIGURE 4.32

EXISTING GAS LINES
FIGURE 4.33

EXISTING THERMAL LINES
FIGURE 4.34
PROJECTED LOADS
The master plan has projected heating, cooling, and electrical loads for future campus buildings. The cooling load is defined as square foot per ton and the heating load is defined as BTU per square foot. The cooling, heating, and electrical loads have been projected and summarized in the Appendices of this report. The cooling loads defined as square foot per ton and heating loads defined as BTU per square foot were estimated. Appendix G summarizes the projected campus chilled water, hot water, and electrical peak loads by phases.

Current Conditions
Phase 1 for Blinn College, currently under construction, will be approximately 70,000 square feet. The CIR building, scheduled to be complete in 2018, will bring the total cooling peak demand to 684 tons and a heating peak demand of 5,950 MBH for the campus.

The new utility that is being constructed, located on the west side of the Central Core, will provide cooling, heating, and power generation for future build outs on campus. The plant will include four new 800-ton chillers, six new 3,000 MBH boilers and one 12,800 ton-hour thermal storage tank. The firm capacity of the new plant will be 3,200 tons of cooling and 18,000 MBH heating. New 24-inch chilled water mains and 12-inch hot water mains will serve both buildings scheduled to be constructed by 2018 and future buildings for the campus.

Next Phase
During a phase from 2018 to 2022, the campus is projected to expand an additional 1,000,000 square feet. The build-out will consist of academic, laboratory, and office buildings.

Following Blinn and CIR, the next building to be completed will be the TTI State Headquarters at approximately 180,000 square feet. This will add a peak load of 411 tons of cooling and 3,600 MBH of heating. Currently in the design phase, the RELLIS Academic Complex Phase 1a and 1b buildings will add 112,200 square feet with a peak load of 299 tons of cooling and 2,244 MBH of heating. Once these buildings are complete, the total peak demand of the campus will be 1,394 tons of cooling and 11,794 MBH of heating.

Other academic projects planned within the next phase include the TEES State Headquarters Phase 1, Industrial Distribution Buildings Phase 1 and 2, and the TEES Industry lab. Non-academic campus projects are projected to include an incubator building for industry and some amount of retail development. These buildings are projected to add about 208,900 square feet with a combined peak load of 546 tons of cooling and 4,378 MBH of heating. This will bring the campus total peak demand to 1,940 tons of cooling and 16,172 MBH of heating.

Future Phases
When the campus expands further beyond the five-year projection, the existing plant will need to add additional chillers and boilers to account for the additional capacity. Currently the plant can add an additional two 8,000-ton chillers and six 3,000 MBH boilers. This expansion of the CUP will provide the campus a firm capacity of 4,800 tons of cooling and 36,000 MBH heating.

Electrical Infrastructure Expansion
In addition to installation of the second feeder into the CUP, a second distribution loop is proposed to accommodate expansion beyond the Central Core buildings. This loop will consist of new 15kV 600A feeder cables in ductbanks, manholes, and 4- or 5-way 15kV loop switches.

Pad-mounted transformers shall be provided for each facility, sized for the calculated demand load (plus 30% spare capacity) for future load growth. All new pad-mounted transformers will be provided with dual-feed primary bushing to accommodate loops where switchgear is not practical. Building service will be at 480/277V, 3-phase, 4-wire unless otherwise determined.
ELECTRICAL EXPANSION
FIGURE 4.35

THERMAL EXPANSION
FIGURE 4.36
4.6 SECURITY

EXISTING SECURITY
RELLIS has a challenging combination of functions with competing demands in terms of access, safety, and security.

PROPOSED SECURITY
Based on the takeaways from workshops, preliminary recommendations regarding security have been developed.

The RELLIS Campus will require segregation, or at least separation, of several activities for security and safety reasons. This can be achieved through relocation or through access control. In general, there are three areas that will require increasing levels of access control and security as the campus develops. Those areas can be described as follows:

• 24/7 Public Access Areas to the north of 7th Street and Along State Highway 21 (Central Core)
• Safety Restricted Areas to the south of 7th Street (Training/Testing)
• Security and Safety Restricted Areas to the west of Avenue A (Secure Training/Testing)

Future classified or secure government or commercial facilities would be best suited for the Security and Safety Restricted Areas. For location in the 24/7 Public Access Areas, adequate building access control to restrict public access to the facilities would be required.

The security strategy attempts to segregate the activities described above, with several notable differences. The recommendations above would alter those rendered recommendations by:

1) Combining the research centers, the amenities, and the education activities into what is called 24/7 Public Access Campus
2) Including the Training/Testing area into the safety sector
3) The Training/Testing area, storage and relocated activities, and possibly some of the secure industry lab areas would be located in the Safety/Security area west of Avenue A.

BUILDING HEIGHT SECTION

EXISTING & PROPOSED FLIGHT LINE ROAD BARRIERS EXAMPLES
BARRIERS
There are three types of barriers to be considered at RELLIS: pedestrian, vehicle, and visual/sound. These may be used individually or in combination. Pedestrian barriers will be required in areas where students, staff, or visitors may accidentally or deliberately walk into areas that require protection, such as along Avenue A. A fence is symbolic in its pedestrian control at a six-foot height, but is effective in pedestrian control at or above eight feet. In areas adjacent to roadways or at gated entrances where accidental incursion would jeopardize the safety of drivers, vehicle barriers such as landscape barriers or impact resistant fences and gates, may be incorporated.

Landscape barriers provide a good choice for a linear, continuous security barrier where the goal is vehicle interdiction. To be effective, barriers need to be approximately three feet high and, depending on material and anchorage, about six feet wide. Fences can also have vehicle interdiction capabilities incorporated into either their structure or through the addition of cables hidden in fence rails at lower heights.

Obscuration of secure areas may be important. Building heights will be limited based on the proximity to the secure area, as indicated in Figure 4.36. Vegetation should be used for obscuration of ground level views. Layers of vegetation can also help with sound control.

In areas where pedestrians and vehicles mix, particularly within the Central Core, low landscape barriers should be considered to help prevent accidental or intentional conflict between people and vehicles.

Barriers are also needed in other areas of the proving and training grounds. TTI performs high-speed (65 mi/h) crash testing of passenger and commercial vehicles into bridge rails off of the end of runway 17C and other locations. For safety, a recommended minimum distance of 100 yards should be maintained from the end of the existing bridge rails to any public roadways. In the event a safe zone of 100 yards cannot be maintained then a ditch and berm combination should be constructed to separate the roadway from the testing site. A suggested configuration would be a four foot ditch with a 4:1 fore-slope and back-slope going into a six foot (above the normal grade) 4:1 berm. The 4:1 slopes are to permit landscape management to mow and maintain. If a ditch and berm configuration cannot be provided then traffic could be temporarily stopped while a test is being performed.
Guidelines

5.1 Purpose
5.2 Campus Design
5.3 Architectural
5.4 Landscape and Open Space
5.5 Signage and Wayfinding
5.6 District Supplements
5.7 Review and Compliance
5.1 Purpose

The RELLIS Campus Design Guidelines provide a set of principles intended to foster a cohesive and functional setting that will aid in the advancement of the institution’s academic and research goals. The guidelines present direction on design decisions for buildings and open spaces. The Texas A&M University System Facility Design Guidelines should be referenced for more specific construction and building systems requirements.

These design guidelines are arranged into four primary categories to correspond to specific project types or components:

• Campus Design Guidelines
• Architectural Guidelines
• Landscape and Open Space Guidelines
• Signage and Wayfinding Guidelines

An outline of each category is presented at the beginning of each section to provide an overview for the general reader, while more specific provisions are defined under the subsequent principles.

Two additional sections are included along with the four categories of guidelines. A section of district specific provisions are provided to outline additional or relaxed conditions for areas outside the Central Core. The guidelines review and compliance procedures are also outlined in the final section of the chapter.
## 5.2 Campus Design Guidelines

Campus design guidelines set forth overarching principles for the organization of the campus on at the macro scale. These guidelines should be reviewed at the conception of a project as part of its programming. They help guide decisions such as building site selection, open space organization, and the location or reorganization of transit networks.

The campus guidelines include the following principles:

- Social and collaborative spaces
- Thresholds
- Connectivity and walkability
- Commemoration

### SOCIAL AND COLLABORATIVE SPACES

New buildings should be sited to reinforce collaborative clustering while preserving land for research and future development.

The RELLIS Campus currently has ample building site opportunities due to the large area and relatively small existing built footprint. When new building projects are determined, consideration should be given to appropriate adjacencies to existing facilities or other planned projects. This clustering creates a cohesive identity as the ‘place’ where innovation occurs, for academic research, and other training purposes. This also limits the necessity for excessive infrastructure investment in the near term by concentrating the areas of development.

Within a cluster, the active edges of buildings should be placed toward primary pedestrian spines or plazas to foster connectivity between buildings. This increases the opportunity for chance encounters and collaboration that fuels innovation.

As various clusters develop, pedestrian streets or paths can be used to create a network of smaller, connected spaces that weave through the campus. These social spaces become a cohesive public realm that provides an opportunity to showcase innovation. This also increases the potential of attracting partner relationships to the campus through startup or tech companies that prefer collaborative interior and exterior environments.
The RELLIS Campus contains two primary vehicular thresholds, one from State Highway 21 at the newly constructed portion of Flight Line Road, and the other from State Highway 47 at Airfield Drive. As the campus grows and population increases, additional entries will be necessary from the western and southern areas of the campus. New thresholds are proposed on the south from Avenue D along Goodson Bend Road, from the northwest at State Highway 21 across from Fazzino Lane, and from the west at Kuder Road.

The State Highway 47 entrance at Airfield Drive is the existing entrance to the entire campus. It is envisioned to remain the primary formal entry, as it provides the most visible and direct link to other institutional functions in Bryan and College Station. Because of its prominence and significance to the campus, this entry should feature a landscape gesture that relates to the overall scale and importance of the campus. Users should move through this extended natural threshold prior to arriving at campus buildings, invoking a sense of relevance and stature for the campus.

The State Highway 21 entrance at Flight Line Road provides a secondary and highly visible entry. It should be highlighted by the framing of significant campus buildings coupled with prominent landscape features. At this threshold, users may gain a quicker sense of the specific activities occupying the campus.

Future tertiary campus entries may employ smaller buildings or scaled landscape components that relate back to the larger campus aesthetic. These entries will be used primarily by individuals familiar with the campus and its organization.
Figure 5.4 Campus Thresholds

- Common Threshold
- Secure Threshold

Building Edge
Landscape
Connectivity and Walkability

Safe and efficient mobility should be reinforced throughout the site through multiple modes of transportation, including pedestrian, bicycle, bus, driverless vehicles, and standard vehicles. The large scale of the RELLIS Campus requires several modes of traversing the site. The street network may use both shared and segregated facilities depending on the location. Several street typologies exist within the master plan to accommodate these needs:

- Pedestrian street
- Recreational path (pedestrian and bicycle)
- Transit street (bus, bicycle, and autonomous vehicle)
- Common-use vehicular street
- Service and access alley
- Secure campus vehicular street

The Central Core should be established with a compact and interconnected network. The character of streets and public spaces should build upon and extend the Bryan AAF grid. This zone should develop a higher degree of segregated use streets to avoid conflicts between modes and to promote safety in the most densely populated district of the campus. Specific transit streets provide opportunities for buses, bicycles, and autonomous vehicles to move freely from common-use vehicular routes that may contain a higher volume of traffic and individuals unfamiliar with the campus. Dedicated service and access streets afford easy connections to loading areas and parking facilities that are internal to the existing block structure.

The campus should incorporate specific walking paths to facilitate pedestrian movement through the site. The core should utilize building types that connect internal public areas with external spaces, leading to a neighborhood fabric of networked open spaces. Discrete pedestrian focus opportunities within the core should be incorporated in the form of pedestrian streets that concentrate the flow of site occupants. Secondary paths through landscaped areas provide opportunities for recreation and pedestrian circulation through the broader campus. Development areas outside the core should implement pedestrian connectivity within the specific development with the consideration for links back to the broader campus network.

Connectivity extends beyond physical links between buildings and districts. The campus should create a culture that fosters professional networks and business connections. It should establish an open network, technologically connected district through the implementation of fiber optics, Wi-Fi, or future connections.
Figure 5.5: Pedestrian Circulation
- Pedestrian Street
- Pedestrian/Bicycle Recreational Path

Figure 5.6: Transit Routes
- Transit-only Street
- Transit Route

Figure 5.7: Vehicular Routes
- Common-use Street
- Service/Access Street

Figure 5.8: Secure Access
- Secure Street
- Secure/Flex Street
COMMEMORATION

The RELLIS Campus has the unique opportunity to develop a site that reflects its rich military history. Moving forward, the RELLIS Campus will grow with memories of the past visible throughout the former base. From buildings to structures to landscapes, RELLIS has a history to proudly display and honor.

A. Recreation
Establish a heritage trail at or near the recreation pond or Brazos River. A hiking/biking trail can include kiosks or historical markers to educate visitors of the significance of a specific site. It could tell about life on the base, important events, and people.

B. Street System
In 1954, General Orders Number 12 issued on June 30, re-designates streets after prominent air force servicemen. This order has never been implemented and could help RELLIS Campus honor fallen military leadership while creating a memorable street system. Streets may also be named to reflect the site's history more generally. The campus has taken such steps with the renaming of 5th Street as Airfield Drive.

C. Rehabilitation
Where opportunity arises, rehabilitate Bryan AAF and Bryan AFB structures for new uses. Buildings that are conducive to this include hangars, chapel, engine shops, and cadet quarters. These can be converted into new uses or restored as tangible reminders for the community.

D. Arts Program
Create an arts program for interior and exterior display that ties back to local history and regional context. New buildings can develop a program with local artists to honor Bryan’s and Texas A&M’s military history. Outdoor art installations can be included in recreation areas or in proper relation to new buildings.

E. Monuments/Memorials/Museum
Create an air service memorial and or museum exhibit that is in a historic or prominent location to note the history of the site. A combination of existing structures, including the air control tower and water tower, could be enhanced with historic relics such as airplanes, helicopters, or other military equipment. This could tie in with a larger arts and recreation program. It also presents an opportunity for landmarks near the new Alliance Academic Complex area.

F. New Buildings
New buildings should respect context and heritage of the existing buildings and site. The character of the RELLIS Campus is derived from Bryan Army Air Field and Bryan Air Force Base. As a unique resource, the site’s runways and gridded base should serve as a determinate for future growth.

G. Marketing/Programming
Create RELLIS identity and programming that relates back to its air service roots; examples include a military walk/run, website, or brochures. This campaign could be comprised of recreation, arts program, memorials, and other opportunity areas for RELLIS to honor its history.
5.3 Architectural

Architectural guidelines establish a design framework for building projects. Ten principles outline categories to provoke innovative solutions to design problems while maintaining a connective fabric and campus architectural identity. Within each principle, varying degrees of specificity are provided while not prescribing a singular outcome. All of these require the trained professional to use ingenuity to develop solutions and demonstrate adherence though the design review process.

The ten architectural principles include:

• Building massing and type
• Fabric and focus
• Reinforcing the public realm
• Facade activation
• Character-defining material palette
• Natural light
• Historic character
• Building economy and sustainability
• Integrated parking
• Screened service areas
**Building Massing and Type**

A building’s massing should respond to the human scale and its surrounding context. Multiple building types should be employed to create variety throughout the campus.

As buildings grow in height and floor plate size, their massing should remain responsive to the human scale. Volumetric elements or shifts that break down the overall massing, such as stepbacks, are appropriate to provide for pedestrian comfort. Long, singular facades should be varied through changes in edge configuration or materials.

As the campus builds out and contains clusters of buildings, new structures should relate to the massing of adjacent facilities. Taller buildings should be responsive and avoid overpowering the nearby context.

**Figure 5.17** This north facade of the CJR uses a material shift in elevation to step down the overall massing of the structure. Plane shifts and volumetric changes along the facade of the building break up its overall length while maintaining a consistent street edge.

**Figure 5.18** The south facade of the RELLIS Alliance Academic Complex Phase 1a building utilizes human-scaled elements and volume recesses to respond to the pedestrian scale at grade.
A variety of building typologies are appropriate for the campus to respond to programmatic needs. This provides differentiation and intrigue for the campus as a whole. The existing RELLIS Campus contains primarily warehouse (hanger) buildings and smaller residential-scale structures. Recent construction has begun to expand these typologies with bar and courtyard structures. Continued expansion of these typologies should be encouraged as the campus grows. Typologies may include the following:

- Bar building
- L-shaped building
- Courtyard building (open or closed)
- Pavilion
- Large-plate or long-span structures (warehouse)
- Tower

Figure 5.19 reflects the existing campus building typologies. Figure 5.20 represents a potential scenario for future building typologies and variation. Exact typologies for future buildings will be determined during the programming and design phases to best suit the needs of the given facility.
Buildings on the campus should be categorized as campus focus, district focus, or fabric buildings. The decision of whether a building should be a fabric or focus should be made early in the design process and based on both the location and function of the facility.

The majority of structures on the campus should be designed as fabric buildings that play an important role in reinforcing a cohesive campus character. Fabric buildings create the connective building tissue that unites the campus.

District focus buildings are useful to reinforce a section of the campus or threshold. They can be used to frame views or thresholds to the campus. Though the material palette will remain consistent with the campus fabric, limited distinct features may be utilized to create the focal nature of the structure.

Campus focus buildings provide a presence and image for the campus as a whole. They will be the least common type employed throughout the campus. These structures may be the most architectural distinctive while maintaining material connectivity to the campus fabric.
Figure 5.23 Potential Fabric & Focus Building Locations

- Fabric
- District Focus
- Campus Focus
Reinforcing the Public Realm

Building edges should be used to reinforce the public realm along significant campus spaces such as plazas and pedestrian streets.

As the RELLIS Campus develops, significant public spaces will be created for a variety of outdoor functions. Building edges should help to define the perimeter of these spaces, creating outdoor ‘rooms’. Though adjacent building facades may not align precisely, they should create a consistent and sustained edge condition that reinforces these spaces.

The organization of a building’s ground level should be used to activate the public realm. Where applicable, primary entrances should be located along pedestrian streets or plazas. The clustering of buildings around these spaces will help to create well-defined civic spaces that are enlivened with campus use.
Figure 5.26 Public Realm

- Featured Public Space
- Existing Building Edge
- Future Building Edge
- Primary Axis
- Secondary Axis
Facade Activation

Active uses should be placed on the ground floor to help reinforce the indoor-outdoor connectivity of the campus buildings to the landscape and open spaces.

The street-level of campus buildings should contain public-oriented programs wherever possible. Such uses may include lobbies, classrooms, conference and event areas, laboratories, food service, student services, and other spaces that provide regular activity or pedestrian flow. If a building program allows, the unique active research and innovative technologies studied on the RELLIS Campus should be highlighted on the building’s exterior or in public spaces.

Building entrances should be located along primary pedestrian routes. They should prioritize pedestrian over vehicular access. The entrance should be highly visible and easily accessible.

A porous building facade at the street helps to enliven the exterior space and draw connections between inside and out. The use of elements such as transparent glazing at social edges or pedestrian elements such as arcades creates intrigue and further strengthens this relationship.
Materials for the campus are selected to create a unifying aesthetic theme. The predominant facade material for solid areas is the Acme RELLIS Red brick. The deployment of the brick is exclusive of glazed areas such as windows or curtain wall.

Complementary accent materials for feature facade elements are appropriate using wood or stone. Stone shall be Lueders limestone. Additional materials such as metal panel may be used, particularly for larger research or warehouse facilities.

The use of sloped roofs provides a connective element to unify the campus from a broader vantage point. These roofs shall be standing seam metal roofs using the Antique Copper-Cote color. Roofs may also incorporate deep overhangs with wood soffits to provide a softer aesthetic from the ground-level vantage point. Long space spaces (such as high-bay testing facilities) need not incorporate sloped roofs, as the scale increases and burdens projects with unnecessary costs.

The absence of strong color hues is preferred in glazing selection to avoid conflict with the predominant building materials. Grey or clear glass substrates and coatings present a neutral facade that more easily relates to the red brick or the green roofs. Glazing should also avoid excessive reflectance or mirroring that creates unnatural visual conditions and limits indoor-outdoor connectivity.
**Natural Light**

Buildings should incorporate ample natural light to provide improved indoor conditions and to reduce energy consumption.

Buildings should allow ample opportunities for natural light throughout the structure to enhance the learning and working environment. Access to natural light provides views to the exterior and reduces the reliance on artificial light sources. The latter limits the requirement for expending electricity on light fixtures during daylight hours.

Thin floor plates should be employed wherever possible for structures that house regular office or educational functions. This limits the distance of occupants from exterior windows. Fenestration should be maximized in regularly occupied spaces to provide visual connection. Interior borrowed light elements may be employed to draw natural light further into the center of a structure.

The maximization of ground-level glazing provides connectivity between interior and exterior activities. This assists in achieving the goals of the “facade activation” principle outlined previously.

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**Figure 5.31** A narrow building floor plate allows light to penetrate to the middle of the structure while deep floor plates force the need for artificial illumination at the center of the building.

**Figure 5.32** The Rowlett Industrial Distribution Building utilizes exterior glazing and clerestory windows to pull natural light deep into the building’s interior spaces.

**Figure 5.33** The RELLIS Alliance Academic Complex Phase 1a building incorporates ample glazing on the north facade and utilizes interior glazed partitions to allow natural light to penetrate the space.
A number of structures exist on the RELLIS Campus from its origins as the Bryan Army Air Field and Bryan Air Force Base. Though some of these are no longer functional and may be removed or commemorated, significant structures, such as the chapel, can provide new and useful programmatic space for the future. These original buildings should be rehabilitated for active campus functions where possible. The most significant of these buildings are outlined in section 2.4 of the master plan.

New construction may take cues from the original structures in certain instances. Examples may include the use of industrial building forms that reflect the functional nature of the program. New buildings may also employ the new campus material palette in patterns or shapes that are reminiscent of the original wooden structures or hangers.
**Building Economy and Sustainability**

Buildings should be constructed of good value and practicality of contemporary construction methods to ensure the longevity of institutional structural. Sustainability should be a primary consideration in limiting the long-term maintenance and energy requirements of a facility.

Institutional buildings on the RELLIS Campus are intended to last many decades, far beyond the use of the initial occupants. Design and construction decisions should be made to ensure the long-term usefulness of these structures. Structures should be designed for long-term durability and sustainability while utilizing assemblies that minimize required maintenance. This should be a driver of architectural character and can help to avoid spending institutional resources on unnecessary ornamentation.

Where possible, buildings should be sited in the east-west direction to maximize solar orientation. This allows for one long facade to face north and minimizes the amount of facade to the west, where the hot Texas sun is the strongest. These decisions can limit solar heat gain and reduce the demand on cooling systems. Additional solar shading or deep overhangs should be designed in accordance with building orientation and incorporated to mitigate the local climate.

A front porch or cover should be integrated over building entries to prevent rainwater from infiltrating the interior. Glazing placed low or at grade should be carefully considered and limited to avoid future maintenance concerns.

Opportunities for vegetated roofs may be explored to reduce the heat island effect of new structures and maximize the insulation of horizontal surfaces. When designing such a roof, a maintenance endowment should be considered to assure the long-term success of the plantings. Where plantings are incorporated that go dormant during winter months, educational components may be added to help users unfamiliar with these systems identify the intent and function.
Integrated Parking

Parking facilities should be designed to seamlessly integrate into the overall campus aesthetic and reduce the visual impact to the pedestrian.

In the near term, the majority of parking facilities on the RELLIS Campus will be constructed as surface lots. When located adjacent to buildings, lots should be positioned behind the primary facade, allowing for better collaborative connections between clustered programs.

As the campus grows and densifies, particularly within the Central Core, parking garages may become necessary to minimize space requirements and preserve valuable building sites or landscape opportunities. These future garages may be part of a larger building or standalone structures. When constructed as part of a larger building, garages should be integrated into the aesthetic of the overall structure and avoid drawing a distinction between the two. Standalone parking garages should not be located along primary pedestrian routes, but rather along common-use vehicular roads for ease of traffic flow. Exterior materials of parking garages should be consistent with the overall campus material palette.

Any future parking garages should be designed so that they can be repurposed into functional buildings when there is an increase in autonomous vehicles and public transportation supporting the campus.
Screened Service Areas

Service areas should be adequately screened through integrated architectural elements.

Necessary building components such as loading docks and mechanical equipment can detract from the aesthetic appearance of the campus and impact the pedestrian experience. At the ground level, the placement of mechanical equipment should be minimized where possible. Loading areas should be screened and utilize a consistent building articulation to the rest of the structure to reduce its impact on the surrounding area. They should be accessed from primarily vehicular streets or service alleys rather than significant pedestrian ways.

Roof areas can often become large mechanical spaces. Effort should be taken to limit the visibility of these elements from the ground or adjacent buildings.

Since the RELLIS Campus is occupied by many unique research and academic programs, an exception to this principle may be made when there is a key research or academic function of a given facility. In certain instances, it may be appropriate to strategically expose a building system or component for educational purposes or demonstration.
5.4 Landscape and Open Space

Landscape and Open Space guidelines provide a series of typologies that exist throughout the campus master plan. These cover aspects of hardscape and softscape treatments from existing habitats to constructed pedestrian environments. Each typology contains an associated plant palette and a schematic section that outlines the high-level design intent for that zone. These guidelines also demonstrate the integration of campus stormwater management strategies into the network of open spaces.

The landscape and open space principles include:

• Low maintenance
• Efficient stormwater management
• Natural ecology and balanced habitat
• Experiential qualities
• Parking

This section establishes design guidelines for the RELLIS Campus open spaces and a methodology for the implementation of these designs.

The design for the different area types described by the Landscape Typologies Matrix should meet these criteria:

• Provide visual connectivity and continuity
• Suitable for high levels of social activity
• Facilitate movement through the space.

While each of the area types are unique, there should be a strong ‘RELLIS Campus’ bond between each of the spaces. In order to achieve consistency in design implementation, each project should meet these following standards and requirements:

• Establish a hardscape materials palette, to be approved by Facilities Planning and Construction
• Utilize a defined vocabulary of site furniture and lighting fixtures
• Create landscapes that reinforce and enhance the intended use of the space through the use of the approved Landscape Planting Palette

### AREA TYPES

1. Maintained Areas
   a. Building perimeters and the perimeter of pedestrian connectivity

2. Natural Areas
   a. Areas identified as part of the tree preservation, but not falling within a Park/Campus Green
   b. Low-Maintenance

3. Undisturbed
   a. All other green areas, including those adjacent to stormwater management and those forming an undisturbed Buffer area

<table>
<thead>
<tr>
<th>1. Pedestrian Streets/Plazas</th>
<th>Cost</th>
<th>ROI</th>
<th>Maintenance</th>
<th>Stormwater</th>
<th>Social Activities</th>
<th>Hard/Softscape</th>
<th>Plant Complexity</th>
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<tbody>
<tr>
<td>1. Campus Green/Rec Areas</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>60/40</td>
<td>Moderate</td>
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<td>2. Open Space</td>
<td>High/Moderate</td>
<td>High</td>
<td>High</td>
<td>Moderate</td>
<td>High</td>
<td>30/70</td>
<td>High/Moderate</td>
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<tr>
<td>3. Frontage / Open Space / Prairie</td>
<td>Moderate</td>
<td>High</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>20/80</td>
<td>Moderate/Low</td>
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<tr>
<td>3. Security Buffer</td>
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<td>Low</td>
<td>Moderate</td>
<td>Low</td>
<td>5/95</td>
<td>Low</td>
</tr>
<tr>
<td>X. Hardscape</td>
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<td>Moderate</td>
<td>Moderate</td>
<td>Minimal</td>
<td>5/95</td>
<td>Moderate</td>
</tr>
</tbody>
</table>
Figure 5.43 Area Types

- District boundaries
- Capacity areas

RELLIS MASTER PLAN
GUIDELINES
FRONTAGE/OPEN SPACE/PRAIRIE
Frontage, open space, and prairie areas make up the majority of the RELLIS Campus perimeter.

The concrete pedestrian pathway, 6’ width minimum, paralleling the primary campus Loop Road, and those pathways linking from the campus interior, will be the only hardscape elements in these spaces. Existing mature Live Oak and Pecan trees are found throughout these spaces, and all measures should be taken to preserve them, including the alignment of pathways. Planting along the Loop Road has been established as Live Oak trees, 50’ on center. The RELLIS Campus street light fixture spacing along the initial Loop Road section (100’ on center) should be continued throughout the remainder of the Loop Road. Along the Loop Road, low-water use grass species (ex. ‘Thunder-Turf’) are recommended. In transition zones between the frontage, open space, and the prairie parcels, lower growing grass mixes and wildflower species should be seeded for the first 50’, and then transition to taller wildflowers and grasses.

- Mass grading across these areas should be employed to facilitate absorption as overland drainage flows through the watershed to designated detention basins.

- Mowing throughout the warmer months along the frontage areas will maintain a well-kept campus appearance. As the spaces transition to open space and then to prairie, mowing should only occur after grasses and wildflowers have gone to seed.

*Where applicable, campus utility corridors should be run in the zone adjacent to the roadway for ease of access and maintenance.

A Preserved Existing Trees (Primarily Live Oak and Pecan)
The frontage / open space meadow is an area of transition. Along the vehicular corridors of the RELLIS Campus, clear lines of sight to buildings remain open and unobstructed by re-planting many of the original prairie species native to the Brazos Valley. A swath of mown grass is maintained adjacent to the roadway, and as distance increases from the road, so does the variety and grass / wildflower mix.

**Primary Street Tree:**
- Live Oak

**Native Species Seeding/Planting:**
- Big Bluestem
- Eastern Gamagrass
- Indiangrass
- Little bluestem
- Sideoats Grama
- Switch Grass Purpletop
- Standing Cypress
- Butterfly Weed
- Lemon Mint
- Black-eyed Susan
- Coreopsis
GREEN PARKING AREAS
Parking areas designed with ‘green-parking’ principles are preferred for RELLIS Campus. As a whole, the parking configuration should provide for the safe passage of users from vehicles to destinations on campus. Every third ‘parking tray’ within the lot should contain an island wide enough to accommodate a 5’ concrete walk, with 5’ of clear space on at least one side. Every parking bay should terminate in a planted island, minimally 9’ x 18’, containing at least one shade tree.

• Rather than depending solely upon surface flow to inlets within the parking lot, the design of alternating planting islands with bioswale islands is preferable. Bioswale islands utilize a wheel-stop along one side, rather than a curb edge, and take in directed water flow at this point.

• Shade tree species for the parking areas should be selected for clearance for head height and taller vehicles clearances. Tree and shrub planting within the islands should be inset a minimum of 18” to accommodate truck bumper overhang. Bioswale and rain garden species selected from the plant materials list are varied and will require moderate maintenance.
Green Parking areas differ from standard parking areas in three ways:

• Space is given to planting strategies for shade and heat reduction
• Space is dedicated to drainage and within the parking area through the use of bioswales
• Shade Trees may be located throughout wider parking islands that occur in every third ‘parking tray’.

Bioswales and drainage within the islands are achieved (in this illustration) by installing a 6” curb on one side of the parking island and a curb stop for parking on the other, allowing water to sheet flow through into the bioswale and permeate.

Primary Trees:

• All large and medium shade trees from the plant guidelines, providing sufficient clearance is achieved.

Rain Garden Planting:

• Butterfly Weed
• Spider Lily
• Inland Sea Oats
• Big Muhly
• Gulf Muhly
• Horsetail Reed
• Louisiana Iris

Turf:

• Thunder Turf (Buffalo Grass, Curly Mesquite, and Blue Grama)
PEDESTRIAN MALLS AND PLAZAS

The pedestrian malls and plazas will be active pedestrian spaces, confined to foot traffic, bicycles, and smaller campus carts.

The pedestrian mall is an uninterrupted 30’ paving section, oriented east to west on 4th Street and north to south on Avenue C, and collecting pedestrian traffic from building courtyards and parking walkways. Permeable pavers, in simple herringbone patterns, are the preferred paving surface for the pedestrian mall, with the paver underdrain system carrying water to detention basins. Street trees in grates, forming an allee, add to the character of the mall, as do the seating opportunities provided by the benches below the tree canopy. Lighting should be spaced in concert with the street trees to provide adequate illumination during evening hours. Most buildings will have open and well-lit first floors, and this should be taken into account when calculating illumination levels.
The pedestrian street planting will be defined by a Cedar Elm allee located at the perimeter of the street right-of-way. The Cedar Elms also anchor the edges of the rain-garden and bioswale plantings, creating an envelope for a shaded pedestrian walkway.

The area benefits from a deciduous tree canopy, and a plant palette suited to higher pedestrian use. Maintenance, as well as visual coherence and unity, are the primary objectives of the plant selection for this area.

Primary Street Tree:
• Cedar Elm

Rain Garden Planting:
• Butterfly Weed
• Spider Lily
• Inland Sea Oats
• Silver Pony Foot
• Horsetail Reed
• Louisiana Iris
• Gulf Coast Muhly
• Dwarf Yaupon Holly

Pedestrian mall plazas occur at the major intersections of vehicular streets. For those streets, operable key-card gates will be required for vehicular passage. The pedestrian malls provide an opportunity for special paver ‘destination’ patterning and combinations. Additional shade trees and ornamental trees may be added to the planting palette, along with planting bed areas to reinforce the design. Seating, in linear and group configurations, is encouraged. Drainage throughout the plazas should also be below grade, either through the use of permeable pavers or sheet flow to area grates. As distance from the vehicular intersections increases, well-maintained and manicured rain gardens may be employed to handle drainage. These rain garden sections are 350' minimum distance from any intersection, 15’ width maximum (outside the perimeter of the pedestrian street), with the plant selection from the Landscape Planting Palette.

The pedestrian mall will be used for as a fire access lane wherever required. In such instances, building facades will be located nearer to the street edge as required for fire department access, and trees should also be positioned as required. Where other fire lanes exist on the sides or rear of a building, the primary facade along the pedestrian street may be located farther back, as indicated in the section.
RECREATION FIELDS AND OPEN SPACE

Recreation fields and open spaces contain both the campus-wide recreational pathway and serve as a transition areas, providing a buffer zone between active, interior campus spaces and perimeter campus circulation.

The campus-wide, concrete pathway will be used for cross-campus circulation, and also for recreation activities, such as cycling and jogging. As such, the width should be sufficient to accommodate all potential users, and should have a minimum centerline radius of 100’. Site furnishing locations will be organized near play fields and at selected intervals along the recreation pathway. Lighting along the recreation pathway should be at intervals sufficient to illuminate the ground plane and imply direction.

Mature Live Oaks and Pecans are found throughout the designated recreation field and open space parcels, and all measures should be taken to preserve them, including altering the layout and alignment of pathways and playfields. Additional large shade trees may be required at gathering spaces near play fields, but the overall effect of added material should preserve clear sight lines across the fields. Planting in transition zones between the open space parcels and the Perimeter parcels should utilize lower growing grass mixes and wildflower species.

Mass grading across these areas should be employed to facilitate absorption, as overland drainage flows through the watershed to designated bioswales and basins. Bioswale and rain garden species selected from the plant materials list are varied, and will require less maintenance than rain gardens in active areas.

Maintenance during warmer months will focus on the upkeep of recreation field areas, based on frequency of use. Bioswales will require fall removal of undesirable plant material.

Open space and recreation planting occurs throughout the RELLIS Campus in specific areas, such as ballfields, and alongside the pedestrian recreation corridors. The planting variety is minimal in this area, with the exception of the bioswales, provided for drainage. Visibility and safety are balanced with shade and the comfort of users.

Primary Trees:

- Live Oak, and the preservation of existing trees in these areas

Shrubs and Ornamental Grasses:

Bioswale Planting:

- Butterfly Weed
- Spider Lily
- Inland Sea Oats
- Big Muhly
- Gulf Muhly
- Horsetail Reed
- Louisiana Iris

Turf:

- Thunder Turf (Buffalo Grass, Curly Mesquite, and Blue Grama)
Width Varies 12' Minimum

Multi-Use Recreation Path

Open Play Field with Preserved Existing Trees

Bioswale

Direction of Drainage

Scarborough Bench

Existing Live Oak

Direction of Drainage

Open Play Field
CAMPUS GREENS AND COURTYARDS
These areas are the community ‘heart’ of the RELLIS Campus. The designs for campus greens and building courtyard spaces should acknowledge the high level of social interaction occurring within these frameworks. Walks and courtyard users are primarily pedestrians, bicycles, and smaller campus carts, and the surfaces should be designed to accommodate these with walk width, materials, and material color and patterning in mind.

Site furniture within the building courtyards, including benches, tables and chairs, and litter receptacles, should be placed for large as well as small group interaction. Light placement should work for these group interactions. Light spill from adjacent buildings should be taken into account when calculating light levels, since most buildings will have a ‘transparent’ lower level.

Planting in these areas offers a higher level of complexity, interest, and color. Since these areas function as outdoor living spaces, the plant selection should reinforce comfort and relaxation. Where turf grasses are desired, low-water usage species (ex. ‘Thunder-Turf’) are recommended.

Several types of drainage features may be combined to provide complete area coverage. In paved courtyards, sheet flow should be directed to area grates. Large turf areas should be gently graded to direct water flow to ‘maintained’ rain gardens, while also allowing percolation into the subgrade.

Maintenance will focus equally on the upkeep of the hardscape and the landscape materials.

The campus green/garden has the appearance of a well-maintained and tidy park, by virtue of the plant palette selections. Since these are areas of multiple pedestrian crossings and activities, clear sight lines are needed. High tree canopies and lower shrub and groundcover provide the bulk of the plant material. In the areas where drainage is required, a ‘manicured’ bioswale is desired, with cleaner lines and more compact plant life.

**Primary Street Tree:**
- Mexican Sycamores
- Cedar Elms

**Low Shrubs/Groundcover**
- Boxwood
- Dwarf Wax Myrtle
- Dwarf Yaupon
- Plumbago
- Firecracker Fern

**Rain Garden Planting:**
- Butterfly Weed
- Spider Lily
- Inland Sea Oats
- Big Muhly
- Gulf Muhly
- Horsetail Reed
- Louisiana Iris

**Turf:**
- Thunder Turf (Buffalo Grass, Curly Mesquite, and Blue Grama)
SECURITY BUFFER
The security buffer is located primarily along the west edge of Avenue A, a security fence on the east in the vicinity of the apiary, and varies in depth and configuration. With the exception of the optional fence, there are no hardscape materials.

The function of the security buffer is to create a green delineation between the public portion of the RELLIS Campus and the secure portion of the campus. The plant palette used in the buffer is moderately complex, providing upper, middle, and lower canopy coverage at dense plant spacings. A clear view of sight at access/egress drives should be maintained with the use of turf grasses. Low-water use species, such as ‘Thunder-Turf’, are recommended.

The security buffer area should be graded to drain away from the optional security fence and into the drainage swales along the west edge of Avenue A.

Plant material should be selected for minimal maintenance requirements. Mowing throughout the warmer months along Avenue A will maintain a well-kept campus appearance.

Buffer zones around the apiary should coordinate with the Best Management Practices guidelines as defined by the Texas Apiary Inspection Service (www.txbeeinspection.tamu.edu/best-management-practices/). For development within 200 feet of the apiary, a dense vegetative barrier should be used to redirect the bees’ flight pattern and prevent a direct line of flight from the hives into neighboring properties. The flyaway barrier should start at grade, be a minimum of six feet in height, and should extend beyond the direct line of sight from the entrance of the hive to the neighboring or adjacent parcel.
Optional security buffer planting occurs only in the north-south area dividing the public and private sectors of the RELLIS Campus. Though it is the ‘rarest’ zone, it may include the widest variety of planting. There are areas where visual clear zones are required at drive entries, where only turf and groundcover are appropriate. In most other areas, dense vegetation in front of the optional barrier fencing is encouraged.

Primary Trees:
• All large and medium shade trees from the plant guidelines, providing sufficient clearance is provided.

Shrubs and Ornamental Grasses:
• All Shrubs and Ornamental Grasses from the plant guidelines, providing sufficient visual clearance is provided where needed.

Turf:
• Thunder Turf (Buffalo Grass, Curly Mesquite, and Blue Grama)
SHADE TREES

- Water Oak, *Quercus nigra*
- Cucumber, *Cucumis sativus*
- Crape Myrtle, *Lagerstroemia indica*
- Chinese Elm, *Ulmus parvifolia*
- Cherry Oak, *Quercus muehlenbergii*
- Common Bald Cypress, *Taxodium distichum*
- Elm, *Ulmus americana*
- Mexican Pecan, *Carya illinoinensis*
- Monterrey Oak, *Quercus polymorpha*
- Monterey Cypress, *Taxodium distichum var. mexicanum*
- Willow Oak, *Quercus phellos*
ORNAMENTAL TREES

- Common Crepe Myrtle, Lagerstroemia indica
- Vitex, Vitex agnus-castus
- Evergreen Sumac, Rhus ovata
- Desert Fan Palm, Washingtonia filifera
- Mexican Plum, Prunus mexicana
- Southern Waxmyrtle, Myrica cerifera
- Possumhaw Holl, Ilex decidua
- Prairie Flameleaf Sumac, Rhus lanceolata
- Purple Leaf Plum, Prunus cerasifera
- Tree Yaupon, Ilex vomitoria
EVERGREEN SHRUBS

- Boxwood, *Buxus microphylla*
- Dwarf Palmetto Palm, *Sabal minor*
- Chinese Fringe Flower, *Loropetalum chinense*
- Dwarf Burford Holly, *Ilex cornuta ‘Dwarf Burford’*
- Gray Cotoneaster, *Cotoneaster glaucophyllus*
- Dwarf Waxmyrtle, *Myricacerifera*
- Dwarf Yaupon, *Ilex vomitoria*
- Glossy Abelia, *Abelia x grandiflora*
- Indian Hawthorn, *Raphiolepis spp.*
- Japanese Pittosporum, *Pittosporum tobira*
- Japanese Yews, *Podocarpus macrophyllus*
- Mahonia, *Mahonia bealei*
- Nandina, *Nandina domestica*
- Nellie R. Stevens Holly, *Ilex cornuta*
- Prinrose Jasmine, *Jasminum mensyl*
- Rosemary, *Rosmarinus officinalis*
PERENNIALS & OTHER SHRUBS

- Artemisia, Artemisia x 'Powis Castle'
- American Beautyberry, Callicarpa americana
- Blue Plumbago, Plumbago auriculata
- Bullrapea, Bulbine frutescens
- Daylily, Hemerocallis spp.
- Dwarf Pomegranate, Punca granatum
- Firebush, Hamelia patens
- Firecracker Fern, Russelia equisetiformis
- Flame Acanthus, Anisacanthis quadrifidus
- Fragrant Sumac, Rhus aromatica
- Gaura, Gaura lindheimeri
- Giant Hesperaloe, Hesperaloe funeraria
- Giant Turf's Cap, Malavavis arboreus var. drummondii
- Inland Sea Oats, Chasmanthium latifolium
- Jerusalem Sage, Ptilomis fruticosa
- Lily-of-The-Nile, Agapanthus africanus
- Louisiana Hydril Iris, Iris x 'Louisiana Hybrids'
- Mexican Heather, Capitata hyssopfolia
- Mexican Mint Marigold, Tagetes lucida
- Neomarica gracilis
- Walling Iris
PERENNIALS & OTHER SHRUBS

- Oakleaf Hydrangea, Hydrangea quercifolia
- Pride-Of-Barbados, Caesalpinia pulcherrima
- Red Yucca, Hesperaloe parviflora
- Russian Sage, Perovskia atriplicifolia
- Rusty Blackhaw Viburnum, Viburnum rufidulum
- Knock-out Rose, Rosa x ‘Knock-out’
- Texas Lantana, Lantana urticoides
- Texas Sage, Leuophyllum frutescens ‘Varieties’
- Texas Totil, Dasylirion texanum
- Trailing Lantana, Lantana montevidensis
- Turk’s Cap, Mahonia arborescens mexicana
- Variegated Ginger, Alpinia zerumbet
- Yellow Bells, Tecoma stans var. argustata
- White Butterfly Iris, Dieris iridoides
- Yellow Bicolor Iris, Dieris bicolor
- Yellow Yucca, Hesperaloe parviflora

ORNAMENTAL GRASSES

- Bamboo Muhly, Muhlenbergia dumosa
- Deergrass, Muhlenbergia rigens
- Gulf Muhly, Muhlenbergia capillaris ‘Reyal Mist’
- Lindheimer Muhly, Muhlenbergia lindheimeri
### NATIVE SEED MIXES / WILDFLOWERS (NATIVE AMERICAN SEED)

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<tr>
<th>Seed Mix</th>
<th>Native Species</th>
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<td>Annuul Winecup</td>
<td>Big Bluestem, Balsamroot*</td>
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<tr>
<td>Big Bluestem</td>
<td>Big Bluestem*</td>
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<tr>
<td>Black-eyed Susan</td>
<td>Black-Eyed Susan*</td>
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<td>Broomsedge Bluestem</td>
<td>Broomsedge Bluestem*</td>
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<td>Buffalograss</td>
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<td>Red Lovegrass</td>
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<td>Purple Lovegrass</td>
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* seed from prairie remnant conservancy harvest
EXAMPLES OF SEASONAL PLANT/GRASS PALETTES
5.5 Signage and Wayfinding

INTRODUCTION
The purpose of the signage section of the guidelines is to define the standards for all signage design and construction. The objective is to assist the RELLIS Campus in providing a thoughtful and useful experience for its greater community through consistent visual signage design standards.

What is it
The institutional signage design guidelines for RELLIS provide a central resource to assist in visioning and design for all future development. It offers clarity for all stakeholders and ensures compliance with signage requirements. The standards ensure that each visitor will be left with a positive and lasting impression of RELLIS.

How it works
The signage guidelines provide the means for campus stakeholders and partners to reference the guiding principles, material specifications, usage diagrams, sign type inventories, restrictions, and related material. It is intended to be a comprehensive point of reference. Any sign designed in adherence to the guidelines can be built and installed by following the procedures herein.

Common Signage Standards
- Material vocabulary
- Typography and graphics
- Sign information hierarchy

Campus Signage
The Campus Signage section addresses the needs of campus administration and facilities management. Content includes the following:
- Overview
- Illumination
- Sign Type Inventory
- Sign Type Diagrams
- Conceptual imagery
- Usage diagrams

Partner Signage
The Partner Signage section provides reference for institutional and corporate partners. This allows each partner’s brand presence to make an outward display of quality and uniqueness contributing to this special, energizing place. Content includes:
- Overview
- Submission procedures
- Material vocabulary
- Usage diagrams
- Monument sign prototypes
- Typical details
- Sign types diagrams
FIGURE 5.44 The RELLIS Campus will have a variety of signage needs from campus infrastructure signage to guidelines for development partners within the campus.
GUIDING PRINCIPLES
There are several guiding principles that unify the design and development of all RELLIS Campus signage:

Brand Expression
The design of all sign structures and messages must align to the brand standards of the RELLIS Campus, as determined by the A&M System. All campus signage designs must be in line with the prescribed brand standards and approved before production.

Unified Campus Environment
The signage guidelines establish a unified system that enhances visitors’ recognition of the campus, the daily experience of its community, and the prestige of the RELLIS Campus as an institution.

Safety and Utility
The signage guidelines assist in creating and siting signage where it will be most effective to keep both visitors and the campus community informed of the proximity of restricted and/or hazardous areas. The guidelines also utilize best practices to make wayfinding as intuitive as possible.

Common Signage Standards

FIGURE 5.45 Campus signage will reflect the RELLIS Brand and help reinforce the unified campus environment.
MATERIAL VOCABULARY
The RELLIS Campus architectural color and material palette will inform the look and feel of all signage.

Sign Cabinet/Lettering Colors

- Aggie Maroon
- Pantone 422
- Pantone Cool Gray 11

Sign Base

- Lueder limestone with honed finish
- Arriscraft Sepia - Adaia Anchored
- Smooth finished concrete only is signage foundation
**TYPOGRAPHY AND GRAPHICS**

Typography for the RELLIS Campus signage will be:

**Primary Typeface**
Frutiger Lt Std 65 Bold is the primary signage and wayfinding typeface. It will be used for all wayfinding and informational content. It could also be appropriate for stylized storytelling, narrative, or interpretive elements.

**Secondary Typeface**
Frutiger LT Std - 55 Roman is the secondary typeface. It will be used for formal building and place identification. It could be appropriate for stylized storytelling, narrative, or interpretive elements.

Frutiger Lt Std - 65 Bold

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
0123456789

Frutiger Lt Std - 55

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
0123456789

**Typography Colors**

- White
- Pantone Cool Gray 424C
- Pantone Cool Gray 422C
**RELLIS Logo**

RELLIS - Full Color

RELLIS logo is only to appear on campus identification monument signage.

**Secondary Branding Element**

A secondary branded graphic element will be employed on signage elements which establish the perimeter of the campus. This branded element can be in Aggie Maroon, Pantone 442, Cool Gray 11, or tonal on approved materials.

**The Texas A&M University System Seal**

Only RELLIS campus signage shall have conspicuous display of The Texas A&M University System seal.

RELLIS Campus use of the A&M System Seal can be in the form of bronze plaques, carved elements or other additive features. Development Partners may only utilize bronze plaques OR internal, non-descript use of the System Seal.
SIGN INFORMATION HIERARCHY

Core Principles
For signage information hierarchy and nomenclature include the following:

- Clear and consistent messaging will be used throughout all campus communications. Destinations and place names will be vetted with consideration for visitors. Naming opportunities to increase orientation and better serve direction sets include campus organization (north and south), entrances, parking areas, and public destinations.
- Vehicular wayfinding can carry a minimal amount of information and should be easily readable at a glance (3–5 destinations).
- Pedestrian wayfinding can carry a variety of information with different levels of density (quick reference directional cues and detailed information to study).

FIGURE 5.56 Information hierarchy will provide a systematic approach for displaying information consistently from one sign to the next.
OVERVIEW
The contents of this section are guidelines for signage design and installation for all official RELLIS Campus infrastructure signage. All campus departments must adhere to these guidelines for all development or temporary signage.

All signage should be designed as a part of the overall campus presentation. Signage should complement the campus brand as well as the architecture of the buildings or facilities.

Policies
Nothing in this document shall be construed to preempt any local, state, or federal regulation or ordinance. It is the responsibility of the campus to ensure that proposed signage meets all requirements of the Texas A&M system. Any deviation from these criteria must be approved in writing by the campus administration.

The A&M System and RELLIS Campus require accuracy or conformity with any building code, signage code, or other governmental and regulatory requirements. Campus procedures to ensure the accuracy and conformity of plans, and the responsibility for obtaining all permits and approvals from all appropriate governmental and regulatory bodies, must be applied and followed. Please refer to the Resources section for additional guidance.
FIGURE 5.57 Districts within the RELLIS Campus will have unique sign types which serve the expected activity within different districts.
ILLUMINATION

Campus signage with illumination will have ground mounted or indirect, and internal illumination methods.

Campus identification and major directional elements will have a combination of internal and ground mounted illumination. Typical directional elements will not have internal or external illumination.

- Ground mounted illumination: low profile light fixtures used to illuminate the sign face, with a lighting color temperature of approximately 3,000 -3,500K. Ground mounted lighting should be placed up out of finished grade conditions, not mounted in areas to receive mowing or other mechanical maintenance. Efforts to obscure the lighting elements with landscape bedding plants or other elements are encouraged. Users must maintain the lighting in working conditions at all times

- Halo illumination: letter-forms, graphics, or signage elements applied to sign face with internal illumination that is projected out the back of the letter-form or graphic, creating a halo or glow, bringing a definition to the letter-form, graphic, and signage element.

- Internal illumination: push-through lettering or logo cut through the sign face and backing material and mounted or inlaid so the sign looks as if the lettering or image had been pushed through, up, and out of the sign. Push-through lettering may be back-lit through the sign, or the fascia of the lettering may be translucent to allow lighting the imagery from behind.

FIGURE 5.57 Primary logo cut out of field with halo illumination. Sub-text relief cut out of stone sign face and lit with external ground lighting. Secondary branding element, cut out of field with white halo lighting.

FIGURE 5.58 Primary logo and sub-text cut out of field with halo illumination. Secondary branding element pushed through sign cabinet and internally illuminated.

FIGURE 5.59 Primary logo text and secondary branding element pushed through sign cabinet with internal illumination.
SIGN TYPE INVENTORY
Multiple sign types in many forms make up a comprehensive system.

Minimum Program Requirements
The following sign types are the minimum program requirements. They address the campus identity and arrival experience from surrounding roads, support top-level vehicular and pedestrian wayfinding needs, and solidifies a unified campus environment.

• Site Identification
• Vehicular Wayfinding
• Vehicular Regulatory
• Pedestrian Wayfinding.

Design Principles
• Design the wayfinding system as a coordinated family of elements.
• Establish clear hierarchy and nomenclature for clarity and consistency.
• Provide useful information when and where it is needed.
• Create a memorable and iconic arrival experience to the campus that celebrates the unique aspects of the physical place, visually engaging State Highway 21 and State Highway 47 to promote the University’s presence.
• Promote campus legibility to all campus users – visitors, students, faculty, staff, administration, and the broader community.
• Ensure ease of implementation and maintenance.
• Use materials and methods appropriate to the architectural and natural environment that can be implemented over time while maintaining their integrity.
SIGN TYPE DIAGRAMS
The RELLIS Campus will require many different sign types as it evolves. The campus sign system should be considered for consistency of form, application, economy of scale, and modularity.

**FIGURE 5.60**
Example of sign types shown as diagrams.

- Site Identification - Monument Sign
- Site Identification - Pylon Sign
- Site Identification - Building Mounted
Figure 5.61: Example of sign types shown as diagrams.

- Building Identification - Free Standing Monument Sign
- Building Identification - Building Mounted
- Large Pedestrian Directional
- Small Pedestrian Directional
- Typical Regulatory Sign
- Building Identification - Vinyl on Glass
- Street and Stop Sign
Column Mounted Level Identification

Parking Stall Signage

Parking Lot Identification - Free Standing Monument and Building Mounted

Column Mounted Level Identification

Elevator Lobby Level Identification

**FIGURE 5.62**
Example of sign types shown as diagrams.
Figure 5.63
Example of RELLIS Campus Sign System.

Site Monument Identification - SH 47 and 21 entrances

District Identification Signage

rellis master plan

campus signage system sheet example
The United States Army Air Forces developed a standardized system of instrument flying. The Full Panel Attitude System, one of the most significant contributions the base made to pilot training, was developed at the base.

Buildings mentioned include Hangar 46, now building 7046. The facility originally had large sliding fold up doors, which were used. The folding doors, along with the rest of the building, had a large number of windows. The oldest photos of the building do not show the east side of it, which is 105' by 20'.

Hangar 46, 1955

The building documentation does not mention an addition built on after the original construction.

The oldest photos of the building do not show the east side of the building. The building documentation does not mention an addition built on after the original construction. The doors are wood along with siding. No interior finishes were deeded to the Agricultural and Mechanical College of Texas (now Texas A&M University) in 1962.
CAMPUS ENTRY SIGNAGE

State Highway 47 Monument Sign - Primary Entrance
The State Highway 47 primary campus entrance will welcome the majority of people to the campus. The sign will be set back from the highway but with sufficient presence to be seen detected by the northbound path of travel.

The entrance will open up into a meadow and the monument sign will act as a threshold, welcoming people to the RELLIS campus.

The monument sign will be a stylized representation of a Texas highway road-cut, a nod to the transportation technology heritage of the RELLIS Campus.
State Highway 21 Monument Sign - Secondary Entrance
The secondary campus entrance will be on the north side of the campus off State Highway 21 and the other on the east side of the campus on State Highway 47. The signage for each entrance will help not only to announce the presence of the RELLIS Campus but will help set the tone for the arrival experience for the different parts of the campus.

The State Highway 21 campus entrance should have a formal, timeless quality, utilizing a palette and materials which share a common vocabulary with the campus architecture.

The State Highway 21 entrance monument sign should be of size and orientation so as to be seen from each direction of traffic.

Future entrances should be marked with monument signs of similar character and nature.
DISTRICT IDENTIFICATION

Campus District Markers
RELLIS will have sub-districts within the campus core area. There is potential to use markers at thresholds to help identify these districts or to create placemaking opportunities.

These markers can be an extension of the campus signage system of a variety of scales and materials. Alternatively, they can be a part of the streetscape or architectural fabric of the district.

**FIGURE 5.73** Example of RELLIS Campus District Markers.

**FIGURE 5.74** Potential locations of Campus District Markers.
Dynamic Digital Signage
Because of the secure nature of the entrances of the proving grounds and training areas and the need to reconfigure different types of information through the day, dynamic signage will be employed at these secure entrances and possibly other locations to aid in safety and security.

Static Signage
The majority of campus signage at RELLIS will be traditional static sign types. Modularity will be employed to ease modification.

FIGURE 5.75 Secured Entry gates require dynamic messaging that can be seen from a distance of 100'-0" or more.
SECURED GATE ENTRY

Proving Grounds Entrances
The campus will be divided between public and secured areas. The secured areas will be the proving grounds and some training areas. Access to these areas will vary depending on the activities of these areas. Clear entrance identification is crucial, as different entrances may have different security concerns within overlapping time periods.

Because of the secure nature of the entrances of the proving grounds and training areas and the need to reconfigure different types of information through the day, dynamic signage should be employed at these secure entrances and possibly other locations to aid in safety, security, and the clear broadcast of information.

FIGURE 5.76 Example of RELLIS Campus Secured Entry Gate Signage.

FIGURE 5.77 Potential locations of Secured Gate Entry locations.
CAMPUS DIRECTIONAL SIGNAGE

Vehicular Directional Signage

Directional Information:
Vehicular wayfinding signage will direct to major geographic destinations and public parking.

Vehicular wayfinding will provide clear guidance at multiple decision-making points within the campus. It will clarify navigation to defined parking zones and reinforce visibility of primary complex destinations.

Content for vehicular directional signs will highlight visitor destinations and include simple, prioritized information about key parking areas, geographic locations, roadways, and visitor destinations. However, vehicular signs will not include individual building or donor named locations to keep signs relevant for the maximum amount of time. Wayfinding will direct visitors to visitor parking areas associated with key visitor destinations.

Vehicular wayfinding will work within the modular system. Wayfinding information should be applied to elements that are sized according to the information that is necessary to display.

Vehicular directional elements should not overpopulate the roads and streets but offer cues at important decision points.

FIGURE 5.78 A typical roadway intersection with two stacking signage modules can allow for two levels of directional information.

FIGURE 5.79 Locations which require a single group of information using a single signage module.
**Pedestrian Directional Signage**

The majority of pedestrian traffic originates from parking areas and on campus housing with considerations for future public transit stops.

Pedestrian wayfinding will establish clear orientation and direction for pedestrian traffic, encouraging foot traffic along the campus pedestrian-only areas and supporting the connections of the different districts.

Pedestrian wayfinding can carry a variety of information with different levels of density, including quick reference directional cues, as well as detailed information for further study.

Signage can include orientation maps, travel distances to major destinations, highlight community amenities, and serve recreational and exploration purposes. It can also serve to increase pedestrian safety at traffic intersections.

Part of the Smart Campus design approach could be implemented in signage by installing bluetooth features that connect with smartphones, allowing individuals to better navigate the campus.
**Pedestrian Directional Signage Map**

Maps should appear on the pedestrian directionals so that visitors can use them as the navigate the different areas of the campus.

The maps should be easy to be changed on the directional elements and be of an illustrative nature to reinforce the RELLIS brand. The maps can carry a variety of information from simple directional cues or highly detailed features of the campus with travel times marked illustrated.

*FIGURE 5.81 Example of a RELLIS Campus Pedestrian Directional Map.*
REGULATORY SIGNAGE

The campus will employ typical regulatory signs that comply with RELLIS traffic control, law enforcement, and the A&M System requirements.

Campus regulatory signage may employ a custom painted sleeve for sign posts that are in public facing areas, major roadways, and streets.
INTERPRETIVE SIGNAGE

Interpretive Signs communicate specific messages to visitors. These messages can be written as a commemorative sign, to change behavior, educate, or evoke an emotion in the reader. They are mounted so they are visible to pedestrians in public areas or areas of note.

Part of the smart campus design approach could be implemented in signage by installing blue-tooth features that connect to smart-phones, allowing individuals with disabilities to experience and learn more about the campus.

FIGURE 5.83 There is opportunity within RELLIS to champion the unique history and convey those stories to the present.

FIGURE 5.84 Interpretive signage can occur at a variety of scales for different message applications or locations.
CAMPUS SIGNAGE PLACEMENT DIAGRAMS

FIGURE 5.85 Highway signage requires scale and placement specific to highway visibility and reduction of speed from 75 mph.

FIGURE 5.86 Interior loop signage requires scale and placement specific to RELLIS Parkway visibility and reduction of speed from 35 mph.

FIGURE 5.87 Interior surface street signage should be placed as close to curb edge as possible while still allowing for safe vehicle passage.

FIGURE 5.88 Pedestrian signage should be located close to the path of travel and be visible from some relative distance. A variety of information from quick directionals to detailed maps should be provided.

FIGURE 5.89 Secure entry gates requires clear, flexible, and highly visible signage.
OVERVIEW
The contents of this section are guidelines for signage design and installation for all A&M System Members, and institutional and corporate partners operating on the RELLIS Campus. Partners must adhere to these guidelines for all permanent or temporary signage.

All business entities are encouraged to express their brand presence in an outward display of quality and contributing nature to reinforce RELLIS as a campus environment.

Good design practices ensure harmony throughout the overall campus presentation. Signage should complement the unified campus experience as well as the architecture of the buildings or facilities. Presentation should work with surroundings to create a sense of place for the individual partner and its neighbors and also within the campus as a whole.

Policies
Nothing in this document shall be construed to preempt any local, state, or federal regulation or ordinance. It is the responsibility of the campus to ensure that proposed signage meets all requirements of the local city sign regulations, as well as all applicable building or other governmental or regulatory requirements. Any deviation from these criteria must be approved in writing by the campus administration (Campus).

RELLIS requires accuracy or conformity with any building code, signage code, or other governmental and regulatory requirements. The submissions resources section provides many tools to assist partners in achieving compliance. However, the responsibility for obtaining all permits and approvals from all appropriate governmental and regulatory bodies ultimately lies with each partner.

Please refer to the resources section for additional guidance.
PARTNER SIGNAGE GUIDING PRINCIPLES
There are several guiding principles that unify the design and development of all RELLIS Partner signage:

Brand Expression
The design of partner sign structures and messages must align to the design standards established by the RELLIS Campus, as determined by the A&M University system. Any partner signage that deviates from these guidelines must be modified and be in compliance before production can be approved. The guidelines provide broad accommodations for the inclusion of corporate or institutional identity elements necessary for partners to establish and maintain the presence of their brand.

Unified Campus Environment
The signage guidelines establish a unified system that enhances visitors’ recognition of the campus, the daily experience of its community, and the prestige of the RELLIS Campus as an institution.

Quality
Partner signage should strive to communicate that RELLIS is a place of quality and excellence. High quality design and materials should be paramount for signage elements.

SIGN TYPES
Multiple sign types in many forms make up a comprehensive system.

Signage helps define Partner developments reinforcing their brand, helping to improve operational aspects and help build the collective of the RELLIS experience. The major signage elements that affect the outward appearance of a development are:

• Project identity
• Monument (RELLIS standard)
• Building identification

Other elements include
• Internal wayfinding
• Regulatory/security
• Placemaking
• Donor recognition*

RELLIS Partner signage allotments are dictated by the property type and size of building. Partners will align their overall development configuration with their building sizes to determine project identification size and number.

Internal elements not critical to the overall visual experience to a development such as internal exterior wayfinding, donor recognition elements, or placemaking, will be reviewed by the Campus for quality of design and appropriateness to the campus.

* Donor recognition features that are part or whole of a building mounted project identification or a ground or building identification sign must conform to the maximum allowable areas allowed.
Project Identification Signage

Project identification signs are signs with the purpose of displaying entity branded logos, word-marks, and organization names and are meant to be seen external to the property.

Project identification signage can be building or ground mounted.

Allotment and sizes determined in the subsequent sections.
Building/Entrance Identification

Messaging priorities:
1. Donor/Honorific name
2. Entity Address
3. Entrance Identification
4. Regulatory Information
5. Wayfinding Information

FIGURE 5.92 Donor/Honorific Name

FIGURE 5.93 Building Mounted Identification

FIGURE 5.94 Free-standing Identification
Vehicular Entrance/Parking

Messaging priorities:
1. Entity Address
2. Entrance Identification
3. Regulatory Information
4. Wayfinding Information
SIGN QUANTITY DIAGRAMS
Each diagram type on the following pages shows the number of signs allotted in each existing condition.

Type 1
Location with one building and on-site parking that represents total site build-out:

 Allowed two exterior project identification signs (building or ground mounted) with clear hierarchy between the two.

Permissible scope:

(A) 1 building mounted identification sign

(B) 1 ground mounted monument sign
(RELLIS Standard)

NOTE
A partner may place their signage at their discretion per the other requirements within this document.
Type 2
Location with multiple buildings and on-site parking that represents total site build-out:

Allowed two exterior project identification signs (building or ground mounted) with clear hierarchy between the two.

Permissible scope:
(A) 1 building mounted identification sign

(B) 1 ground mounted monument sign (RELLIS Standard)

(D) 1 building entrance identification sign per main entrance; can be building or ground mounted

Note: A partner may place their signage at their discretion per the other requirements within this document.
Type 3
Location with multiple buildings and multiple on-site parking that represents total site build-out:

Allowed two exterior project identification signs (building or ground mounted) with clear hierarchy between the two.

Permissible scope:

(A) 1 building mounted identification sign

(B) 1 ground mounted monument sign

(C) Parking lot identification

(D) 1 building entrance identification sign per main entrance; can be building or ground mounted

Note: A partner may place their signage at their discretion per the other requirements within this document.
Type 4
Location with one building without on-site parking that represents total site build-out:

Allowed two exterior project identification signs (building or ground mounted) with clear hierarchy between the two.

Permissible scope:

(A/B) 2 project identification signs; can be building or ground mounted

(D) 1 building entrance identification sign per main entrance; can be building or ground mounted

NOTE
A partner may place their signage at their discretion per the other requirements within this document.
Type 5
Location with multiple buildings without on-site parking that represents total site build-out:

Allowed two exterior project identification signs (building or ground mounted) with clear hierarchy between the two.

Permissible scope:

(A) 1 building mounted identification sign
(B) 1 ground mounted monument sign
(D) 1 building entrance identification sign per main entrance; can be building or ground mounted

NOTE
A partner may place their signage at their discretion per the other requirements within this document.
SIGN ALLOTMENTS
Use these calculations to determine the size of the major signage components for your development type.

(A)

Project Identification - Primary Building Mounted

Total number of 2.5 square feet per linear foot of the primary public facing facade of building with a maximum of 250 square feet; see conditions below for total overall square footage:

less than 20,000 sq ft overall = 50 sq ft maximum
less than 100,000 sq ft = 75 sq ft maximum
less than 300,000 sq ft = 100 sq ft maximum

(B)

Building Identification - Ground Mounted

Total number of 9 square feet for each public entrance or public facing facade with a maximum of 2, which includes donor recognition components.

(D)

Building Identification - Building Mounted

Total number of 20 square feet for each public entrance or public facing facades with a maximum of 2, which includes donor recognition components.

FIGURE 5.97 Example of signage allotments for a 20,000 sqft building.
PARTNER MONUMENT SIGNAGE

Partner monument signs have a standard sign body while allowing partner logos in a confined area.

RELLIS development partners wanting to have monument signs for their development allotment are required to use the RELLIS Standard monument sign.

**FIGURE 5.98** Example of partner monument signage

**FIGURE 5.99** Example of partner monument signage lighting options. Internally illuminated, halo lit letters on left; external up-lighting on right.
All entities wanting ground mounted monument sign allowed by their development type must use the RELLIS standard monument sign.

**Monument Sign Elevation**

- **SCALE:** 1/2"=1'-0"
- **5'-0" Setback**
- **Deed line**
- **5'-7" x 2'-0" logo area**
- **fabricated sign cabinet with painted finish; color TBD**
- **partner logo / message live area; Option A: graphics to be push-through with internal illumination (white); graphic element faces can be in color**
- **Option B: dimensional graphics with painted finish; lighting is ground based continuous LED (white) based fixture**
- **Arriscraft Adair Limestone Sepia smooth block base**
- **1/2" inset reveal, paint TBD**
- **concrete base, smooth finish**
- **optional ground based lighting**

**Monument Sign Details**

- **SCALE:** 3/4"=1'-0"
- **8'-2" W**
- **8" D**
- **4" painted, dimensional address numerals; color TBD**
- **optional ground based lighting; specification is TBD**

**Monument Sign Views**

- **Top View**
- **End View**
- **Face View**
PARTNER BUILDING MOUNTED SIGNAGE
Partner allowable building mounted signage are shown as diagrams.

Internal Illumination
- Reverse Channel-letter with halo illumination
- Perforated face channel letter with LED illumination
- Push through letters with internal illumination
- Channel letters with internal illumination

FIGURE 5.95 Reverse channel-letter with halo illumination, letters mounted to building facade.

FIGURE 5.96 Open-face channel letter with LED infilled and perforated metal face. No plastic or rubber trim rings allowed.
FIGURE 5.97 Push-through letters with internal illumination.

FIGURE 5.98 Channel letters with internal illumination.
PARTNER BUILDING MOUNTED SIGNAGE
(CONT.)
External Illumination
- Dimensional letter-forms with external illumination

PARTNER CANOPY MOUNTED SIGNAGE
Partner allowable building mounted signage are shown as diagrams.

Internal Illumination
- Channel letters with internal illumination

External Illumination
- Front-face externally illuminated
- Back-face externally illuminated

Canopy Signage Design Considerations
- Some tenant signs will have descenders that need to protrude in front of the canopy fascia, consider all cap font options with no descenders

FiguRe 5.99 Dimensional letter-forms with external illumination (light source may be mounted above or below dimensional letters).

FiguRe 5.100 Diagram of an internally illuminated canopy mounted sign.
FIGURE 5.101 Diagram of a front-face externally illuminated canopy mounted sign.

- Some tenant signs will have descenders that need to protrude in front of the canopy fascia, consider all cap font options with no descenders.
- Construction of canopies vary; verify conditions.
- No exposed fasteners or welds.

FIGURE 5.102 Diagram of a back-face externally illuminated canopy mounted sign.

- Some tenant signs will have descenders that need to protrude in front of the canopy fascia, consider all cap font options with no descenders.
- Construction of canopies vary; verify conditions.
- No exposed fasteners or welds.
SIGNAGE SPECIFICATIONS

Primary Partner signage may be made in any number of methods, materials, and can incorporate many different lighting methods. This signage serves as the main identification for the Partner’s space. Partners are allowed one sign per facade, no more than two signs maximum unless by written permission from the Campus.

Tips and Recommendations

• Using simple shapes and color palettes help with visibility and contrast
• Dimensional pin-mounted letters add depth and interest.
• Keep lettering simple and minimal.
• Use colors and materials that contrast with the facade.
• Illumination allows the sign to be effective at night.
• Use fonts that are easy to read.
• Use materials and methods appropriate to the architectural and natural environment that can be implemented over time while maintaining their integrity.
• All lighting shall be Dark Sky compliant.

Primary Signage

Depending on site configurations, Partners shall be allowed up to two primary identification signs, one facade mounted and one freestanding. In certain site configurations, a Partner may have two facade mounted primary signs and no freestanding, providing the arrangement of the same meets the approval of the Campus and is within the restrictions of the local sign code.

If a Partner elects to have a facade sign in addition to another sign type, one shall be deemed the primary identification through a hierarchy of dimensions or sizing. Use of second primary identification requires prior Campus approval.

Facade sign content shall be limited to the Partner’s name. Description of services or products offered is not allowed on a facade sign. Additional brand language requires prior Campus approval. Multi-line signs require prior Campus approval and should be no more than 30” overall height or the maximum allowed by the specific property. Overall signage length is to be determined case-by-case at the discretion of the Campus based on frontage and facade proportions.

Signs may have internal or external illumination. External illumination shall be well integrated into storefront design. A projecting facade sign, or blade sign, is an option for Partners with corner locations and is only permitted with prior Campus approval.

Any external light fixtures shall be the Campus’s standard, Cooper Lighting Cambria 922 or PAR20 bullet sign lighter.

a. Recommend 1-LED2741 light source (this is wide angle)
b. With OSL lens option
c. Lights mounted w/ on-center spacing, approx. 24” (28” max.)

Partners may specify a fixture of equal or better quality, subject to the Campus’s review and approval. External light fixtures is to be white in color.

Facade signs area to have a minimum clearance of 10” from upper and lower edges of sign band, and 12” clearance from a demising wall center line. Facade signs and other sign elements may not be installed outside of Partner’s frontage without prior Campus approval.

Refer to local codes and ordinances for maximum sign size for business type.
Primary Freestanding Signage
A freestanding sign is most appropriate for when an out parcel is set back from the street or sidewalk. The RELLIS standard monument sign has two faces and the Partner’s brand elements shall be appropriately scaled to compliment the sign and the Partner location.

A freestanding, out-parcel, business shall be allowed one freestanding sign provided the approval of the Campus and is within the restrictions of the local sign code.

Place freestanding signs near the public right-of-way where appropriately scaled for pedestrians or slow speed surface streets, a minimum of five feet from the street right-of-way and ten feet from all interior side lot lines. No freestanding sign should be placed in a manner that obstructs the pedestrian walkway or visibility from street intersections or parking lot entrances or exits.

If a Partner elects to have a freestanding sign in addition to another sign type, one shall be deemed the primary identification through a hierarchy of dimensions or sizing. Use of a second primary identification sign requires prior Campus approval and shall be within the restrictions of the local sign code.

Freestanding sign content shall be limited to the business name and address. Description of services, tag lines, or products offered is not allowed on a freestanding sign. Additional brand language requires prior Campus approval.

Freestanding signs may carry more than one business name but must be considered as part of the overall building signage plan. If more than one business is displayed, they should be considered primary occupants of a building.

Refer to RELLIS monument signage diagrams for illumination and other signage information.

Any external light fixtures may be Campus’s standard, Cooper Lighting Cambria 922 or PAR20 bullet sign lighter.

a. Recommend 1-LED2741 light source (this is wide angle)
b. With OSL lens option
c. Lights mounted w/ on-center spacing, approx. 24” (28” max.)

Partners may specify a fixture of equal or better quality, subject to Campus review and approval. External light fixtures are to be white in color.

Freestanding signs must have a maintained ground plain of plantings, mulch, gravel, or other improved dressing as a component of an overall landscape plan. Bollards or other traffic impediments are not permitted. Signs must not interfere with street trees or the future growth of street trees.
GENERAL SIGNAGE SPECIFICATIONS

1. The sign and any part, or parts thereof, except as otherwise provided in these criteria, shall be located within the limits of the business’s storefront premises.

2. All signs must be new and custom-made. Restored vintage or re-purposed signs may be acceptable with written approval by the Campus.

3. The term “primary identification signage” or “facade signage” used in this section refers to the partner’s most prominent display of identity. Primary identification signage may be placed anywhere within the storefront envelope and may be any sign type listed in this document. The term “secondary identification signage” denotes any sign that supports the aesthetic or branding message of the primary identification sign or business identity. Primary signage shall be larger than any single secondary signage element. The use of primary/secondary signage is intended for the Partner to have an opportunity to convey a hierarchy of messaging. Placement locations will require the Campus review and approval.

4. The signage contractor shall perform all cutting and patching of existing surfaces where required for installation of the signage work included herein. The procedures for the accomplishment of cutting and patching work shall be submitted by the sign contractor to the Campus for approval. The submission is to also include a work schedule showing start of work, finish date, and any other important dates within the project time line. The procedures shall include a detailed description of the methods and equipment to be used for each operation. The sequence of operations of all materials for patching and repairing of existing surfaces shall match existing adjacent surfaces in all respects.

5. Service/rear egress/delivery doors to business areas will have standard identification (business’s name and address number) designed and installed by the Campus at the business’s expense. No other signing or graphic is permitted at the service entrance.

6. Illumination shall be internal to the sign or by external front lighting. Light sources shall not cause glare hazardous to pedestrians or vehicle drivers. Lighting for internally illuminated signs is to be white. With the exception of neon signs, colored lamps shall be permitted only with Campus approval.

7. Face illumination should only consist of day/night type face material so that the face reads as a solid element during the day and illuminates at night. Illumination is to be consistent with no shows or hot spots. Standard type acrylic faced letters/signs with colored faces are prohibited or by the Campus approval only.

8. Non-illuminated storefront facade signage requires written Campus approval.

9. If applicable, the Partner shall provide a dedicated circuit for the Partner’s signage illumination and shall coordinate and utilize a Campus-provided master switching relay system for all illuminated signage.

10. Red, green, or yellow as a primary or majority color of business signage is prohibited without prior Campus approval. This includes material finish as well as illumination.

11. The Campus is not responsible for costs incurred for replacement or construction of signs that do not conform to these sign criteria or for signage that did not receive prior Campus approval.

12. Prohibited sign elements and materials include, but are not limited to the following:
   a. Flashing lights
   b. Animated components
   c. Vinyl trim caps on letter-form/sign face or return. See note J for face material limitations. Use of minimal size aluminum retainers or other low profile retainers for letter-form/sign face are encouraged.
   d. Cabinet signs with illuminated, translucent background and silhouette letters
   e. Vacuum-formed plastic letters
   f. Paper, cardboard, stickers, or decals applied to or located behind the storefront glazing
   g. Sandblasted wood signs in natural wood finish with painted, raised letters and/or logos
   h. Advertising placards, banners, pennants, names, insignia, trademarks, or other descriptive or promotional material not designed as part of the business’s overall presentation and brand identity may not be affixed or maintained on windows, glass fixtures, equipment, or another area of the storefront without owner approval.
i. Exposed raceways, exposed ballast boxes, or electrical transformers; if raceway is used, it must be integrated into the design of the sign. Note applies to wall/facade and canopy signs.

j. Acrylic faced letter-forms and sign cabinet; the only allowed acyclic faced elements are the day/night type where the face appears a solid color during the day and illuminates white at night. See note C for trim cap limitations unless approved in writing by the Campus.

Note: The Campus may modify this list at any time to include any material specific to a business’s signage design and/or fabrication that in the Campus’s opinion is not in keeping with the architectural character or overall quality of the development.

Campus Administration has authority over all campus signage.
5.6 District Supplements

The RELLIS Campus is comprised of four general districts: Central Core, Perimeter, Public Training/Testing, and Secure Training/Testing areas. The design guidelines laid out in this chapter fully apply to any project undertaken within the Central Core. However, certain elements of the guidelines may be relaxed within the other three zones. Those supplementary provisions are outlined here.

PERIMETER DISTRICT
The campus consists of parcels located along the State Highway 21 and State Highway 47 frontage. These sites are planned to be occupied by the A&M System agencies and partnership opportunities that desire a higher degree of visibility from the highway.

• These sites may not be directly connected for pedestrian circulation to the core campus. However, they are encouraged to be designed to accommodate ease of pedestrian flow internal to the site and to seek opportunities for linking into the larger campus recreational path network.

• Within the Perimeter, building massing is still encouraged to respond to the human scale, though longer lengths of buildings may be appropriate when adjacent to the highway or accommodating a necessary programmatic element.

• Certain sites within the Perimeter district may be more auto-centric than the core campus. These buildings are not required to place parking lots at the rear of the site. Parking lots along the perimeter should be carefully sited to allow for convenience while not giving an excessive prominence to surface parking as the outward image of the institution.

TRAINING/TESTING AREA
The Training/Testing area is situated adjacent to the Central Core, largely sited within the Bryan AAF grid south of 6th Street. Though in close proximity to the core, this area requires a more utilitarian, functional treatment and the incorporation of appropriately designed buildings.

• Building massing may incorporate larger floor plates and longer spans to accommodate large research or industrial training or storage functions.

• Building materials should respond to the palette prescribed for the campus as a whole, but the extent of more expensive materials may be limited to particular feature elements that provide a link to the overall RELLIS aesthetic. For warehouse or industrial type buildings, tilt-up or metal walls may be appropriate for building projects with limited budgets.

• The natural light provision can be loosened for buildings in this zone that require large floor plates. Though natural light is always encouraged for regularly occupied spaces, some building designs may prohibit large amounts of glazing toward the center of the floor plate.

SECURE TRAINING/TESTING AREA
The Secure Training/Testing area consists of the proving grounds, training facilities, and private partnership sites generally located west of Avenue A and south of RELLIS Parkway. This zone will be occupied by large training and research functions, warehouses, and test areas. It will also house secure partnership opportunity sites west of the proving grounds.

• Due to the large distances between facilities in the secure campus, pedestrian connectivity to the rest of the campus may not be directly feasible. Sites are encouraged to promote pedestrian connectivity within buildings of the same complex and to seek opportunities to link into a large campus recreational network for bicycles or pedestrians.
• Many buildings in the Secure Training/Testing area will require large floor plates for testing, research, and storage functions. These buildings need not respond directly to the human scale, though regularly occupied spaces and building areas adjacent to common outdoor spaces should still strive to do so.

• The majority of buildings in the Secure Training/Testing area need not reinforce a public realm specifically. Facilities with multiple buildings should still seek to create well-defined exterior spaces for site users. Additionally, sites located along the primary circulation drive should create a defined street edge to provide a sense of place for the larger secure district.

• Building materials for sites in the secure district may vary somewhat from the overall campus palette. While buildings should still contain feature elements that highlight the campus aesthetic, the RELLIS Red Brick may not be the predominant material for many of these facilities when cost is a significant factor. Complementary materials such as concrete, glass, or metal may be used as the predominant material.

• Parking facilities for secure campus buildings may be located closer to the front door of the facilities than they would be in the Central Core. This section of the campus will likely be more auto-centric due to larger distances between buildings. However, priority should be given at the entry to shuttle or bicycle facilities, where possible.
5.7 Review and Compliance

The RELLIS Campus Master Plan Design Guidelines will be administered by a limited Design Review Board to ensure compliance with the intent of the guidelines.

DESIGN REVIEW BOARD
A design review board (DRB) will be appointed to facilitate the review and compliance process. The DRB will initially consist of three members. One member will be appointed by the chancellor of The Texas A&M University System; one member will be appointed by the RELLIS Campus Director; and one member will be appointed by the A&M System Facilities Planning & Construction department. Appointed members should be experienced in the profession of architecture or landscape architecture, as the design guidelines present a series of principles that require professional expertise to analyze and ensure compliance.

The DRB size is kept small to be able to respond quickly to project requirements as the campus grows. Once the campus population increases, two additional members may be added to provide input from a broader constituency. One of these members would be appointed from a selected A&M System institution occupying the campus. The second additional member would be a student representative, typically a student leader with a background in built projects, such as the AIAS president from a College of Architecture.

The DRB will have the responsibility of reviewing the proposed Site Plans, Architecture, Landscape Architecture, and Signage to ensure that designs comply with the approved RELLIS Campus Design Guidelines established for the master plan.

PROCESS
All projects shall be developed in accordance with A&M System policies. On any given project, the DRB shall review projects at regular intervals. Projects should be reviewed by the DRB at the following intervals:

1. Program/Conceptual Design: A project should be reviewed for compliance with the campus guidelines and conformance with the overall master plan vision

2. Schematic Design

3. Design Development

4. Pre-Construction: Exterior Building Material and Assembly Mockup

Following the approval by the DRB, a project may be reviewed by the A&M System Chancellor and Campus Director for additional approval.

APPROVAL
Approval of a project by the DRB should be based solely on compliance with the RELLIS Campus Design Guidelines, as evaluated by professional judgment. Decisions to approve a project should not be based on personal preference.
SIGNAGE SUBMISSION RESOURCES

Formal Design Submission

Member and Partner applicants will submit the formal design submission to the DRB. Concepts approved (Concept Design Submission) may then be developed into implementation documents through any required design professionals.

The required design professionals include any professional design services such as architects and engineers for building envelope development. Members and Partners may also consider (though not required) environmental graphic designers to provide designs and fabrication documents for signage. Signage fabricators typically provide the necessary engineering requirements for signage installation.

Formal Design Submission Requirements

Digital files in PDF format of the following materials are required:

a. Detailed construction documents showing detailed information on materials, colors, dimensions, design details, connection details, lighting features for architectural features, and signage/graphic elements (see Signage Overview for Signage requirements);

b. Exterior color elevations or renderings depicting the overall architectural and signage characteristics;

Note

Members and Partners shall provide working drawings to the DRB.

No construction shall commence until written approval from the DRB has been obtained.
Appendices

A  Acknowledgments
B  Resources and Additional Studies
C  Campus Comparisons
D  Potential Future Facilities
E  Capacity Analysis
F  Parking and Trip Generation
G  Projected Utility Loads
H  Smart Campus Checklists
ACKNOWLEDGMENTS

THE TEXAS A&M UNIVERSITY SYSTEM BOARD OF REGENTS

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Elaine Mendoza, Vice Chairman (2023)
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James Nelson, Director of Special Academic Initiatives
Kevin McGinnis, Former Executive Director, Risk Management and Benefits Administration
James Bright, Senior Program Manager
The Texas A&M University System is one of the largest systems of higher education in the nation, with a budget of $4.55 billion. Through a statewide network of 11 universities and seven state agencies, The Texas A&M System educates more than 148,000 students and makes more than 22 million additional educational contacts through service and outreach programs each year. System-wide, research and development expenditures exceeded $972 million in FY 2016 and helped drive the state’s economy.

**Universities**

- Texas A&M University
- Texas A&M Health Science Center
- Prairie View A&M University
- Tarleton State University
- Texas A&M International University
- Texas A&M University-Corpus Christi
- Texas A&M University-Kingsville
- West Texas A&M University
- Texas A&M University-Commerce
- Texas A&M University-Texarkana
- Texas A&M University-Central Texas
- Texas A&M University-San Antonio

**Agencies**

- Texas A&M AgriLife Research
- Texas A&M Engineering Experiment Station
- Texas A&M AgriLife Extension Service
- Texas A&M Forest Service
- Texas A&M Engineering Extension Service
- Texas A&M Transportation Institute
- Texas A&M Veterinary Medical Diagnostic Laboratory

**RELLIS Master Plan Executive Committee**

- John Barton
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- Dimitris Lagoudas
- Kevin McGinnis
- James Nelson
- Gary Sera
- Jorge Vanegas
- Greg Winfree
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Nathan Jones, Utilities and Energy Services
Bob Meyer, Utilities and Energy Services
Jim Riley, Utilities and Energy Services
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Yvonne Bryant, Project Planner
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Randy Wipke
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Aaron Hodge
Audrey Rohloff Ecklund
Eve Persons
Joe Ellerbrock
Robert Hartman
Charles Frosch
Andrew Lange

Engagement Teams - Campus Planning Team

Page, Project Lead
AEI Engineering, Utilities & Infrastructure
Architexas, Historic Preservation
Atkins, Smart Campus Planning
Coleman & Associates, Landscape Architecture
DeShazo Group, Mobility Planning
Protection Engineering Consultants, Site Security
Sherwood Design Engineers, Civil Engineering

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Joan Muniz, Texas A&M System
Nancy Johnson, Texas A&M System
Megan Johnson, Texas A&M System
Robbye Morsko, Texas A&M System
Ashlea Hewlett, Texas A&M System
Christopher Matus, Texas A&M Facilities Coordination
The RELLIS Campus Master Plan presents the future organization and guiding concepts for the development of the site. Individual projects will need to refer to the master plan to ensure they fit within the campus vision. However, not all necessary documents and information for construction projects are contained within this document. Additional resources are available that provide background and specific detail for work on the campus.

The Texas A&M System Facility Design Guidelines are the most significant resource document to be referenced on all capital projects on the RELLIS Campus. These guidelines are intended as guidance for the project architect/engineer and the contractor team during the design and construction process. The content covers specific design criteria, the design process, and administrative procedures for permanent buildings on A&M System campuses. The most current version of the guidelines can be found on the A&M System website: www.tamus.edu.

RELLIS Resource Documents that were developed prior to the master plan process are available to provide additional detail and background that on items such as infrastructure or existing structures. They are useful resources to understand specific planning decisions. These documents include the following:

- RELLIS Campus Infrastructure Evaluation, developed by Burns & McDonnell (September 6, 2016)
- Sanitary Sewer Infiltration and Inflow Investigation, developed by Stanley Consultants (January 2017)
- Texas A&M RELLIS Campus Historical Building Assessment, developed by AmaTerra Environmental (September 2016)
- The Texas A&M University System Developer Project Guidelines, which can be found on the A&M System website: www.tamus.edu.
- Cushing Memorial Library & Archives

Additional Studies are likely to be required in the future as the campus builds out and new infrastructure is required. Among these possible studies are the following focuses:

Priority 1
- Sanitary collection system evaluation and sewer treatment plant upgrades analysis
- Water tower evaluation

Priority 2
- UES guidelines update
- Wayfinding and signage master plan that provides the campus with buildable documentation of all sign types for ease of implementation and consistency

Priority 3
- Campus security plan
- Campus technology plan
C Campus Comparisons

During the analysis phase of the master plan, various research parks and innovation campuses were studied to better understand how the RELLIS Campus can or should be positioned on the national stage. The matrix on the following page provides a high-level summary of these campuses and their relationship of campus size to programmatic function, whether mixed- or single-use.

Campuses identified with red in the matrix were studied to understand their physical conditions, primarily surrounding the ratio of built to open space. Some of these campuses are relatively new, where others have existed for decades and are beginning to rethink their physical model.

An additional case study of the Texas A&M University campus in College Station was developed to provide a point of reference from within the A&M System. Through these analyses, the stakeholder group determined that the initial development scenario for the RELLIS Campus would be approximately 10% built area for the campus at large, with certain areas of elevated concentration, such as the Central Core.

Built areas shown in these cases studies are reflective of building footprint only and not FAR. Areas calculated as structured parking are for standalone parking facilities. Parking areas integrated into larger buildings are calculated within the building footprint.

<table>
<thead>
<tr>
<th>REllIS Campus (Existing)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Campus Details</strong></td>
</tr>
<tr>
<td><strong>Size</strong></td>
</tr>
<tr>
<td>1,877 acres</td>
</tr>
</tbody>
</table>
## Texas A&M University

### Main Campus Details
- **Size:** 450 acres (excluding 250 acres for Golf Course and Polo Fields)

### Built Area
- Building Footprints = 19.6%
- Structured Parking = 2.6%
- **Total Built Area = 22.2%**

## Wichita State University Innovation Campus

### Campus Details
- **Size:** 126 acres

### Built Area
- Building Footprints = 14.5%
- Structured Parking = 4.4%
- **Total Built Area = 18.9%**

## Western Michigan University Business Technology & Research Park

### Campus Details
- **Size:** 252 acres

### Built Area
- Building Footprints = 4.9%
- Structured Parking = 1.7%
- **Total Built Area = 6.6%**
Stanford Research Park

Campus Details
Size
750 acres
Built Area
Building Footprints = 19.5%
Structured Parking = 1.3%
Total Built Area = 20.8%

Research Triangle Park

Campus Details
Size
6,640 acres (excluding 472 acres of nature preserve)
Built Area
Building Footprints = 3.5%
Structured Parking = 0.3%
Total Built Area = 3.8%

*Only a portion of Research Triangle Park is shown for scale comparison with other campuses.

Park Center
Research Triangle Park

Campus Details
Size
113 acres
Built Area
Building Footprints = 40.6%
Structured Parking = 1.6%
Total Built Area = 42.2%

*Park Center plan will redevelop a portion of Research Triangle Park.
Over the course of the master planning process, RELLIS Campus stakeholders identified potential future facilities and projects to fulfill the missions of entities active on the campus. Some of these are identified on the current list of capital projects, where others are simply projections of future possibilities based on the existing trajectory of education, research, and training. The following potential future facilities are organized according to the agency, institution, or general campus function and are given an approximate building size or area where one can be estimated.

**General Campus**

- Expo/large conference center
  - 30,000–40,000 GSF
  - 300 people for largest capacity meeting
- Wellness facility
- Recreational field
- Residential for students and visiting academics
  - 2,000 beds
- Infrastructure
  - Storm sewer
  - Wastewater treatment plant
  - Stormwater detention
  - Electric substation
  - Field wireless communications

**Alliance Academic Complex**

- RELLIS Academic Complex Phase 1a & 1b
  - Phase 1a - 68,100 GSF
  - Phase 1b - 44,100 GSF
  - 2,000-2,500 students
- RELLIS Academic Complex Phase 2
  - 70,000 GSF
  - 2,000-2,500 students
- RELLIS Academic Complex 3 & 4
  - 140,000 GSF
  - 4,000-5,000 students
- Blinn College
  - (3) additional buildings

**Agriculture and Life Sciences**

- ALEC Agricultural STEM Integration Complex
  - 40,000 GSF
  - 4-5 acres of outdoor space
- BAE SIWI Center and Infrastructure
  - 1 acre
- Natural History Museum/Collections Facility
  - 150,000 GSF
- Animal Science acreage
- Animal Handling Facility Expansion
- Safety City
  - 15 acres

**Economic Development**

- Pad sites for retail
- Retail strip center
  - 20+ acres
- Incubator building for potential corporations
  - 20,000 GSF
- Food service
- Data center
  - Phase 1 - 50,000 GSF
  - 300,000 GSF total in up to 4 phases

**Joint Library Facility**

- Module 3
  - 13,000 GSF
- Bookless library
  - 10,000 SF
  - Within another campus building

**TEES**

- TEES State Headquarters
  - Phase 1 - 38,900 GSF
  - Phase 2 - 25,600 GSF
- Industrial Distribution Buildings
  - Rowlett IDB - 30,000 GSF
  - IDB #2 - 30,000 GSF
  - IDB #3
  - IDB plaza
• Mary Kay O’Conner Process Safety Center
  ◦ Part of the TEES State Headquarters building

• Industry Lab
  ◦ 30,000 GSF
  ◦ 180’x110’

• Cyber/National Security
  ◦ Cyber Security/SCIF - 20,000 GSF
  ◦ Cyber House - 1,500 GSF

• Directed Energy
  ◦ 50 acres

• Research Building
  ◦ Applied Research Lab
  ◦ Industrial Scale Testing
  ◦ Product Development Center
  ◦ 100,000 GSF

• Applied Research Building #2
  ◦ TI Replacement
  ◦ 100,000 GSF

• Flexible Manufacturing Scale-Up
  ◦ 40,000 GSF

• Workforce Development Classrooms
  ◦ 50 person classrooms
  ◦ (1) in each research area
  ◦ Part of other buildings

• Energy Sector/Smart Well
  ◦ Use of existing oil pad

• Large Scale Testing/Coastal Energy

• Solar Field
  ◦ 10 acres

• Subsurface Exploration
  ◦ Use of an existing oil pad
  ◦ Building - 40,000 GSF

• Aerospace Research Facility
  ◦ 40,000 GSF

TEEX

• Advanced Testing & Training Area
  ◦ 145 acres (2,500 lineal feet minimum)
  ◦ Relocated prop houses - 2 acres
  ◦ Expansion of simulation operations
  ◦ Expansion of training capabilities
  ◦ Cyber training
  ◦ Law enforcement training
  ◦ Utilities training (poles & subsurface)
  ◦ Urban grid testing area
  ◦ UAS - 1.5 acres

• TEEX Headquarters
  ◦ 30,000 GSF

• TEEX Print Shop replacement
  ◦ 1.5 times existing facility size

TTI

• Erosion Control Support Building
  ◦ 1,200 GSF

• Covered Storage
  ◦ 50,000 GSF
  ◦ Some space to be accommodated in renovated existing facilities

• Temporary AV/CV Vehicle Preparation Area
  ◦ 2 garage bays

• Asset Management Building
  ◦ 20,000 GSF

• Proving Grounds Support Building
  ◦ 45,000 GSF

• Field Testing Portable Trailers
  ◦ (3) trailers

• State Highway 47 ACT Equipment

• Proving Grounds
  ◦ 250 acres
  ◦ Oval track for high-speed continuous testing

• Green Infrastructure Park
  ◦ 15 acres
E Capacity Analysis

The Potential Future Facilities list (Appendix D) provided direction on utilization of portions of the campus built area. The adjacent table created additional area assumptions to influence the plan. Beyond these currently envisioned functions, additional “infill” development is possible to meet the target capacity determined through the stakeholder input process. Together, the program summary and the infill development create the built scenario outlined in the master plan’s illustrative plan.

### PROGRAM SUMMARY FOR DEVELOPMENT STUDIES

<table>
<thead>
<tr>
<th>BLDG ID</th>
<th>Description</th>
<th>Location</th>
<th>Area (GSF)</th>
<th>Housing Levels</th>
<th>Beds</th>
<th>Exterior Space Infra. (ac)</th>
<th>Green Space (ac)</th>
<th>Estimated Build Projection</th>
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<tr>
<td>GENERAL CAMPUS</td>
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<tr>
<td>G1</td>
<td>Expo/Conference Center</td>
<td>CC</td>
<td>40,000</td>
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<td>G2-2</td>
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<td>G2-3</td>
<td>Residential: Upper/Visitor PR/CC</td>
<td>125,000</td>
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<td>Wellness Center</td>
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<td>ALLIANCE ACADEMIC COMPLEX</td>
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<td>AAC1</td>
<td>RELLIS Phase 1a &amp; 1b</td>
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<td>AAC2</td>
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<td>AG1</td>
<td>ALEC STEM Complex</td>
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### PROGRAM SUMMARY FOR DEVELOPMENT STUDIES (CONT.)

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*Note 1: Workforce Classrooms are to be constructed as shared facilities within other buildings.*

### POTENTIAL INFILL DEVELOPMENT

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<th>Description</th>
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<th>Levels</th>
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<td>TA</td>
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| WEST OF RUNWAYS | D3 Partner Development | PR/FX    | 405,000    | 2-3    |
|                 | D4 Partner Development | SA/FX    | 705,000    | 1-3    |

**TOTAL** 2,095,000
The Potential Future Facilities were placed on the campus layout to present a possible scenario for building locations. When projects are realized, exact site decisions should be evaluated against the intent of the master plan and the specific programmatic requirements.

Facilities in the plan are labeled according to the “BLDG ID” indicated in the tables on the preceding pages.
*Unlabeled white buildings are infill
Estimated parking requirements were developed for the projects listed on the Potential Future Facilities list (Appendix D) that included approximate buildings sizes.

References:

Institute of Transportation Engineers (ITE) Parking Generation, 4th Edition (2010)

Based on the populations estimated from the areas of Potential Future Facilities, approximate weekly and peak hour trip generations estimated for the campus. Trips were not generated for the “Expo/Conference Center”, as convention centers are unique and need to be evaluated on a case-by-case basis to determine the estimate trips.

In addition to trip generation, primary roadways on the RELLIS Campus, such as RELLIS Parkway and Airfield Drive, were analyzed for their likely capacity. These roadways have a theoretical daily capacity in a range between 5,000 and 15,000 vehicles.

References:

<table>
<thead>
<tr>
<th>BLDG ID</th>
<th>Description</th>
<th>Quantity</th>
<th>Weekday Trips</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
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<td>G1</td>
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<td>112,200 SF</td>
<td>1,925</td>
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<tr>
<td>G2</td>
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<td>1,925</td>
<td>155</td>
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Based on the individual project trip generation estimates, along with analysis of existing facilities and programs, total peak hour trip generations for the campus were estimated at the 5-year, 10-year, and 20-year build-out time frames. Facilities included in each of these time frames are indicated in Appendix E.

<p>| TRIP GENERATION SUMMARY (CUMULATIVE) |</p>
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The campus will develop in the near-term with a primary entrance on Airfield Drive off of State Highway 47 and a secondary entrance off of State Highway 21. For both of these entrances, peak hour turning movements were estimated based on the near-term build-out of the campus.
Utilizing the Potential Future Facilities list (Appendix D), approximate building loads for utilities were projected to determine the required capacity of campus infrastructure in the future. For certain facilities not given an area in the list, an area was estimated in the table to ensure some demand was captured for these buildings. Projects under construction at the time of the master plan were also included to incorporate the complete demand on new systems.

### PROJECTED CAMPUS LOAD

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<th>BTU / Sq. Ft.</th>
<th>MBH</th>
<th>Peak Heating Load</th>
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### PROJECTED CAMPUS LOAD (CONT.)

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DECISION CRITERIA

Evaluation Criteria Decisions should reinforce mutual benefits in a manner that is responsive to the RELLIS and the A&M System communities. These benefits should be evaluated across four distinct criteria that advance new pedagogies: Vision, Impact, Implementation, and Transferability.

**VISION**
Ideas should be bold, creative, and importantly, should tackle the most pressing issues.

**IMPACT**
Ideas should have the potential to significantly improve citizens’ lives. Issues addressed should be timely and relevant.

**IMPLEMENTATION**
Concepts must demonstrate their commitment and a viable path to bringing ideas to life. This includes garnering support from key stakeholders.

**TRANSFERABILITY**
Ideas will not only be beneficial to RELLIS, but also have the potential to spread—and succeed—in other A&M System campuses and markets.
DATA STANDARDS
The following questions are intended to facilitate practical questions as a checklist to maintain standards of the RELLIS smart campus initiative. This is not intended to facilitate critical inquiry through any vendor interaction and is not a comprehensive list.

Examples include:

• What data feeds are anticipated?
  ◦ Data to be consumed by system
  ◦ Data to be provided by system
  ◦ Privacy considerations?

• Is the feed well-defined and written down?

• Who will maintain?

• What is the schema for changing default logins and passwords on each device?
  ◦ How does the vendor demonstrate compliance with this requirement?
  ◦ What is the schema for disabling all non-required ports/services?

• What dependencies does this IOT system have on other systems?

• Is there a documented commissioning plan for this IOT system and associated devices?

• Is there a design guide for this IOT system?

• How many endpoints (IOT devices) will be deployed?

• Who will support these?
  ◦ If local FTE, is capacity available?
  ◦ Will it remain available?
  ◦ If not local, vendor availability?

• What are vendor requirements for hosting aggregating server, database, and redundancy hardware/services?
  ◦ Who pays for this?
  ◦ If cloud-based, who pays and manages this?

• Is a risk sharing agreement in place with the vendor?

• Committee for New Projects
  ◦ Planning
  ◦ RFI
  ◦ RFP
  ◦ Contract negotiations
  ◦ Identify adoption roadblocks