ONE

One planet. One People. One Campus.

University of Texas at Arlington

Team Registration Number: M24

West View into the Deck Park area

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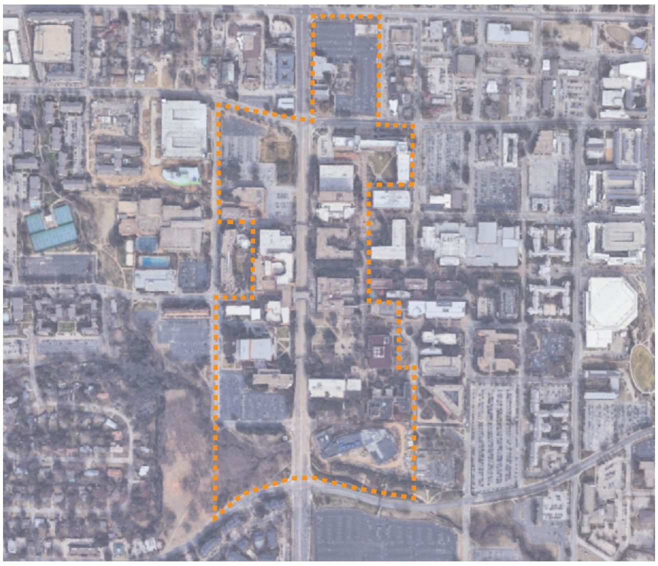
PROJECT ABSTRACT

The campus of University of Texas Arlington (UTA) is impacted by several environmental stressors, including excess impervious surfaces and the bisection of the site by Cooper Street. In 1989, the death of a student crossing Cooper Street led to a major reconstruction of the campus and its relationship to the roadway. Concrete retaining walls were put in place to contain traffic and minimize pedestrian and vehicular interaction. As well, three obsolete pedestrian bridges above Cooper Street provide safe passage for students crossing from East to West campus,

The passage of Cooper Street through the campus is void of pedestrians and plant life, as it is physically unsafe. Both the north and south entrances to campus are stationed along Cooper Street, where the south entrance bridges over Trading House Creek, a tributary of the Trinity River. The topography of campus provides an ideal situation for capturing and filtering runoff before depositing into the creek, as the north entrance of campus is at a higher elevation than the south.

Proposed solutions not only have an impact on our campus, but can influence environmental and social systems on a larger scale. UTA has nearly 60,000 students, from 100 different countries, with most students living off-campus, and the Trinity River system provides water for millions of Texas residents and wildlife. Our team seeks to create a safer environment for multi-modal transportation through the campus, mitigate stormwater, pollution, reduce heat-island effects, conserve water and provide an identity of sustainability and diversity for the campus.



Site Location, Google Earth

INTRODUCTION

Problem Statement

The University of Texas at Arlington's (UTA) master plan vision hopes to continue expanding the campus, with efforts to create a more sustainable campus environment. Our goal is to expand upon this vision by proposing systems that not only make the campus more accessible, but position UTA as a leader in **environmental resiliency.** Through guidance from the University Master Plan Document, our plan is to be implemented in the Long Term Vision, or "2060 Plan", which provides an overall direction for the growth and phased implementation of campus expansion. The goal of the 2060 plan is to turn grey water green in order to mitigate the amount of impervious cover in addition to enhancing the Trading House Creek to recover and enhance the natural amenity. (UTA, 2007)

When the features of our master plan design are implemented, the campus will not only benefit from the sustainable approaches to stormwater management, solar harvesting, and green infrastructure, but also the reconnection of both the East and West side of campus. In any attempts to reconnect campus over Cooper Street, it would be pertinent to do so through a sustainable approach, as adding too much impervious infrastructure would have severe consequences to flooding and management of Trading House Creek.

Our master plan will introduce the concept of a traffic-calming design approach along Cooper Street, allowing for the roadway to become more pedestrian and bike friendly. In a traffic-calming design, there are opportunities for spaces that draw visual interest of the passengers in vehicles passing by, increasing awareness of drivers and consequently slowing down traffic. Along with an improved visual relationship along Cooper Street, there will be an increase in stormwater infiltration rates through the introduction of vegetated medians. These rain gardens will provide reduction of impervious run-off and improvement of water and air quality along with the addition of a healthier and safer habitat for local wildlife.

Creating a green corridor along Cooper Street is supported by the construction of a deck park that connects students from East and West campus. The deck park will create a new, central campus quad by connecting the former campus quad near our Central Library, and extending connections over Cooper Street to Texas Hall. Historically, this connection was made before the implementation of retaining walls along Cooper Street. This new campus quad is an extension of the

Figure 1.1.Cooper Street in 1983 (Left) and Cooper Street Today (Right) (Vedia et. al., 2019)

improvements along the Cooper Street corridor, featuring LID bioswales, water filtration systems, vegetated green walls and providing a safer habitat for local wildlife above the roadway.

An improved multi-modal transportation corridor, featuring a new campus quad, serves as a model for future development of UTA and the Arlington community by reconnecting the historically disjointed campus. Our master plan exceeds modern standards for the community spirit of a college campus, and its surrounding city, through defining the importance of water and green infrastructure in its larger context of the Trinity watershed. Through the opportunity to increase UTA's identity and imageability in the built environment, we implement environmentally sound solutions that contribute to campus user's quality of life. The environmentally-focused design is infused with social, leisure and educational functions.

SITE SELECTION, INVENTORY, AND ANALYSIS

Campus Context and Location

University of Texas Arlington is located in Arlington, Texas, also known as "The American Dream City." Arlington is positioned in between both the Dallas and Fort Worth metroplex, serving students from all over this expansive urban area. UT Arlington is largely known as a commuter campus, with excess parking lot space and a campus defined by Cooper Street, which divides it in half.

This character of campus being more vehicle-centered has allowed UTA's identity to diminish, and a community "college experience" is not a defining characteristic of UTA. UTA's Master Plan Vision states that one of its guiding principles is to create a "campus of outdoor rooms, shaded gardens and activity hubs, punctuated with water features" (UTA, 2007). There has been a solid attempt to achieve this, but the reality has somewhat missed the mark. The spatial organization of buildings at UTA are clustered together with little lawn or openspace, and there is excessive amounts of impervious surfaces due to the importance placed on cars and parking lots. The attempt to create outdoor rooms can feel smothering at times, with the juxtaposition of these enclosed spaces to public roads and opening up into desolate parking lots. The narrow pedestrian bridges across Cooper Street, which cuts campus in half, are not sufficient for making a meaningful connection within the campus.

Site Selection

A summarized formal analysis of the most dire issues in our campus environment supports our team's site selection process, with the division of campus at Cooper Street and the issues related to and stemming from this corridor becoming our main focal point. The UTA 2060 Master Plan Vision was important to our team's design development, with our goal for the alignment of shared values with those who initially produced the documentation. This, in our view, makes our design proposal more implementable and likely to be given support and maintenance on an institutional level. We sought to align our design proposal with the ideas of the Master Plan Vision, through the addition of impactful solutions that address timely environmental problems, such as climate change and the necessity to create a more sustainable planet for future generations, through the use of renewable energy and resilient infrastructures.

Goals and Vision Statement

Our master plan seeks to CLEAN our water and air to create a thriving campus ecosystem, CONNECT a campus divided by a highway (Cooper Street), and PROMOTE an image of sustainability and diversity for UTA.

Watershed and Climate

Texas has 188 major water-supply reservoirs, in addition to over 20 major reservoirs that serve no water-supply function. Texas also has approximately 191,000 miles of streams, 15 major river basins, eight coastal basins, and 196 major reservoirs. The water for the city of Arlington comes from four reservoirs - Cedar Creek, Richland-Chambers, Lake Arlington and Lake Benbrook. Our campus gets municipal water supplied by the Trinity River watershed, which includes the river and tributaries that were dammed for retention. The creek that runs through campus, Trading House Creek, is related to Johnson Creek, which both fall within the Trinity River Watershed.

The average yearly rainfall in Arlington, Texas is 40 inches. This is slightly above the U.S. average of 38 inches per year. Arlington receives some form of precipitation on average 77 days per year, or about 21% of the time. This is a reduction in the U.S. average of 106.2 days. Arlington's stormwater system includes 10,000 storm drains, over 330 miles of storm sewers and 33 miles of natural stream channels. From this information, we can determine that while Arlington receives less days of precipitation, each rainfall event brings a higher volume of precipitation than the average American city. There is also an average of 1 inch of snow per year, which is important to note as snow and frost melt accumulate as run off.

May is the wettest month in Arlington, with an average of 4.8 inches of rain over the last 30 years. The rainiest season in Arlington is in the summer, with 29% of yearly precipitation. In May, there are a total of 8.7 average days of rain. February is the most likely month for snow, and Arlington receives on average .6 inches of snow per snowfall, which is higher on average than most cities in Texas.

Arlington also sees 30 more days of sunlight than the U.S. average of 205 days per year, as well as 5.7 UV index compared to the U.S. average of 4.3. This makes Arlington an ideal candidate for solar harvesting infrastructure, such as white roofs. August is the hottest month in Arlington, with an average temperature of 95.6 degree Fahrenheit. This ranks Arlington on average with other Texas cities. The most comfortable months, according to temperatures of 75-80 degrees Fahrenheit, in Arlington are October, April and May. January has the coldest night time temperatures of 34 degrees Fahrenheit on average, and this is colder than most cities in Texas (Best Places, 2020).

Soils

UTA is home to a variety of soil types, including Crosstell, Gasil, Navo, Pulexus, Rader, Silstid, and Wilson soils (Center for Geospatial Technology, 2020). The soil type that is most impacted by our design proposal is the urban soil type found in central campus. Urban soil typically lacks nutrients and may include harmful elements, and are characterized by variability in structure and composition. This is due to the potential mixing of dusts and rubbles from construction activity, as well as compaction and contamination related to industrial settlements, human uses, waste disposal, and watercourse malfunction. The increase in urban soils depletes soil carbon levels and the above-ground biomass of carbon pools, thereby challenging the flux of carbon from soil and vegetation into the atmosphere. Thus, urbanization of soils has exacerbated ecological and environmental problems (Lal, 2018).

The quality of urban soils on our site must be restored in order to make use of soils as a valuable and essential resource for delivery of ecosystem services, including food, water, air quality, carbon sequestration, temperature control, and maintenance of biodiversity in urban environments. Properties of urban soils are not favorable for growth of vegetation due to contamination from heavy metals. As our design functions as a system, the removal and filtration of heavy metals in other areas of the site will have benefits in helping to amend soil condition and function.

Demographics

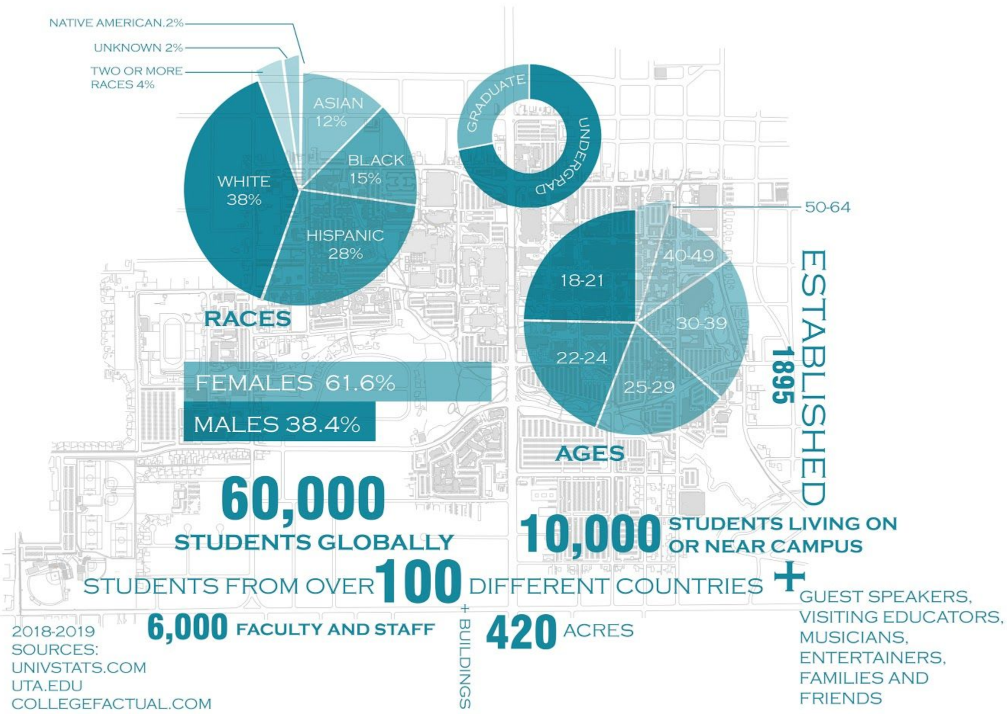


Figure 1.2 UTA Demographics and Campus Overview

UTA serves over 60,000 students from over 100 different countries. It is also known as the “most diverse” campus in the state of Texas, and has been ranked in the top 25 nationally for two years in a row (Fort Worth Business Press). The students at UTA are 61.6% female and 38.4% male. A diverse campus requires solutions that promote accessibility and ease of movement. Our master plan concept capitalizes on this solution through our major design interventions.

Environmental Context

UTA is located in the Cross Timbers ecoregion of Texas, which is the primary eco-region of North Central Texas. It is a broad vegetative region of approximately

26,000 square miles, that extends north into Oklahoma and Kansas. Arlington lies within the Fort Worth Prairie portion of the Cross Timbers, which is characterized by gentle slopes, tall grass native prairies, and thin soil over layers of resistant limestone. Historically the area was used for livestock grazing and farming operations, but urban sprawl and development has increased considerably, causing lasting damage to wildlife and habitat resources (TPWD).

Flora and Fauna

Figure 1.3 Flora and fauna diagram for Arlington, Texas

Arlington plays host to a variety of native and adapted plants, as well as Texas wildlife. Our plan proposes the use of 35 native plants and tree species throughout the more than 27,000 Sq.Ft. of added bioswales. Native plants require less maintenance due to the plants increased resistance to pests and disease and are less likely to be invasive. The use of native plants in our design proposal will also reduce the need for pesticides and fertilizers, and we would propose eliminating the use of these on the UTA campus due to their negative environmental impacts. Native plants also attract and provide refuge for our local, native wildlife. Our proposed plant list for the site was carefully crafted and curated to meet functional, ecological and aesthetic goals. A native and adapted planting palette that provides both an enjoyable experience to pollinators and wildlife, and is fragrant and visually beautiful to human users, helps to create a campus of biodiversity, unity, resiliency, and sustainability, as well as an overall pleasant experience for all users and visitors of UTA.

We selected different forms of plants such as perennials, shrubs, vines, trees, and ornamental grass to serve a variety of functions that play into our master plan concept. This combination and variety creates visual interest, flexibility, and functionality of the many different spaces. A unified planting palette will also help to strengthen UTA's campus identity and create a stronger sense of place, with repetition and consistency of the types of plants that are placed and used throughout the master plan design.

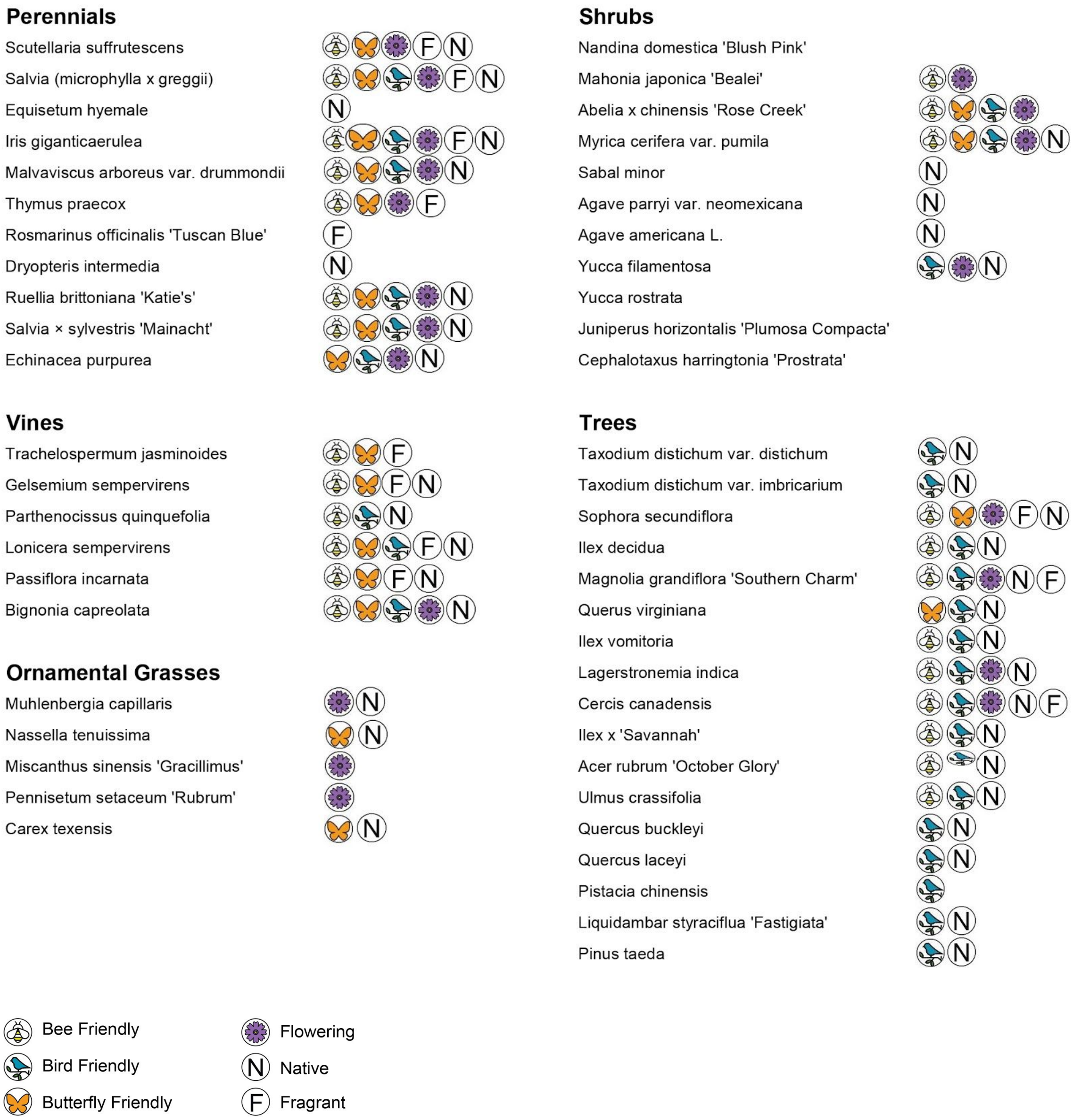


Figure 1.4 Project plant list and legend

COOPER STREET CORRIDOR MASTER PLAN

Site Design

Approximately 5,000 UTA students live on campus and an estimated 5,000 students live near campus. Our plan seeks to create a pedestrian, bike and wheelchair friendly campus environment for students, providing the opportunity to commute from off-campus locations through the addition of wider sidewalks and vegetative buffers. The proposed sidewalks are a permeable pavement with ground aggregate and river stones along with lawn pavers that will allow some seepage and slowing of water during a rain event, while also having the added benefit of enhancing the look of the paths. For our students and the Arlington-wide community who travel through campus along Cooper Street, the new vegetative buffer will be useful for traffic calming, aiding in the cleaning of the air from the vehicular traffic, and providing a safer passage for pedestrians and bikers. The vegative buffer is a bioswale that will slow the flow of road water runoff during a rain event. The vegetation will filter and clean the water prior to its eventual arrival at Trading House Creek, the creek that runs through the south of UTA campus. Enhancements were also made at the Cooper Street bridge over Trading House Creek. The creek was slightly altered to create a detention pond and native plantings were added for erosion control on the north and south side of the creek. Large overlooks on the east and west side of Cooper were added to strengthen the campus entrance.

The existing North entrance to campus is a setback of green lawn surrounding a large parking lot. According to our campus resources, with the expected future growth of UTA this space will likely become a new campus building. Our plan added two buildings with a large corner fountain, vertical gardens, cisterns, and signage to promote the university's commitment to sustainability. Seating and shade were added between the fountain and new buildings to accommodate outdoor classrooms and create a lively common area. Large metal trellis structures are located at the entrances, along Cooper street's concrete retaining walls and on many of the existing building walls to reduce the radiant building heat, while also increasing carbon sequestration and aiding in our vision of UTA's sustainable identity

An improved walkability to and from campus will reduce the amount of parking that is needed. This is also a more affordable option for our students who will no longer need to pay for parking on campus, and it will reduce their car maintenance requirements. Many of our students come from other countries or states, where the culture is either not as auto-centric as American culture, or they do not have a car or driver's license. Less cars on the road to campus will reduce the amount of fossil fuel emissions. Increased walkability to campus would give these students more options for housing. Increased walkability from the city to the campus could also increase the opportunity for retail and dining options along those paths. As well, an increase in physical activity has been shown to improve both physical and mental health (Star, 2019). Depression and suicides are on the rise in college campuses, and commuting to school may provide an important opportunity for physical activity for many students (David, 2019).

In the current design and layout of UTA, the central campus quad is separated by elevation and a strong boundary of retaining walls from the main transportation corridor of Cooper Street. This current layout hinders the university from having a stronger, more unified campus identity, and lacks definition as a place that should be a major social connection hub for students. In our design, we not only activate and enhance the major transportation corridor of Cooper Street, but we also address these issues as the central campus quad, in order to create a more cohesive circulation system that gives UTA a beating heart.

New additions along the Cooper Street corridor expand the East and West campus by replacing lanes with vegetated medians and pedestrian paths. Enhancements to existing infrastructure that frame Cooper Street, specifically at the location of the campus quad, will mediate UTA's lack of connection between the historic East campus with the newer West campus, creating a more unified "one" campus.

Table 1.1 Modes of transportation for major design interventions:

Cooper Street	***Campus Quad/Deck Park***
Car, bike, skate, scooter, walk	Bike, skate, scooter, walk

The new campus quad features a deck park, with a circulation system consisting of a hybrid ramp and stairs. The hybrid nature of the circulation system allows for greater accessibility for students traversing campus on bike, skateboard, or wheelchair without having to use an elevator, which is currently in place at the existing pedestrian bridge. We plan to remove this elevator and replace it with our hybrid accessible design. The existing pedestrian bridge cages in the user and could make one feel claustrophobic or trapped above the traffic below. Our proposed deck park will be spacious, open and inviting to both the East and West side of campus.The steps on the deck park leading down to the campus quad double as seating opportunities, with ample shade on the periphery of the deck. Large fountains are placed at either side of the deck, facing East and West. The fountain facing East towards the Central Library cascades down into a pool at the bottom of the deck, which flows underneath a raised wooden crossover and into a LID rain/garden that is central to the campus quad. Runoff from the deck, as well as the campus quad, can run into this stream system and allow for the water to be filtered and cleaned before reaching the nearest connecting storm pipe drains to the end of the system.

This LID/rain garden in the central campus quad provides not only environmental benefits, but social and educational as well. Water flowing through the "stream" in the center of the campus quad provides students with opportunities for interacting directly with water, as well as educational opportunities to be used as an outdoor science or sustainability classroom. The current campus quad is filled with impervious surface, but this new design creates a quad that is almost 100% permeable by using permeable pavings, maximizing space for open lawns and gardens. These native plantings will also provide a safe haven for local wildlife on campus, as the LID/rain garden can provide food for birds, amphibians, and small mammals, as well as the surrounding enhanced planting areas can provide food and shelter for pollinators, birds, mammals and amphibians.

Implementation and Approach

Our design features several typologies of infrastructure improvements, that serve to connect users, and provide a more resilient campus design. Our design interventions are categorized below, with a description of how we have utilized each typology in the design.

Table 1.2 Low Impact Development : Infrastructure Practices

LID Implementation	***Area (sq.ft)***
Green Roof	43510.10
Blue Roof	193310.8
White Roof	266716.31

Bioswales	27,700
Retention Pond	12272.91
Slowing Down Water	by 7.97 cu.ft/sec

GREEN WALLS

Green walls are self-sufficient vertical gardens attached to the facades of buildings. These walls reduce the urban heat island effect by cooling the buildings and surrounding area, along with catching and slowing stormwater volume that flows from roofs. Vegetated green walls also have a positive impact on CO_2 levels, as the vegetation may treat nitrogen, pollution, and negates effects from acid rain.

BLUE ROOFS

Our design implements a total of 8 blue roofs, which will collect precipitation from rain and storm events. This water will flow from the surface of the roofs of buildings into a system for initial temporary water storage. While some water will immediately flow to other rainwater collection systems, some of the water will be temporarily stored for a more gradual and manageable release of stored water.

WHITE ROOFS

A total number of 5 white roofs, which hold systems for solar panel energy harvesting, will be implemented in our design. A white roof represents the top of a building which uses solar panels and photovoltaic glass panels to harvest energy from the sunshine. This intervention allows for the reduction of the 'heat island effect' by reflecting the sunlight rather than absorbing it, as well as generating and storing power for outdoor campus lighting at night.

ADDITION OF PERVIOUS MATERIALS

Permeable Materials used in the redesign of all walkways in addition to the new bike paths will increase infiltration, decrease run-off volume, and peak flow energy, leading to the improvement of rainwater quality.

Table 1.3 Permeable and impermeable surfaces: Pre-Development

Description	***Area (acres)***	***Percentage (%)***
Impermeable surfaces	41.53	74
Permeable surfaces	14.47	26
Total	56	100

Table 1.4 Permeable and impermeable surfaces: Post-Development

Description	***Area (acres)***	***Percentage (%)***
Impermeable surfaces	36.46	65
Permeable surfaces	19.54	35
Total	56	100

The addition of 11% permeable surfaces allows for the increase in permeability which impacts the urban heat island effect through mitigation of surface temperature and reflectivity.

Methods: As illustrated in the tables above, the percentages of the impermeable and permeable surfaces are calculated. Post-development, there are 74% impermeable surfaces and 26% permeable surfaces. Pre-development, there are 65% impermeable surfaces and 35% permeable surfaces. The reduction in impermeable surfaces is:

41.53 acres – 36.46 acres = 5.07 acres
5.07 acres / 41.53 acres = 12.2%

CISTERNS

Cisterns provide storage for rainwater harvested and collected by blue roofs, impervious surfaces, and rainwater management systems. Our cisterns are on display in the north entrance of the site for visibility and educational features, as well as a number of them being located underground on-site to aid stormwater run-off through the conservation of water.

BIOSWALES & RAIN GARDENS

Rainwater and storm runoff is collected from impervious surfaces such as roads, buildings, parking lots, and sidewalks and flows into bioswales and rain gardens throughout our design. The water is filtered and cleaned in these systems before flowing towards the low point of our site in the South of campus, towards Trading House Creek. Rain gardens along the border of Cooper Street conveniently flow to either side of Trading House Creek at this collection point. This reduces problems associated with on-site erosion and high levels of flow energy, and protects ecosystem integrity with ground stabilizing edging vegetation and habitat enhancement.

RESTORE HABITAT & SOIL AMENDMENT

We will implement succession planting along Cooper Street in order to restore the once riparian areas and make improvements to soil structure at all bioretention sites along the vegetated medians. This improves water quality, infiltration rates, and biodiversity, as well as reducing stormwater run-off volume and speed.

Financial Viability

As the university is state funded, funding shall be sourced from the city of Arlington and the State of Texas. ONE focuses on not only a better connection on campus, but also a connection within the city of Arlington by way of opening the access of our site to all, and ease their connections along Cooper Street.

The Office of Strategic Initiatives for the City of Arlington has been conducting a "South Cooper Street Corridor Study" in 2020 that includes our site in totality. The study includes a five-mile section of Cooper Street, beginning at UTA Boulevard to Bardin Road. The goals of the study are to analyze the existing conditions and issues of the corridor in order to develop a new vision, and to create an implementation plan to fulfill that vision. There is a public link for input from the community about the study (Public input). As the City of Arlington is obviously on board with making major improvements to the section of Cooper Street that runs throughout the site, our team believes that our concept is financially viable and implementation would be likely if this aligns with other members of the community. (Source - City of Arlington)

The project schedule for the study will host a hybrid (in-person and virtual) public meeting on December 10th, 2020, and an initial plan for the corridor will be drafted in the following first few months of 2021, with hopes to adopt the plan by early summer next year. The study area has been selected to improve transportation, enhance economic development and position Cooper Street to provide better support and connection to the broader Arlington community, including UTA. As UTA represents a powerful community entity, working together with the City of Arlington to make critical changes to the design of Cooper Street is completely probable and likely. Furthermore, the expansive 5 mile section of Cooper Street suggests that the City of Arlington could potentially have ample finances to fund these changes.

As for the campus quad, deck park and other additions to campus design, the university and the state of Texas would provide funding for the project. As a public-funded university, UTA would receive funding from the Texas government. As our concept and vision is aligned with UTA's master plan vision, this suggests that the university would be inclined to make new additions to campus that have already been cost estimated and well thought out.

Site Maintenance

The site shall be maintained by the university's facilities management, as well as the landscaping and grounds management. Each intervention we propose has specific maintenance requirements, which are generalized below:

Native Planting Beds/Rain Gardens - Native and adapted Texas plants typically have low water requirements. Some planting beds will need to be irrigated, especially those that are not associated with a rain garden or bioswale, as well as open lawn spaces in the campus quad. This will be executed through drip irrigation in planting beds, as well as irrigation systems connected to our cistern storage tanks that can reuse the water in hotter, dryer months. Native planting beds along the Cooper Street corridor will require the least amount of maintenance, as the plant selection will be consistent with plants that can handle this form of stress. Planting beds within the campus quad will require trimming and cleaning seasonally, and open lawn spaces will be mowed as needed. Rain gardens shall be self-maintaining as they receive ample water from rain events and drainage, as well as support of a polyculture style planting palette that maximizes nitrogen acquisition and soil nutrients.

Green Walls - Vegetated green walls may require careful attention and evaluation by a professional, as well as the landscape and groundskeeping teams on campus. For vertical green walls, the blue roof water storage systems will harvest rainwater to help nourish and maintain the vitality of the vegetation. Plants used in the green walls are specially selected to perform well in the vertical environment.

Green Roofs - All green roofs on campus will be maintained by both facilities management and by research or student/faculty groups. The green roofs provide educational opportunities for students, so proper maintenance is essential for maximizing educational benefits. Green roofs will need to be weeded and inspected periodically. Green roofs also require little water and should be kept out of drainage areas.

Fountains/LID - The LID stream that runs central to the campus quad should be self-maintaining as a living ecosystem, and plantings may need to be cut back if interfering with or obstructing adjacent pathways. Fountains in the campus quad should be cleaned regularly, as they will use filtered rainwater and fountain pumps are likely to become occasionally clogged. An automatic fountain shut off system will be in place that turns off fountain activity during freezing weather events.

White Roofs - Solar panels require little maintenance, it will still be necessary that the panels are checked for possible replacement and repairs. However, this will be minimal, as the solar panels that will be installed should be able to withstand hail sizes of up to 1 inch and fall at 50 mph. Just in case, maintenance of solar panels should occur yearly or on an as-needed basis.

Blue Roofs - Blue roofs require regular inspection and maintenance of surface and roof drains, especially following high winds. Algae and debris can develop around roof drains and limit the rate of discharge of stormwater. Roof check dams and terraces may need to be installed in roofs with slope of more than 2%, in order to maximize rainwater storage capacity. Sediments and debris should be removed periodically from outlet and storage areas to prevent clogging, and also to limit deterioration of the roof membrane.

Pavements - The pavement and circulation systems on campus shall be maintained by the landscape and grounds maintenance teams, to check for cracks, damages, or vandalism on newly installed permeable pavements.

SITE IMPACT RESULTS

Expected Outcomes

The direct and immediate outcomes from our site design will be better connectivity for students, faculty and visitors on campus through the improved campus quad and circulation system that consolidates UTA into one campus instead of two (currently East and West campus). As well, we expect to see an improved identity of campus permeate the local Arlington community and expand on a broader scale with the implementation of traffic-calming design efforts along Cooper Street, and enhanced entrance at the North and South entrances of campus.

Long term outcomes will provide campus visitors, students and faculty a better quality of life and a community experience with the unifying of East campus and West campus. Users of our design proposal will experience cleaner air from the increase in vegetation, as well as a more aesthetically “greener” campus.

Performance and Resilience

STORMWATER BENEFITS

Table 1.5 Stormwater runoff: Pre-Development

	Area (sq.ft)	*i (inches)*	*Area (Acres)*	*C (Co-efficient number)*	*Q=CiA (cu.ft/sec)*
West Campus	627570.80	2	14.4	0.75	21.60
East Campus	520467.83	2	11.95	0.75	17.93
Asphalt Streets	211078.84	2	4.84	0.8	7.74
Lawn & Planting	630313.20	2	14.47	0.2	5.79
Concrete Paving	451281.60	2	10.36	0.85	17.61
				Total	70.67

Table 1.6 Stormwater runoff: Post-Development

	Area (sq.ft)	*i (inches)*	*Area (Acres)*	*C (Co-efficient number)*	*Q=CiA (cu.ft/sec)*
West Campus	756637.20	2	17.37	0.75	26.06
East Campus	520467.80	2	11.95	0.75	17.93
Asphalt Streets	123710.40	2	2.84	0.8	4.54
Lawn & Planting	747925.20	2	17.17	0.2	6.87
Concrete Paving	187308.00	2	4.3	0.85	7.31
				Total	62.70

Methods: As illustrated in the tables above the stormwater runoff is calculated with Rational Method (Q=CiA). The Co-efficient numbers for different materials is referenced from the LARE reference manual.

The water quality of our urban site is greatly improved by the infrastructure that we propose. Based on a University of Pittsburgh School of Engineering study, our design will provide an estimated 80% reduction in suspended solids, a 70% estimated reduction in metals (Wilmoth et al., 2019), as well as a 70% estimated reduction in bacteria (Purvis et al, 2018) . Suspended solids, heavy metals and bacteria are harmful for not only water quality resources for drinking, cleaning and daily use, but also to wildlife who live in the ecosystems of Arlington's creeks and streams.

Overall there is 7.97 cu.ft/sec reduction in the stormwater runoff which is 11.27% reduction for the whole site of the ONE implementation. In the urban landscape of our campus, we reduce stormwater runoff by 10%. This is achieved through addition of more permeable surfaces as well as low impact development that slows down, cleans and filtrates stormwater runoff from pavements and roadways.

SOCIAL AND COMMUNITY IMPACT

By reaching out and interacting with the community, we have gained not only a connection to the city, but with the county, private entities, by that we have grounded the financial support for the development, maintenance, and expansion of our goal of ONE. With the help of alumni, we were able to support design education and allow for them to consult with the implementation of systems.

With the addition of new research facilities on the north and south entry points of Cooper Street, the University will be in a good position to attract and retain more students which would result in research grants, which provide a large boost to the economic status of both the UT Arlington campus and the city.

Conclusion

ONE, enhancing existing green and blue infrastructure that frames Cooper Street, expanding and adding the new campus quad deck park, and most of all, mediating UTA's lack of connection between the historic East campus with the newer West campus, creating a more unified "one" campus. With the implementation of our concept, the traffic-calming design approach along Cooper Street allowing for the roadway's multimodal function to become pedestrian and bike friendly. Our concept follows the UTA 2060 plan to mitigate the amount of impervious cover in addition to enhancing the Trading House Creek to recover and enhance the natural amenity for not only our campus, but the city of Arlington.

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