UtahState University

USU Tooele
Campus Master Plan




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PREPARED BY MHTN ARCHITECTS, INC.

USU Tooele Campus Master Plan Contents

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SECTION 1

Executive Summary

The USU Tooele Campus Master Plan establishes a framework for future campus development that will fulfill the vision of the University and fellow stakeholders in the Tooele community. The 50-year plan provides a guide for incremental development that is sustainable and responsive to the immediate and regional context of the campus. The plan meets programmatic objectives as defined by the University with support and participation from educational partners, local government, local business and industry, and area residents and community members.

The master planning process occurred from July through December of 2011. Guided by a small core team of Regional Campus administrators and University facility planners, the process also included broad participation from the stakeholder groups mentioned above.

From modest beginnings in downtown Tooele in 1986, USU Tooele has grown to serve a headcount of nearly 1,000 students. Its current 36,000 SF building in west Tooele City is adjacent to two other educational facilities: the recently constructed Tooele County School District (TCSD) Community Learning Center (CLC) and the Tooele Applied Technology College (TATC), currently being designed for construction in 2012. The adjacent facilities provide alternative high school and post-secondary technical education and partner with USU in sharing academic and student support space.

USU has acquired 54 acres of undeveloped land directly south of the three existing educational facilities and plans to expand its physical campus on the vacant property. USU, the TATC, the TCSD, and other Tooele community members envision this area of the city as the Tooele Educational Corridor, which will serve the educational, training, and cultural enrichment needs of the entire Tooele County community. The master plan primarily addresses the development of the new USU property, but also includes the relationship between the new campus and the existing educational facilities, in support of the educational corridor concept.

Additional planned developments and improvements, and their influences for this area, were considered during the master planning effort. Among others, they included:

- Tooele Research & Business Park, a business, research and light industrial park planned by Tooele City for the large parcel of property west of USU's 54 acre property;
- Utah Industrial Depot (west of the Tooele Research & Business Park);
- Deseret Peak Complex (recreational facility);
- Miller Motorsports Park and its future motor vehicle related industrial research park;
- Mid-Valley Highway, the Utah Department of Transportation's planned north-south highway in western Tooele County, which will be a major access route from Interstate 80 for County residents in the future;
- Rail lines serving Tooele and future public transit to be provided by the Utah Transit Authority.

USU Tooele Campus Master Plan

Master Plan Description

The campus 50-year master plan accommodates the following:

Students. A total of 3,200 full-time equivalent (FTE) students, representing an annual increase of 4.25% above the fall 2011 FTE quantity of 408. The 4.25% annual growth rate is equivalent to a 23% 5-year growth rate.

Buildings. Ten new buildings, totalling 600,000 to 700,000 gross square feet (GSF) or approximately 200 GSF per FTE. The buildings are projected to be 2 to 3 stories each, with an average footprint of 30,000 GSF.

Infrastructure. Roadways, parking, pathways, open space, landscaping and utilities appropriate to support the full 50-year campus build-out.

The master plan includes these elements, which are numbered on the plan opposite. (See Section 2 for larger plan images and more detailed master plan description.)

1. Open Space. Three formal open green spaces organize the campus. The largest, an oval, is located on the west side of the campus center, and is visible from Tooele Boulevard on the west. Smaller quads are located to the north and south, connected by pedestrian pathways.

2. Agrarian Zone. An agrarian research area of approximately 5 acres is preserved at the south end of the campus. A support/service building is adjacent to it on the southeast.

3. Buildings. Two large buildings, containing campus-wide functions such as administration, student services, and student life, front the large green space at the campus center. Two groupings of four academic buildings surround the smaller quads located at the campus north and south ends.

4. Landscape Buffer. A 45' wide landscaped zone along the campus east edge preserves an existing utility easement and also provides a buffer between the campus and residential neighborhoods to the east.

5. Parking. Surface parking lots along the north and east sides of campus accommodate approximately 1,150 cars. This represents 1.6 to 1.9 cars per 1,000 GSF, and .36 cars per FTE, at full campus build-out. (The existing USU building parking count of 178 represents 4.9 cars per 1,000 GSF and .35 cars per FTE.) Surface parking could become a 2-level, above-grade, open structure in the future, if additional parking capacity is needed.

6. Intermodal Edge. A 120' wide intermodal zone lines the west campus edge. It contains: separated pathways for pedestrians and bicycles; a drop-off/pick-up location for mass transit; campus markers at the north and south ends, which act as visual links to the existing USU building to the north; and an open, xeriscaped channel for storm water drainage, retention, and percolation.

7. Connector. A narrowed extension of the Intermodal Edge continues north from the campus, providing pedestrian and bicycle connections to the existing CLC, USU and TATC buildings.

8. Tooele Boulevard. Tooele Boulevard extends the full length of the campus on the west. A roundabout near the campus north end provides access to USU Tooele and the future Tooele City Industrial Park.

9. Existing USU Building. As master-planned, the primary façade and entry point for the existing USU building is relocated from the north to the west side, strengthening its connection to the new educational corridor, and the buildings and campus to the south.

10. Tooele Applied Technology College (TATC). This building will be constructed in 2012 and will provide approximately 12,000 GSF of space for USU Tooele.

11. Existing Community Learning Center (CLC). The Tooele County School District CLC provides space for USU Tooele's Engineering and Child Care programs.

Vehicular pathways are located along the campus north and east edges, leaving the campus core as a compact, pedestrian-only zone. A small amount of parking and a drop-off arrival zone are located at the north end. The vehicular pathway travels through the campus surface parking lot on the east and terminates at the south end of campus at 700 South Street.

The campus main utility corridor is a below-grade walkable tunnel underneath the primary north-south pedestrian pathway at the center of the campus. East and west spurs connect the tunnel to all campus buildings.

The master plan shows three options for a central plant location. Two are standalone facilities, on the north and south ends of campus. The third and recommended option locates the plant inside a campus building constructed during the second phase of campus development.

Master Plan Phases

Development of the Tooele Educational Corridor and the USU Tooele campus is planned to occur from north to south, in four general phases as shown on the plan opposite. The phases are not tied to specific time frames, but will occur in response to need and demand for additional space. The plan denotes the anticipated order of building construction within each phase.

The first phase consists of: construction of the new TATC; modification of the existing USU building so that the primary building and parking entries face Tooele Boulevard; and construction of elements connecting the existing educational facilities and the new campus (pedestrian pathway, bicycle pathway, landscaping and Tooele Educational Corridor markers.)

In Phase 2, four academic buildings will be constructed. Portions of Tooele Boulevard, the east parking lot and the campus central utility tunnel will be constructed as necessary to support the north end of the new campus.

In Phase 3, campus-wide support functions will move from the existing USU building to two large buildings at the campus center, and the large central quad will be constructed. Roadways, pathways, parking and utilities will be extended southward to support the new development.

Phase 4 will see the addition of four more academic buildings and the final extension of support and utility elements.

The agrarian research zone on the campus south end will be developed during the first and second phases of campus construction, in an enlarged configuration extending into the Phase 3 and Phase 4 areas. As the later phases are constructed, the zone will shrink accordingly, until it reaches its final size and configuration.

Master Plan Phases

Site

The site image shows the immediate vicinity of the USU Tooele campus, located on the west edge of Tooele City, west of the Oquirrh Mountains. The property is oriented north-south and slopes down from southeast to northwest. The site is a former regional airport; the runway is parallel to and east of the property's west edge.

Residential neighborhoods consisting of single story houses are directly east of the campus. The land to the west and south is undeveloped or sparsely developed, and zoned for light industrial use. To the immediate north is the Tooele County School District Community Learning Center (CLC), with the existing USU Tooele building located north of that. North and west of the new campus is the 8.43 acre site of the future Tooele Applied Technology College (TATC).

Existing Conditions & Site Forces

SECTION 2

Master Plan

Introduction & Background

Utah State University established a presence in Tooele County in 1986, with initial courses offered in a face-to-face format by traveling USU instructors in a four room suite of office space in downtown Tooele. For a ten year period of time, classroom space was rented at the Tooele Army Depot, Tooele High School, and in cooperation with private business and industry partnerships. In 1996, the community rallied for the construction of a permanent facility by underwriting a loan from an area credit union. Responding to increasing needs for program expansion, the original facility was expanded in 2009. USU Tooele's programs and capacities are being supplemented by shared space in two adjacent facilities: the Tooele County School District's Community Learning Center, completed in 2010, and the new Tooele Applied Technology College which will be constructed in 2012. See Section 3 for more information regarding existing facilities.

USU Tooele has acquired 54 acres to accommodate future campus expansion. In 2009, the City of Tooele gifted 30 acres to USU Tooele and the University exercised an option to purchase an additional 24 contiguous acres. The north edge of the 54-acre parcel is approximately one-third mile south of USU Tooele's existing facility. The Community Learning Center and two additional properties (Valley Mental Health and the Tooele County School District Maintenance Shops) lie between the current and acquired properties.

Even though there has been an increase in facility capacity during the past several years, recent community demands and large enrollment increases have led to recommendations for further expansion. In order to fully understand campus needs and the best direction for future growth, USU Tooele has undertaken this comprehensive 50-year master plan.

Master Plan Goals & Scope

Broad goals for development of the master plan include:

- Implement the vision of an educational corridor for Tooele County, in which the USU Tooele Campus, the TATC and the TCSD are essential partners. This will be a campus community environment that provides access to high quality adult education, six days a week, 52 weeks a year.
- Develop connections among all educational facilities in the vicinity: the current USU building, the planned TATC / USU building, the CLC, and the newly acquired campus property.
- Establish a physical framework for the future campus environment that will allow USU Tooele to fulfill its programmatic objectives, as well as the vision and goals of the collective stakeholder group.
- Incorporate sustainable design principles in all aspects of the campus development, including site, building, and utilities.

The primary focus of the master plan is the 54-acre property, but the property's relationship to and connections with the current USU Tooele facility, the CLC and the TATC are extremely important considerations and are included in the master plan scope.

Specific master plan scope elements are outlined below:

- Assess existing facilities, property and infrastructure.
- Analyze site planning forces and parameters.
- Project future campus enrollment and program needs, based on demographic projections and other factors.
- Outline planning principles and design guidelines for future development.
- Recommend a physical framework – buildings, open space, transportation pathways, utility corridors – that will accommodate future campus needs in a way that is sustainable and appropriate to the regional context.
- Develop a plan that links the future campus with existing educational facilities, creating an educational corridor that supports community education, economic development, and cultural life.
- Develop a reconfigured access from Tooele Boulevard into the existing USU Tooele facility, with appropriate signage along Tooele Boulevard.
- Determine appropriate phasing for campus development, along with projected costs.

Master Plan Process

The master plan core team consisted of USU Tooele administrators, along with Facility Planning and Regional Campus and Distance Education (RCDE) representatives from USU's campus in Logan, Utah. The core team met on a regular basis during the development of the master plan. The process also included broad participation from additional project stakeholders representing these areas:

Tooele City government
Tooele City Planning
Tooele County Planning
Tooele Army Depot
Utah Industrial Depot
Local business leaders
Residents of surrounding neighborhoods
Tooele Applied Technology College
Tooele County School District
USU Facilities
USU RCDE

The master plan process took place from July to December of 2011 and included:

- Master plan visioning sessions attended by broad stakeholder representation.
- Information-gathering interviews with local planning and zoning departments.
- A town hall meeting attended by local residents.
- Telephone interviews and coordination with the Utah Department of Transportation and the Utah Transit Authority.
- Study of background information provided by USU, including: a CAD plan showing existing site conditions; USU campus standards and materials; existing facility data; and enrollment/program data.
- Formulation of enrollment and program projections.
- Determination of future campus utility needs.
- Development of master plan principles and guidelines.
- Creation of site planning options and selection of a preferred conceptual direction.
- Documentation of the master plan process and decisions in a printed and electronic deliverable.

Master Plan Assumptions & Capacities

The campus 50-year master plan accommodates the following:

Students. A total of 3,200 full-time equivalent (FTE) students, resulting from an annual increase in enrollment of 3.7% (equal to 20% growth over a 5-year period), and starting at the current FTE quantity of 509 (headcount of 971).

Buildings. Ten new two to three-story buildings, with an average footprint of 30,000 gross square feet (GSF). As master-planned, the campus total GSF would range from 600,000 to 700,000, or approximately 200 GSF per FTE, which was the ratio determined appropriate during master planning.

Infrastructure. Roadways, parking, pedestrian pathways, landscaping and utilities appropriate to support the 50-year campus.

Agricultural Research Plot. A zone on the south end of campus to be used for agricultural research. The zone will act as a land bank for the campus; its initial size and configuration will be enlarged, extending north into future building sites. As the campus grows into its final configuration, the plot will shrink to its master-planned, 5-acre size.

Xeric planting at a water-feature stream bed.

Master Plan Vision

At the beginning of the master plan process, USU Tooele stakeholders gave input on their vision for the campus. The input was organized into categories and formulated into a statement of Master Plan Vision. The finalized statement is presented here, with categories in alphabetical order.

Campus Functions & Programs

USU Tooele will...

- promote and celebrate this area of the city as the Tooele Educational Corridor.
- act as an industrial incubator, promoting spin off companies that can flourish in the nearby Industrial Research Park, the Industrial Depot, or elsewhere in the Tooele community.
- incorporate and encourage research as part of the curricula, and create an institute for research innovation.
- accommodate a broad future curriculum, with potential offerings in the fields of study proposed by the focus group:
  - Science
  - Biology
  - Chemistry
  - Business
  - Performing Arts
  - International Trade
  - Community Education
  - Veterinary Medicine
  - Criminal Justice
  - Manufacturing
- provide a gathering place for the campus community, as well as for the surrounding community.
- accommodate a possible future cultural center, to be used for the arts, and for community and special events.
- plan for facilities that promote student life, including student services, career services, financial aid and scholarship, and a student center.
- provide dining and snacking options within the fabric of the facilities.
- allow future creation of student recreation facilities.
- consider accommodation of future residential life facilities.
- create space for a possible USTAR facility.
- incorporate a museum, or museum-like components within campus facilities.
- include special-use spaces within larger facilities in order to round out options available for students and the surrounding community.

Campus Organization

USU Tooele will...

- create a walkable, pedestrian-friendly environment that can tie into future walkable-community initiatives.
- form a link, both physically and visually, between the existing building and future campus facilities.

- act as a buffer between the residential neighborhood to the east and the future Industrial Research Park to the west.
- consider covered connectors between buildings that provide a continuous, conditioned pedestrian pathway linking all campus facilities.

Design Parameters

USU Tooele will...

- relate to existing and future educational corridor facilities through programs offered, material palette, design, and context.
- establish a strong sense of entry through appropriate signage and landmark structures.
- incorporate high-quality, timeless design elements that are practical, functional and that use regional materials.
- incorporate standards that can be complemented and matched by those of the neighboring Industrial Research Park.
- uphold a high standard that exceeds the quality level of the surrounding community.
- express respect for the environment and surrounding natural beauty by using innovative and sustainable landscape and xeriscaping.
- encourage learning through building designs that demonstrate principles of quality construction and sustainable design.
- appropriately screen parking from street and neighboring views.
- be adaptable to change over time.
- place a priority on sustainability and green design.
- encourage openness in facility design.
- accommodate reasonable amounts of storage for maintenance equipment within the buildings and on the site.

Image & Character

USU Tooele will...

- develop a welcoming and inviting character and image that recognizes its regional context and contributions.
- achieve statewide and regional recognition for academic offerings related to industrial technology and business development. USU Tooele will become an educational destination, known for its excellent opportunities and outcomes.
- in addition to its academic achievements, serve as a center for community involvement and cultural events.
- be visually and philosophically recognizable as Utah State University, with strong links to the Logan campus.

Phasing & Implementation

USU Tooele will...

- develop its own unique character while at the same time respecting Tooele City's master plan and development goals. Its flexible planning concept will achieve campus goals now and 50 years into the future.

Relationship with Neighboring Properties

USU Tooele will...

- encourage development of, and partnering with, industrial and manufacturing businesses nearby.
- complement the city's Industrial Research Park.
- recognize the needs and concerns of neighboring residents and accommodate those needs in a mutually beneficial way.
- facilitate opportunities for small, privately-run retail operations to be integrated into the campus fabric.

Relationship with Surrounding Community

USU Tooele will...

- offer attractive, accessible, and affordable first-rank higher education opportunities to Tooele County and regional residents.
- become a good community partner for business development and incubation, providing a highly educated workforce to local businesses.
- fulfill the community expectation of the campus as an economic engine and anchor for local, regional, and statewide development and job growth.
- celebrate Tooele County with opportunities for community gatherings and events.

Safety & Security

USU Tooele will...

- provide a safe environment for all who use the campus.

Sustainability Goals

USU Tooele will...

- set the standard for sustainable campuses, with design requirements that utilize green technology and local alternative energy sources. USU Tooele will be recognized as the campus with the lowest carbon footprint in the region.

Traffic, Parking & Wayfinding

USU Tooele will...

- incorporate standards for internal and external streetscape development – a complete design that includes rights of way, utility easements, pedestrian and bike pathways, and appropriate landscaping.
- promote clear and obvious way-finding to and around campus, creating traffic patterns that reduce neighborhood congestion and facilitate vehicle access.
- catalyze improved public and private transportation options in the Tooele Valley, with accommodation for current and future multi-modal options that are pedestrian and bike friendly.

Utilities & Infrastructure

USU Tooele will...

- benefit from a well-designed utility corridor that allows cutting edge technology to be incorporated on campus now and in the future.

Landscape design that combines traditional and non-traditional plantings.

Utah State University Facility Planning identified key goals, principles, and strategies which were used throughout development of the master plan. These elements must continue to be given strong consideration in future campus design and growth.

Key Master Plan Concepts

1. Accommodate the projected increase in enrollment.

2. Preserve USU's land grant legacy.
    - USU State-wide Plan 2011: "The mission of USU state-wide campuses is to provide opportunities for professional and vocational learning, as well as lifelong enrichment through participation in social cultural programs. These programs enable people of all ages and circumstances to enrich their lives and increase their knowledge without disrupting their employment or life style."

3. Maintain a compact walkable academic core.

4. Strengthen and clarify USU's image.
    - Architectural style and building materials standards should be developed to support the image of USU and the regional context of the site.

5. Enhance compatibility with the community.
    - Compatibility with the community grid system, for civic clarity and infrastructure efficiency.
    - Sensitivity to surrounding zoning, including adjacent residential and commercial areas, and the City of Tooele future development plans.
    - Connection with compatible adjacent development, and buffering with incompatible development.

6. Maintain consistent spatial density.
    - Pattern and density of new developments to be compatible with the scale and character of the surrounding community and region, and should support the campus image.

7. Promote efficient and safe pedestrian and vehicular travel.

8. Promote sustainability and energy efficiency.
    - Incorporate principles of green building and sustainability, for site, building, and utility design.

Key Master Plan Strategies

- Identify key nodes and gateways.
- Maintain a network of interconnected large and diverse open spaces, which may include quads, courtyards, plazas, squares, and recreational or agricultural fields.
- Consider three- to four-story buildings, to increase density for more efficient land use of the finite land resource.
- Use buildings to strengthen the street frontage and to frame open space features.
- Parking should be adequate to support the space, but should not be a dominant feature. Surface lots should be located towards the back of buildings, where possible. The design should be softened by integrating landscaping and pedestrian walkways. Parking terraces should be considered.
- Maintain a compact core, and plan for infrastructure efficiency. A future central utility plant location should be considered.

Commitment to Sustainability

In signing the *American College & University Presidents Climate Commitment* (see Appendix R), Utah State University has demonstrated its support for sustainability issues, particularly those related to carbon neutrality. In addition to USU's philosophical commitment, the State of Utah requires state-owned projects to be constructed to a level of LEED Silver at a minimum, to follow the State's High-Performance Building guidelines for energy efficiency, and to follow State guidelines for water-efficient landscaping.

The USU Tooele campus gives Utah State University the opportunity to implement sustainable strategies on a campus-wide basis. Potential strategies include:

- Orienting buildings to optimize solar exposure for daylighting, and using orientation, shading devices and technology (high-performance glass) to limit glare and unwanted heat gain.
- Generating on-site renewable energy from sources such as solar, wind and ground-source heat.
- Designing with building materials that have high recycled content; that can be recycled in the future; that are produced locally or regionally; and that are from renewable sources.
- Using high-efficiency light fixtures, lighting controls, and low-water plumbing fixtures.
- Limiting hardscape on the site, detaining site storm water, and using low-water landscaping.

Master plan sub-sections contain specific sustainable considerations and strategies.

Master Plan Description, Planning Guidelines & Design Standards

This section describes the master plan, and outlines planning guidelines and design standards that should be implemented as the campus is developed.

Master Plan Design Philosophy

The USU Tooele campus plan is a response to these major design drivers:

- Creating a sense of place, for the campus as a whole and for smaller areas within the campus.
- Supporting the identity of the campus as an institution of higher learning.
- Working with the shape and the natural topography of the site.
- Responding to the regional and neighborhood contexts – the climate, the level of development, and the type of development.
- Establishing a street presence on Tooele Boulevard.
- Strengthening the Tooele Educational Corridor concept by developing a sense of unity with the Community Learning Center and the Tooele Applied Technology College.
- Maintaining a pedestrian core, with roadways and parking held at the campus perimeter.
- Blending formal and informal design elements in campus quads/open spaces, building configurations, landscaping, and pathways.
- Referencing USU's agricultural roots in the landscape design.
- Creating enclosed spaces as the campus develops over time.

Landscape design featuring native and xeric-adaptive plantings.

PLATE 1:
Master Plan Organization & Zones

The master plan has several major elements which organize the campus. Numbers in parenthesis refer to the plan image.

- A large open space or quad (1) is in the west central area of the campus. Fronting on Tooele Boulevard, it provides a front lawn to the central campus buildings, which are anticipated to house administrative and student life functions.

- Two minor quads (2) are on the north and south ends of the campus, providing a focal point and organizer for the four-building groupings that surround them.

- An intermodal edge (3), 120 feet wide, lies along the west campus boundary. It contains: separated pedestrian and bicycle pathways; mass-transit stations; a storm drainage and retention/ detention channel incorporated into a xeriscaped landscape.

- Tooele Boulevard (4) to the west provides the major access route to the campus as well as a vehicular and pedestrian link with the neighboring educational facilities to the north.

- Along the east boundary, a 45 to 60-foot wide landscaped zone (5) contains an existing utility easement and also provides an aesthetically pleasing buffer between the campus and the residential neighborhoods to the east.

- The majority of parking (6) is in a surface lot along the east side of the campus; there is a small amount of parking on the north end as well, in conjunction with a vehicular drop-off zone.

- A five-acre agrarian plot (7) on the campus south end will be used for agricultural research or other functions as the school sees fit.

- Vehicular traffic paths (6) are on the north and east edges of the campus, connecting to Tooele Boulevard (north zone) and to 700 South (south zone). The center of campus is reserved for pedestrian and bicycle traffic.

- Tooele Educational Corridor campus markers/signs are located along Tooele Boulevard, at key facility entry points, including: the existing USU building (8), the TATC (10), the Community Learning Center (9) and the north and south ends of the 54-acre parcel.

PLATE 1 LEGEND

1 Main Quad
2 Minor Quad
3 Intermodal Zone
4 Tooele Boulevard
5 Landscaped Buffer Zone
6 Parking / Vehicular Path
7 Agrarian Zone
8 Existing USU Building
9 Existing Community Learning Center
10 Tooele Applied Technology College
11 Residential Neighborhoods

Campus Marker/Sign
Existing Building
New Building
New Road or Improved Road

PLATE 1: MASTER PLAN ORGANIZATION & ZONES

PLATE 2 : PHASING PLAN

PLATE 2 LEGEND

Phase 1

1 TATC building construction
2 Modifications to existing USU building
3 Educational corridor connectors
4 Area available for agrarian research

Phase 2

1 Four academic buildings, in order shown
2 Campus central plant (location to be determined)
3 North section of Tooele Boulevard & intermodal zone
4 North section of parking & landscape buffer zone
5 Area available for agrarian research

Phase 3

1 Administration & Student Life/Services buildings, in order shown
2 Main quad
3 Central section of Tooele Boulevard & intermodal zone
4 Central section of parking & landscape buffer zone
5 Area available for agrarian research

Phase 4

1 Four academic buildings, in order shown
2 South section of Tooele Boulevard & intermodal zone
3 South section of parking & landscape buffer zone
4 Final agrarian zone configuration

PLATE 2:
Phasing Plan

Development of the Tooele Educational Corridor and the new campus will occur from north to south in four general phases, as shown on the Phasing Plan. The phases are not tied to specific time frames, but will occur in response to campus need and demand for additional space.

The campus is planning to construct the initial building on the new campus within the next five years to meet the needs of recent high increases in enrollment. The campus has a current quantity of 509 full-time equivalent students. The master plan's planning ratio of 200 gross square feet of built space per full-time equivalent student (GSF/FTE) calculates the current campus need at almost 102,000 GSF. The existing campus building is approximately 36,000 GSF, indicating a current shortfall of 66,000 GSF.

The north to south development pattern will support the pedestrian and conceptual connection of new campus buildings with the existing educational facilities to the north. It will also allow an incremental construction of Tooele Boulevard from north to south, as needed to provide road access and utilities for the campus. USU Tooele will likely be the first developer along Tooele Boulevard and, as such, will be responsible for the costs associated with design and construction of the right-of-way. As development occurs west of Tooele Boulevard, USU Tooele will be reimbursed for half of the right-of-way development expenses. The initial roadway and infrastructure development costs will be high; they will be more easily absorbed into campus construction budgets in incremental pieces.

Phase 1 will consist of development north of the new campus property: construction of the new TATC; modification of the existing USU building so that the main entry and parking are oriented toward and accessed from Tooele Boulevard; and construction of landscaping, campus markers, and pedestrian and bicycle pathways that will connect the existing educational buildings with the new property.

The Phasing Plan shows the anticipated order of building construction within Phases 2-4. Construction projects will likely consist of an individual building and its associated utility and site development. Each of these three phases, therefore, will include several construction projects over a period of years.

In the second phase, four academic buildings will be constructed around the north quad. Campus administration, student life/services functions, and some academic programs will remain in the currently existing USU building. During Phase 2, the north portions of Tooele Boulevard, campus roadways and pathways, utilities, and the east parking lot will be constructed as necessary to support this end of campus.

Initial campus buildings will have standalone heating and cooling systems. A central heating plant to serve the entire campus is expected to be constructed at the time of the third or fourth building; a final determination of the timing will be made as the campus is developed. When the central plant is constructed, campus buildings already constructed will be connected to it through a campus-wide utility tunnel system.

If the central plant is constructed as part of another campus building, two considerations will be critical to a successful design: the central plant must be easy to access, with a location as close to the parking zone as possible; and the design must provide for acoustic isolation and control of the central plant within the building.

In Phase 3, campus support functions such as administration and student life/services will move from the currently existing USU building to two new buildings at the campus center. The large central quad will be constructed, and Tooele Boulevard, the east parking lot, and campus pathways and utilities will be extended southward to support the new development.

Phase 4 will see the addition of four more academic buildings, along with the final extension of roadways, parking, pedestrian and bicycle pathways, and utility elements.

The agrarian research zone on the campus south end, along with its adjacent support/service building, will likely be developed during the first or second phase. The initial research field size may be as large as 20 acres, extending into available land in the Phase 3 and Phase 4 areas. As Phases 3 and 4 are developed, the agrarian zone will shrink as necessary. When the campus is fully developed, the agrarian zone size and configuration will be approximately five acres, as shown on the master plan.

View of the Oquirrh Mountains looking southeast from the site.

Phase One

Element	Program/Function
TATC Building	TATC: Academic, Administration & Student Services USU Tooele: Registered Nursing
Existing USU Building	Modifications to locate main building and parking lot entry on Tooele Boulevard
Educational Corridor Connectors	Landscaping, pathways, campus markers

Phase Two

Element	Program/Function
Academic Building (1)	Manufacturing/Prototype, Industrial Hygiene Construction Management, Biology/Chemistry/Physics
Academic Building (2)	Forensic Anthropology, Criminal Justice Geriatrics Health Services, Mental Health/Substance Abuse
Academic Building (3)	Environmental Sustainability, Agro-Enviro Recreation/Tourism, Graphic Arts, Visual Arts, Interior Design
Academic Building (4)	Technology Transfer, Logistics & Procurement Marketing/Public Relations, Architecture
Campus Central Plant	Standalone facility or within another building

Phase Three

Element	Program/Function
Admin/Student Life Building (5)	Student Services, Administration, Library/Learning Resource Centre, Theater/Auditorium
Student Life/Wellness Building (6)	Gym, Track, Workout, Dance, Climbing Wall, Cafeteria, Recreation, Student Center

Phase Four

Element	Program/Function
Academic Building (7)	Health Science, Social Work
Academic Building (8)	Engineering, Technology Sciences, Information Systems, Geography (GIS, GPS, Lab)
Academic Building (9)	Existing Programs Expansion
Academic Building (10)	Existing Programs Expansion

PLATES 3 -5:
Site Context & Forces

Regional Context

The USU Tooele campus site is on the west edge of Tooele City, approximately 30 miles west of Salt Lake City and 10 miles south of Interstate 80 and the Great Salt Lake. Neighboring towns are Grantsville, ten miles to the northwest, Erda, eight miles to the north, and Stockton, seven miles to the south.

Developments in the vicinity that may influence future academic programs on the campus include the Miller Motorsports Park, approximately 5 miles to the northwest, and the EnergySolutions bulk waste disposal and treatment facility at Clive, Utah, approximately 60 miles to the north and west.

Government facilities that have an important influence in the area include the Tooele Army Depot several miles directly west of Tooele City; Deseret Chemical Depot, approximately 12 miles south; and the Dugway Proving Ground, about 70 miles to the southwest.

The Oquirrh Mountains are to the east and south of the site. The site slopes downward from these mountains, with the site's low point on the northwest corner. The Stansbury Mountain range provides mountain views to the west.

The Oquirrh Mountains behind the residential neighborhoods that are east of the site.

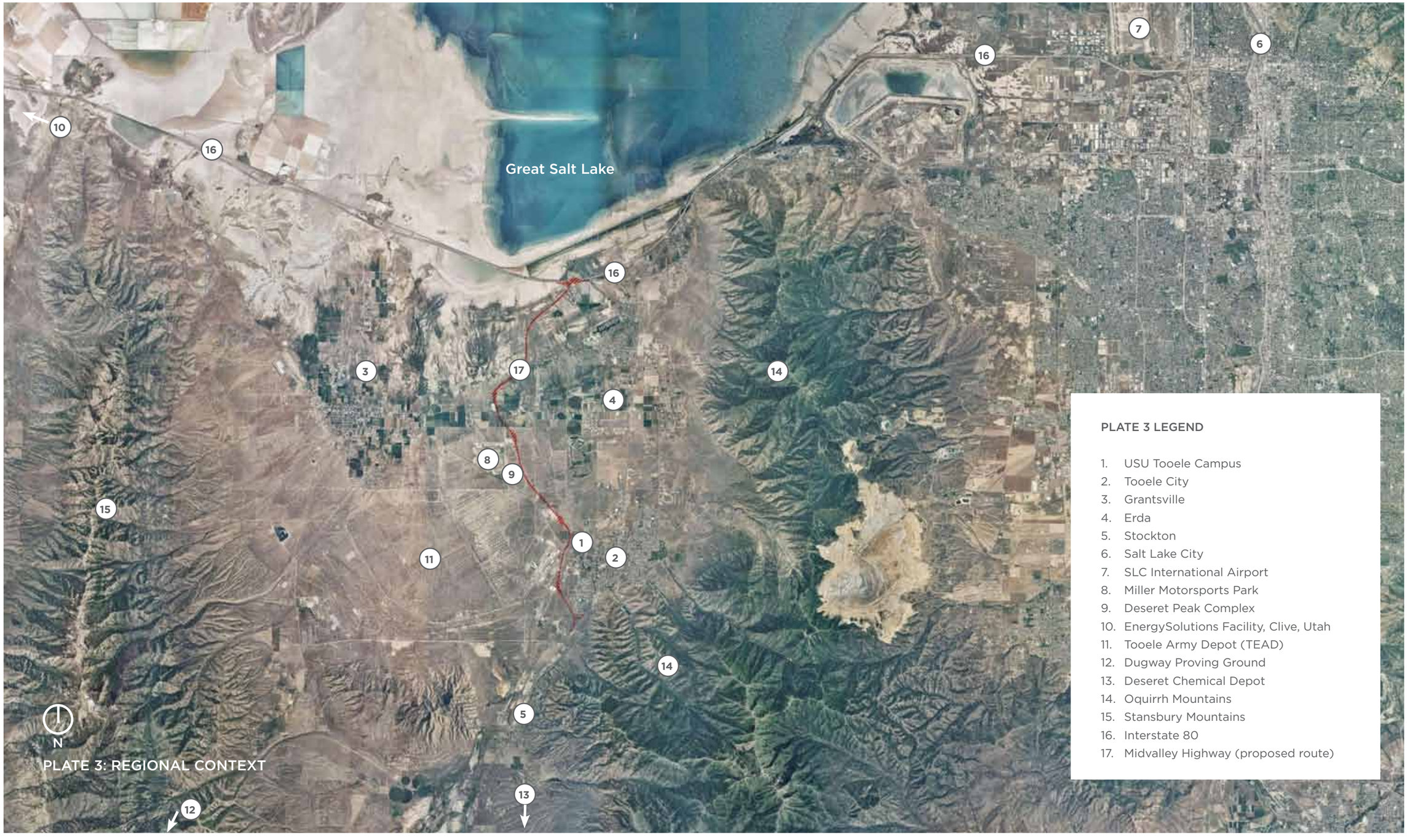


PLATE 3: REGIONAL CONTEXT

PLATE 3 LEGEND

1. USU Tooele Campus
2. Tooele City
3. Grantsville
4. Erda
5. Stockton
6. Salt Lake City
7. SLC International Airport
8. Miller Motorsports Park
9. Deseret Peak Complex
10. EnergySolutions Facility, Clive, Utah
11. Tooele Army Depot (TEAD)
12. Dugway Proving Ground
13. Deseret Chemical Depot
14. Oquirrh Mountains
15. Stansbury Mountains
16. Interstate 80
17. Midvalley Highway (proposed route)

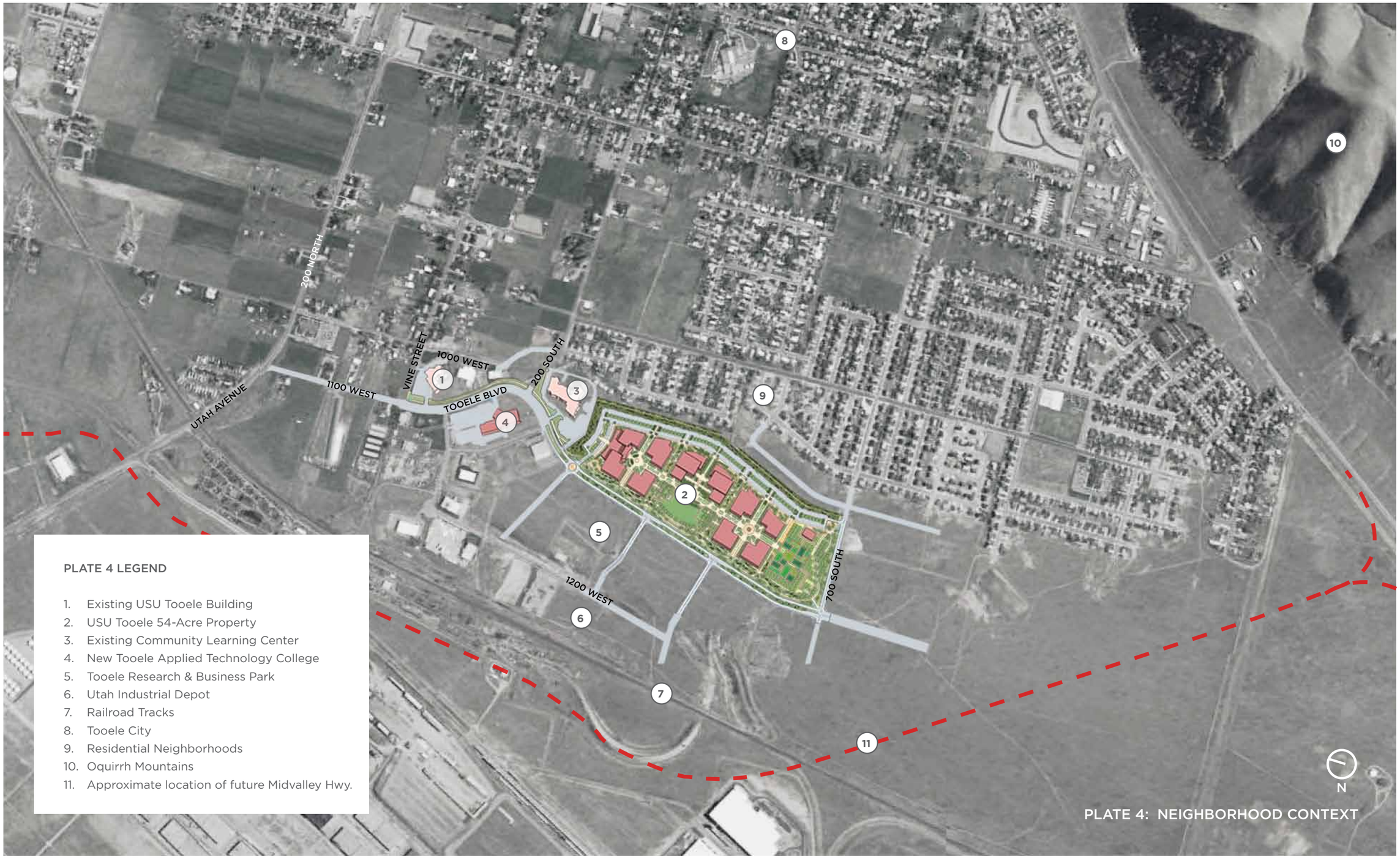


PLATE 4 LEGEND

1. Existing USU Tooele Building
2. USU Tooele 54-Acre Property
3. Existing Community Learning Center
4. New Tooele Applied Technology College
5. Tooele Research & Business Park
6. Utah Industrial Depot
7. Railroad Tracks
8. Tooele City
9. Residential Neighborhoods
10. Oquirrh Mountains
11. Approximate location of future Midvalley Hwy.

PLATE 4: NEIGHBORHOOD CONTEXT

Neighborhood Context

The property is oriented north-south. Its Tooele City coordinates are approximately 300 South (north end), 1000 West (east side), 700 South (south end) and Tooele Boulevard (approximately 1100 West) on the west side.

North of the site is the Tooele County School District Community Learning Center, with the existing USU Tooele building located north of that. To the north and west, across Tooele Boulevard, is the 8.43 acre site of the future Tooele Applied Technology College. The new USU Tooele campus must have a strong connection with these facilities, creating an educational corridor for the area.

East of the campus is a residential neighborhood consisting of single story houses. It will be desirable to have a barrier and buffer zone between the campus and the neighborhood. Of particular concern to residents are the potential for disturbance from lights, loss of privacy if buildings are located too close, and noise.

South of the site is undeveloped private land.

West of the site is undeveloped land owned by Tooele City. The city is planning its use as a research and light industrial/business park called the Tooele Research & Business Park. To the west of the research-business park are railroad tracks and the Utah Industrial Depot (UID), intended for heavy industry.

Zoning

The campus property and the areas to the north, south and west are within a LI (Light Industrial) district. The residential neighborhoods to the east are zoned R1-8 (Medium Density Residential), with two small insets of HDR (High Density Residential) zoning.

It should be noted that the USU Tooele campus and facilities will be state owned. As such, the campus will not be required by law to comply with local zoning ordinances and regulations. The State of Utah Department of Facilities Construction and Maintenance (DFCM) has stated that while the project is not required to comply with local ordinances and regulations, USU Tooele may choose to comply if it is a benefit to the campus.

As an example, the zoning ordinance requires that the USU Tooele campus property be separated from the neighboring residential zone by a six foot high solid visual barrier. While the DFCM indicates the campus is not obligated to build such a separation, USU Tooele may wish to do so to maintain good neighbor relationships.

Existing Utilities and Easements

The site is a former regional airport; the former runway parallels the property's west edge. Because the site has been developed in the past, it will not need to undergo an archaeological assessment prior to development as a campus.

A Phase I Environmental Assessment has been conducted on the property with no significant hazards noted. Environmental hazard cleanup is not foreseen on the campus property at this time.

The site has a 20' wide sewer line easement along the east edge. Fiber optic cabling has recently been installed in this easement and the campus will be allowed up to three connection points with the fiber optic line. A 45' to 60' wide landscaped zone will be located on the east property boundary, which will encompass the easement and provide a buffer zone between the campus and the neighboring residences.

A storm drainage easement bisects the site from east to west near the north-south center (approximately 500 south). This will be rerouted and placed in below-grade piping through the campus. The storm drain will be returned to grade as it exits the campus property on the west.

View of the Stansbury Mountains across Tooele Valley to the west.

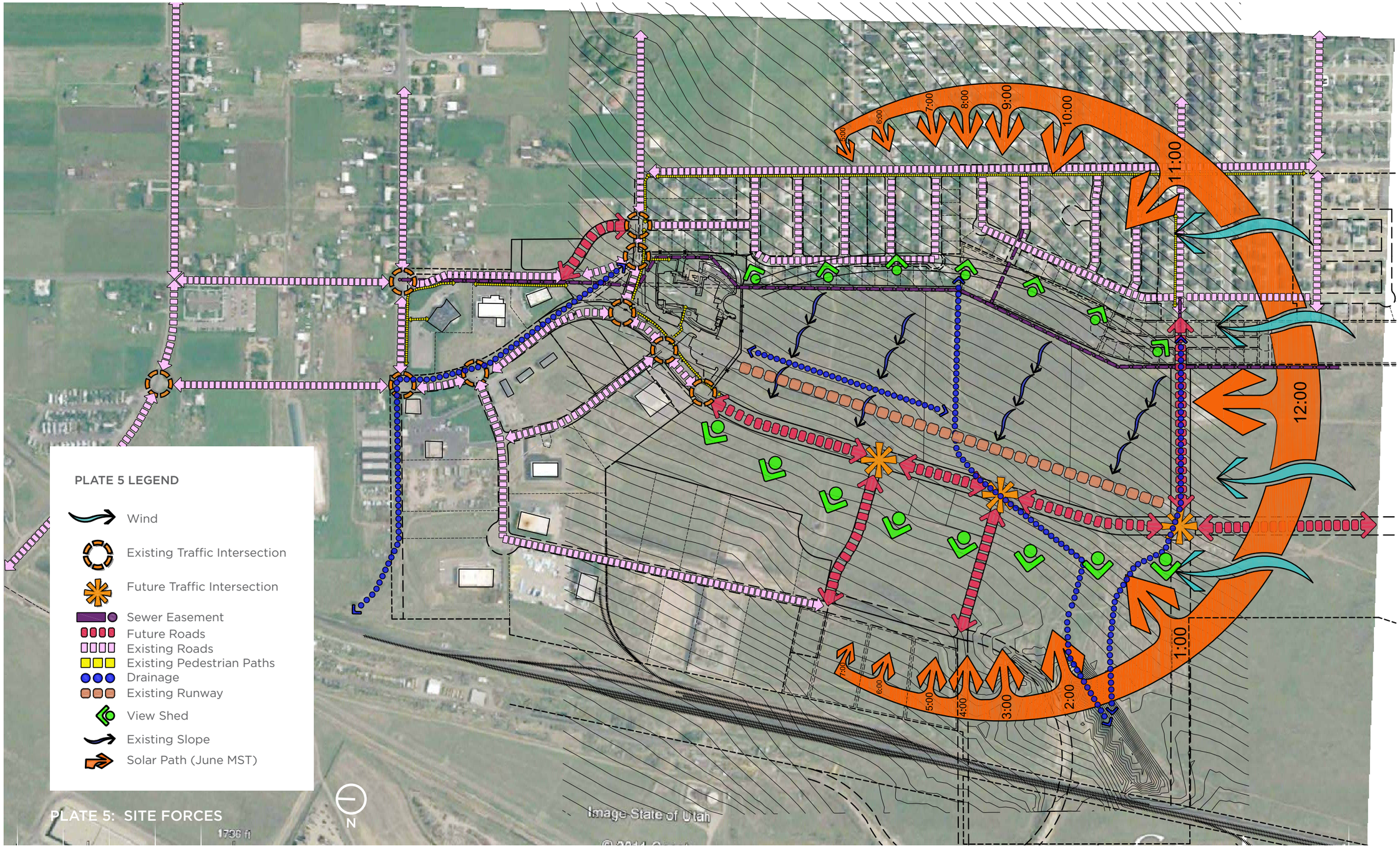


PLATE 5: SITE FORCES

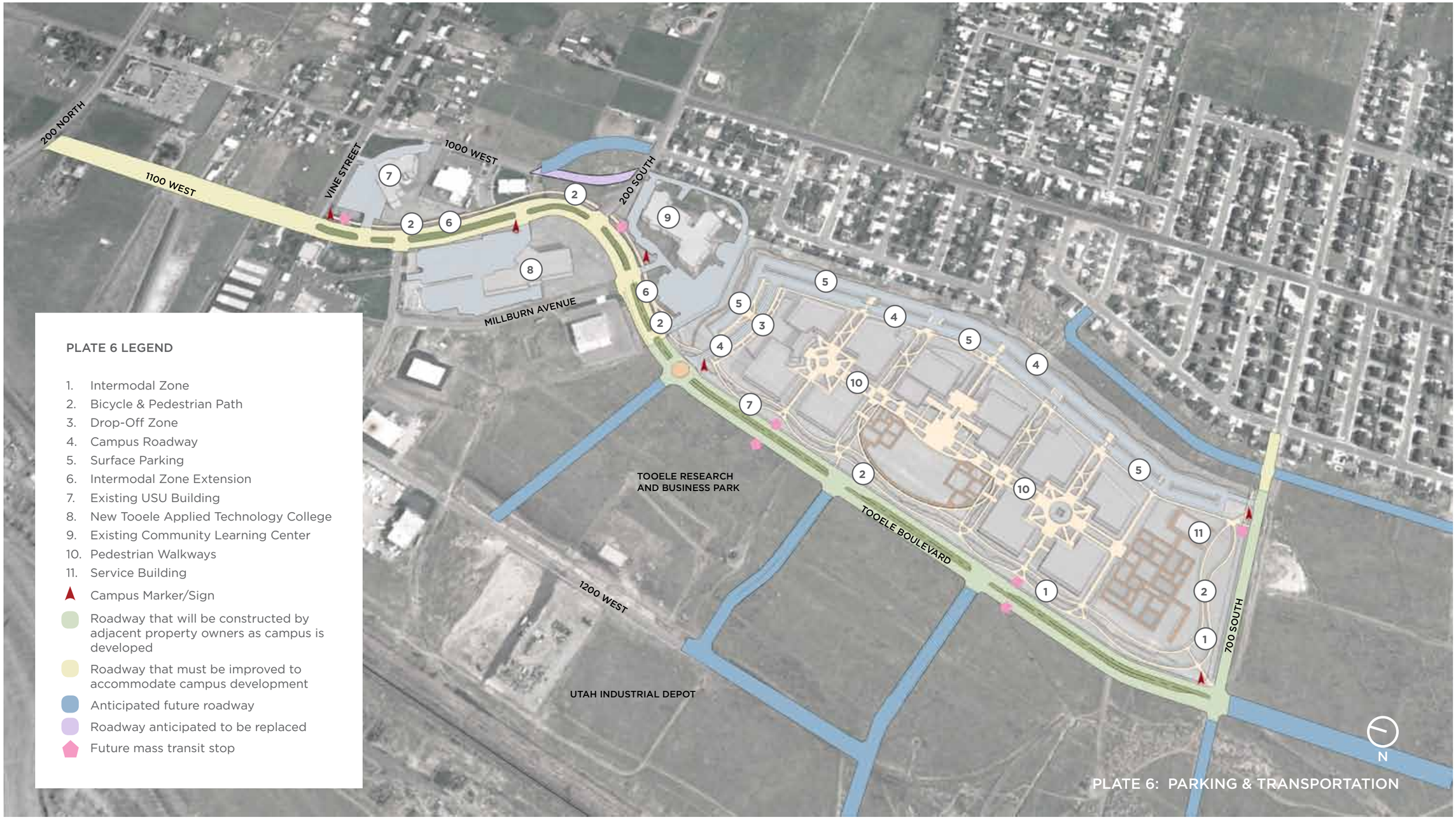


PLATE 6 LEGEND

1. Intermodal Zone
2. Bicycle & Pedestrian Path
3. Drop-Off Zone
4. Campus Roadway
5. Surface Parking
6. Intermodal Zone Extension
7. Existing USU Building
8. New Tooele Applied Technology College
9. Existing Community Learning Center
10. Pedestrian Walkways
11. Service Building

Campus Marker/Sign

Roadway that will be constructed by adjacent property owners as campus is developed

Roadway that must be improved to accommodate campus development

Anticipated future roadway

Roadway anticipated to be replaced

Future mass transit stop

PLATE 6: PARKING & TRANSPORTATION

PLATE 6:
Parking & Transportation

Existing and Future Access Roads

The primary road used for immediate access to the campus will be Tooele Boulevard, which has been visualized by Tooele City as a four lane divided highway with a center landscaped median. It is anticipated that the landscaping of the Tooele Boulevard median will be congruent with the campus landscape along the eastern edge of Tooele Boulevard, namely xeriscaping.

Tooele Boulevard is currently developed only between Vine Street and the north end of the 54-acre campus. Further development southward will be paid for by the property owners on each side of it; that is, USU Tooele and the future owners/developers of the Tooele Research & Business Park. Tooele Boulevard construction will likely be in increments from north to south, as portions of the campus and industrial/ business park are constructed.

The City prefers to limit the number of access points to the campus from Tooele Boulevard and would like campus access points to be coordinated with those of the Tooele Research & Business Park on the west. The master plan shows a roundabout at the north campus entry point that could also serve the research and business park.

Tooele Boulevard between Vine Street and 700 South will feature campus entry/signage markers at primary educational facility entry points (shown on the plan opposite). These will promote the identification of the various educational facilities as the Tooele Educational Corridor.

Two blocks north of the campus, at Vine Street, Tooele Boulevard becomes 1100 West. 1100 West intersects with 200 North, which will be the primary roadway connection eastward to Tooele City. 200 North becomes Utah Avenue as it travels west from 1100 West and curves to the northwest, leading to the Deseret Peak Complex, the Miller Motorsports Park, and on to Grantsville City.

Tooele City would like 200 North to become the major roadway access from Tooele City to the Tooele Educational Corridor. In order to encourage this, the city will need to widen and improve 1100 West north of Vine Street so that it is a suitable connector to Tooele Boulevard. Its width will not necessarily match that of Tooele Boulevard, as 1100 West is not anticipated to have a center landscaped median.

Other surrounding city streets that provide access to the campus from Tooele City on the north include Vine Street and 200 South, although the city and adjacent neighborhood residents prefer that heavy use of these roads be discouraged.

700 South will be the major entry to campus from the south. The intermodal edge concept proposed for the east side of Tooele Boulevard is also proposed for the northern edge of 700 South, with the exception that the bike and pedestrian pathways will be interlaced with the orchard portion of the agricultural research area.

There will be no access to the campus from the east.

The Midvalley Highway is a planned roadway that will influence future access to the USU Tooele campus from the north, west and south. As proposed by the Utah Department of Transportation, with recent preliminary approval from the Federal Government, this highway will connect with Interstate 80 and travel southward along a route west of the Utah Industrial Depot. Several interchanges are planned that will provide good access to the Tooele Educational Corridor. Tooele County anticipates that this road will be constructed in 20 to 30 years (see Plates 3 and 4).

Campus Roadways (4)

On the campus itself, roadway access is provided at the northwest and southeast corners, at Tooele Boulevard and 700 South Street. A 2-way roadway crosses the north end of the site, past a passenger drop-off zone at the northernmost building. On the east side of the campus, the roadway travels southward through the main parking lot to the south end of campus and the connection with 700 South. Because the vehicular pathways are at the perimeter, the campus interior is preserved as a pedestrian and bicycle-only zone.

Public Transit

The Utah Transit Authority (UTA) currently has one bus route that reaches the existing USU Tooele campus facility. The route travels westward on 200 South, north on 1000 West to Vine Street, and then east back into the city center. The bus arrives at the USU building on an hourly basis from 6 AM to 7 PM. The lack of frequent service makes reliance upon public transit difficult for students who need to get quickly to other responsibilities in Tooele Valley or neighboring communities. UTA's level of service will increase based upon need and demand. In the future, as the campus grows, it is foreseen that public bus transit will increase service to the campus. The intermodal edge along Tooele Boulevard will be the location for public transit drop off and pick up.

There are no current plans to extend public rail transit into the Tooele Valley. TRAX (light rail) service is not foreseen in the near future. Likewise, commuter rail is not foreseen in the near future. If TRAX lines or commuter rail lines follow current rights of way, these services will not be close to campus. It is likely that bus service will be required to connect the campus to any future rail service.

Parking (5)

A small amount of parking is located at the campus north end. The main parking area extends the full length along the east/back side of campus. The east parking zone contributes to the desired buffer between campus buildings and the residential neighborhoods to the east.

The master plan shows surface parking which provides approximately 1,150 stalls. This represents 1.6 to 1.9 cars per 1,000 GSF of building area, and .36 cars per FTE, at full campus build-out. The existing USU Tooele building parking count of 178 represents 4.9 cars per 1,000 GSF and .35 cars per FTE. Surface parking can be modified to a 2-level, above-grade, open structure in the future, if additional parking capacity is needed.

Intermodal Zone (1)

The Intermodal Zone extends along the west side of the new campus. This 120-foot wide zone provides separated pathways for pedestrians and bicycles that connect with pathways in the campus interior and at the campus edge. The intermodal zone also has drop-off/pick-up locations for mass transit.

The Intermodal Zone continues north of the new campus at a smaller scale, providing a pedestrian and bicycle link along the Tooele Educational Corridor, to the Community Learning Center (CLC), the Tooele Applied Technology College (TATC) and the existing USU Tooele building.

Pedestrian Walkways (10)

The primary pedestrian pathway runs through the center of campus from north to south. It passes along the east side of the main campus green space/oval and extends north and south to the minor quads that are at the center of the academic building groupings. The primary walkway connects with the east parking lot and the intermodal zone with secondary pathways. The primary and secondary walkways are planned to be concrete.

Pedestrian walkways are bordered by landscaped plantings as described later in this narrative. In keeping with the campus landscaping and drainage concepts, xeriscaped dry bed drainage pathways will be incorporated between and by the side of selected walkways.

Campus Gateways and Markers

The Tooele Educational Corridor will have a gateway on Tooele Boulevard at the current USU Tooele building. The marker used to denote the gateway will repeat at the new USU Tooele campus entry and at the south end of campus near the agrarian zone. It is also planned that campus markers be placed at the entries to the existing Community Learning Center and the new TATC.

Service Building (11)

A service and utility building is shown adjacent to the agrarian zone, at the southeast corner of campus where there is direct campus access from 700 South Street. The building's primary function is to support the agrarian area, but it will also provide support space for campus facilities and physical plant personnel, equipment and materials.

Emergency Vehicle Access

Emergency vehicle access is provided by the perimeter roadway and parking areas, and by the primary pedestrian walkways in the campus interior. Pedestrian walkways in landscaped areas will be augmented by stabilized pervious pavers on each side, so that the combined concrete/paver width meets the required drive width as defined by the State Fire Marshall.

The USU Innovation Campus in Logan includes xeric landscape and a canal water feature.

Planning Guidelines

- Consider all aspects of the travel sequence – vehicular access, parking, and pedestrian pathways – and plan their use to be a pleasant experience.
- Campus transportation pathways and access points must have continuity and compatibility with the surrounding community grid system. They must be planned to minimize traffic congestion.
- Parking should be adequate to support the campus, but should not be a dominant feature. Surface lots should be in low-visibility locations, as much as possible. Parking lot design should be softened by integrating landscaping and pedestrian walkways. Parking terraces should be considered, if a large parking quantity is needed. Locate parking adjacent to and easily accessible from roadways.
- Bicycle pathways must be planned for careful connections with surrounding streets, for safety and support of bicyclists. Use exclusive bike paths where possible. Locate bicycle parking facilities – covered areas for racks or lockers, secure and well-lit – prior to arriving at the campus pedestrian core, to minimize bicycle / pedestrian conflicts.
- Pedestrian paths provide points from which the campus is viewed; they should provide a sequence of pleasant experiences, vistas & views. Paths play a role in establishing a sense of order & orientation. Pathways are locations for social interaction; points of intersection become natural focal points and gathering spaces – include small seating areas and group-activity spaces adjacent to them.
- Plan logical locations for placement of snow during snow removal operations. These locations should be carefully reviewed with campus facilities.
- The overall width of emergency vehicle access lanes must be 20 to 26 feet, as determined by the Fire Marshall. A 12' heavy-duty concrete fire lane with stabilized pervious pavers on each side will minimize the area of concrete and provide a more sustainable solution.
- Plan service access and pathways to minimize vehicular/pedestrian conflicts. Minimize the visual and aesthetic impact of service areas to the campus; provide attractive visual screening; minimize disruption from noise and smells.
- Campus and adjacent roadways should be planned using a "Complete Streets" approach, in which road networks are planned to be safer, livable and welcoming to all, including pedestrians, bicyclists and motorized vehicles.

Design Standards

- Parking size/orientation: Full-size stalls, 9' wide x 20' long, are recommended for ease of access.
- Provide raised walkways at major pedestrian pathways from parking areas to campus.
- Exterior walkways material, width, coloration & finish: Durable surfaces such as concrete with minimal variation in texture for general walkways. Provide scored, integral-color concrete at nodes and building entries. Walkways should have a minimum width of 6'.

PLATES 7 & 8:
Open Space & Landscape

This new campus is located in the high desert of Utah and as such, the planting concept should require the use of both native and adaptive water-wise or xeric plant material. Arrival locations and building entries may use plant materials that are adaptive but these materials should be limited. A consistent palette of xeric, low water use plants, grasses and perennials will tie the entire campus landscape together with a cohesive aesthetic.

Gateway Zones (1)

The landscape design in the arrival or gateway zones should include a more formal lush planting design, with small inviting turf areas which lead pedestrians into the quad and courtyard entries. These zones should create interest and will contrast with the more xeric planting around the campus. Raised concrete paving extending into and across the parking areas is recommended and will act as way-finding from the perimeter parking lots into the boulevard areas. The remainder of the planting adjacent to the arrival zones should include masses of low water use plant material.

East Residential Green Edge Buffer Zone (2)

This area should include a mix of evergreen trees and shrubs, as well as informal tree and shrub plantings similar to the intermodal edge. These will screen the solid wall separating the residential zone from the campus. The linear green edge directly east of the parking areas should include native and or adaptive low water use grasses which will require minimal maintenance. A path of stabilized crushed aggregate paving will provide a separation between the plant material types.

Intermodal Zone (3)

The perimeter intermodal zone provides an opportunity not only for circulation but also for a dry stream bed or bioswale feature which can provide for storm water surcharge into the water table. This free form and narrow water feature should be constructed of multiple sized boulders, cobble and stone to create interest. It should include several basins at which the storm water can temporarily pond and surcharge before flowing into the next recharge basin. Flat topped boulders can be used to provide seating at intermittent areas along the pedestrian path for both bicycle and pedestrian use. Xeric and native plant material in informal groupings and masses will provided seasonal color change and interest. Small areas of non mown, low water use turf / native and adaptable grasses in this zone along the park strip will create interest and diversification of the planting in this entire zone.

Quad Areas (4)

The plant material in the quad areas should include more formal plantings of medium and low water use trees, shrubs and perennials. Large turf areas for informal seating, student gathering and passive recreation will create a formal green space. Seat walls and benches should also be provided to help create student gathering spaces and areas of respite.

PLATE 7 LEGEND

1. Gateway Zone
2. Residential Buffer Zone
3. Intermodal Zone
4. Quad
5. Pedestrian Boulevard
6. Agrarian Zone
7. Connector Zone
8. Tooele Boulevard

PLATE 7: OPEN SPACE & LANDSCAPE

PLATE 8: OPEN SPACE & LANDSCAPE: ENLARGED VIEW

Formal tree plantings can provide shaded as well as enhance the views and create enclosure for the quad areas.

The main quad is oval shaped and will provide a large expanse of a drought tolerant turf. The north and south ends of the oval shall consist of a series of agrarian looking plots separated by stabilized crushed aggregate paths. These plots may be planted with a mixture of various types of turf, masses of shrubs, ornamental grasses and xeric plantings and are laid out in a checker-board pattern.

The large quad area is 5.7 acres in size in size and can be used for many University, student and community functions. The two smaller quads are over 1.25 acres in size including paving and are important central nodes for plaza use and campus circulation.

Landscape design that combines traditional and non-traditional plantings.

Pedestrian Boulevards (5)

The north-south pedestrian spine should include more formalized plantings and allow for the use of decomposed granite paving which can allow for easy pedestrian movement in the east-west direction. A low wall overlook area at the south end of the boulevard will frame the end of the boulevard and provide an observation point looking into the agrarian zone.

The east-west boulevards design will include a smaller version of the dry stream bed aesthetic. Plant material in this zone should be transitional with a mix of xeric grasses, shrubs and perennials.

Concrete fire lanes, 10'-12' wide, will be functional as well as aesthetically pleasing. Permeable pavement with sod, seed or aggregate should be used as approved by the campus fire marshall to minimize the required 20 to 26 fire lane widths. The permeable paving should meet fire lane loading requirements.

Agrarian Zone (6)

An agrarian zone is unique to this campus and connotes the original mission of the University as a land-grant institution. Research plots of various crops, plants and turf types may be grown and tested in this area. The test plots are enclosed by a fruit tree orchard which should include various types of stone and non-stone fruits.

Landscape design that references agricultural plots, at the Agriculture Building on the USU Logan campus.

Connector Zone (7)

The landscape in the park strip and adjacent turf areas are proposed to match the non-mown, native/adaptable grasses in the intermodal zone and will create a seamless landscape aesthetic in the education corridor.

Tooele Boulevard (8)

The landscape planting in Tooele Boulevard should include very low maintenance plant material which can provide seasonal color yet require very little maintenance. Medium to small trees should be used to maximize visibility of vehicles and respect the views into the large oval quad.

Xeric landscape design.

Landscape Water Use/Conservation

The State of Utah DFCM Landscape Guidelines were established in 2002 to set water allowance guidelines for new and existing facilities. Both landscape and irrigation design standards have been established by the guidelines. A typical campus/institution will have a ratio of 5% shrubs and 95% blue grass turf. The water allowance for a new campus/institution should be 60% of the standard water use coefficient, according to the State DFCM Guidelines.

The baseline water allowance for a campus of this size is projected to be 17,450,595 gallons per year. The projected yearly water allowance for the new USU Tooele campus is calculated to be a maximum of 10,470,357 gallons to meet the DFCM standards, a savings of 21.4 acre feet of water. This amount of irrigation water per year is 60% of the base water use as per DFCM requirements. The design calculations indicate that the irrigation water allowance should be 9,531,956, which is a 43% decrease in the baseline water allowance.

The water use in the agrarian zone at final build out is calculated at 2,934,030 gallons per year. This gallonage was determined using the reference Et of water required to raise alfalfa throughout the entire Agricultural Zone area.

Water Use per Zone

The Et rate for each zone is 24.28 with the exception of the agrarian zone which has an Et rate of 34.81

The USU Tooele Campus will have 29.3 water shares in early 2012. These water shares will provide irrigation water for approximately 100% of the overall calculated water use on the site at full build out.

Irrigation Design Standards

As of yet, no secondary water use is available to the USU Tooele campus. The design of the culinary irrigation system should be carefully reviewed to assure that the use of water is minimized. The following standards, in addition to the DFCM Irrigation Design Standards, should apply to the campus irrigation design.

Controllers

The design should incorporate ET based controllers that schedule landscape irrigation use according to current weather and landscape conditions. These controllers, when used correctly will prevent over watering, reduce water consumption and maintain a healthy landscape.

Hydrometers

The use of a hydrometer on the system will provide the following benefits:

- Maintain constant pressure at the mainline source
- Constantly read irrigation flows and prevent water waste in broken mains and lateral lines.
- Provide overall metering of the system.

Drip/Low Volume or Point Source Irrigation

Drip or point source irrigation can significantly reduce the amount of water required in the landscape. Point source will place the water directly to the plant material. Its use is recommended in all shrub planting areas.

Irrigation Heads

Large area irrigation heads which have a specific CU and DU rating over 88% shall be used.

Landscape Design Standards

Landscape plantings on campus should establish an overall character for the campus and provide unity and scale to the building design. Low water use and low maintenance plantings should define the landscape style of the campus.

Plantings should be used to create and enhance the sense of place, create outdoor rooms, enhance and define pedestrian boulevards and provide four-season interest.

Use drought tolerant, attractive but low maintenance plant material where possible. Native plants should be given first consideration. Adaptable non-natives are acceptable. (See Appendix M Plant List.)

Large Shade Trees

- Use to provide shade in parking areas and reduce the heat island effect.
- Large shade trees should be used on the pedestrian boulevards in formal patterns both in single and double rows.
- Large shade trees in conjunction with under story accent and evergreen trees may be used in the east green buffer zone to screen the residential area from the campus and vice versa.
- Use large shade trees and understory trees in a non-formal pattern in the intermodal zone to create seasonal interest and provide shade to informal seating areas in this zone.

Understory Trees

- Use understory flowering trees for way-finding in all gateway areas.
- Use understory trees to define quad areas and courtyard entries and to provide seasonal interest.
- Use to frame views on and off site.
- Use to define and create outdoor spaces.

Shrubs

- Use a combination of native and low maintenance adaptive ornamental shrubs as foundation plantings at primary and secondary building entries.
- Use adaptive ornamentals to provide screening of the adjacent residential zone on the east of campus.
- Use low maintenance native shrubs in informal groupings along pedestrian corridors, parking lot plant planting, in the dry stream areas and in the intermodal zone.

Ground Plane

- Ground cover areas should be minimized and used only for accent plantings.
- The use of stabilized aggregate paths to separate areas of planting in the large oval quad area is recommended. Stabilized aggregate may also be used in some areas of the intermodal zone at informal/formal seating areas and to create interest in the ground plane.
- Stone mulch is recommended in all planting areas. This type of mulch is cost effective in that it does not need to be replenished and will retain moisture in the soil for plant use. Various sizes of stone should be used to create interest when used in conjunction with informal native or perennial plantings.

Prairie design concept integrated with traditional landscape.

Perennials/Ornamental Grasses

- Use native and adaptive perennials/grasses in large masses on the north and south sides of the large oval quad to create interest and frame the turf areas.
- Masses of perennials and grasses should also be used as accent plantings at the smaller quad and plaza areas.
- Smaller masses should be used along pedestrian zones, the intermodal zone, in the green zone and parking lot plantings.

Turf and Grasses

- High use areas may include bluegrass varieties or a combination of bluegrass and fescue. All other turf areas should include the use of fescue or other low water use turf varieties which require less water and mowing.
- Native/Adaptive grasses: The perimeter buffer zone and intermodal zone should include low maintenance native and adaptive grasses. These areas will require lower water and fertilizer use and may be mowed as little as twice a year after establishment.

Site Furnishings

Furnishings should support the program requirements of specific campus spaces. A standard palette of furnishings should be developed which will help establish a sense of place and unify the campus aesthetic.

Site Context: Furnishings should be harmonious with the outdoor spaces and structures on campus. Site furnishings can strengthen the sense of place and should be responsive to scale, form and texture of the campus structures.

Functionality: Site furnishings should be practical, low maintenance and yet aesthetically pleasing.

Quality: The site furnishings must be of such quality that they cannot easily be damaged. A long term, high-quality campus environment is of key importance. Powder coated metal is recommended over wood.

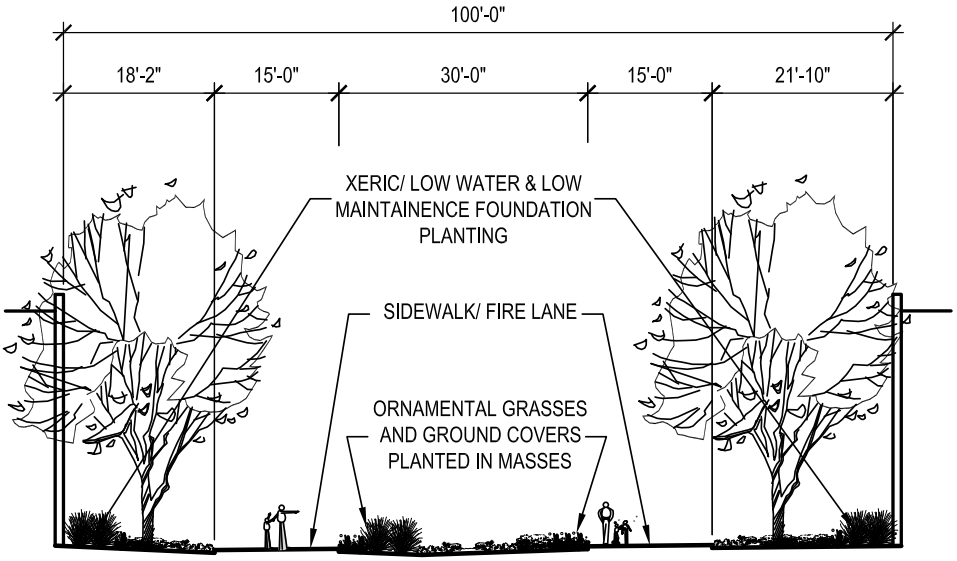
Economy: It is imperative that site furnishings be designed and constructed to provide and maintain a cost effective life cycle.

Sustainability: The use of eco-friendly materials and technologies will reduce the consumption of energy and non-renewable resources. Benches and/or trash receptacles should be located at gathering places, at nodes on the pedestrian corridors, in strategic locations along the pedestrian boulevards and in the shade of trees. Informal seating areas using flat topped boulders should be considered along the pedestrian path of the intermodal zone and the buffer zone to provide areas of respite.

Bike racks should be provided in strategic locations across campus with adequate storage for all users.

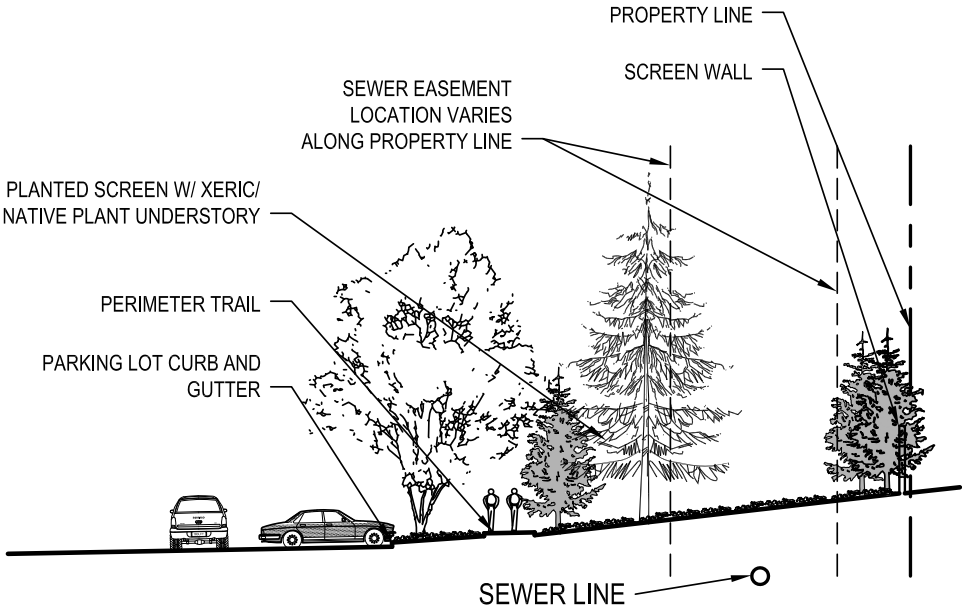
Bollards: The use of removable bollards is recommended to restrict vehicular access to service and emergency fire lanes through campus.

Native landscape with dry wash.



CENTRAL CAMPUS WALK WAY

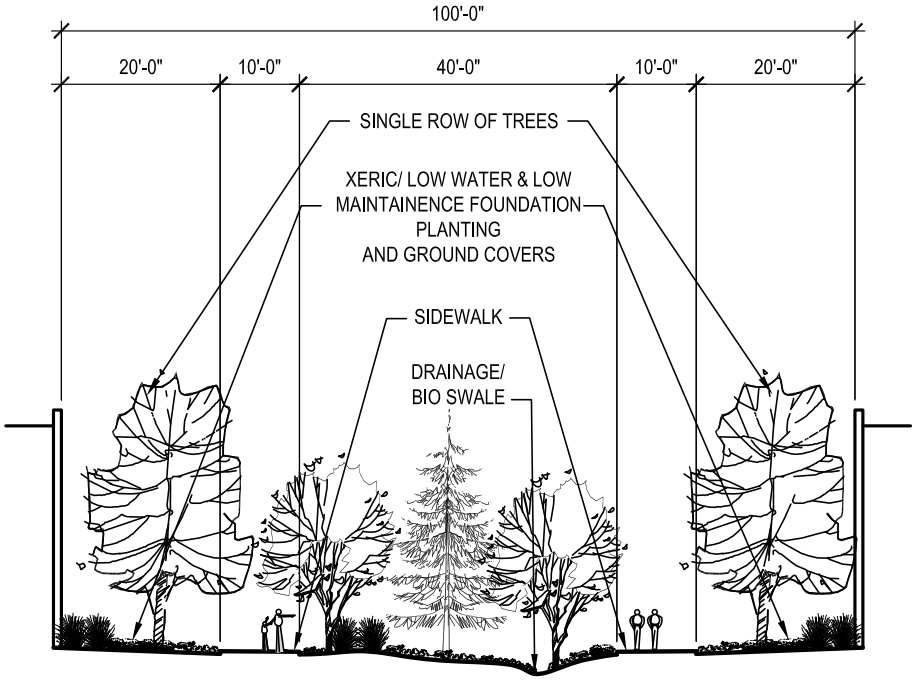
1" = 20'-0"



GREEN SPACE/ BUFFER ZONE

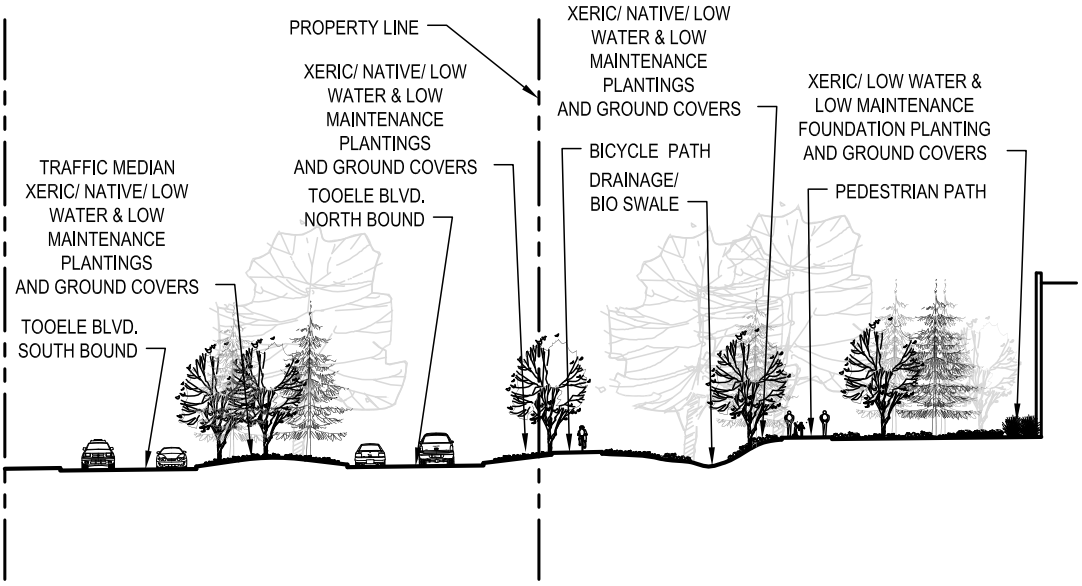
1" = 20'-0"

See Key Plan for locations (page 2.43).



DRAINAGE/ BIO SWALE WALKWAY

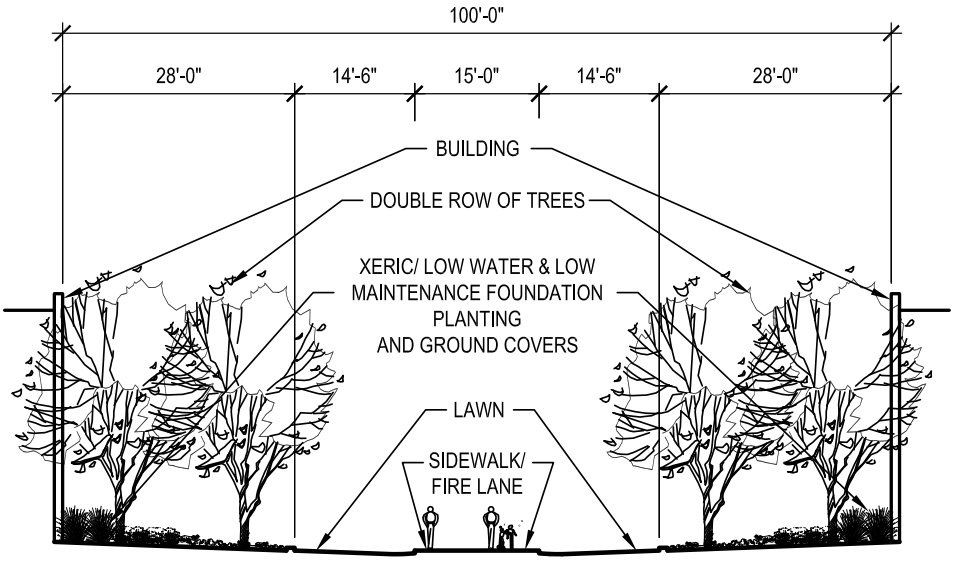
1" = 20'-0"



INTERMODAL ZONE SECTION

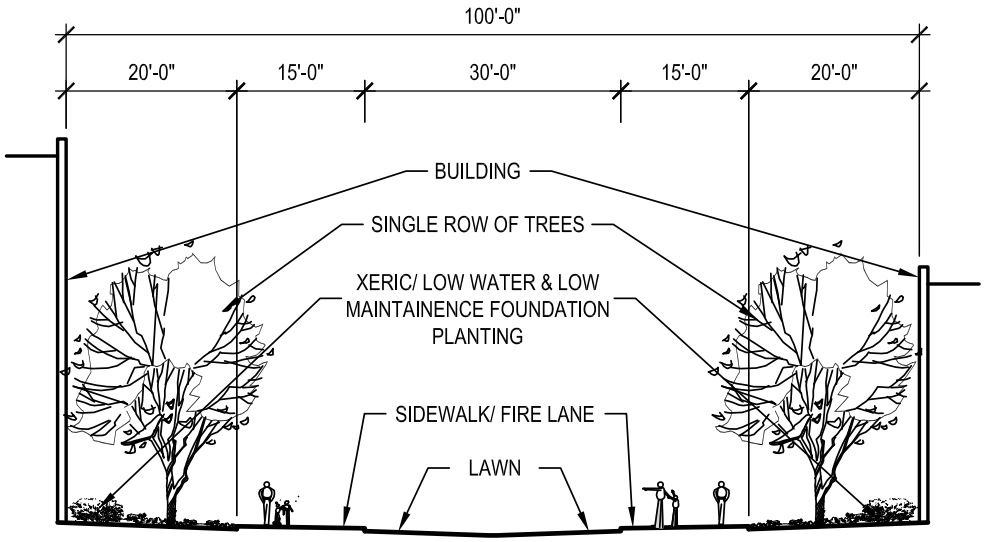
1" = 30'-0"

See Key Plan for locations (page 2.43).



MAIN QUAD ENTRY WALKWAY

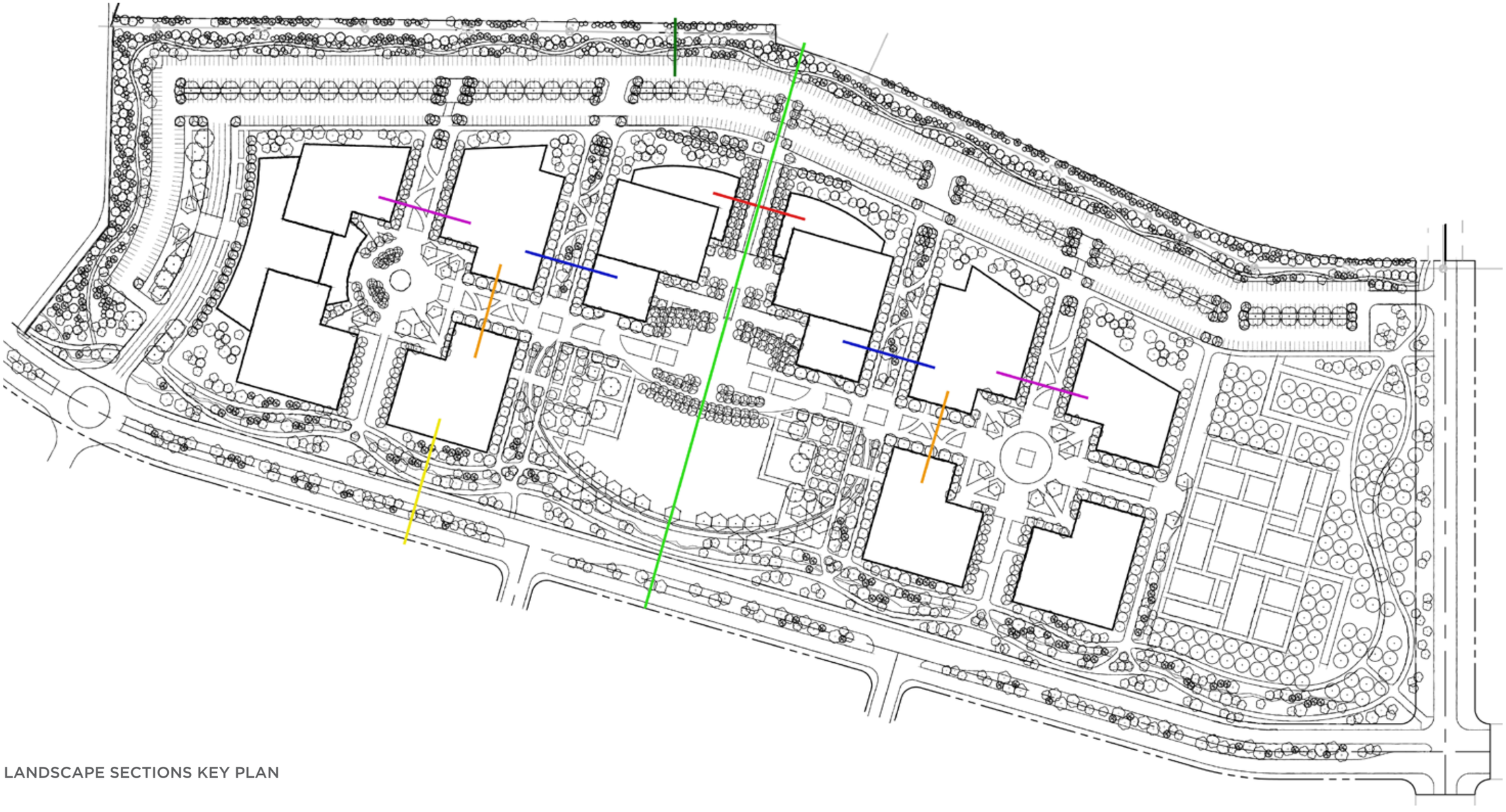
1" = 20'-0"



PLAZA ENTRY WALKWAYS

1" = 20'-0"

See Key Plan for locations (page 2.43).



LANDSCAPE SECTIONS KEY PLAN

Examples of native and xeric adaptive planting.

SITE SECTION

1" = 80'-0"

PLATE 9: BIRD'S EYE VIEW

PLATE 10 LEGEND

1. New Academic Building
2. New Administrative/Student Life Building
3. Service/Support Building
4. Recommended Central Utility Plant Location
5. Central Quad
6. Minor Quad
7. Existing Community Learning Center
8. New Tooele Applied Technology College
9. Existing USU Tooele Building

▲ Campus Marker/Sign

PLATE 10: BUILDINGS & ARCHITECTURE

PLATE 10:
Buildings & Architecture

The master plan shows a total of ten new campus buildings over the 50-year master plan time frame. They include eight academic buildings and two administrative and student life/support buildings. One additional structure, a support/service building, will be constructed adjacent to the agrarian research area at the campus south end. Its area was not included in the overall campus gross area or GSF/FTE calculations.

As master planned, the academic and administrative/student life buildings are two- to three-story structures, each with an approximate footprint of 30,000 gross square feet (GSF), for a range of 60,000 to 90,000 total GSF each. The campus total building GSF is anticipated to be between 600,000 and 700,000.

To obtain the total campus GSF needed for the 50-year build-out, the anticipated total FTE quantity of 3,200 was multiplied by 200 GSF. The master planning core team decided to use the value of 200 GSF/FTE after looking at similar campuses within the USU system, as well as additional resources, including the Western Interstate Commission for Higher Education (WICHE) which acknowledges the commonly accepted standard for GSF/FTE as 165 to 225. Because USU Tooele does not anticipate ever having student housing on its campus, its GSF/FTE value may be more appropriate toward the lower end of the range. This means that the projected campus total GSF of 600,000 to 700,000 may accommodate more FTE's than 3,200.

As master-planned, the buildings frame campus open spaces: the two center buildings front the central quad, and the four-building academic groupings surround the two minor quads, as well as provide an edge for the large central quad. The buildings support a well-defined edge along Tooele Boulevard, and the campus roadway and parking areas on the north and east.

Architectural style and building materials standards should be developed to support the image of USU and the regional context of the site.

Planning Guidelines

- Buildings should provide flexible space that will accommodate changing needs and uses over time.
- Solar orientation, daylighting, shading devices, appropriate glazing and other sustainable elements must be strongly considered during individual building design.
- Building exterior design should express building functions, and building forms should follow functions and activities.

- Consider the impact of the mix and placement of shorter and taller buildings on the campus, when designing individual buildings. Creating building edges that relate spatially to each other as well as to pedestrians will be important to develop a user friendly campus that feels comfortable and does not overwhelm facility users.
- Buildings should be composed of a complex of smaller forms and volumes, to create visual interest and scale/massing that is compatible with immediate surroundings.
- Consider the use of a particular building as an icon, a visual identifier of the campus, or an orientation element.
- Building entries must be designed for comfortable passage from outdoor to indoor spaces and vice versa, providing transition zones that are covered, sheltered or shaded.
- When designing each building's main entry, consider the entry's visibility from and orientation toward adjacent quads or pedestrian pathways. Wayfinding should be facilitated by building entry locations.
- Window placement should capture and frame views, and/or provide visual access to outdoor courtyards, walkways, and scenic views of the nearby mountains or Tooele Valley.
- Utility and equipment structures should be incorporated into campus buildings, as much as possible, to mitigate their possible negative impact on campus aesthetics.

Architectural Design - Master Plan Vision

The USU Tooele campus building designs should honor the master plan vision. As a reminder, several sections from the vision statement are repeated here:

Design Parameters

- Relate to existing and future educational corridor facilities through programs offered, material palette, design, and context.
- Establish a strong sense of entry through appropriate signage and landmark structures.
- Incorporate high-quality, timeless design elements that are practical, functional and that use regional materials.
- Incorporate standards that can be complemented and matched by those of the neighboring Tooele City Business and Research Park.
- Uphold a high standard that exceeds the quality level of the surrounding community.
- Express respect for the environment and surrounding natural beauty by using innovative and sustainable landscape and xeriscaping.
- Encourage learning through building designs that demonstrate principles of quality construction and sustainable design.
- Appropriately screen parking from street and neighboring views.
- Be adaptable to change over time.
- Place a priority on sustainability and green design.
- Encourage openness in facility design.
- Accommodate reasonable amounts of storage for maintenance equipment within the buildings and on the site.

Image & Character

- Develop a welcoming and inviting character and image that recognizes its regional context and contributions.
- Achieve statewide and regional recognition for academic offerings related to industrial technology and business development. USU Tooele will become an educational destination, known for its excellent opportunities and outcomes.
- In addition to its academic achievements, serve as a center for community involvement and cultural events.
- Be visually and philosophically recognizable as Utah State University, with strong links to the Logan campus.

Sustainability Goals

- Set the standard for sustainable campuses, with design requirements that utilize green technology and local alternative energy sources. USU Tooele will be recognized as the most carbon-neutral campus in the region.

Architectural Design Standards

Building Design:

- The new buildings should use clean lines, clear and simple detailing, with a contemporary style that reflects the Tooele Valley regional context.
- While respecting existing neighbors in the Tooele Educational Corridor (the CLC and the TATC), new building designs should not try to copy or imitate the designs of either of these facilities.
- The architectural design character should be unique to USU Tooele; it should reflect the primary educational objectives of the Tooele campus – business, industry, and technology.
- While all buildings on the new campus will have variations in their purposes and therefore their designs, the desire is to have a campus with a uniform style. All campus buildings should reflect and honor the campus style. Based on this precept, it is clear that the first building on campus will set the character and style for those to follow.
- Building interiors must be clean and open, with clear lines of sight, allowing users to easily understand where they are within the facility and where they need to be.
- Multi-story lobbies that allow views from floor to floor are encouraged.
- Natural light is an imperative for the new facilities.
- Achieving the highest level of sustainability for the available project program and budget will be required.
- Buildings and utilities (heat plants, generators, etc.) must be designed and located to mitigate the impact of noise on campus neighbors.
- Building and site lighting must be designed to avoid spillover to neighboring properties and to avoid contributing to night-sky pollution.
- Design campus buildings with consideration for USU campus building standards.

Building Materials:

- Basic building materials must be uniform from building to building to maintain the visual consistency desired on campus.
- Materials should reflect the Tooele Valley and the surrounding environmental context.
- Accent materials can vary from building to building, encouraging some variety with the uniformity.
- Clay brick masonry, metal panels, and clear or green glass will be the primary campus materials.
- Basic structures must accommodate and support Type II construction or better.
- Wood framing and stucco (traditional or synthetic/EIFS) will not be allowed as materials for the campus.
- Interior and exterior building materials will be durable and easily maintained.

Footprint Size:

- Approximately 30,000 GSF

Roof Forms & Materials:

- Roof lines should be clean and simple.
- Roof lines should not resemble residential architecture, but should rather contribute to the identification of the campus as an institution of higher education.
- Parapets are seen as appropriate means to screen mechanical equipment.
- Where upper level stories step back from lower floor facades, an opportunity exists to create a green / vegetated roof. Accessibility to the roof from inside the building is required.
- Roof material shall be single ply membrane.

Window Types & Styles:

- Window systems shall be high quality aluminum systems using clear anodized finish or a powder coated finish.
- Appropriate drip edges, flashings, thermal breaks, and structuring shall be used. Curtain wall systems are encouraged with appropriate structural support.

PLATE 11:
Utilities

Mechanical and Plumbing

Campus Tunnels and Central Plant

The campus will have a utility tunnel system. The main spine will run through the center of the campus, underneath the major north-south pedestrian walkway. Spur tunnels will run from the main spine east and west to each building. Portions of the tunnel will be constructed as part of each campus building project.

The campus will have a central plant which will connect with all campus buildings. The central plant will likely be constructed at the time of the 3rd or 4th campus building. Campus buildings constructed prior to the central plant, with standalone mechanical systems, will connect with the central plant after it is built.

The utility plan shows three possible locations for the central plant:

1. At the north end of campus (standalone plant).
2. At the south end of the campus (standalone plant).
3. Within Building 3, with structural separation from other building spaces, for noise and vibration control, and with provision for future access for large equipment (recommended option).

Depending on the rate of campus build-out, smaller central plants may be established for clusters of buildings, which will then be interconnected. The plants will be located in one of the buildings in the cluster.

Building Mechanical Systems

Initial campus buildings will have stand-alone mechanical systems, with air-cooled chillers and modular, non-condensing water tube boilers. Size air handlers for large (20-degree) delta-T, to minimize future flow requirements. These buildings will connect with the central plant after it is constructed. The baseline building mechanical system will be a single VAV air handler, with chilled water cooling and hot water reheat.

The initial buildings should be designed so that cooling towers can be added to them when they are connected to the central plant. The cooling towers will likely be rooftop-mounted; the building structures must be designed to accommodate that.

When the main central plant is built, chilled water and possibly steam will be distributed in tunnels from the plant to each building.

Building mechanical rooms must be located on the right-of-way side of buildings, and individual building mechanical systems must be designed so that future connections with the tunnel system and central plant can be made easily.

Plumbing Design Standards

Water Closets	1.28 gpf, manual flush valve, wall hung
Urinals	0.125 gpf, sensor flush valve
Faucets	0.5 gpm, sensor
Classroom Buildings:	2" supply; 4" sewer
Food service Buildings:	2.5" supply; 4" sewer; separate 4" grease waste routed through exterior grease interceptor & combined with 6" building sewer.
Laboratory Buildings:	Acid waste routed to common acid neutralization basin & combine into 4" building sewer.
Water Heating:	Gas-fired, condensing water heater with storage.
Natural Gas Demand:	Total demand at complete campus build-out = 13,000 Btu (assumption)

Electrical and Data

Electrical Power Service

Electrical power for initial campus buildings will be provided through a medium voltage system from the local utility, Rocky Mountain Power. As the campus grows to have an electrical demand load in the range of 2 to 4 megawatts, it may become feasible from a cost standpoint for the campus to take over ownership of the medium voltage system. Campus ownership of the electrical power distribution system would allow up to a 10% energy and demand discount on the rate schedule, but the campus would be required to maintain the transformers and system.

With assumptions as noted below, at the expected individual building size of 60,000 to 90,000 gross square feet (GSF), a campus-owned system may occur as early as the third or fourth building.

Expected Design Load:	15 watts / GSF
Expected Demand Load:	7 to 8 watts / GSF
Building Demand Range:	480 to 720 kW

The initial buildings should receive electrical power from a single source to allow easy takeover for a future campus-owned system. The electrical distribution system should be planned to extend from the first building, with tap points for subsequent buildings. Routing should be designed for easy extension and connection with the next future building.

Electrical cabling should be placed in conduit for ease of future cable replacement. It should not be direct-buried, and will not require encasement in concrete.

In the future, it may become possible to generate power on site, decreasing the potential campus demand load. The electrical system must be designed with the flexibility to allow the campus to take over ownership of the power distribution system, or to keep the service owned by Rocky Mountain Power.

Redundancy must be considered as the electrical distribution system is planned and designed. Initial campus buildings will receive power through a single radial feed from the north. For these first buildings, it is recommended that redundancy for life safety, data and other critical systems be provided by generator backup. As the campus grows, it will become financially feasible for redundancy to be provided by a secondary feed located toward the south end of the campus.

Electrical Planning & Design Guidelines

- Service size shall contain a minimum of 50% spare capacity, per USU design guidelines.
- The designer should choose either a 277/480 volt 3 phase service, or 120/208 volt 3 phase service.
- Digital metering equipment shall be provided at the main service switchboard.
- Transient voltage surge suppression shall be provided at the main switchboard and the emergency switchboard, and at other selected locations as determined by the design engineer.

Data

A new fiber optic telecommunications service, from Beehive Fiber, runs along the east side of the site. Another source of telecommunications service, from Qwest (Century Link), is located near the Community Learning Center, north of the new campus. Redundant data service, from both sources, should be provided to the first campus building, and should be extended to all other buildings as they are constructed.

Data Planning & Design Guidelines

- The campus should have a single data center that serves the entire campus. The initial campus building should be planned with a small data center that has the possibility of either future expansion or relocation to a larger center in a future building, as the campus grows.
- The data system design should incorporate redundant paths and conduits that allow future flexibility. Microwave communications could be a redundant path.
- All telecommunications rooms shall be on separate air conditioning to allow 24 hour, 7 day a week operation.
- All MDF rooms shall have appropriate grounding, and grounding bus, tied back to the power service ground. Provide grounding jumpers to all metal raceways entering the closet. Provide spare holes on grounding bus.
- A campus tunnel may also be used to distribute telecommunications with trays located opposite and above the mechanical central plant piping.

CIVIL

Sanitary Sewer

The campus sanitary sewer should have a divided collection system. The east side of campus can be served by a collection system running along the east side of the east buildings in a south to north direction, following the natural slope of the site. The east collection system could connect with an existing Tooele City 12-inch diameter PVC sewer line at the campus northeast corner.

The buildings on the west side of campus can be served by a collection system that would parallel Tooele Boulevard. The system would run from both the north and south ends of campus to a point in the middle; it would then run west to an outfall line and connect with the Tooele City sewer system at 1200 West street.

An alternative to the dual connection points described above is for the campus east side collection system to run to the west after it reaches the north side of campus. It could then connect and combine with the west side collection system, running to a single Tooele City connection point at 1200 West street.

Culinary Water

The new campus can tie into a 12" culinary water line near the southwest corner of the CLC in Tooele Boulevard, and into existing 8" water lines from the east residential subdivision, at 540 South Street and at 700 South Street. These water lines are in the same pressure zone and need to connect through the proposed new campus to create looping for the water system. (Additional information is being obtained by the master plan consulting civil engineer to determine what limitations may be imposed on the campus.) The water line in Tooele Boulevard is approximately 48 inches deep to the top of the pipe. The static water pressures will vary across the site from 85 psi at the southeast corner of the campus to 105 psi at the northwest corner of campus.

The water system within the campus will be constructed in phases, initially connecting to the 12" water line on Tooele Boulevard near the southwest corner of the CLC and extending southward until additional connections into the lines at 540 South Street and 700 South Street can be made.

The water line will be looped on campus as needed to provide fire protection to each of the structures and as directed by the State Fire Marshall.

Water line sizes will be based on the culinary water and fire flow demands of each campus facility.

As part of the construction of Tooele Boulevard, Tooele City will require the extension of the 12-inch water line within the street right-of-way. We anticipate the main lines to consist of 8-inch, 10-inch and possibly some 12-inch lines constructed using C-900 PVC Class Pipe.

Storm Drainage

Storm drainage for the campus will consist of a series of inlet boxes, and roof-drain and runoff water collection piping, that will collect and direct the water to an open, landscaped drainage system along the east side of Tooele Boulevard. The open drainage area will have a series of detention basins that flow toward the low point at the northwest corner of the campus. The basins will be tied together through piping and overflow structures, with restrictions to control the amount of detention and discharge. The landscaped basins will remove sediment and oils, acting as a bioswale.

Gas

There are several options for gas line connections to the campus, including a 4" high-pressure main on Millburn Avenue northwest of the campus, two lines (2" and 4" high-pressure) on Tooele Boulevard west of the CLC, and several 2" and one 3" high-pressure lines in the residential developments east of campus. The proposed connection points, shown on the Utilities Plan, are on Tooele Boulevard west of the CLC and at 700 South Street at the southeast corner of the campus.

Existing Drainage Easement

Existing storm drainage from an easement that runs across the campus from east to west at about the north-south midpoint will be routed through new below-grade piping, exiting from the campus and connecting to the City's storm drain system west of the campus.

Road Design & Construction

Tooele City requires the first developer in an area to construct the roadways fronting their property, at a minimum width of 66'. If the new Tooele Regional Campus is developed prior to the Tooele City Industrial Park (the property to the west), the campus will be required to construct Tooele Boulevard.

It is anticipated that construction of Tooele Boulevard will occur in phases, from north to south, as corresponding portions of the campus are constructed.

Grading and Drainage

The grading concept is to provide good vehicular access to parking areas, and to ensure that pedestrian routes have optimal alignment and function.

- Design each route to meet ADA standards, with maximum 2-percent cross slopes perpendicular to the direction of travel, and less than 5-percent slope in the direction of travel.
- Minimize or eliminate ADA Ramps and handrails wherever possible.
- Design building placement, finish floor elevations and site grading to minimize exporting or importing soils, and to provide good drainage away from buildings
- Design parking lots with grades between 1.5 and 4.0 percent across asphalt.

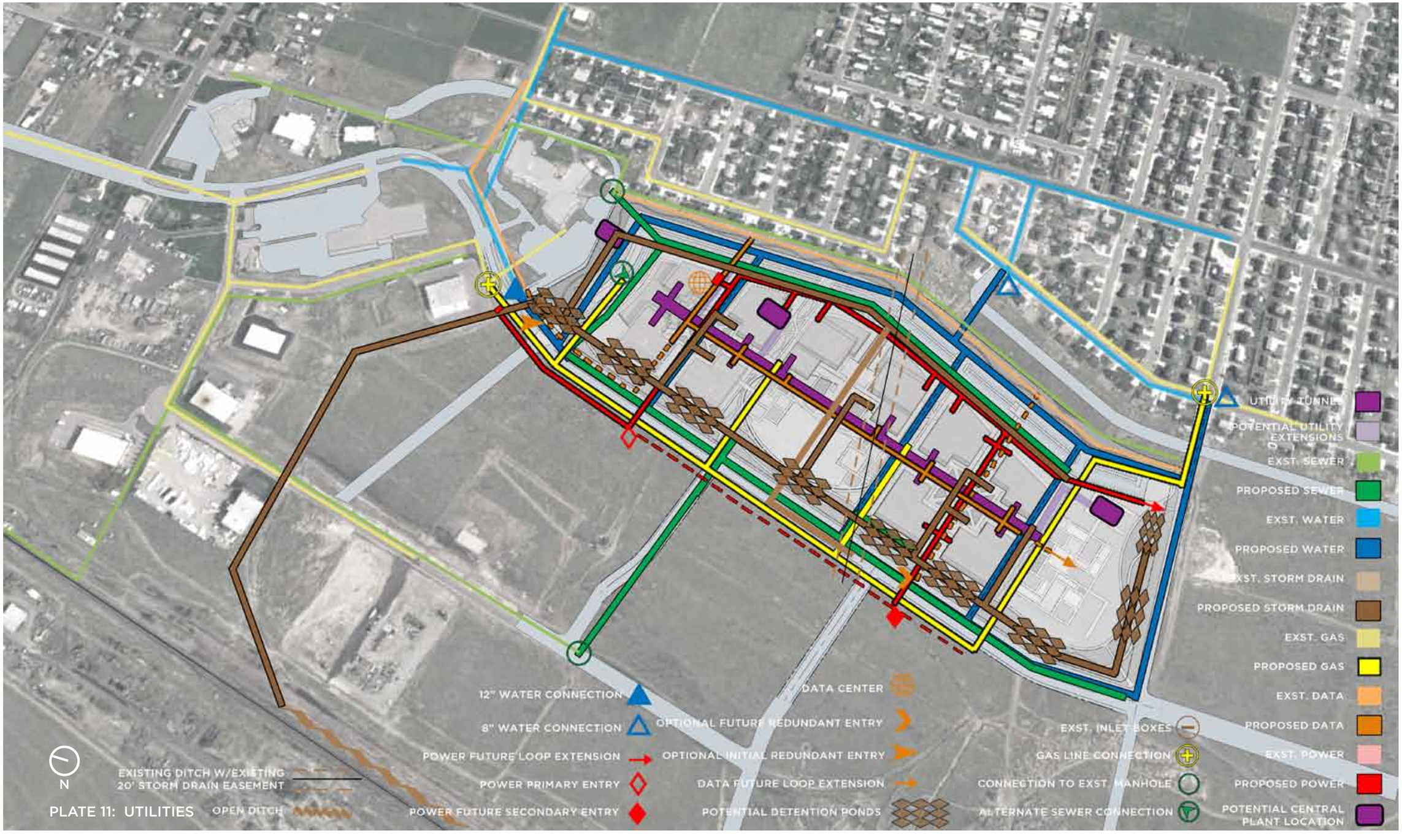


PLATE 11: UTILITIES

Data

Power

Gas

Sewer

Storm Drain

Utility Tunnel

Water

Composite

SECTION 3

Background Information

Section 3 contains background information, future projections, and utilities information that was used in the development of the USU Tooele Master Plan. Contents include:

- USU Tooele enrollment history and future enrollment projections
- USU Tooele academic program history and future projections
- Existing facilities:
  Existing USU Tooele Building 862
  Tooele County School District Community Learning Center
  Tooele Applied Technology College
- Tooele County demographics:
  Population history and projections
  Employment history and projections
- Engineering narratives:
  Mechanical & plumbing
  Electrical and data
  Civil

Enrollment

From 2006-07 through 2010-11, USU Tooele had an average 12% yearly increase in the quantity of full-time equivalent students (FTE's). Over the past five years, the campus has experienced greater than a 77% increase in FTE quantity and a 155% increase in the number of degrees awarded. The master plan core team, after studying past patterns and looking at possible future growth scenarios, decided that an FTE growth rate of 23% for future five-year periods should be used to project long-term campus growth (equivalent to a 4.25% yearly growth rate.) This will take the campus from a fall 2011 FTE quantity of 408 to around 3,200 over the next 50 years.

FTE quantities at the USU Tooele campus over the past five years

FTE's	Full Year 2006-07	Full Year 2007-08	Full Year 2008-09	Full Year 2009-10	Full Year 2010-11	Fall+Spring 2011-12
Concurrent	138	158	263	232	131	**170**
18-25 years old	49	76	126	167	175	N/A
26-30 years old	112	110	94	108	104	N/A
30+ years old	140	189	197	210	243	N/A
Non-concurrent:	301	375	417	485	522	**607**
All Students	440	533	680	717	654	**777**

See Notes 1 & 2

Past 5-year FTE growth rate (Full Year 2006-07 to Fall/Spring of 2011-12):	**77%**
Average yearly growth rate from 2006-07 through 2010-11:	**12%**

Notes

1. Full Year enrollment figures (2006-07 through 2010-11) include quantities of students enrolled in fall, spring & summer terms. These figures are available for the years 2006-07 through 2010-11. FTE quantities for the current year 2011-12 include only fall and spring enrollment quantities. When summer 2012 enrollment quantities are added to fall and spring, the past 5-year FTE growth rate will be higher than the 77% shown in this chart.
2. Enrollment figures were updated in January 2012. Final document print date was 01.27.12.

5-Year Growth Rate	5-Year Projections for Fall Term FTE Quantities & Campus Total GSF Needs											
	2011	2016	2021	2026	2031	2036	2041	2046	2051	2056	2061	
		5 years					*30 years*				*50 years*	
77%	408	**901**	1,595	2,823	4,998	8,846	**15,657**	27,712	49,051	86,820	**153,671**	*FTE Qty.*
(recent)		**180,245**					**3,131,335**				**30,734,250**	*Campus GSF*
32%	408	**539**	711	938	1,239	1,635	**2,158**	2,849	3,761	4,964	**6,552**	*FTE Qty.*
(aggressive)		**107,712**					**431,652**				**1,310,477**	*Campus GSF*
10%	408	**449**	494	543	597	657	**723**	795	875	962	**1,058**	*FTE Qty.*
(moderate)		**89,760**					**144,559**				**211,649**	*Campus GSF*
23%	408	**502**	617	759	934	1,149	**1,413**	1,738	2,137	2,629	**3,234**	*FTE Qty.*
(proposed)		**100,368**					**282,567**				**646,757**	*Campus GSF*

After considering several scenarios, the project Core Team decided to use 23% per 5 years for master plan growth projections, with 408 FTE's (fall 2011) as a starting point & space projections based on 200 GSF/FTE.

Degree Type	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Associate, HS Concurrent	0	0	0	13	9	11	5
Associate Degree	4	23	37	47	69	80	89
	4	**23**	**37**	**60**	**78**	**91**	**94**
Bachelor's, Agriculture	0	0	0	0	0	1	0
Bachelor's, Education & Human Services	18	12	26	11	14	26	9
Bachelor's, Business	5	9	10	10	15	12	18
Bachelor's, Humanities, Arts & Social Sciences	1	4	2	6	4	8	6
	24	**25**	**38**	**27**	**33**	**47**	**33**
Master's, Education & Human Services	3	4	3	0	0	2	8
Master's, Business	3	1	1	0	0	0	0
	6	**5**	**4**	**0**	**0**	**2**	**8**
Total degrees	34	**53**	79	87	111	140	**135**
5-year growth rate (2005-06 to 2010-11)							**155%**

Degrees awarded at the USU Tooele campus over the past five years.

USU Tooele has historically had a high number of non-traditional students, including concurrent students who are taking college courses while still enrolled in high school, and students above 26 years of age. Tooele County residents who are high school graduates aged 18-26 years old have typically attended full-time college outside of Tooele County. As local post-secondary educational offerings have increased, and as the local population has grown, the number of traditional students on the Tooele Campus has increased as well. USU Tooele and other area educators and community members are hoping to increase local post-secondary educational opportunities, so that local youth can gain college education while remaining at home, in their own community. In support of this, USU Tooele is implementing policies and programs to target growth in the traditional-age student demographic, while trimming concurrent enrollment to general education courses only.

Academic Programs

USU Tooele offers courses and degrees in a variety of areas of study. (See Appendix K for list of currently offered degrees and programs.) The majority of Bachelor's degrees awarded over the past several years have been in the Colleges of Business; Education & Human Services; and Humanities, Arts & Social Sciences. These areas are expected to continue to grow. In addition, the campus will target programs that focus on areas related to Tooele business and industry, including light manufacturing and industry. A chart listing projected future programs, their dates of initiation, and their expected enrollment, is below.

Projected Program	Expected Enrollment				
	2015	2020	2025	2030	2035
Investment/Securities Counselor (BS/MS)	5	10	15	20	25
Associates of Applied Science (AAS)	10	15	20	25	25
Registered Nursing (BSN)	20	20	20	20	20
Manufacturing/Prototyping (BS)	5	10	20	30	35
Industrial Hygiene (BS)		10	15	20	25
Construction Management (BS)		10	15	20	20
Forensic Anthropology (BS/BA)		10	20	25	30
Criminal Justice (AS/BS)		10	25	30	35
Geriatrics Health Services (BS)		5	10	15	25
Mental Health/Substance Abuse (BS/MS)			10	20	25
Environmental Sustainability (BS/MS)		10	15	20	20
Agro-Enviro Recreation/Tourism (BS)			10	15	20
Graphic Arts (AS)			15	20	25
Technology Transfer (BS/MS)			5	10	20
Logistics/Procurement (BS)			10	20	25
Marketing/Public Relations (BS)			10	15	20
Total Expected Enrollment	**40**	**110**	**235**	**325**	**395**

Future projected programs, dates of initiation and expected enrollment.

In the past, USU Tooele has relied heavily on the use of distance education generated from the USU campus in Logan, to supplement its on-campus course offerings. As the Tooele campus grows, the trend will be toward less use of distance and on-line education in favor of traditional face-to-face instruction by faculty based in Tooele.

Year	Building	Program Initiation	Building Program/Occupants	Building GSF	Campus GSF	FTE Capacity	Projected FTE's
2011	Exist. Building	2015	Investment/Securities Counselor	36,000	36,000	180	509
		2015	Associates of Applied Science				
2013	TATC/USU	2015	Registered Nursing	12,000	48,000	240	529
2014	Outbuilding		Agrarian research support	6,000	54,000	270	529
			Outdoor maintenance storage				
2015	Building 1	2015	Manufacturing/Prototype	60,000	114,000	570	549
		2020	Industrial Hygiene				
		2020	Construction Management				
		Existing	Biology/Chemistry/Physics				
2020	Building 2	2020	Forensic Anthropology	60,000	174,000	870	659
		2020	Criminal Justice				
		2020	Geriatrics Health Services				
		2025	Mental Health/Substance Abuse				
2025	Building 3	2020	Environmental Sustainability	60,000	234,000	1,170	894
		2025	Agro-Enviro Rec/Tourism				
		2025	Graphic Arts				
			Visual Arts				
			Interior Design				
2030	Building 4	2025	Technology Transfer	60,000	294,000	1,470	1,219
		2025	Logistics and Procurement				
		2025	Marketing/Public Relations				
			Architecture				
2035	Building 5	Existing	Student Services	60,000	354,000	1,770	1,614
		Existing	Administration				
			Library/Learning Resource Center				
			Theater/Auditorium				
2035	Building 6		Student Life/Wellness: Gym, track,	60,000	414,000	2,070	
			workout, dance, climbing wall				
			Cafeteria				
2040	Building 7		Health Science	60,000	474,000	2,370	
		Existing	Social Work				
2045	Building 8	Existing	Engineering	60,000	534,000	2,670	
		Existing	Technology Sciences				
		Existing	Information Systems				
			Geography (GIS/GPS lab)				
2050	Building 9	Existing	Existing Programs Expansion	60,000	594,000	2,970	
2055	Building 10	Existing	Existing Programs Expansion	60,000	654,000	3,270	

Existing Facilities

Existing USU Building

The existing USU Tooele building was originally constructed in 1996 at 1021 West Vine Street, at a size of about 15,000 square feet. It was home to two permanent faculty members, about 200 students, and a handful of professional staff and administrative assistants. Teaching was delivered face-to-face as well as through a variety of technologies (Ed-Net, Comm-Net, Slow Scan, Satellite, and now IVC). A 2009 addition more than doubled the building's size, to accommodate enrollment that has expanded to approximately 1,000 students (headcount) taught by 10 full time faculty and 20 adjunct instructors. The 35,500 square foot facility is a one-story masonry building with 178 parking spaces and traditional landscaping. Its main entry faces Vine Street to the north and the recent addition places a secondary entry on the west side facing Tooele Boulevard, where the majority of the parking is located.

The building has 21 classrooms. Sixteen have a seat count of 16 or higher, with most in the mid-20 range. Five classrooms seat 10 or under, serving distance education. Nearly all of the classrooms have a flexible-use, general set-up, with seating at rows of 24" deep tables. The building has one biology classroom-laboratory that has laboratory bench stations. Academic support facilities include two testing centers, a writing center, and a psychology lab.

A small bookstore component serves students and faculty with textbooks, and small amounts of general books and USU branded clothing and gifts.

The building has 22 private offices for campus administrative staff and faculty, and a registration office for student services functions. There are work, conference and storage rooms that provide general building support.

The building has an efficiency ratio (net square feet divided by gross square feet) of 63%, which is very appropriate for a higher education academic facility.

(See Appendix F for building floor plan and space list.)

Existing USU Tooele campus building from the north.

Existing USU Tooele campus building from the west.

Tooele County School District Community Learning Center

Directly south of the current USU Tooele facility is a 95,000 square feet building completed by the Tooele County School District (TCSD) in August 2010. Called the Community Learning Center (CLC), this facility provides technical and general education to alternative high school and post-secondary students.

The CLC currently provides space for two USU Tooele programs – engineering and a child care center. This partnership between USU Tooele and the CLC is expected to continue in the future.

Tooele County School District Community Learning Center, looking Southeast.

Tooele County School District Community Learning Center.

Tooele County School District Community Learning Center.

Tooele Applied Technology College

USU Tooele purchased 8.43 acres southwest of its existing facility during the winter of 2010-11. During the 2011 Utah Legislative session, USU Tooele and the Tooele Applied Technology College (TATC) received approximately $9.9 million to construct a joint facility on the newly acquired property. The City of Tooele has obligated an additional $4.5 million for the construction of the 66,700 square foot building.

The new building will be shared by USU Tooele and the TACT in respective approximate percentages of 20%/80%. USU Tooele's nursing program will be based in the new TATC building, and USU Tooele will also share student life amenities such as the bookstore and cafeteria.

(See Appendix G for USU space list and area calculations for the TATC.)

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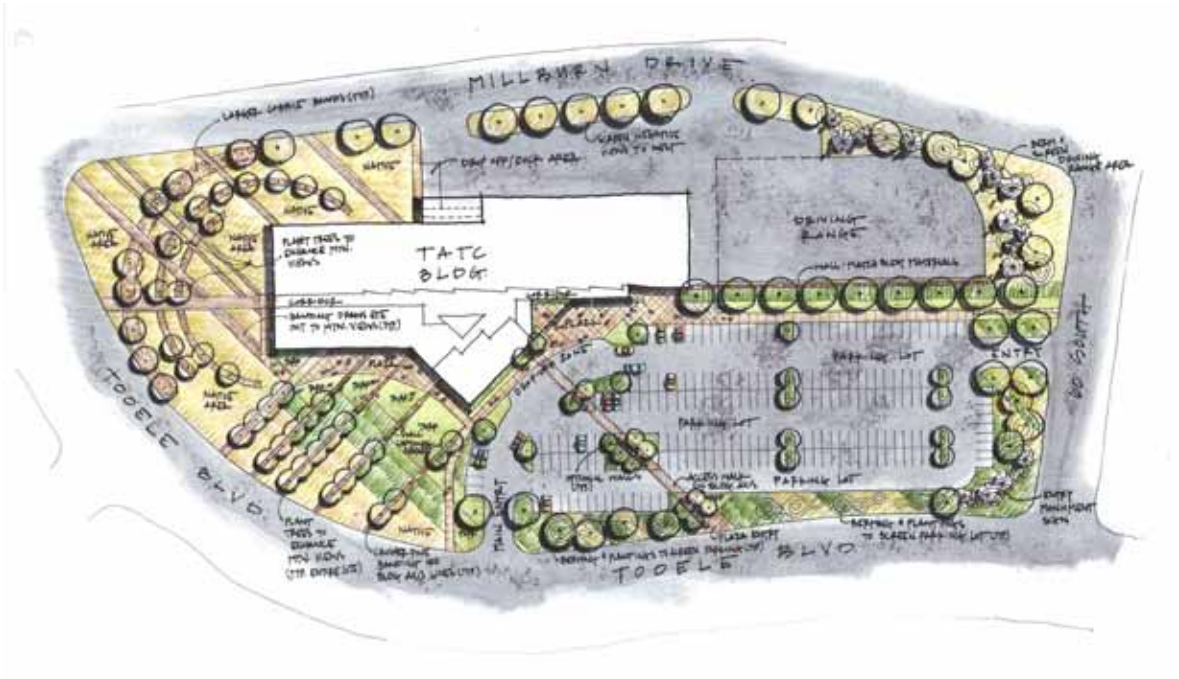
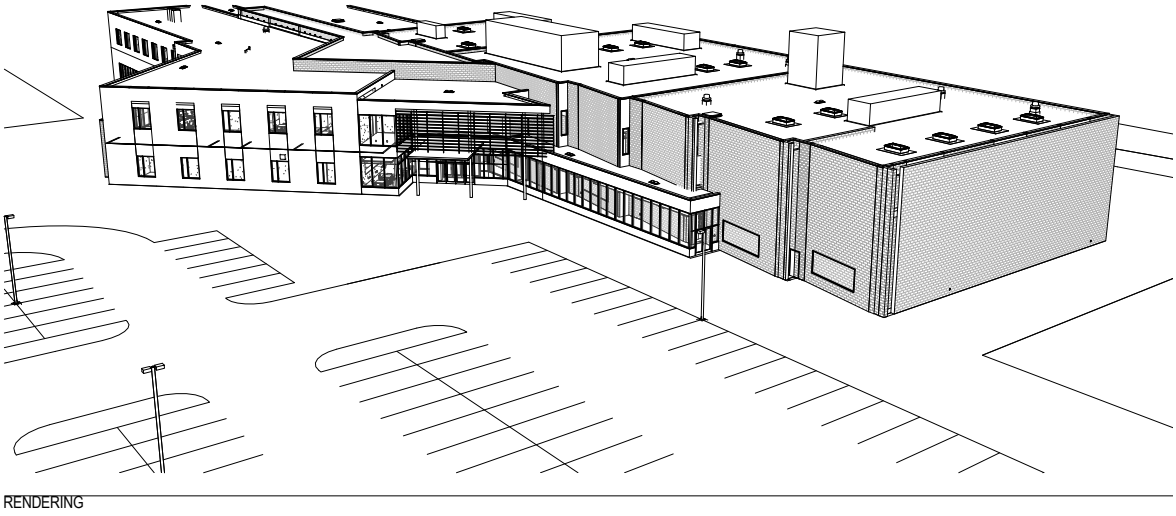


Tooele Applied Technology College Conceptual Site Plan.



Tooele Applied Technology College Schematic Perspective.

Tooele County Demographics

The Demographic and Economic Analysis (DEA) section of the State of Utah Governor's Office of Planning and Budget publishes population and employment projections for all state counties. The information in this section of the master plan was obtained from the DEA data. (See Appendix H for Tooele County demographic data.)

Population History & Projections

Tooele County has experienced a high rate of population growth over the past several decades and that trend is expected to continue, according to the State of Utah's population projections. The projections validate the anticipated need for growth by USU Tooele.

Tooele County recorded a population of 152 in the area's first census in 1850. By 1900, the population had increased to over 7,000 people. During the first half of the twentieth century, growth in Tooele County was slow, increasing to just above 9,000 by 1940.

Since 1950, however, growth has been rapid. With the exception of a lull during the 1980's, the County has experienced 10-year growth rates ranging from 21% to 60%. The population increased by 124% during the past 30 years alone.

The State of Utah is projecting 10-year population increases that range from 23% to 44% in Tooele County over the next fifty years. The projected increase for the next 30 years is 139%, fifteen percentage points higher than the growth during the past three decades.

Employment Projections

Future employment opportunities in Tooele County are expected to grow even faster than the population (171% growth for employment over the next 30 years versus 139% for the population). The chart on this page shows employment areas that have projected growth rates that are higher than the projected population growth over the same period, in order of the highest rate. Health and Social Services, and Educational Services top the list at around 400% growth expected over the next 30 years. Administrative and Waste Services, and general service industries have around 200% expected growth increases.

The State's employment projections do not seem to recognize that Tooele City is targeting growth and development in light business, industry and manufacturing. Those areas may grow more than the 153% increase in the State's data.

Tooele County Population & Employment Data Summary

Past 30-Year Population Growth		**124%**
Year	1980	2010
Population	26,033	58,218

30-Year Population Projection		**139%**
Year	2010	2040
Population	63,777	235,839

30-Year Total Employment Projection		**171%**
Year	2010	2040
Population	24,998	67,842

Employment sectors with growth rate projections higher than projected population growth of 139%, in order of highest rate:

1	Health & Social Services	414%
2	Educational Services	373%
3	Administrative & Waste Services	234%
4	Accommodation & Food Services	233%
5	Other Services	209%
6	Arts, Entertainment & Recreation	200%

7	Utilities	187%
8	Real Estate, Rental & Leasing	187%
9	Construction	173%
10	Finance & Insurance	159%
11	Manufacturing	153%

Mechanical and Plumbing Systems

Mechanical Design

- At the building level, the baseline mechanical system is a single VAV air handler, with chilled water cooling and hot water reheat.
- Initial buildings will be stand-alone, with air-cooled chillers and modular, non condensing water tube boilers. Size air handler coils for large (20-degree) delta-T, to minimize future flow requirements.
- There will be at least one central plant at some time in the future, but it is not required as part of the initial build-out.
- Depending on the rate of build-out, smaller central plants may be established for clusters of buildings, which will then be interconnected. The plants will be located in the basement of one of buildings in the cluster.
- When the main central plant is built, chilled water and possibly steam will be distributed in tunnels from the plant to each building. However, no tunnels are required as part of the initial build-out.
- A site for the central plant, as well as a right-of-way for a future tunnel should be established and maintained through the initial construction phases.
- Locate mechanical rooms in the new buildings on the right-of-way side of the building, so that when the tunnel is installed, connections to the tunnel will be straightforward. Also, design the mechanical systems so that future central plant connections can be easily made.
- Design the initial buildings so that when they are connected to the central plant, a cooling tower can be added to the building, and the existing air handlers converted to evaporative cooling. The cooling tower will likely be installed on the roof, so plan to provide structural accommodation.

Plumbing Design

- Use 1.28 gpf, manual flush valve wall hung water closets, 0.125 gpf, sensor flush valve urinals, and 0.5 gpm sensor faucets with individual tempering valves at each faucet.
- Classroom buildings will have 2” supply and 4” sewer, buildings with food service will have a 2-1/2” supply and 4”sewer, with separate 4” grease waste that is routed through an exterior grease interceptor and combined into a 6” building sewer. Laboratory buildings will have acid waste routed to a common acid neutralization basin and combined into a 4” building sewer.
- Water heating will be with gas-fired, condensing water heater with storage.
- Assume that total natural gas demand at complete build-out will be 13,000,000 Btu.

The mechanical systems are to be designed with efficiency as a primary goal. Buildings will be designed in accordance with the latest edition of ASHRAE Standard 189.1, and should be designed to achieve an average EUI that is 50% lower than current satellite campuses. When the central plant is constructed, the annual average COP target, including refrigeration, heat rejection, and distribution should be a minimum of 3.5.

Goal: Efficient, maintainable means to provide HVAC to an expanding campus

	Initial Phase	Long Term (> 3 Buildings)			Option
	Individual boiler/chiller plant at each building	**Central Chilled Water Plant Central Boilers**	**Central Chilled Water Plant, Local Boilers**	**Multiple Chiller/Boiler Plants**	**Central Condenser Water Loop**
Description	Air -cooled chillers and modular non-condensing boilers at each building.	Water cooled chillers in a central plant building, designed for current and near-term load, with expansion capability. Steam boilers in plant and steam converter at each building. Distribution via tunnel.	Water cooled chillers in a central plant building, designed for current and near-term load, with expansion capability. Individual non-condensing boilers in each building Distribution via tunnel	Chiller and boiler plant located in the first building of a cluster. Utilities distributed throughout cluster, and between clusters.	Two-pipe condenser loop with heat pumps or heat recovery chillers at each building. Ground coupled heat source/sink
First Cost	Highest per building, but lowest "sunk" cost	High initial cost for plant and distribution Lower marginal cost, but provisions needed to allocate plant additions	High initial cost for plant and distribution Lower marginal cost, but provisions needed to allocate plant additions	The first building in a cluster incurs a large cost, then each remaining building is low (depending on size of initial boiler/chiller plant)	Ground-coupled system is initially expensive, but it is readily expandable Each building requires a heat recovery chiller
Efficiency	Least efficient of the options Air cooled chiller is poor efficiency	High diversity allows better chiller efficiency than individual chillers, but distribution losses can erode savings. Cooling tower at each building can reduce chilled water demand by 80% Steam boilers are low efficiency	High diversity allows better chiller efficiency than individual chillers, but distribution losses can erode savings Cooling tower at each building can reduce chilled water demand by 80% Modular boilers are more efficient than central steam	Diversity is less than central plant, but improved over individual boiler/chiller. Minimal distribution losses.	Very high because shared heating and cooling loads.
Maintenance	Highest, because each building stands alone Air-cooled chiller is less maintenance than cooling tower	Central location optimizes maintenance. Building cooling tower requires regular maintenance	Central location optimizes maintenance. Building cooling tower requires regular maintenance Local boiler requires periodic maintenance	Multiple central plants should be only marginally more difficult to maintain than single plant	Very low maintenance – no cooling tower, no boiler
Noise	Air-cooled chiller is very noisy	Noise is concentrated at plant, with minimal noise at building. Cooling tower can be noisy if at grade	Noise is concentrated at plant, with minimal noise at building. Boiler is not noisy, but needs to be considered. Cooling tower can be noisy if at grade	The building with boilers and chillers will be noisy, others not	Each building has a chiller
Durability/ Longevity	Chiller: 15 years Boiler: 25 years	Chillers, w/o local evap cooling: 25 years Chillers, w/ local evap cooling: 40 years Boiler: 30 years Cooling Tower: 20 years	Chillers, w/o local evap cooling: 25 years Chillers, w/ local evap cooling: 40 years Boiler: 25 years Cooling Tower: 20 years	Chillers, w/o local evap cooling: 25 years Chillers, w/ local evap cooling: 40 years Boiler: 25 years Cooling Tower: 20 years	Ground coupled system: 75 years Heat recovery chillers: 25 years
Mechanical Space	Boilers and chillers at each building Air-cooled chiller or split condensing unit at each building.	Chilled and condenser water pumps and heat exchanger at each building. Cooling tower on roof	Chilled water pumps and boiler room at each building Boiler room	Substantial room in first building, very little room in subsequent	Chiller and pumps at each building

Electrical & Information Technology Systems

Code Requirements

The codes and laws that apply to the electrical systems are the latest versions of the following:

National Electric Code (NEC)
International Energy Conservation Code (IECC)
International Building Code (IBC)
International Fire Code (IFC)
International Mechanical Code (IMC)
National Fire Code (NFPA) 72
American's with Disabilities Act (ADA)
ADA Application Guide (latest edition)
Underwriters Laboratories (UL)
State of Utah Fire Marshal's requirements R710-4
DFCM Design Guidelines
Utah State design standards

Note that Section 501.1 of IECC 2009 allows the substitution of ASHRAE/IESNA Standard 90.1 for Commercial Energy Efficiency standards.

Standards Requirements

The additional standards that apply to the electrical systems are the latest accepted versions of the following:

NFPA
ANSI standards as applicable
NEMA standards as applicable
IEEE standards as applicable
EIA/TIA standards as applicable to Information Technology
BICSI standards as applicable to Information Technology

Power Service

From a master planning standpoint, there are two potential ways of feeding this campus, either a medium voltage system from the local utility (Rocky Mountain Power), or a campus owned medium voltage system.

For a single building, service from Rocky Mountain Power makes a lot of sense. The initial cost of a medium voltage system is fairly high, and the discount received on the utility rate schedule would never pay itself back before the equipment reaches end of life

However, as the load grows, there is a potential for the utility rate schedule to tip in favor of a customer owned medium voltage system. Usually the tipping point is between 2 to 4 Megawatts at today's rates.

Chart of Power Service Options

	Initial Phase Individual Rocky Mountain Power Feed	Future phase Campus Owned Medium Voltage System
Description	Initial utility owned distribution system, fed radially from the north. Utility owns the transformers.	Campus to take over medium voltage system to obtain a voltage discount through the rate schedules. Campus owns and maintains the transformers
First Cost	Lowest	Highest
Ongoing Cost	Pay commercial rates for power	Discount on energy and demand approximately 10%-20%
Maintenance	Utility owns all maintenance costs	Campus owns and maintains the utility system and transformers. Requires highly specialized electrician, or requires hiring out all maintenance to qualified subcontractors.

Review of the growth pattern of the campus shows that the system will grow to several hundred thousand square feet over a 30 to 50 year period. The initial building may be on the order of 90,0000 to 100,000 square feet and will be classroom and office oriented. With an expected design load of 15 watts/SF and a demand load likely in the 7 to 8 watts/SF, the total demand of the first building should range in the 630kW to 800 kW range. As the campus grows, the tipping point of a customer owned medium voltage system may occur.

The University would like the initial power system supplied by Rocky Mountain Power to be from a single source, which would allow easy takeover if they choose to have a customer owned system in the future. Rather than individual feeds to buildings from the north and south, a master planned system for Rocky Mountain power that extends beyond the first building, with tap points (ground sleeves or switches) for future buildings is desirable. Routing should always keep in mind the extension to the next building. For example, if the power service is obtained from RMP from the north, the conduits shall extend south of the first building to allow the 2nd building an easy tap point.

Because the system would be Rocky Mountain Power owned initially, there is no need for concrete encasement of the ductbank system. However, for ease of cable replacement, conduit will be a requirement, rather than direct buried medium voltage cables.

Future Renewables

It is unknown what 30 years holds. It is possible that renewable on site energy may become more and more prevalent, which would decrease the potential demand load. How this affects the utility rate schedules is also unknown. Therefore, flexibility in allowing the owner to either take over the power distribution system and go to a less expensive rate schedule, or to maintain the Rocky Mountain Power services, is important.

Redundancy

It is expected that the first building would be a radial feed from the north, from the power company. Eventually, as the campus grows, there may be a desire to have a 2nd point of connection from the power company, perhaps on the southeast of the site. Such redundancy may be important in Rocky Mountain Power's master plan in providing reliable service to a growing campus or to extend additional power to the campus from another substation source. However, to pay for the initial redundancy is cost prohibitive for a single building, as RMP would charge for the redundancy and for the demand from two sources. It is recommended that such redundancy be considered in laying out the system, but not be implemented for the initial few buildings. Generator backup systems can provide required redundancy for specific life safety, data systems, and other critical systems.

A single spine concept running down the center of the site, or the east or west of the site would allow the power line to line the long linear campus, and provide for a future connection point at the south or southeast.

Power Service

Service size shall contain a minimum of 50% spare capacity according to the USU design guidelines.

The designer should choose either a 277/480 volt 3 phase service, or 120/208 volt 3 phase service.

Digital Metering equipment shall be provided at main service switchboard.

Transient Voltage Surge suppression shall be provided at the main switchboard and the emergency switchboard, and at other selected locations through the facility as determined by the design engineer.

Electrical Sustainability

It is desired to feature green building technology as part of each facility at the Tooele campus. For the electrical system, this starts with lighting and controls. Placing the exact amount of light that is necessary is the first step in controlling lighting wattage. The second step is to turn the lighting off or down when it is not needed. Finally, this is rounded off with the use of the highest efficacy lighting fixtures, for the lowest possible energy use.

Strategies for control include dual technology occupancy sensors and daylighting controls. The newest technology in lighting fixtures is solid state, and such fixtures are affordable in places where dimming is anticipated, such as lecture halls, or in daylight dimming areas. To ensure full functionality, specifications shall include full commissioning of these systems including illumination level testing.

Telecommunications Service to New Facility

A new fiber optic telecommunications service runs along the east side of the site from Beehive Fiber. Another source of telecommunications services is located near the Tooele continuing Learning Center from Qwest (NextLink).

It is desired to have redundant path fiber services to the first building, which will then extend to all other buildings.

Telecommunication MDF and Data Room Requirements

The types of data center spaces are expensive to build. As such, it is desirable to have a single building host the data center. In the initial building, a small data center can be built. This could be expandable for future buildings, or it can be relocated into another larger dedicated facility in the future. The important thing is to provide redundant paths and conduits to allow flexibility in the future. For example, when the 2nd building is built, it is desirable to have a conduit pathway to the first building. But it is also desirable to have a conduit pathway to the utility telecommunications pathway on the east, in case permanent utility service is moved to the 2nd building. This 2nd fiber service could also provide another redundant pathway.

It is possible that microwave communications can be a redundant path.

All telecommunications rooms shall be on separate air conditioning to allow 24 hour, 7 day a week operation.

All MDF rooms shall have appropriate grounding, and grounding bus, tied back to the power service ground. Provide grounding jumpers to all metal raceways entering the closet. Provide spare holes on grounding bus.

Renewable energy, on site, should also be considered. Photovoltaic panels, which can harness energy from the sun, are a good fit for the Tooele valley area to help offset energy use. In addition, the valley provides a reasonable wind corridor. The existing Community Learning Center north of the USU Tooele 54-acre site has a vertical turbine. A designer anticipating wind as a resource may consider review of the data available at the CLC to review number of wind days, total power generated, and other available data from this current installation. Although not always available, wind turbines could lower the energy use Index of the facility by a substantial margin, and this resource is sometimes available when the sun is not shining, such as at night and during stormy weather.

Civil Engineering Narrative

Sanitary Sewer

There are two potential sanitary sewer connection points for the 54-acre campus. The first is a 12-inch diameter PVC sewer line, approximately 10 feet deep, that crosses the USU property near the east property line and continues north where it has been rerouted through the Tooele School District's Community Learning Center (CLC). The sewer flows from south to north with an approximate slope of 1.3 %, giving the pipe a full flowing capacity of about 2160 gpm. Because this line is on the east or high side of the property, the buildings adjacent to Tooele Boulevard in the northwest corner of the campus (the campus low point) would have a difficult time gravity flowing into this existing line. A sewage lift station would have to be used, or the finished floor elevations of the buildings would need to be raised to about 5 feet above existing grade.

The other possible sewer connection is a to an existing 10-inch sewer line in 1200 West Street, currently serving a portion of the existing development in the area west of Tooele Boulevard. Tooele City indicates this existing sewer line could be extended east and enter the USU Tooele campus just north of the middle of the campus (north-south direction). The surface elevation at 1200 West at this potential connection point is approximately 28 feet lower than Tooele Boulevard at the mid-point of the USU Tooele campus. This would provide approximately 2.5% slope in the proposed sewer line.

The sanitary sewer system can be divided into two collection systems. The first would consist of a collection main and manholes running along the east side of the east buildings, in a south to north direction, then northeast to an existing sanitary sewer manhole near the northeast corner of the campus. This sewer main would only serve the east side buildings because of the grade limitations mentioned above. The second collection system would be on the west side of the campus, paralleling Tooele Boulevard, running from the north and the south to the middle of campus and then west to the outfall line connecting into 1200 West Street. Sewer laterals would be extended from the sewer main to each building.

Another alternative is to design and construct the outfall line west to 1200 West Street with the capacity to service all the campus buildings by gravity flow. In this option, the campus sanitary sewer system would not connect with the existing sanitary sewer lines in the east and northeast areas of campus.

The calculable capacity of the downstream sewer lines is dependant on all the line sizes, slopes and service areas through the western part of Tooele City to the city's sewage treatment facility located approximately 4.3 miles to the north at 3300 North 1200 West. The sewer treatment facility currently can treat 2.25 MGD - approximately 17,000 people and is scheduled to be upsized to 4.5 MGD average with a peak flow capacity of 11 MGD.

Culinary Water

There are two Tooele City water wells and pump stations approximately 600 feet west of the west boundary of the USU Tooele campus and two additional Tooele City water wells and pump stations nearby. These pump stations push the well water east over 1.5 miles to water storage tanks on the east side of State Road 36. The water gravity flows westward through the city and eventually to the proposed USU Tooele campus. There are several pressure regulators installed in-line to control the water pressure. The USU Tooele campus can tie onto a 12-inch water line near the southwest corner of the CLC in Tooele Boulevard, and into existing 8-inch waterlines from the nearby subdivision to the east at 540 South Street and at 700 South Street. These water lines will be in the same pressure zone and need to connect through the proposed USU Tooele campus to create a loop for the water system.

The water line in Tooele Boulevard is approximately 48-inches deep to the top of the pipe, which is Tooele City's standard. The static water pressures will vary across the site from 85 psi at the southeast corner of the campus to 105 psi at the northwest corner of campus. Recent flow tests from Tooele City Engineering have been requested.

Water line sizes will be based on the culinary water and fire flow demands of each campus facility. As part of the construction of Tooele Boulevard, Tooele City will require the extension of the 12-inch water line within the street right-of-way. The water lines will consist of 8-inch, 10-inch and possibly some 12-inch lines constructed using C-900 PVC Class Pipe.

The Water Source Protection Plans from the Utah State Division of Drinking Water for these four wells show that the entire USU Tooele campus falls within the 3-year and 15-year groundwater travel zones of these wells. The Source Protection Plan guidelines indicate that new developments need to: identify the Potential Contamination Sources (PCS's) individually as they move into protection zones; include them on the inventory of PCS's; identify and assess current controls; and plan land management strategies if they are not adequately controlled.

Storm Drainage

Tooele City is proposing an open landscaped drainage swale for storm water collection and detention on the campus. The low end of the campus property is at the northwest corner. The preferred location for the drainage ditches is along the east side of Tooele Boulevard. Detention basins can be incorporated as part of the open ditch system. These basins can be cascading pools that are part of the drainage conveyance system. Used for storm drainage and detention, the swale can become a site landscape amenity. This type of system work has worked in several other locations, the Salt Lake International Center being a nearby example.

A storm drain extension is required to connect from the edge of campus into an existing storm drain system near the railroad tracks, just west of the Utah Industrial Depot. The discharged storm water will flow southwest along the railroad tracks to a gravel pit that serves as Tooele's regional detention basin in the southwest part of the city. Location of this outfall line must be coordinated with the city.

On the campus, the storm drainage system will consist of a series of inlet boxes and piping designed to collect roof-drains and runoff from parking lots and landscaped areas. The piping will be sized to accommodate the area of drainage and direct the flows to the open, landscaped drainage system flowing northwest along Tooele Boulevard. The drainage system basins will be tied together through piping and overflow structures with restrictions to control the amount of detention and discharge rates. The landscaped basins will also remove sediment and oils acting as a bioswale. Maintenance needs for the landscaped swales will be determined at the time of design.

Tooele City requires designing storm water detention facilities and pipe sizing calculations using a 10-year rainfall intensity frequency with an allowable discharge rate of 0.1 cubic feet per second per acre of property.

The drainage design for the neighboring Community Learning Center includes detention basins in landscaped areas as well as onsite detention in some of the parking areas. The landscaped ponds are filled first and during storms with high rainfall intensity water backs up into the parking areas. This option, which allows use of smaller storm drain piping, could be considered for the USU Tooele campus.

Gas

Questar gas has several gas lines available in the area of the campus. On Millburn Drive, just northwest of the site, there is a 4-inch high pressure gas main. On Tooele Boulevard, north of the CLC building, there are two lines; a 2-inch and a 4-inch high pressure gas lines. There are several 2-inch and one 3-inch high pressure gas lines in the residential developments just east of the campus. This should provide much of the needed natural gas demand for the campus.

Drainage Easement on Survey

The drainage easement that cuts east and west through the site will be relocated to accommodate the proposed campus layout. This will need to be done prior to the phase of the campus build-out on which the easement is currently located. Typical requirements for utility line relocation would be to provide an equal or greater flow capacity in the new, realignment system, whether the ditch remains open or is piped. There is a 30-inch CMP crossing the old Runway. A pipe with similar flow characteristics can be used.

Road Design / Construction

Currently, Tooele Boulevard has been dedicated as a 106-foot width street as it fronts the CLC. Tooele Boulevard from Vine Street to 200 South Street will need to be widened, as the TATC, USU Tooele campus and the Tooele Research and Business Park grow. A portion of this road section has been dedicated to a 100' foot right-of-way, indicating Tooele City's intent to have this widened. The TATC is currently working with a traffic engineer and Tooele City to determine the needed right-of-way width for Tooele Boulevard in this section from Vine Street to 200 South Street.

Tooele City provided some clarification on the responsibility for the construction of Tooele Boulevard and other roadways within Tooele City; for rights-of-way 66' wide or less, the first developer is responsible to develop their side of the road, from their property line to the back of the curb on the opposite side of the road. For rights-of-way wider than 66' (Tooele Boulevard will be more than 66' wide), the developer can appeal to the City Council for an exemption from constructing the entire roadway, but typically will be required to construct a portion of the road that is equivalent to a 66' design without curb and gutter on the opposite side of the development. Thus, USU can appeal to the City Council for a reduction in the improvements required for the construction of Tooele Boulevard when they build their first building, assuming they are the first developer along the street.

Roadway improvements will be required for that portion of each phase of the project that fronts a dedicated public street. It is anticipated that Tooele Boulevard will be constructed in contiguous phases starting from the north end and working south. USU and or Tooele City may chose to construct Tooele Boulevard across the frontage of the USU Campus in larger phases to insure that a better product is constructed.

Grading and Drainage

The grading concept should provide good vehicular access to parking areas. Pedestrian access to a university campus is critical and all access routes must be evaluated to ensure the best alignment and function of the route. Each route must also be designed to meet ADA standards with 2-percent cross slopes perpendicular to the direction of travel and less than 5-percent slope in the direction of travel, wherever possible to minimize or eliminate ADA ramps and handrails. The building placement, finish floor elevations and site grading will be prepared to minimize exporting or importing soils and provide good drainage away from buildings. Parking lots will be designed with grades across asphalts between 1.5 and 4.0 percent. The natural slope across the property is roughly 3% from east to west and about 1% from south to north.

Irrigation

No secondary or raw water systems are available near the proposed campus. Therefore, it will be necessary to utilize culinary water to irrigate USU Tooele's landscape. However, it would still be beneficial for the campus to have an irrigation system that is metered and networked independently of the culinary water lines on campus.

Backflow prevention valves are required any time an irrigation main is connected onto the culinary water system.

Water rights for both culinary and secondary water are required to connect onto the Tooele City water system.

SECTION 4

Cost Opinion

This section contains a cost opinion for the development shown in the master plan, by phase. The costs include construction of site elements, buildings, roads and utilities. Buildings have been estimated at 60,000 gross square feet each. The costs include inflation at 3.5% per year, and contingency (undefined building elements) of 5 to 10%, depending on the element being priced.

Below is a summary of the cost opinion:

PHASE 1		
Building 1	June 2015	$13.5 million
Building 2	June 2020	$15.6 million
Building 3	June 2025	$18.6 million
Building 4	June 2030	$13.0 million
Service Building		$.9 million
Site		$4.3 million
Roadway		$2.0 million
Utility Tunnel		$2.1 million
Central Plant		$12.5 million
Total Construction Costs		$82.5 million
Soft Costs		$15.7 million
Total Project Costs		**$98.2 million**

PHASE 2		
Building 5	June 2035	$26.2 million
Building 6	June 2035	$26.2 million
Site		$8.5 million
Roadway		$1.3 million
Utility Tunnel		$2.7 million
Total Construction Costs		$64.9 million
Soft Costs		$13.0 million
Total Project Costs		**$77.9 million**

PHASE 3		
Building 7	June 2040	$31.1 million
Building 8	June 2045	$37.0 million
Building 9	June 2050	$37.0 million
Building 10	June 2055	$37.0 million
Site		$4.3 million
Roadway		$3.7 million
Utility Tunnel		$3.8 million
Total Construction Costs		$153.8 million
Soft Costs		$30.8 million
Total Project Costs		**$185.5 million**

If needed, during Phase 3:	
2-Level Parking Structure (2,000 cars total)	$22.3 million

Utah State University's typical annual facility operations costs are:

Classroom/office buildings	$7.92/SF
Lab buildings	$9.05/SF

Utah State University Tooele Campus
Full Campus Summary
Cost Opinion by MHTN Cost Control
Stage of Cost Opinion : Program

DATE
Nov 21 2011

MHTN ARCHITECTS

Phase One

		Gross Sq Ft	Cost Per Gross SF	Total Construction $
Building # 1				
Manufacturing/Prototype				
Industrial Hygiene	Building 1	60,000	$ 224	$ 13,466,936
Construction Management				
Biology Chemistry Physics	Bid Date June 2015			
Building # 2				
Forensic Anthropology	Building 2	60,000	$ 261	$ 15,638,192
Criminal Justice				
Geriatrics Health Services	Bid Date June 2020			
Mental Health Substance Abuse				
Building # 3	Building 3	60,000	$ 310	$ 18,573,266
Environmental Sustainability				
Agro-Enviro Rec/Tourism	Bid Date June 2025			
Graphic Arts				
Visual Arts				
Building # 4	Building 4	60,000	$ 368	$ 13,046,939
Technology Transfer				
Logistics and Procurement	Bid Date June 2030			
Marketing and Public Relations				
Architecture				
	Site storage building	6,000	$ 148	$ 888,000
	Site phase one	782,217	$ 5.47	$ 4,281,362
	Roadway phase one	2850	$ 695	$ 1,980,750
	Campus tunnel system	1,160	$ 1,850	$ 2,146,000
	Allow for Central plant			$ 12,500,000
	Construction Total Phase 1			**$ 82,521,445**

ADDITIONAL COSTS NOT PART OF CONSTRUCTION ESTIMATE

(Costs/percentages listed are typical)

EQUIPMENT AND FURNISHINGS COST		7.00%	$ 5,776,501
PROFESSIONAL FEES (DESIGN)		6.50%	$ 5,363,894
TESTING AND INSPECTION		0.50%	$ 412,607
MOVING COST	By Owner		$ -
CHANGE ORDER ALLOWANCE		5.00%	$ 4,126,072
OWNER SUPPORT AND OTHER REQUIRED COSTS	By Owner		$ -
Sub total other costs			**$ 15,679,075**
Construction cost			**$ 82,521,445**
TOTAL PHASE 1 PROJECT COST			**$ 98,200,520**

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MHTN ARCHITECTS

Phase Two

		Gross Sq Ft	Cost Per Gross SF	Total Construction $
Building # 5				
Student Services				
Administration	Building 5	60,000	$ 437	$ 26,199,427
Library learning Resource Center				
Theater Auditorium	Bid Date June 2035			
Building # 6				
Forensic Anthropology	Building 6	60,000	$ 437	$ 26,199,427
Criminal Justice				
Geriatrics Health Services	Bid Date June 2035			
Mental Health Substance Abuse				
	Site phase two	782,217	$ 10.88	$ 8,510,521
	Roadway phase two	950	$ 1,383	$ 1,313,850
	Campus tunnel system	725	$ 3,681	$ 2,668,805
	Construction Total Phase 2			**$ 64,892,029**

ADDITIONAL COSTS NOT PART OF CONSTRUCTION ESTIMATE

(Costs/percentages listed are typical)

EQUIPMENT AND FURNISHINGS COST		8.00%	$ 5,191,362
PROFESSIONAL FEES (DESIGN)		6.50%	$ 4,217,982
TESTING AND INSPECTION		0.50%	$ 324,460
MOVING COST	By Owner		$ -
CHANGE ORDER ALLOWANCE		5.00%	$ 3,244,601
OWNER SUPPORT AND OTHER REQUIRED COSTS	By Owner		$ -
Sub total other costs			**$ 12,978,406**
Construction cost			**$ 64,892,029**
TOTAL PHASE 2 PROJECT COST			**$ 77,870,435**

Utah State University Tooele Campus
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MHTN ARCHITECTS

Phase Three

		Gross Sq Ft	Cost Per Gross SF	Total Construction $
Building # 7				
Health Science				
Social Work	Building 7	60,000	$ 519	$ 31,140,000
	Bid Date June 2040			
Building # 8				
Engineering	Building 8	60,000	$ 616	$ 36,960,000
Technology Sciences				
Information Systems	Bid Date June 2045			
Building # 9	Building 9	60,000	$ 616	$ 36,960,000
	Bid Date June 2050			
Building # 10	Building 10	60,000	$ 616	$ 36,960,000
Existing Program Expansion				
	Bid Date June 2055			
	Structured Parking			
	Site Phase Three	782,217	$ 21.65	$ 4,281,362
	Roadway phase three	1350	$ 2,752	$ 3,715,200
	Campus tunnel system	725	$ 5,193	$ 3,764,925
	Construction Total Phase 3			**$ 153,781,487**

ADDITIONAL COSTS NOT PART OF CONSTRUCTION ESTIMATE

(Costs/percentages listed are typical)

EQUIPMENT AND FURNISHINGS COST		8.00%	$ 12,302,519
PROFESSIONAL FEES (DESIGN)		6.50%	$ 9,995,797
TESTING AND INSPECTION		0.50%	$ 768,907
MOVING COST	By Owner		$ -
CHANGE ORDER ALLOWANCE		5.00%	$ 7,689,074
OWNER SUPPORT AND OTHER REQUIRED COSTS	By Owner		$ -
Sub total other costs			**$ 30,756,297**
Construction cost			**$ 153,781,487**
TOTAL PHASE 3 PROJECT COST			**$ 184,537,784**