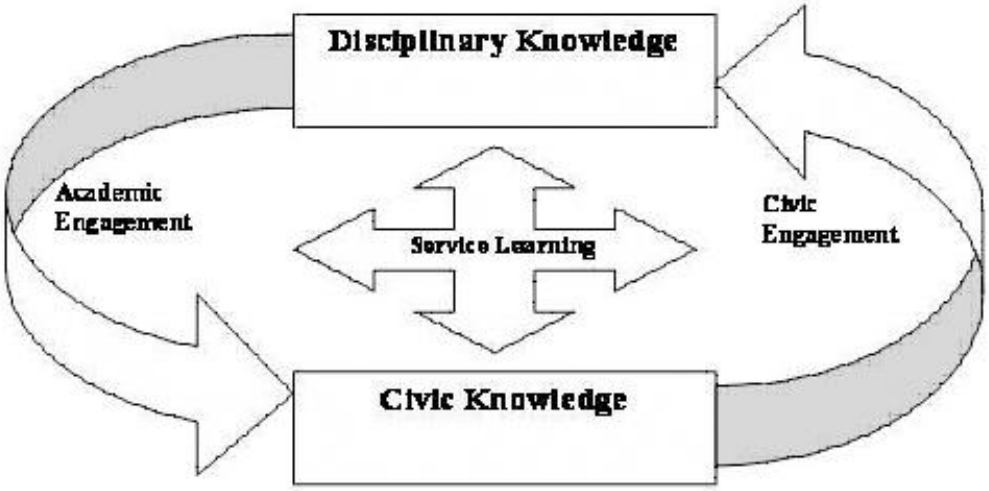
UTILIZING GIS, SERVICE LEARNING, AND LANDSCAPE ARCHITECTURE TO ASSIST OKLAHOMA COMMUNITIES

15th Annual OKSCAUG Conference
September 25, 2012
Moore Norman Technology Center, South Penn Campus
Room 109/ 110, 11:25 am – 11:55 am
Oklahoma City, OK

Leehu Loon, RLA, MLA, ASLA
Associate Professor and Graduate Liaison
The University of Oklahoma
College of Architecture
Division of Landscape Architecture

What is Service Learning?

- "A credit bearing education experience in which students **participate** in an organized service activity that meets identified **community needs** in such a was to gain further **understanding** of course content, a broader **appreciation** for the discipline, and an enhanced sense of **civic responsibility**." (Bringle and Hatcher, 1996)



Service Learning Model. (Source: University of Oklahoma Program for Instructional Innovation)

Importance of Service Learning in Landscape Architecture

- Well rounded educational opportunity
  - Project scope evolves throughout project.
- Multi-disciplinary education
  - Pivotal for design education to mimic real world application
  - Faculty can conduct applied research
- Positive impacts for Oklahoma communities
  - Connecting University to the taxpayers

Why does Service Learning work so well in Landscape Architecture?

- Intuitive nature of the design process
- Necessary dialogue between students and community is fundamental to learning
- Community feedback and participation
- Design process enriched by the understanding gained through the larger audience
- Connecting students to a community

Why GIS and Service Learning?

- Why try to incorporate GIS into the Landscape Architecture curriculum?

- And why incorporate it through a Service Learning project?

What is Geodesign?

- "Geodesign is the thought process comprising the creation of entities in geographic space." –Bill Miller

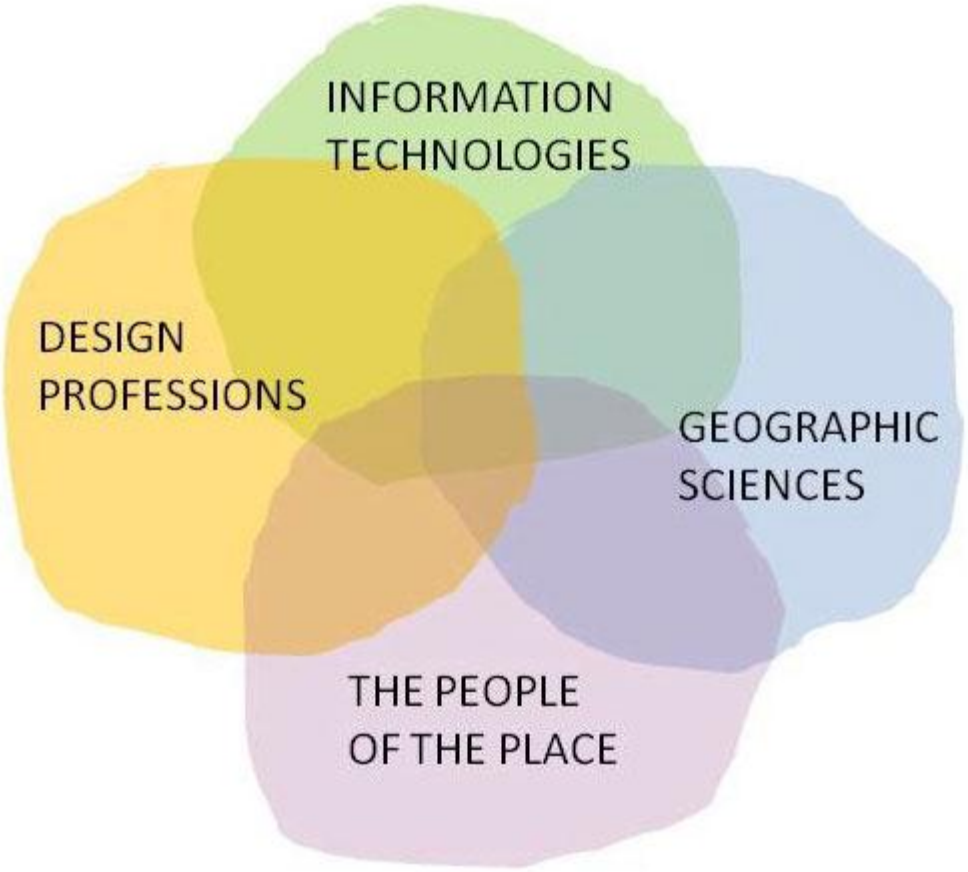
- "Geodesign is designing with nature in mind." –Jack Dangermond

- "Geodesign is changing geography by design." –Carl Steinitz

- "Geodesign is both an old idea and a new idea." –Jack Dangermond

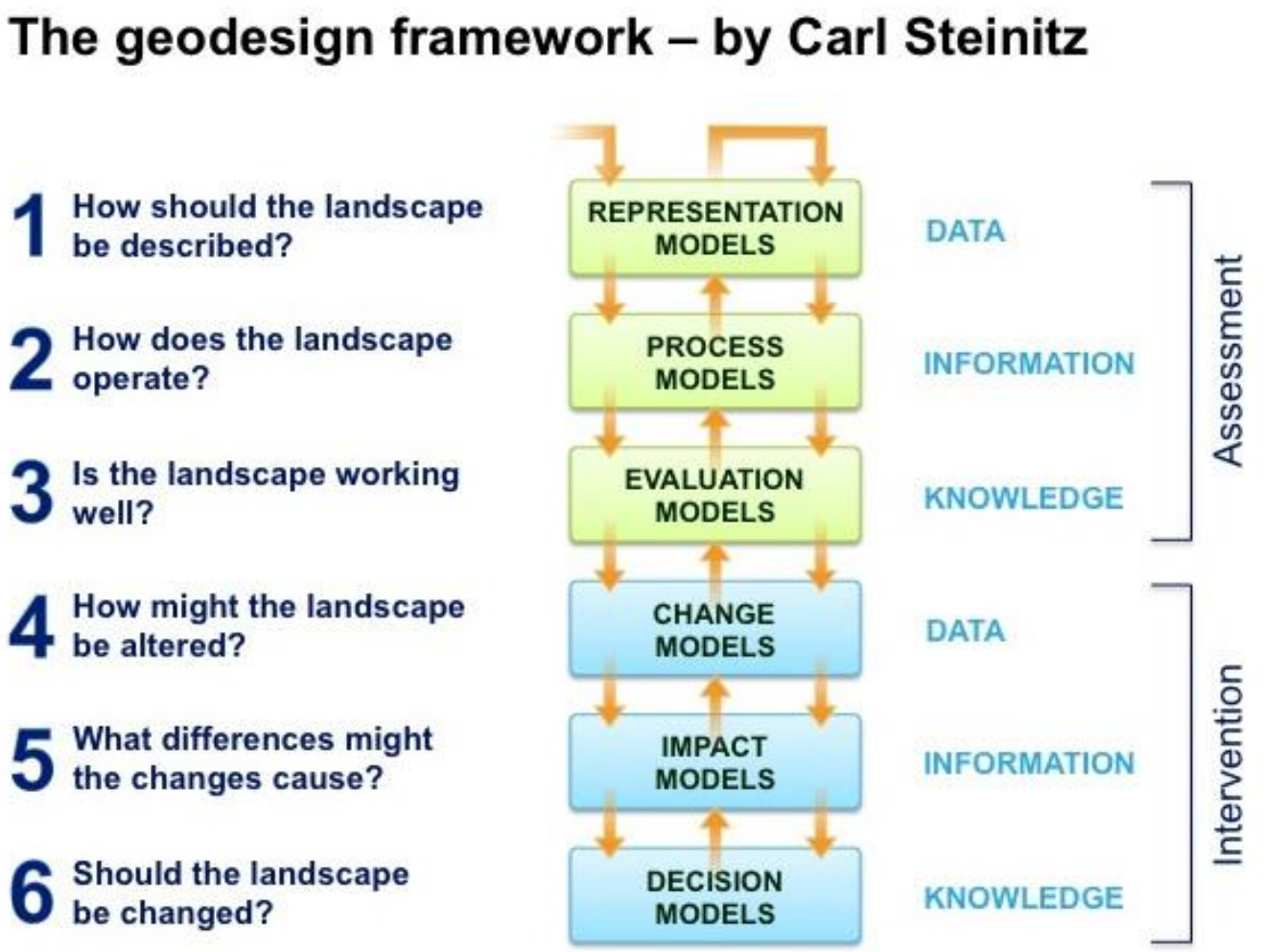
What is Geodesign?

- *A Framework for Geodesign: Changing Geography by Design.*
  Written by Carl Steinitz, Esri Press, 2012.



A Framework for Geodesign. (Source: Carl Steinitz, Esri Press)

A Geodesign Framework



LA at the University of Oklahoma

- Graduate Program
- First Professional Degree
- Design Studios are the foundation of the curriculum
  - Studio I: Fundamentals of Design
  - Studio II: Urban Design and GIS
  - Studio III: Park Design
  - Studio IV: Competition Studio (multi-disciplinary)
  - Studio V: Comprehensive Planning Studio (multi-disciplinary with RCPL)

GIS Methodology (Workflow)

- GIS Workflow from *Making Spatial Decision: Using GIS, A Workbook*
  - by Kathryn Keranen and Robert Kolvoord
- GIS Workflow

1. Define the problem or scenario
2. Identify the deliverables (mostly maps) needed to support the decision
3. Identify, collect, organize, and examine the data needed to address the problem
4. Document your work
   - Create a process summary
   - Document your map
   - Set the environments
5. Prepare your data
6. Create a basemap or locational map
7. Perform the geospatial analysis
8. Produce the deliverables, draw conclusion, and present the results

LA Design Process

- Pre-Project Design Phase Work
- Phase I: Data Collection and Analysis
- Phase II: Conceptual Design and/or Program Development and Planning Studies
- Phase III: Preliminary Master Plan
- Phase IV: Master Plan
- Phase V: Schematic Design
- Phase VI: Design Development
- Phase VII: Contract Documents
- Phase VIII: Bidding and Contract Award
- Phase IX: Construction Administration
- Phase X: Post Construction Observation and Evaluation

GIS Workflow and the LA Design Process

GIS Workflow

1. Define problem
2. Identify deliverables
3. Data
4. Document work
5. Prepare data
6. Create basemap
7. Perform geospatial analysis
8. Deliverables, conclusions, and results

LA Design Process

I. Data Collection/ Analysis
II. Conceptual Design
III. Preliminary Master Plan
IV. Master Plan
V. Schematic Design
VI. Design Development
VII. Contract Documents
VIII. Bidding/ Contract Award
IX. Construction Administration
X. Post Construction Observation/ Evaluation

Course Goals and Objectives

- Course Goals
  - Understand key areas of information, GIS, and design
- Course Objectives
  - Analyzing, synthesizing, and applying information pertinent to projects
  - What is meaning in built environment?
  - What is a sense of community?
  - Real world project
- Relevant issues: sustainability, urban form, pedestrian circulation, infill development, housing, density, mixed-use, public spaces, mixed-mode circulation; public participation, implementation and funding strategies, feasibility, and place.

Course Projects – Graphic Resume

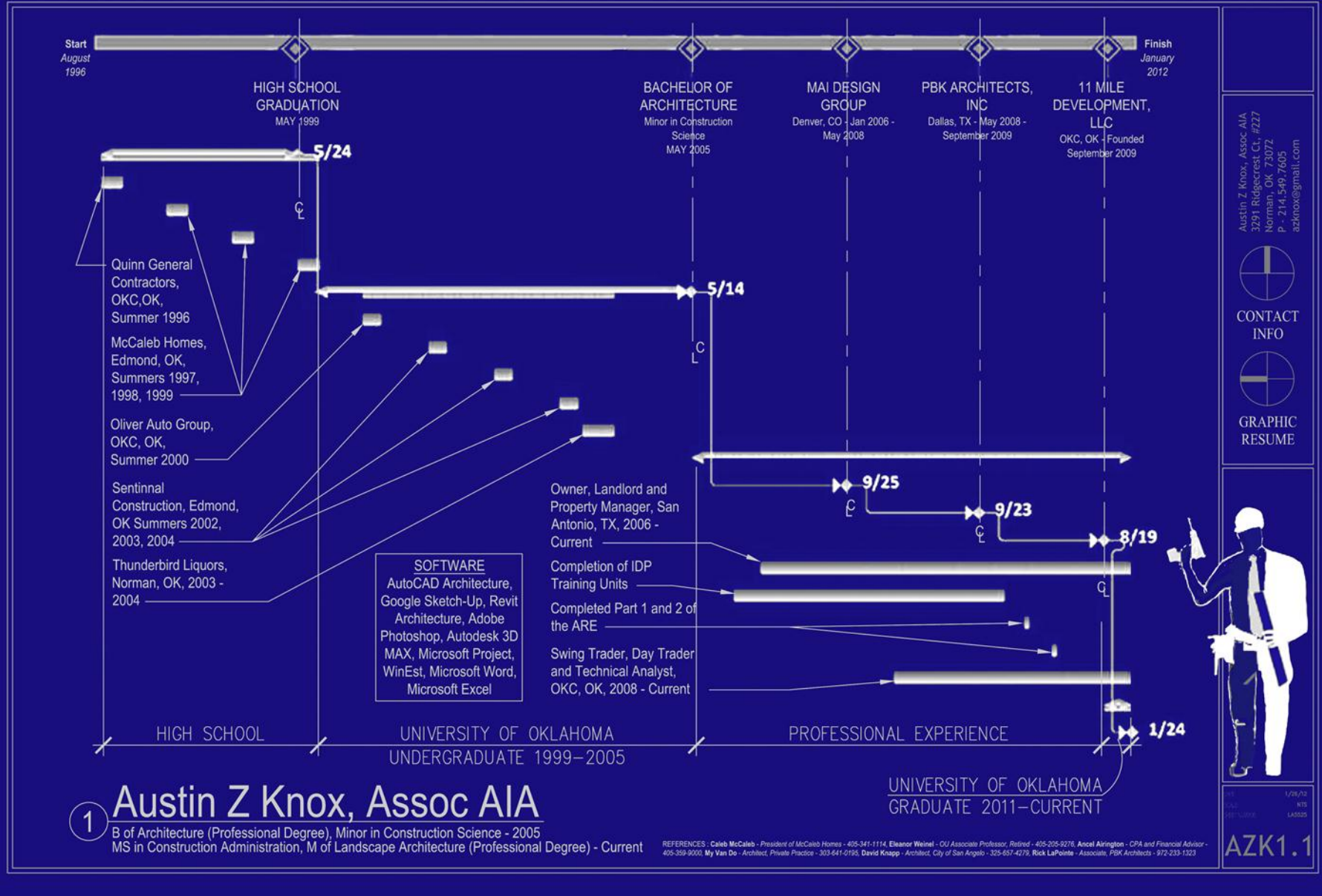
- Visualizing data as a graphic resume
- Graphic communication is essential in landscape architecture
- Describe your skills in 20 seconds

GIS Workflow (4 of 8)

- 1: Define problem
- 2: Identify deliverables
- 5: Prepare data
- 8: Deliverables, conclusions, results

LA Design Process (2 of 10)

- I: Data collection/ analysis
- II: Conceptual Design



Austin Z Knox, Assoc AIA

1

B of Architecture (Professional Degree), Minor in Construction Science - 2005
MS in Construction Administration, M of Landscape Architecture (Professional Degree) - Current

REFERENCES : **Caleb McCaleb** - *President of McCaleb Homes - 405-341-1114*, **Eleanor Weinel** - *OU Associate Professor, Retired - 405-205-9276*, **Ancel Airington** - *CPA and Financial Advisor - 405-359-9000*, **My Van Do** - *Architect, Private Practice - 303-641-0195*, **David Knapp** - *Architect, City of San Angelo - 325-657-4279*, **Rick LaPointe** - *Associate, PBK Architects - 972-233-1323*

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azknox@gmail.com

CONTACT INFO

GRAPHIC RESUME

1/26/12
NTS
LA5525

AZK1.1

BRYCE A. FROST

OBJECTIVE:
TO DESIGN, RESTORE, AND PRESERVE THE LAND ECOLOGICALLY THROUGHOUT URBAN AND RURAL SITES BY WAY OF NATIVE DESIGN AND SUSTAINABLE MANAGEMENT.

FALL 2008
NATIONAL STUDENT EXCHANGE

WASHINGTON STATE UNIVERSITY
PULLMAN, WA
- COMPLETED 3 LANDSCAPE ARCHITECTURE CLASSES.
- ENJOYED CASE STUDY TRIPS TO SEATTLE & IDAHO PANHANDLE NATIONAL FOREST.

IRRIGATION TECHNICIAN & FOREMAN.
SUMMER INTERNSHIP 2009

A.A.A. LANDSCAPES
PHOENIX, AZ
- MANAGED A CREW OF 5 LANDSCAPE MAINTENANCE & IRRIGATION LABORERS.
- TROUBLE SHOOTING OF IRRIGATION PROBLEMS ON MY H.O.A. SITE.
- WORKED WITH CREW MEMBERS TO INSTILL A SYSTEM OF LEAN BUSINESS PRACTICES FOR DAILY TASKS.

LANDSCAPE SALES INTERNSHIP
SUMMER 2008

2005-2009
BACHELORS DEGREE

IOWA STATE UNIVERSITY
AMES, IA
MAJOR: HORTICULTURE, LANDSCAPE DESIGN

FOSTER'S INC.
CEDAR FALLS, IA
- RESEARCHED & VISITED LANDSCAPE & NURSERY COMPANIES IN IOWA. COLLECTED SURVEYS & PROMOTED OUR PRODUCTS.

FOREMAN FOR SOLDIER FIELD, MILLENIUM PARK, & MUSEUM CAMPUS. *SUMMER 2010*

CHRISTY WEBBER LANDSCAPES
CHICAGO, IL
- OVERSAW AND MAINTAINED 35 ACRES OF TREES, SHRUBS, TURF, & IRRIGATION.
- COORDINATED 3-6 LABORERS' DAILY WORK.
- HELPED TO CREATE A NATURAL AND ENJOYABLE CAMPUS FOR MILLIONS OF VISITORS.

ORGANIZATIONS & HONORS
- CHAPTER & NATIONAL STUDENT MEMBER OF ASLA.
- PARTICIPANT AND FINALIST IN PLANET; 2005-2009.
- NETHERLANDS STUDY ABROAD RECIPIENT;2008.
- FARMHOUSE FRATERNITY ALUMNI.

2012-2014
COMPLETION OF MASTERS DEGREE

UNIVERSITY OF OKLAHOMA
NORMAN, OK
LANDSCAPE ARCHITECTURE
STUDENT ASLA CLUB MEMBER

2011-2012
BEGAN MASTERS DEGREE

MISSISSIPPI STATE UNIVERSITY
STARKVILLE, MS
LANDSCAPE ARCHITECTURE
- STUDENT ASLA.
- HAD EXPERIENCE WITH SUSTAINABLE STORMWATER DESIGN, AND CONSTRUCTION OF RAIN GARDEN PROJECT.

SKILLS
-ADOBE CS4 SUITE
AUTOCAD, SKETCHUP
ARCGIS10
MICROSOFT OFFICE.
-DEFINED HAND GRAPHICS

EDUCATION/ BACKGROUND
WORK EXPERIENCE

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CHICAGO, IL 60614

WANTED

DESCRIPTION

NAME: JIXIANG WANG
SPECIES: HUMAN
GENDER: MALE
HEIGHT: 5"10'
BS: SHANDONG JIANZHU UNIVERSITY
MLA: UNIVERSITY OF OKLAHOMA

WEAPON

AUTO CAD, PHOTOSHOP, INDESIGN
SKETCHUP, POWER POINT
WORD, EXCEL FORMATFACTORY

AFFILIATIONS

BACHELOR'S DEGREE: URBAN PLANNING
2005-2010 SHANDONG JIANZHU UNIVERSITY
OVERALL GPA: 83/100
AWARDS:
2005-2010 EXCELLENT STUDENT LEADER OF COA
2005-2010 FELLOWSHIP WINNER OF COA
2005-2010 EXCELLENT STUDENT
INTERSHIP:
QINGDAO URBAN PLANNING & DESIGN RESEARCH INSTITUTE (QDGHY) 2009-2010

MASTER'S DEGREE: LANDSCAPE ARHCITECTURE
UNIVERSITY OF OKLAHOMA 2010-2013
OVERALL GPA: 3.22
AWARDS: DES MOINES WATER WORKS PARKITECTURE COMPETITION, 2011 FALL

REWARD

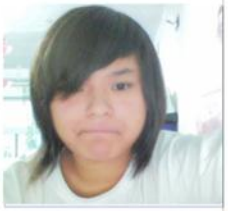
EXCELLENT DESIGNER

If you want to find him, please contact:
jixiang@ou.edu or 405-837-5289
Jixiang Wang

resume

Search

QI Zhao | OU COA | Landscape Architect



QI Zhao (SHERRY).

Edit Profile | View As...

Born on October 15, 1988

English Mandarin Chinese

207 wadsack Dr. Apt D , Norman, OK

405-778-1540

zhaoqi_zq@hotmail.com

Studied at Shenyang Agricultural University, China , Landscape Architecture

Studied at University of oklahoma ,USA , Master of Landscape Architecture

- Wall
- Info
- Photos
- Notes
- Friends
- Subscriptions

Skills

Update Status

The landscape belongs to the man who knows it.

Experience

Internship in Landscape Design Institute, northeast sorting, 2010-2011

Lab Assistant in Chinese Academy of Sciences, Institute of Apllied Ecology, 2009-2010

Tutor to teach HSK, 2011.3-2011.6

volunteer

2008 World Horticultural Exposition, Shenyang, China

School kindergarden, 2007

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Hornour

2007-2008 School third-class outstanding scholarships

2008-2009 School second-class outstanding scholarships

2009-2010 School third-class outstanding scholarships

2008 School Social Practice Advanced Individuals

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Jobs interested in — See All

Landscape Architect
dream job

City Planner

Architect

Self assesment — See All

Future Landscape Architect

I'm a cheerful and lively girl of wide interests,with fast learning ability and strong adaptive and communicating ability, and professional skills.

Abby Liu (Friend & classmate)

Today

She is happy to render help to others!
I like to work with her~~

Reid R. Coffman
PHD

Scott Williams
IDEC, Assoc.AIA, LEED AP

Leehu Loon
RLA, MLA, ASLA

Thomas Woodfin
PHD

References

Course Projects – Tree Inventory

- Assessing and Using Data (with ArcGIS Online)
- Create site inventory and analysis
- Set up a project framework
  - Basemap
  - Methods
  - Site Inventory and Analysis

GIS Workflow (6 of 8)

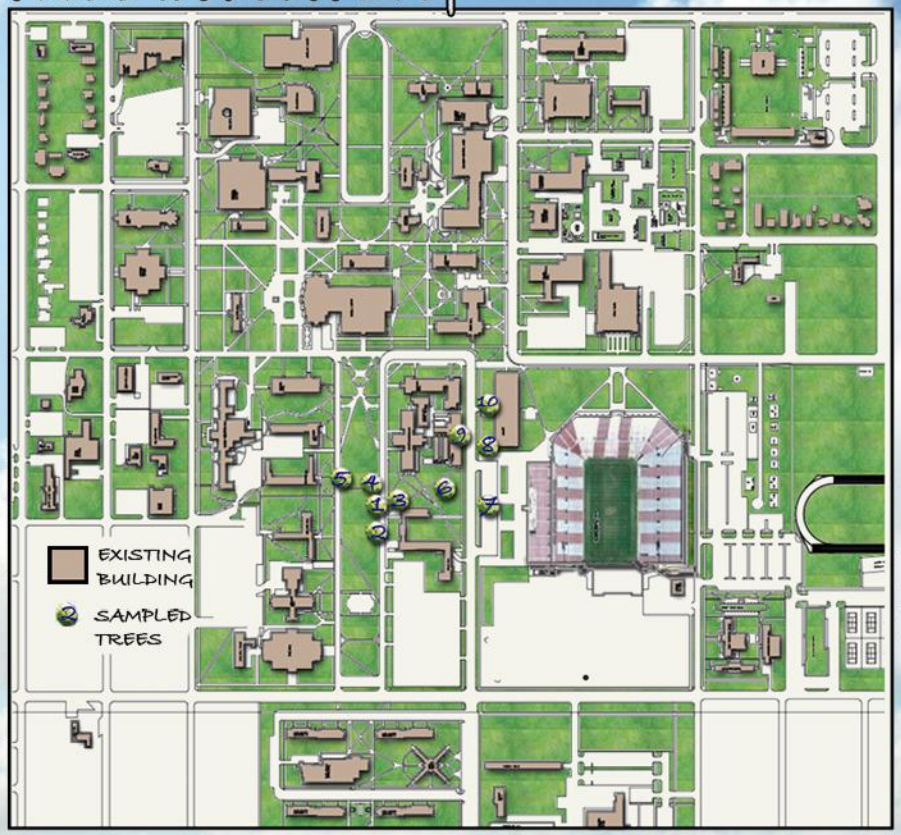
- 3: Data
- 4: Document work
- 5: Prepare data
- 6: Create basemap
- 7: Perform geospatial analysis
- 8: Deliverables, conclusions, results

LA Design Process (3 of 10)

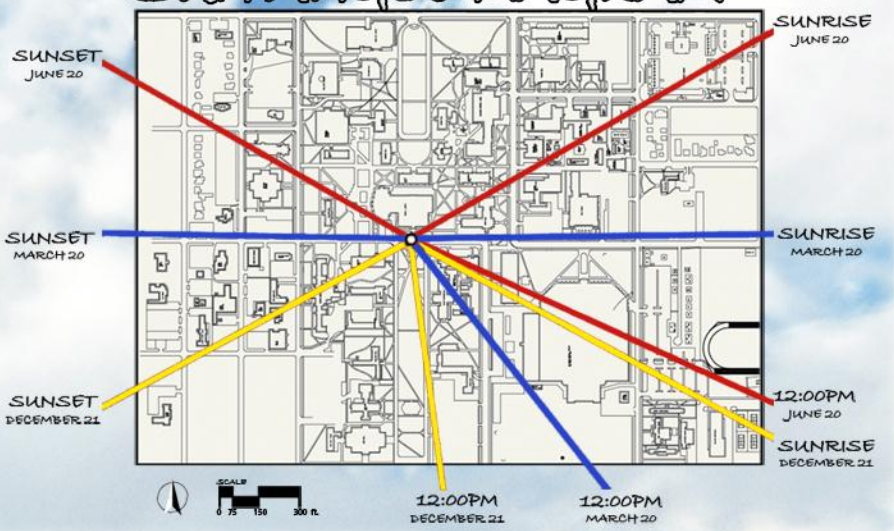
- I: Data collection/ analysis
- IX: Construction administration
- X: Post construction observation/ evaluation

UNIVERSITY OF OKLAHOMA TREE INVENTORY

TREE INVENTORY



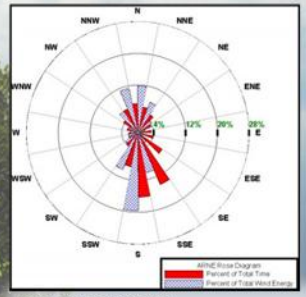
SUN ANGLE DIAGRAM



TREE INVENTORY MAP

The trees labled on the map correspond with an attached spreadsheet containing detailed information about each tree.

PREVAILING WINDS



WIND ROSE

This diagram shows that the prevailing winds of this area come mainly from the south.

INVENTORY

Upon request of the University, our team will select and research the following information about existing trees on the site in order to help maintain and observe the health of the trees on campus:

- Location
- Size: Height and Circumference
- Species
- Overall health condition and amount of pruning needed
- Include conditions that may affect the tree- drainage problems, low sun, etc.

UNIVERSITY OF OKLAHOMA
DIVISON OF LANDSCAPE ARCHITECTURE
STUDIO II AND IV LA 5545
PROFESSOR LOON AND PROFESSOR WILLIAMS
SHAYNA ORR AND QUENTIN KONG
FEBRUARY 27, 2012

NORMAN CAMPUS TREE INVENTORY

the university of OKLAHOMA

ALEX TYLER AND ABBY ERI - LA 5545/5525 COLLABORATION - PROF. L. LOON AND S. WILLIAMS

PROJECT OBJECTIVE: To locate, report, and analyze the location of ten trees around the University of Oklahoma's Main Campus and it's surrounding context.

METHODOLOGY: In order to accurately begin a tree analysis of the campus, a certain array of steps had to be implemented. These steps were done sequentially, and resulted in an extensive inventory and analysis of the 125 acre site of the Main Campus. We established our campus boundaries to be Boyd Street on the North, Lindsey on the South, Elm on the West, and Jenkins on the East.

Obtaining Base Map:
As a class, we were able to obtain a ten-year-old base map AutoCad File by getting in touch with the Architecture and Engineering Services. By using this AutoCAD file (.dwg) of the campus in 2000, we exported the .dwg file into Adobe Photoshop and then rendered the plan accordingly.

Inventory Collection:
Using the base map, our team surveyed the campus and by using a GPS receiver were able to collect the exact location of the ten trees. Inventory was then collected on certain items that we felt had either a physical or emotional relationship with the trees. This list consisted of:

- Circulation Patterns (Vehicular and Pedestrian)
- Vegetation (Trees, Lawns, Gardens)
- Destinations (Water Features, High-Use Buildings, Sculptures, Viewpoints)
- Wind Rose (Indicat both Time and Energy distribution of Wind)

Graphic Analysis:
After inventory was collected, the data was then represented graphically over a simplified base map. The creation of these graphics allowed us to analyze the site through the obtained data and keen intuition. Analysis of our site was applied to each inventory graphic and was done as follows:

- Circulation - Using site observations, we indicated through line thickness amount of traffic on each given path
- Vegetation - Proposed future tree management plans as well as indicated "lawn" and "garden" areas
- Destinations - Finding particular points that would be affected if their was, or wasn't, a presence of trees
- Wind Rose - The wind rose diagram allowed us to see how the trees affect the wind's movement around campus

PROJECT IMPLEMENTATION:

The methodology of the project did not take very long to establish, as through prior knowledge we were able to begin collecting data on the inventory rather quickly, thus spend more time creating an in-depth analysis and graphic composition.

After the map was finished, a certain time was allotted for inventory gathering. We then spent the majority of the time working on the analysis of the site and producing the graphics that best represent our objective and methodology. These analyses are described more in depth the correlated inventory graphic. The project was completed by two students, and took a total of 29.5 hours (shown right).

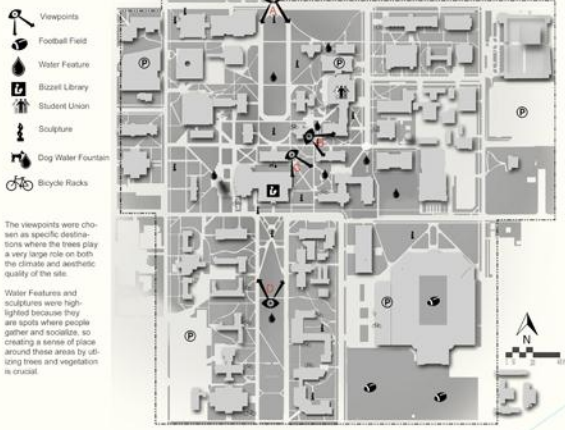
South Perspective of North Oval

Sycamore Grove Facing East

Labyrinth Gardens Facing South

North Perspective of South Oval

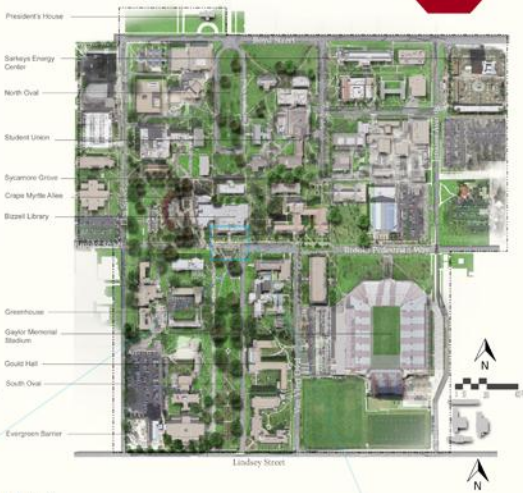
DESTINATIONS



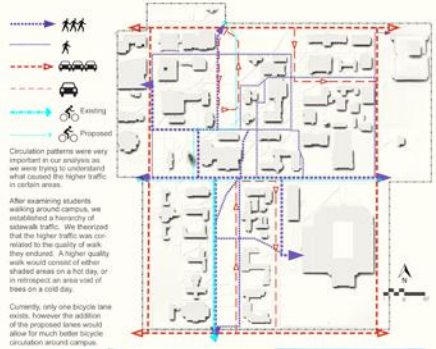
The viewpoints were chosen as specific destinations where the trees play a very large role on both the climate and aesthetic quality of the site.

Water Features and sculptures were highlighted because they are spots where people gather and socialize, so creating a sense of place around these areas by utilizing trees and vegetation is crucial.

EXISTING AERIAL VIEW



CIRCULATION

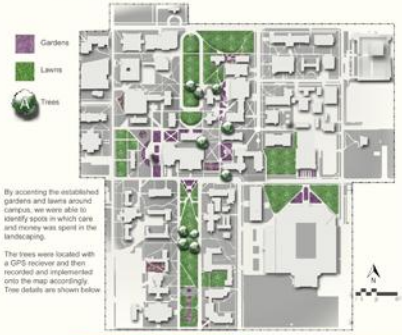


Circulation patterns were very important in our analysis as we were trying to understand what caused the higher traffic in certain areas.

After examining students walking around campus, we established a hierarchy of sidewalk traffic. We theorized that the higher traffic was correlated to the quality of walk they endured. A higher quality walk would consist of either shaded areas on a hot day, or in retrospect an area void of trees on a cold day.

Currently, only one bicycle lane exists, however the addition of the proposed lanes would allow for much better bicycle circulation around campus.

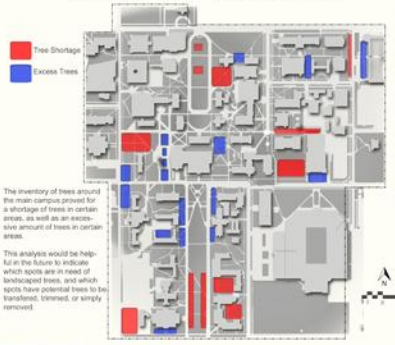
VEGETATION



By accenting the established gardens and lawns around campus, we were able to identify spots in which care and money was spent in the landscaping.

The trees were located with a GPS reciever and then recorded and implemented onto the map accordingly. Tree details are shown below.

FUTURE TREE MANAGEMENT

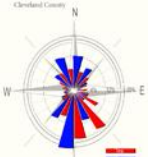


The inventory of trees around the main campus proved for a shortage of trees in certain areas, as well as an excessive amount of trees in certain areas.

This analysis would be helpful in the future to indicate which spots are in need of landscaped trees, and which spots have potential trees to be transferred, trimmed, or simply removed.

WIND ANALYSIS

Central Oklahoma experiences some extremely windy days, and by utilizing trees as wind buffers, designers can create a much more comfortable place for the users.

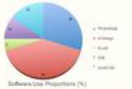


Special Thanks to:

- USDA NRCS Soil Survey
- Oklahoma Wind Power Initiative
- University of Oklahoma's Architecture & Engineering Services
- images.google/com/ (various tree species)

Software Used:

- Adobe Photoshop
- Adobe InDesign
- AutoCad 2012
- ArcGIS
- Microsoft Excel


Software Use Proportions (%)

SOIL ANALYSIS

*Soil Analysis showed that 86.7% (~109 acres) of our site was comprised of Urban Land.

Nearly 6% (7.3 acres) is Kirkland-Urban Land-Pawhuska Complex with a 0-3% slope.

Vanoss and Bethany-Urban Land Complex were also found minimally throughout the sight (<4%).

A

B

C

D

E

F

G

H

	A	B	C	D		E	F	G	H
SPECIES	Bald Cypress *Taxodium distichum*	Hackberry *Celtis occidentalis*	Sweetgum *Liquidambar styraciflua*	Shumard Oak *Quercus shumardii*		European Littleleaf Linden *Tilia cordata*	Water Oak *Quercus nigra*	American Sycamore *Platanus Occidentalis*	Pecan *Carya Illinoinensis*
LOCATION	A1: 35°12'22"N 97°26'44"W	A2: 35°12'35"N 97°26'44"W	35°12'21"N 97°26'44"W	D1: 35°12'23"N 97°26'44"W	D2: 35°12'34"N 97°26'44"W	35°12'26"N 97°26'44"W	35°12'30"N 97°26'41"W	35°12'31"N 97°26'41"W	35°12'35"N 97°26'41"W
DBH	21.66"	26.75"	19.75"	19.15"	14.65"	24.84"	37.58"	19.42"	21.66"
HEIGHT	35'	50'	55'	60'	35'	48'	55'	75'	70'
CONDITION	Fair	Fair	Poor	Fair	Fair	Fair	Good	Fair	Good

Course Projects – Site Master Plan

- Comprehensive design process
- Collect data, analyze data, understand data
- Prepare basemap
- Site Inventory and Analysis to Schematic Design to Master Plan

GIS Workflow (5 of 8)

- 3: Data
- 5: Prepare data
- 6: Create basemap
- 7: Perform geospatial analysis
- 8: Deliverables, conclusions, results

LA Design Process (6 of 10)

- I: Data collection/ analysis
- II: Conceptual design
- III: Preliminary master plan
- IV: Master plan
- V: Schematic design
- VI: Design development

Kessler Atmospheric and Ecological Field Station (KAEFS)

- 350 acres of mixed grass prairie
- Dr. Edwin Kessler donated a portion of his family farm to the University of Oklahoma for research and teaching
- Atmospheric and ecological research
- Research areas will be expanded in the future

Kessler 360

Atmospheric and Ecological Field Station

From the Skies to the Soils, Educating and Researching the World Around Us.

Through a revitalization of the diverse ecosystems and the rejuvenation of the land, the Kessler Atmospheric and Ecological Field Station in conjunction with the University of Oklahoma, can provide an exciting and innovative learning sanctuary for students and researchers of all levels. Kessler offers a unique opportunity for researchers and visitors alike to gather information all the way from the atmosphere to below ground levels; a 360 degree look on the world in which we live.

Kessler Research

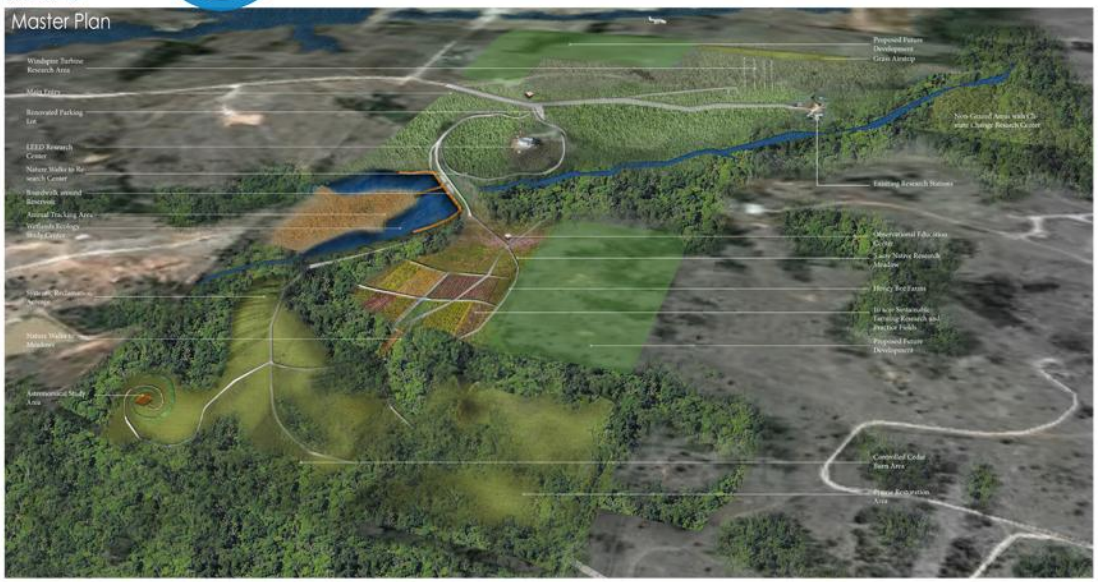
Astrology

Water

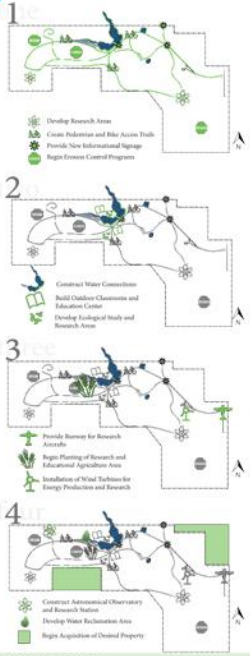
Ecology

Soil

Master Plan



360 Phasing



360 Programming

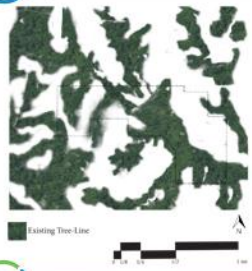
Research Utilizing low-impact, solar powered vertical windspines and the existing monsoon stations, researchers and students alike will be able to conduct advanced studies on the natural weather around them.

Agriculture The 10 acre field programmed for both sustainable and experimental farming will provide agricultural programming for younger children as well as help educate visitors in sustainable farming techniques

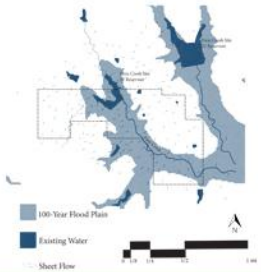
Education Nature trails will connect important destinations with wooden bridges that interact the existing creek beds and natural tree lines around the station. Information plaques will provide facts about local species

Ecology The 3 acre native meadows will be planted for blooms to be seen year round, and will also include bee farms, the farm will consist of locally manufactured bee hives and conduct educational programs around the importance of bees and pollination within our ecological world

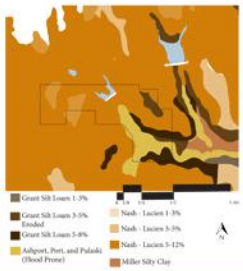
360 Vegetation



Hydrology

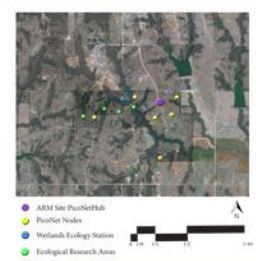


Soil Analysis



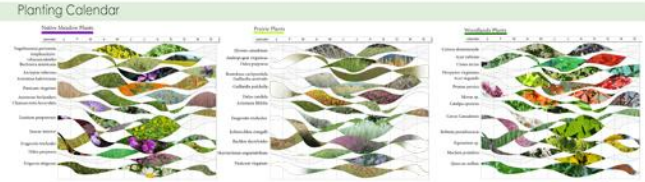
Topography

Research Stations

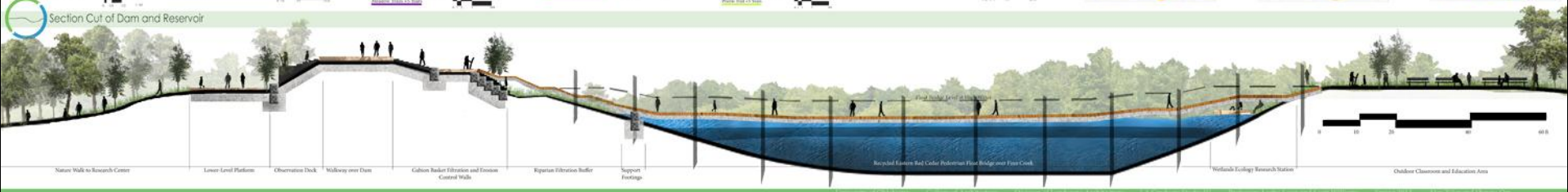


360 Circulation

Planting Calendar



Section Cut of Dam and Reservoir



University of Oklahoma · College of Architecture · Division of Landscape Architecture · LA Graduate Studio IV · Professors Leena Loon and Scott Williams · Spring 2011 · Dick Tyler and Shayna Ory

site inventory scale 1"=200'-0"

mesonet & piconet ranges
proposed property acquisitions
existing vegetation
floodplain
existing pedestrian circulation
existing vehicular circulation

a.r.m. site

kaefs weather research

piconet

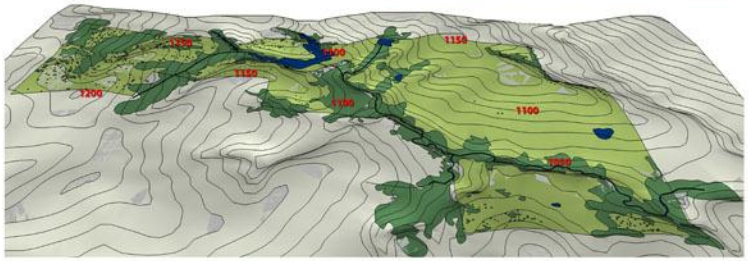
mesonet

1. Eastern Red Cedar Invasion

2. Chasm

3. Overgrazed Erosion Area

4. Pond



topography and hydrology in ten foot contours

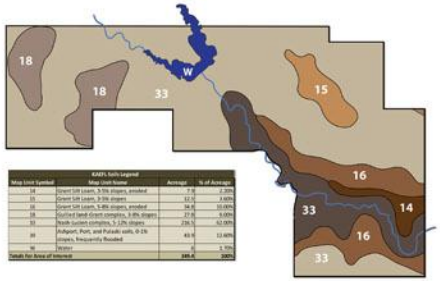
OPPORTUNITIES:
- Unique ecologies that can be restored to their natural characteristics by removing invasive plant species and poor management practices.
- Potential environmental and atmospheric learning tours and stations for REU programs and/or groups of students led by KAEFS guides.
- Possible increased visibility of the KAEFS by promoting structured, programmed field events to the University of Oklahoma and Noble Foundation.
- Scenic views overlooking native Oklahoma prairie and uninterrupted nighttime skylines for astrological studies.
- Rich Native American history that can be used as an educational tool for history from pre-Oklahoma times.

CONSTRAINTS:
- Unnoticeable arrival and uninviting tone at entrance of site.
- Shortage of vehicular circulation throughout the site.
- Lack of proximity in location to heavily populated areas or fairly frequently visited landmarks.

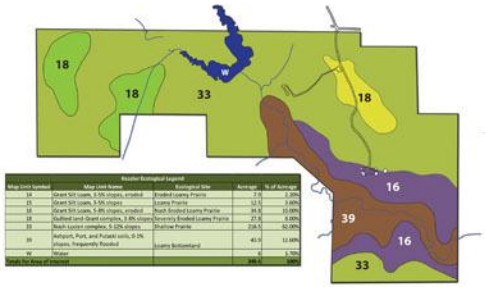
5. Prairie Cattle Pond

6. Kessler Homestead

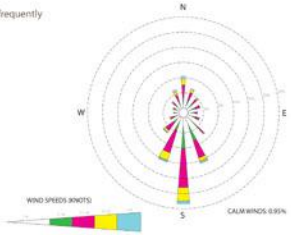
7. Finn Creek Bottomland



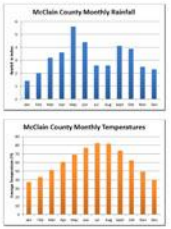
soil analysis



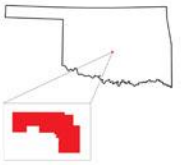
ecology study



wind rose



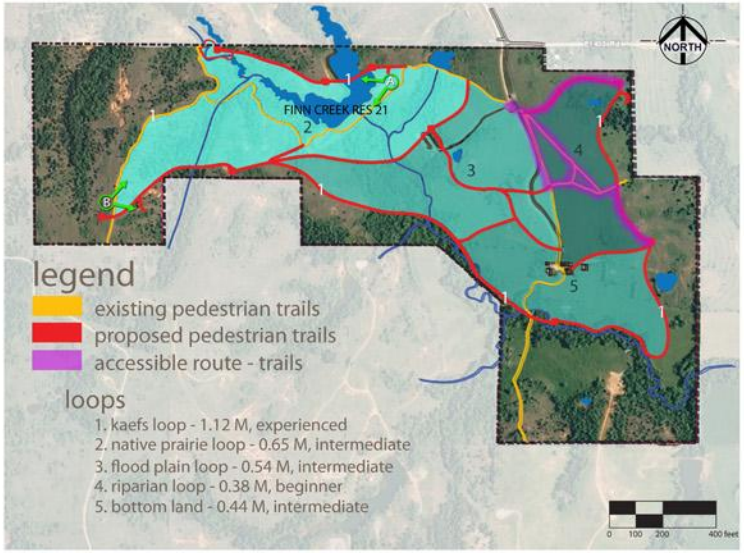
climate info



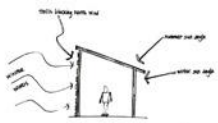
site context

kaefs site redevelopment

conor cummings & austin knox
la 5525 professors loon & williams
division of landscape architecture
university of oklahoma
spring 2012

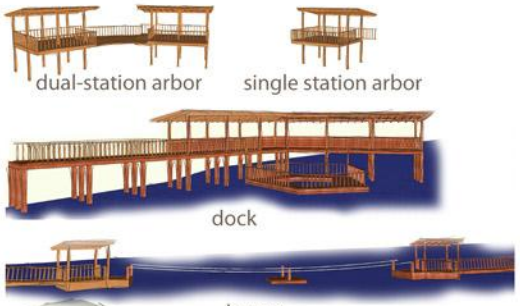


trail map
scale 1"=200'-0"



arbor concept

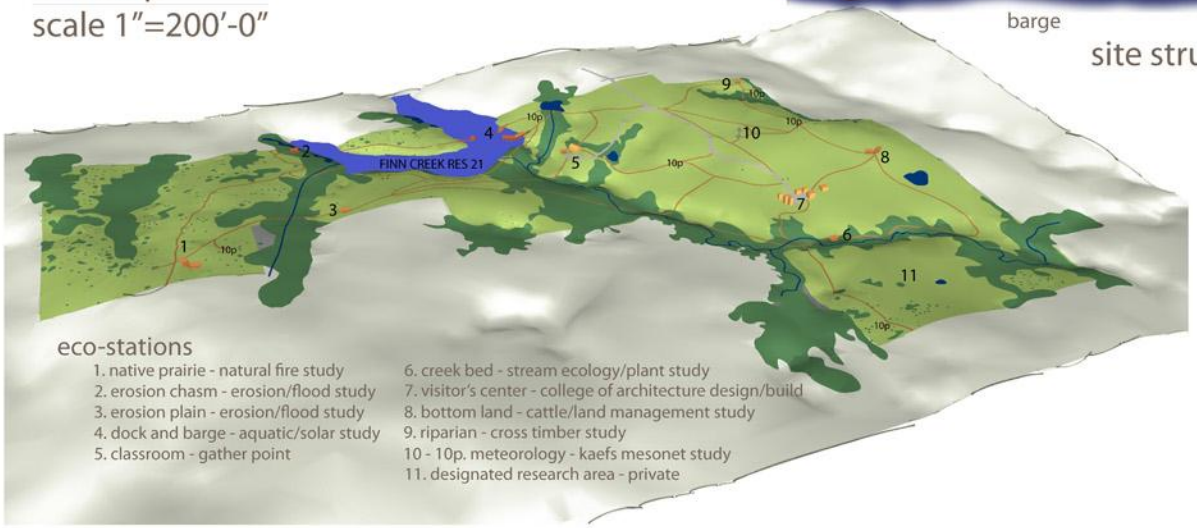
fishing dock section



site structures

A. fishing dock facing west

B. native prairie facing east



master plan - axonometric

MISSION STATEMENT:

The mission of the Kessler Atmospheric and Ecological Field Station is to provide a venue for integrative and transdisciplinary investigations of atmospheric, ecological, and human interactions in the southern Great Plains rural landscape and to share the knowledge and information gained with the scientific community and the general public.

In pursuit of the mission:

1. KAEFS will promote crosscutting field-based research for a better understanding of atmospheric and ecological relationships within the context of land-use in the rural Oklahoma prairie environment.
2. Lead by example of environmental stewardship with low-impact development coexisting within the natural environment without compromising its integrity or long-term functionality.
3. KAEFS will create structured educational events & programs tailored to the learning of environmental and atmospheric sciences, and their effects on land use in the southern Great Plains.

kaefs site redevelopment

conor cummings & austin knox
la 5525 professors loon & williams
division of landscape architecture
university of oklahoma
spring 2012

SITE INVENTORY & ANALYSIS

BUILDINGS, CIRCULATION, OIL
HYDROLOGY, SLOPE, SOILS
VEGETATITON & WILDLIFE
VIEWS

BUILDINGS, CIRCULATION, OIL

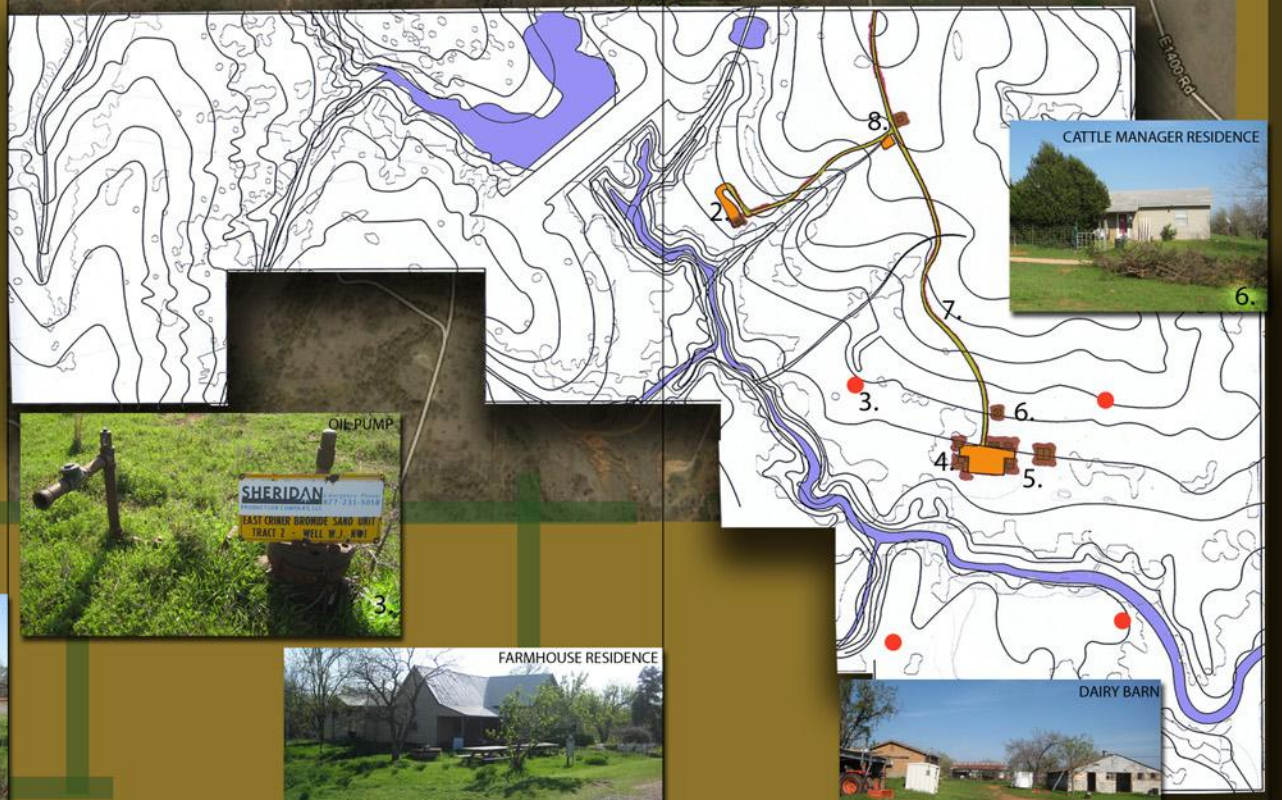
MAP KEY

BUILDINGS

PARKING

OIL WELLS

VEHICULAR GRAVEL ROAD



KESSLER ATMOSPHERIC & ECOLOGICAL FIELD STATION MASTER PLAN
PROJECT 4
GRADUATE STUDIO 2 LA5525

BRYCE FROST
QUENTIN KONG

DESIGN CONCEPT

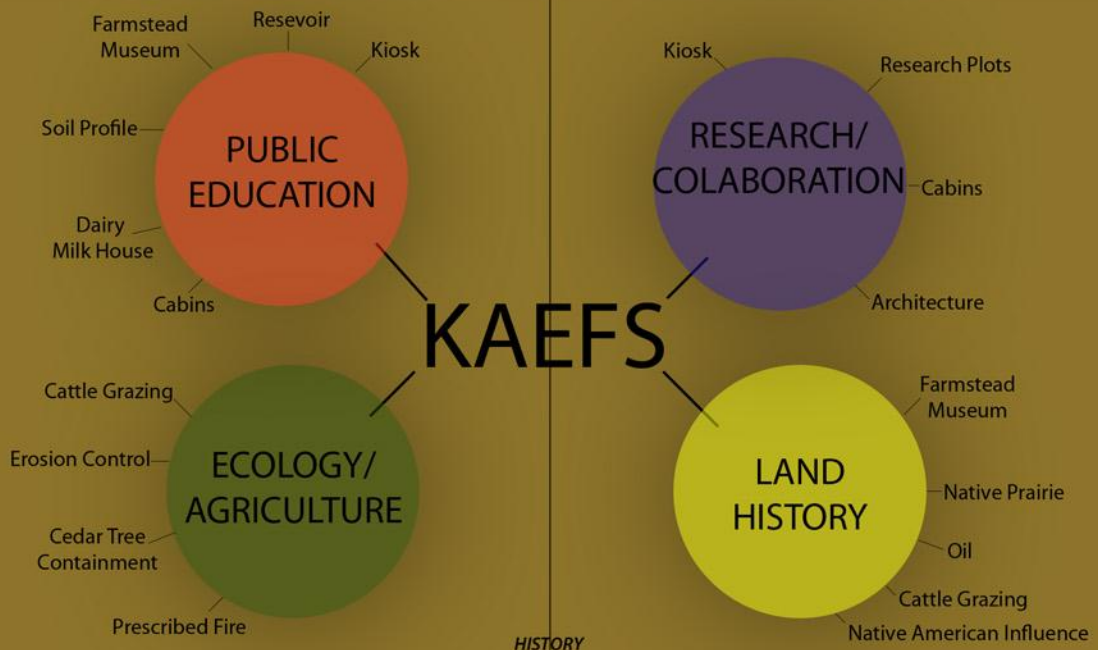
OKLAHOMA PLAINS INTERPRETATION
CONCEPT STATEMENT
DESIGN PROGRAM
DESIGN PRECEDENTS

CONCEPT STATEMENT

Student (10 years old) Narrative: We are on our way to the Kessler Atmospheric & Ecological Field Station for a field trip, I grew up in the city so I'm not very familiar with nature. The road we are on is very hilly and I see some farms along the road. We are coming upon a large corten steel structure that is the entrance to the site. As we drive down the road we come upon a really cool modern building, where we park. Inside this building is interesting interactive maps and activities for us kids that describe the native land we are on now as well as the different plants, wildlife, and climate for this site. Now it is time to go out and walk through the prairie, the grass is above my waist, I feel like an animal in it's native habitat. It is really windy today but I found a large boulder off the trail near a wooded area to sit protected from the wind and sun. It is cool to play in the dirt and discover animal tracks, and insects and worms. Me and some friends crossed a cool bridge where there was a small creek and learned the names of some trees. Our teacher told us that it is now time to go back in the bus and go to another part of the site.

We are now getting out at the Farmstead Museum; close to the farmhouse is a cool old dairy barn. At the dairy barn we get the chance to milk a cow, and learn about how much grass cows eat and how much milk they produce, the people on the farm used to have cows just like this. Inside the house we can read and see pictures of when Native Americans first lived here and when Dr. Kessler and the projects he was doing on this farm. They told us we could go behind the house and pick some apples, and this orchard is amazing as we walk down the allee of pear and apple trees. Once we are out of the orchard we come upon a large garden full of vegetables. Our teacher tells us that we have 5 minutes to pick some apples and then it is time to leave.

It has been a great day out here at this ecological research station. I learned so much about different species that live in Oklahoma's ecological habitat, I really enjoyed hands on experiences and being able to get outside and enjoy the land.



HISTORY

(Native Americans were the first settlers on site; they lived with a focus on both land and sky, and was very minimalistic with materials and the land. This will also be our focus through our proposed modern architecture and showcasing ecology and atmospheric research on site.

AGRI-PRAIRIE

After the land run and new settlers owned land, livestock was used as a source of income. This method kept grass down, and provided food & income for families. This practice is still used today at this Field Station.

PUBLIC APPRECIATION/INTEREST OF THE LAND

It is our hope that students and adults will learn not only about the authenticity of the atmospheric research on site, but also the history & see first hand the pieces of the native land. Having the public leave the site with the same appreciation that Native Americans had for the land years ago would be a great benefit to this research station.

RESEARCH/OU

Current research on this site studies the appropriate time to have cattle on these grassland pastures; monitoring erosion, time of grazing, quantity of cattle, etc. This is not the only research on site, the Field Station has become a critical data collecting site for many climatological research plots in Oklahoma and the Midwest.

EDUCATION/SHOWCASE

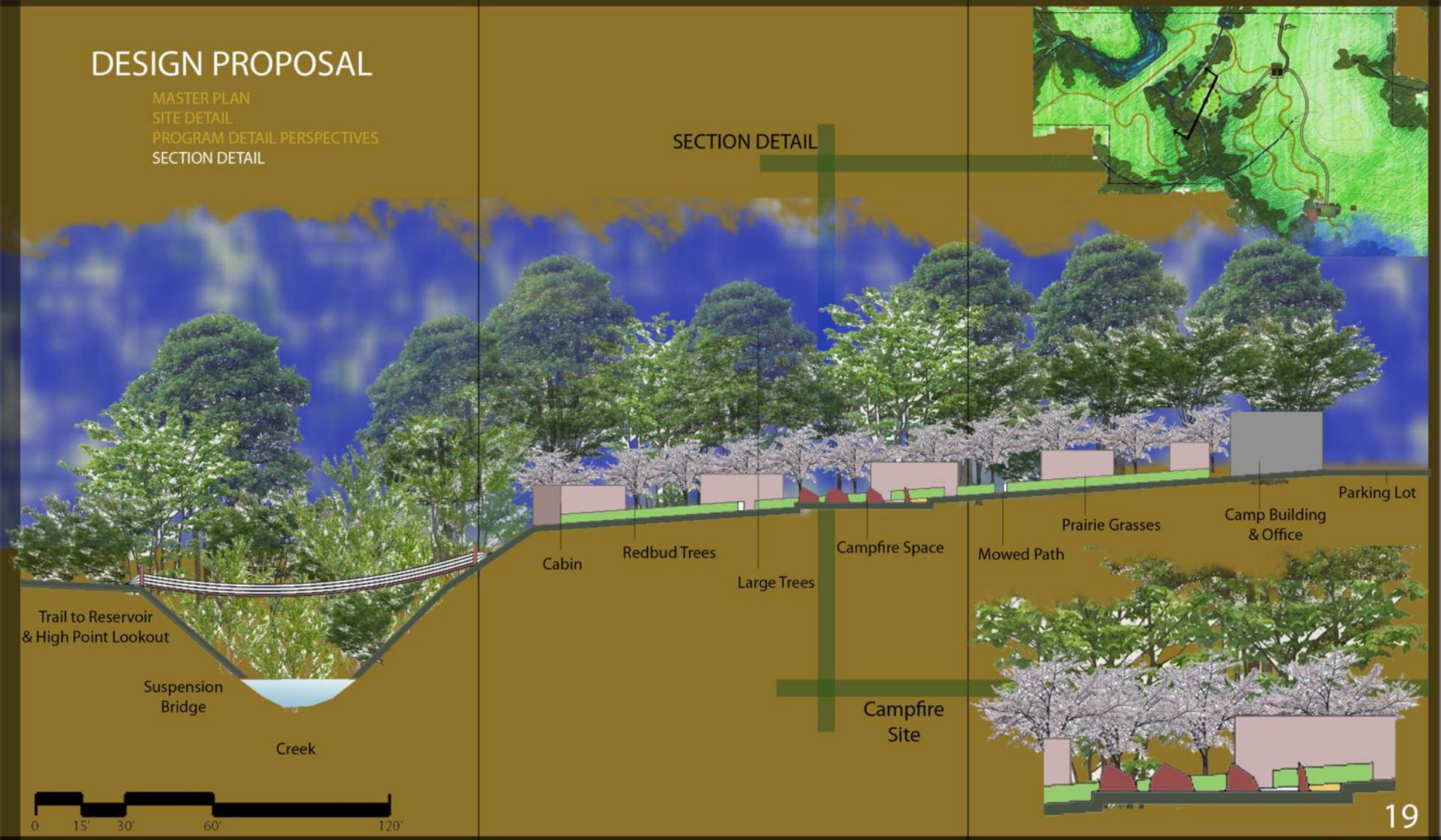
Within our Master Plan we want to emphasize to school aged kids as well as the rest of the general public educational components throughout the field station: current atmospheric research, ecology & wildlife, and the history of the native Oklahoma land.

KESSLER ATMOSPHERIC & ECOLOGICAL FIELD STATION MASTER PLAN
PROJECT 4
GRADUATE STUDIO 2 LA5525

BRYCE FROST
QUENTIN KONG

DESIGN PROPOSAL

MASTER PLAN
SITE DETAIL
PROGRAM DETAIL PERSPECTIVES
SECTION DETAIL



KESSLER ATMOSPHERIC & ECOLOGICAL FIELD STATION MASTER PLAN
PROJECT 4
GRADUATE STUDIO 2 LA5525

BRYCE FROST
QUENTIN KONG

KESSLER ATMOSPHERIC AND ECOLOGICAL FIELD STATION DESIGN

SHAHIDI ANVAR, MEHDI & JIXIANG WANG
LA GRAD STUDIO 2&4
LOON LEEHU & SCOTT WILLIAMS
University of Oklahoma
College of Architecture
Division of Landscape Architecture
Spring,2012

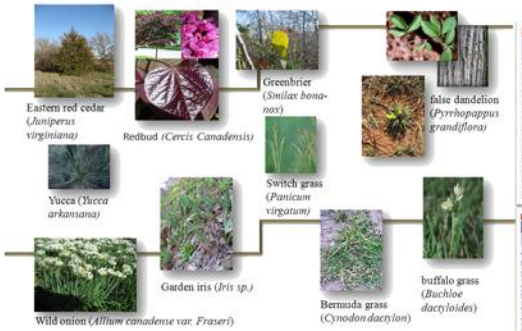
PART 1: BACKBROUND

Kessler Educational, Ecological and Atmospheric Field is accessible by car and bike with a entrance from western avenue (North), from State Highway 39, I-35 Interstate Highway McClain County, Oklahoma.The distance between Kessler Educational Field Station to The University of Oklahoma Norman's campus is about 28 miles.It will take approximately 40 minutes by car and 90 minutes by bike.

LOCATION

Longitude: W 97° 31' 39.36" – W 97° 31' 13.44"
Latitude: N 34° 58' 26.4"- N 34 ° 58' 52.32"

1.1 miles
0.7 miles



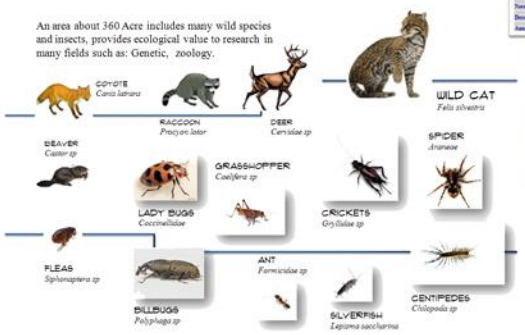
Mean Monthly Humidity and Moisture (1994-2010)

	Daily Max Relative Humidity	Daily Min Relative Humidity	Daily Average Relative Humidity	Daily Average Dewpoint	Daily Average Vapor Deficit
January	89	44	66	28	3.6
February	87	42	65	31	4.4
March	87	41	64	38	5.9
April	89	42	65	47	7.3
May	93	51	73	59	7.8
June	93	58	75	66	10.1
July	91	62	77	67	10.9
August	91	61	76	67	12.0
September	92	57	75	60	10.1
October	92	45	70	50	8.7
November	90	44	69	39	6.0
December	90	45	68	38	5.3
Annual	90	44	68	49	7.9

Monthly Averages (1994-2010)

	Temperature (deg Fahrenheit)			Precipitation (inches)	Wind (Miles Per Hour)		Solar Radiation
	Daily Max	Daily Min	Daily Avg	Monthly Average	Direction	Speed	Daily Avg (MJ/m2)
January	51.2	28.7	40.0	NA	NA	NA	9.8
February	55.7	32.7	44.2	NA	NA	NA	12.7
March	65.8	43.5	55.2	NA	SSE	10.6	NA
April	72.1	49.1	60.6	NA	SSE	10.7	NA
May	79.5	58.8	69.1	3.74	SSE	9.9	21.4
June	87.5	66.5	77.0	4.49	SSE	8.3	23.8
July	93.4	70.2	81.8	3.31	SSE	7.3	24.7
August	93.5	69.5	81.5	3.58	SSE	6.7	22.4
September	84.6	61.2	73.0	3.57	SE	7.0	18.2
October	74.1	50.7	62.4	3.53	SSE	8.1	14.0
November	63.2	40.0	51.6	1.55	SSE	9.0	10.1
December	52.3	30.2	41.3	1.71	NA	NA	8.8
Annual	72.7	49.4	61.1	NA	SSE	8.7	14.8

An area about 360 Acre includes many wild species and insects, provides ecological value to research in many fields such as: Genetic, zoology.



TEMPERATURE

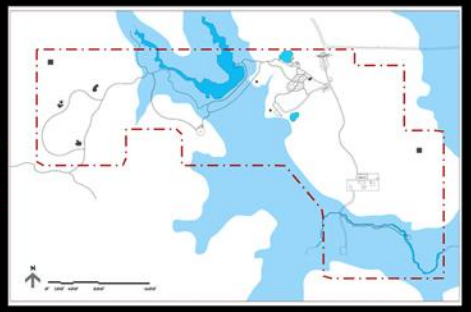
Average Annual: 61 degrees
Average Maximum: 73 degrees
Average Minimum: 49 degrees
Highest: 114 degrees
(Purcell, August 11, 1936)
Lowest: -13 degrees
(Purcell, December 23, 1989)
Days of 90 Degrees or Higher: 81
Days of 20 Degrees or Lower: 21

PRECIPITATION

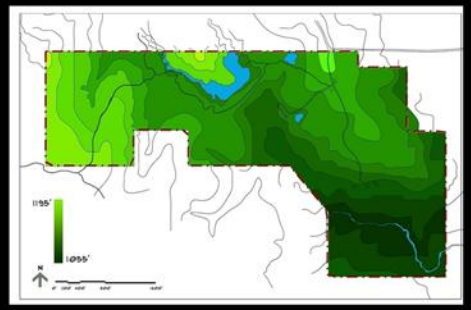
Average Annual: 36.63 inches
Days With Precipitation: 74
Wettest Year: 57.69 inches in 1957
Driest Year: 19.19 inches in 1954
Greatest Daily Rainfall: 13.58 inches
(Purcell, May 11, 1950)

WINTER WEATHER

Average Annual Snowfall: 6.7 inches
Days with snow on ground: 5
Greatest Seasonal Snowfall: 24.5 inches
(1987-1988)
Greatest Daily Snowfall: 14.0 inches
(Purcell, March 6, 1989)
Last Freeze in Spring: April 4
First Freeze in Autumn: November 2
Growing Season: 212 Days



FLOODING
Existing Building and100 years flood plan

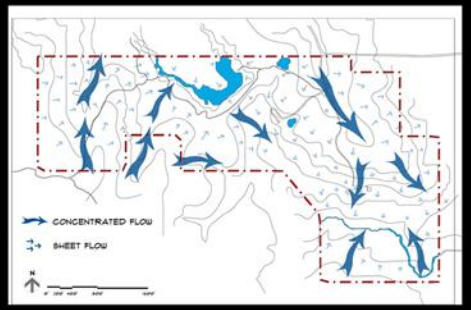


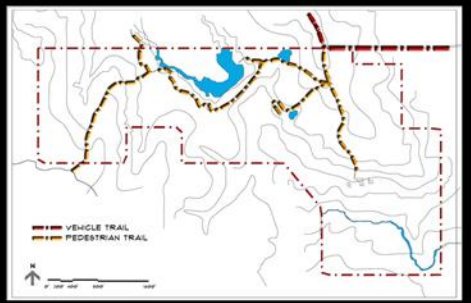
CONTOURS

PART 2: INVENTORY AND ANALYSIS

SOIL

HYDROLOGY
CIRCULATION





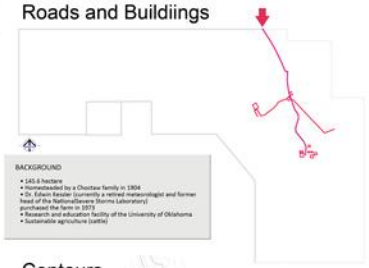
Accessible Conservation

Kessler Atmospheric and Ecological Field Station

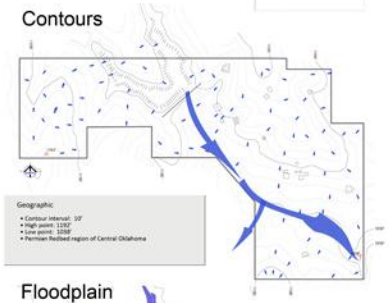
LESLIE NOVOTNY. MICHELLE SIMMONS. UNIVERSITY OF OKLHAHOMA. COLLEGE OF ARCHITECTURE. DIVISION OF LANDSCAPE ARCHITECTURE.
L A-5545-001 - L A INTERM GRAD STUDIO IV. PROFESSORS - LEEHU LOON & SCOTT WILLIAMS. SPRING 2012

Site Analysis

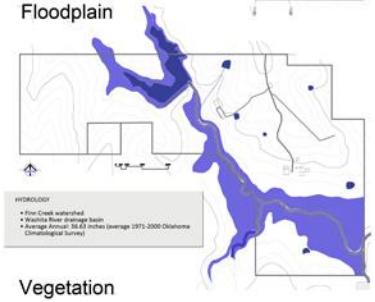
Roads and Buildiings



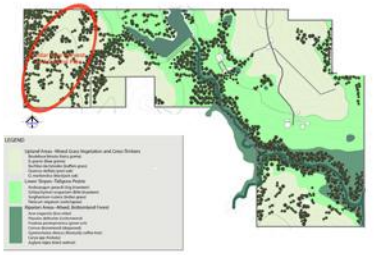
Contours



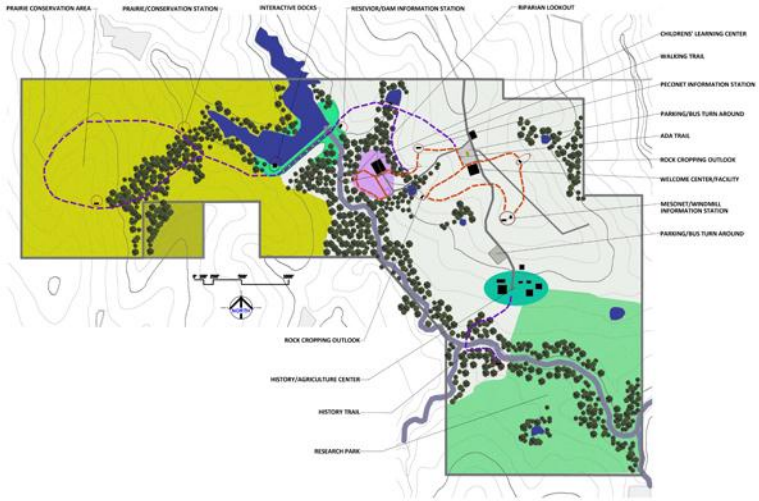
Floodplain



Vegetation



Master Plan



Program Explanation

The prairie has great mystery, variety, and beauty incomparable to any other landscape. However, these aspects are not clearly visible to most us. The prairie has a down-to-earth beauty that you really have to get down and carefully observe to discover. That is where the concept of education and conservation comes from. We are not trying to change the education that involves the university-- that is clearly running well on the site. What we are trying to do is educate people of the wonders of the prairie and, by doing that; we can help develop an understanding of why we should preserve the prairie. To do this, we must make the different areas of the site displaying simple wonder and aesthetics accessible. This begins with placing signs at intersections and the entry so visitors can easily navigate to the site. Once on the site, visitors can walk trails to places of rest where they can stop and interact with the landscape, learn interesting things, and take a closer look to discover the prairie.

HISTORY TRAIL

Visitors can travel under the shelter of trees on the original historic road of the homestead and veer off along winding path following the creek. Information signs will explain the history and landscape. Visitors will experience close encounters with vegetation of the riparian areas and can reflect in a natural stone seating area.

CHILDREN'S LEARNING CENTER

Ecological Tag Field and Wildlife Print Pad creates interactive learning for children while still teaching adults lessons by observing kids at play.

ACCESSIBLE TRAILS

ADA trails allow all visitors the opportunity to explore large portions of the site. Made of compacted decomposed granite with a sealant topcoat, these trails can withstand light to moderate vehicular traffic as well.

LOOK-OUTS

Open structures provide shade for rest and reflection, as well as information about the land formation, vegetation, and other ecological facts. From these outlooks, visitors can view protruding clay rocks and the vegetation transition from lower slopes to riparian areas.

NATURAL ASPECTS

Nature is a major program of this design. The site's major advantage is the ability to visit the different vegetative systems and geographic forms within walking distance. The design will take full potential of the natural element of the site.

INFORMATION STATIONS

Plaques allow for self-guided tours while highlighting the impressive landform, vegetation, and wildlife along the trails and inform visitors about conservation efforts.

KAEFS – Trail Planning

- Categorize circulation network
- Investigate standards
- Develop specifications
- Understand construction

GIS Workflow (3 of 8)

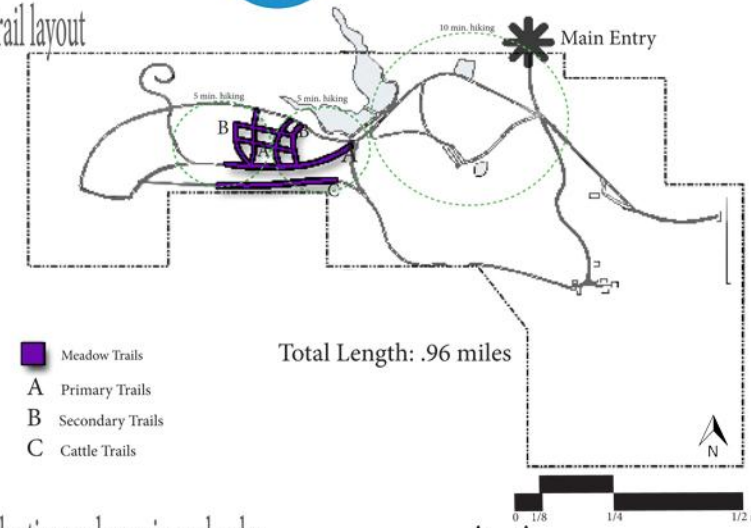
- 4: Document work
- 7: Perform geospatial analysis
- 8: Deliverables, conclusions, results

LA Design Process (3 of 10)

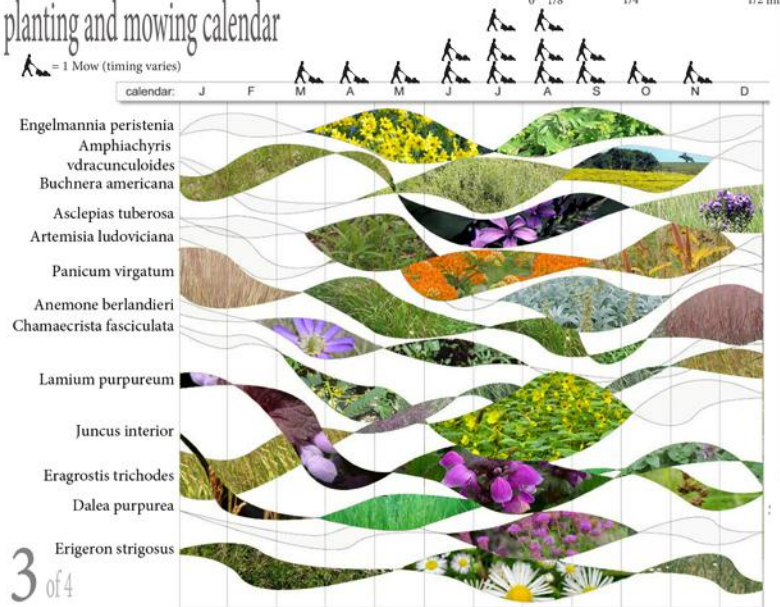
- VI: Design development
- IX: Construction administration
- X: Post construction observation/ evaluation

Kessler 360 Atmospheric and Energy Station trails

trail layout



planting and mowing calendar



examples

Primary Meadow Paths

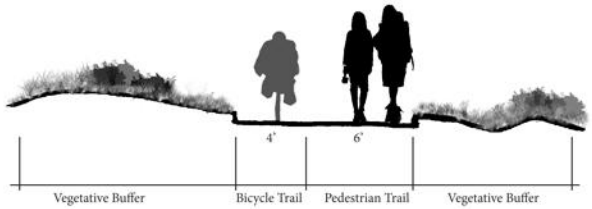
- 10-12' Wide, Found in High Traffic Areas of Meadow
- Crucial that mowing frequency is high during Spring and Summer Seasons, as well has the final mowing prior to Winter
- Trails are aesthetically rich and diverse, and provide a natural but maintained native meadow feel

Secondary Meadow Trails

- 4-8' Wide, Found in Medium Traffic Areas of Meadow
- Mowing is less important than Primary Meadows, but still must be maintained in orderly manner (~50% less frequent than primary trails mowing)
- More natural, overgrown feel than Primary Trails

Meadow Cattle Trails

- Less traveled areas along outskirts of meadows or secondary system
- Use Weedeater over Compacted Subsoil for maintenance, primary material is existing soil



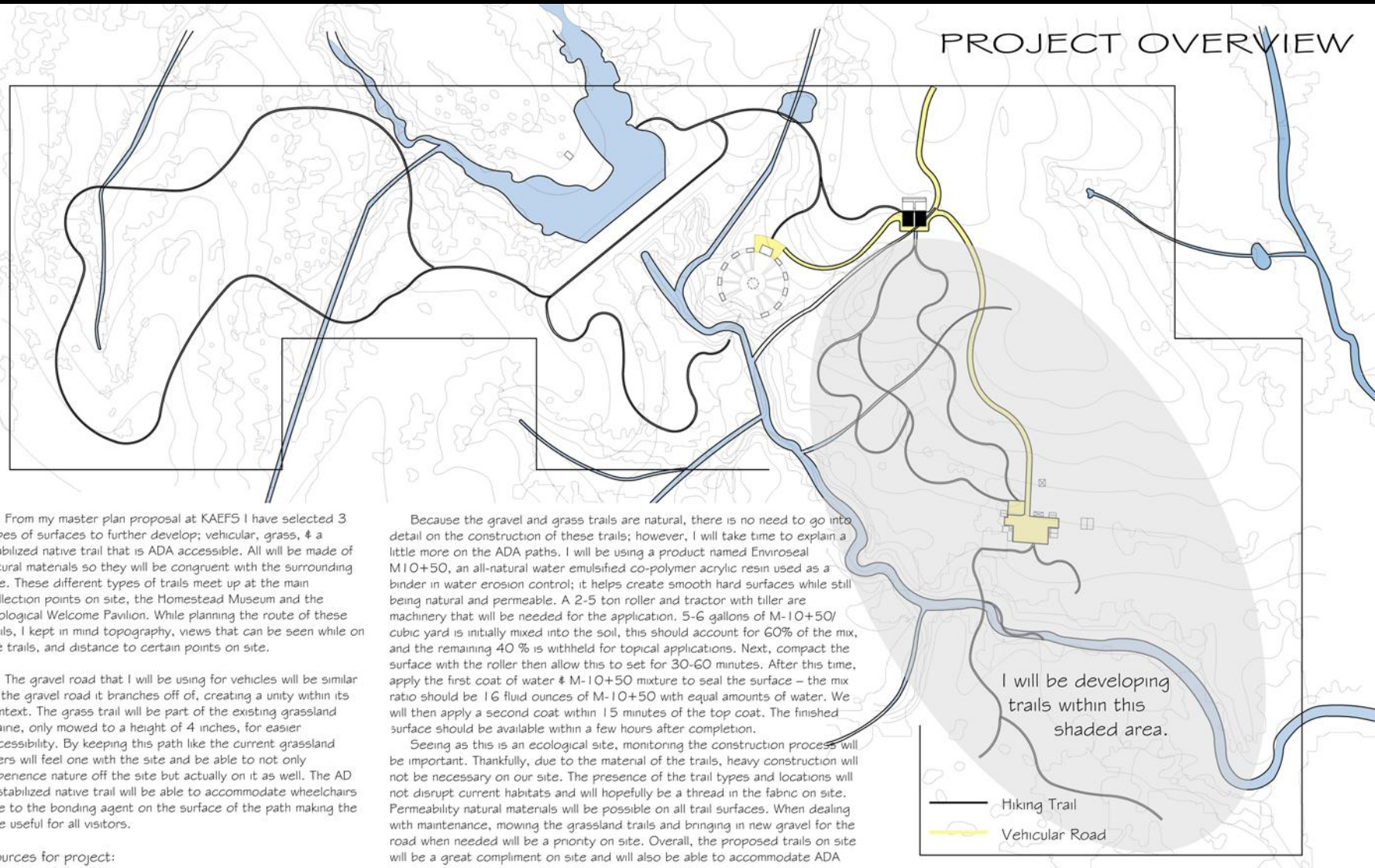
Meadow Trail Section

Meadow Trails +5 Years

native meadows

KESSLER ATMOSPHERIC & ECOLOGICAL FIELD STATION

PROJECT OVERVIEW



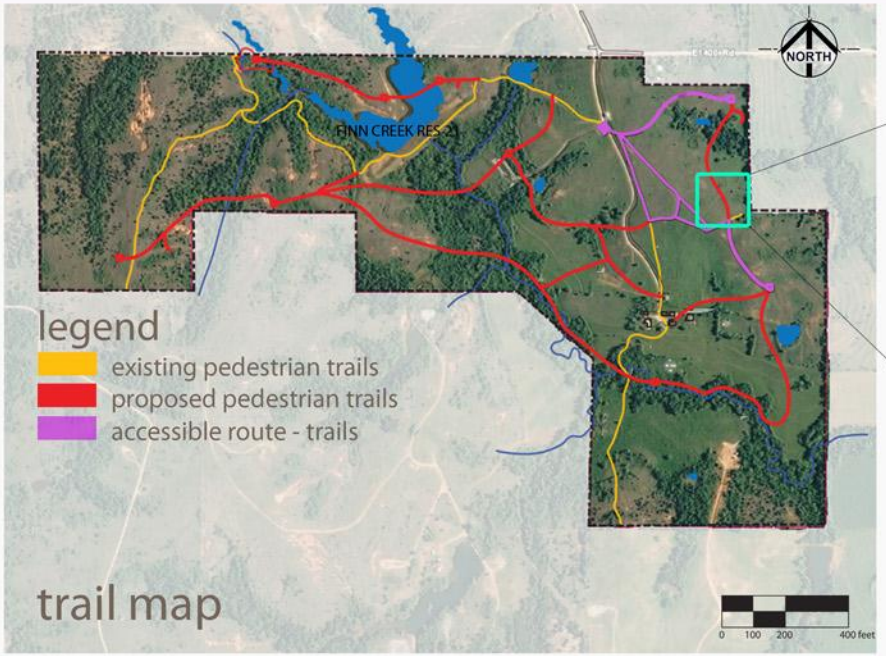
From my master plan proposal at KAEFS I have selected 3 types of surfaces to further develop; vehicular, grass, & a stabilized native trail that is ADA accessible. All will be made of natural materials so they will be congruent with the surrounding site. These different types of trails meet up at the main collection points on site, the Homestead Museum and the Ecological Welcome Pavilion. While planning the route of these trails, I kept in mind topography, views that can be seen while on the trails, and distance to certain points on site.

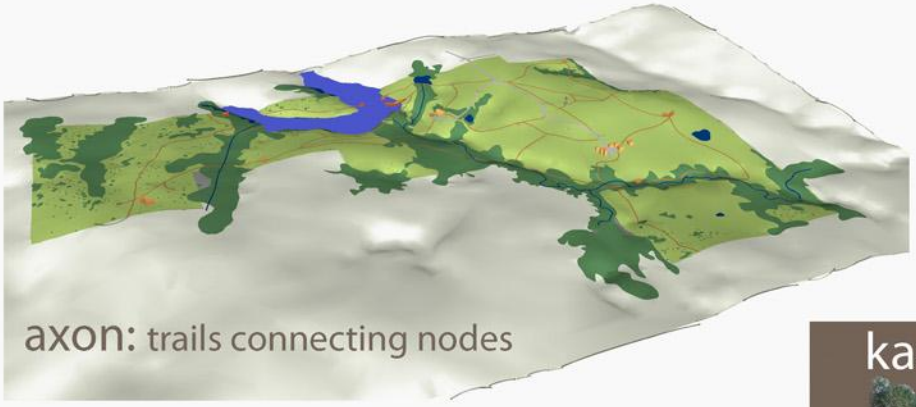
The gravel road that I will be using for vehicles will be similar to the gravel road it branches off of, creating a unity within its context. The grass trail will be part of the existing grassland prairie, only mowed to a height of 4 inches, for easier accessibility. By keeping this path like the current grassland users will feel one with the site and be able to not only expenence nature off the site but actually on it as well. The AD A stabilized native trail will be able to accommodate wheelchairs due to the bonding agent on the surface of the path making the site useful for all visitors.

Sources for project:
University of Illinois-Urbana
American Trails.org
Enviroseal.com

Because the gravel and grass trails are natural, there is no need to go into detail on the construction of these trails; however, I will take time to explain a little more on the ADA paths. I will be using a product named Enviroseal M10+50, an all-natural water emulsified co-polymer acrylic resin used as a binder in water erosion control; it helps create smooth hard surfaces while still being natural and permeable. A 2-5 ton roller and tractor with tiller are machinery that will be needed for the application. 5-6 gallons of M-10+50/ cubic yard is initially mixed into the soil, this should account for 60% of the mix, and the remaining 40 % is withheld for topical applications. Next, compact the surface with the roller then allow this to set for 30-60 minutes. After this time, apply the first coat of water & M-10+50 mixture to seal the surface – the mix ratio should be 16 fluid ounces of M-10+50 with equal amounts of water. We will then apply a second coat within 15 minutes of the top coat. The finished surface should be available within a few hours after completion.

Seeing as this is an ecological site, monitoring the construction process will be important. Thankfully, due to the material of the trails, heavy construction will not be necessary on our site. The presence of the trail types and locations will not disrupt current habitats and will hopefully be a thread in the fabric on site. Permeability natural materials will be possible on all trail surfaces. When dealing with maintenance, mowing the grassland trails and bringing in new gravel for the road when needed will be a priority on site. Overall, the proposed trails on site will be a great compliment on site and will also be able to accommodate ADA personnel.

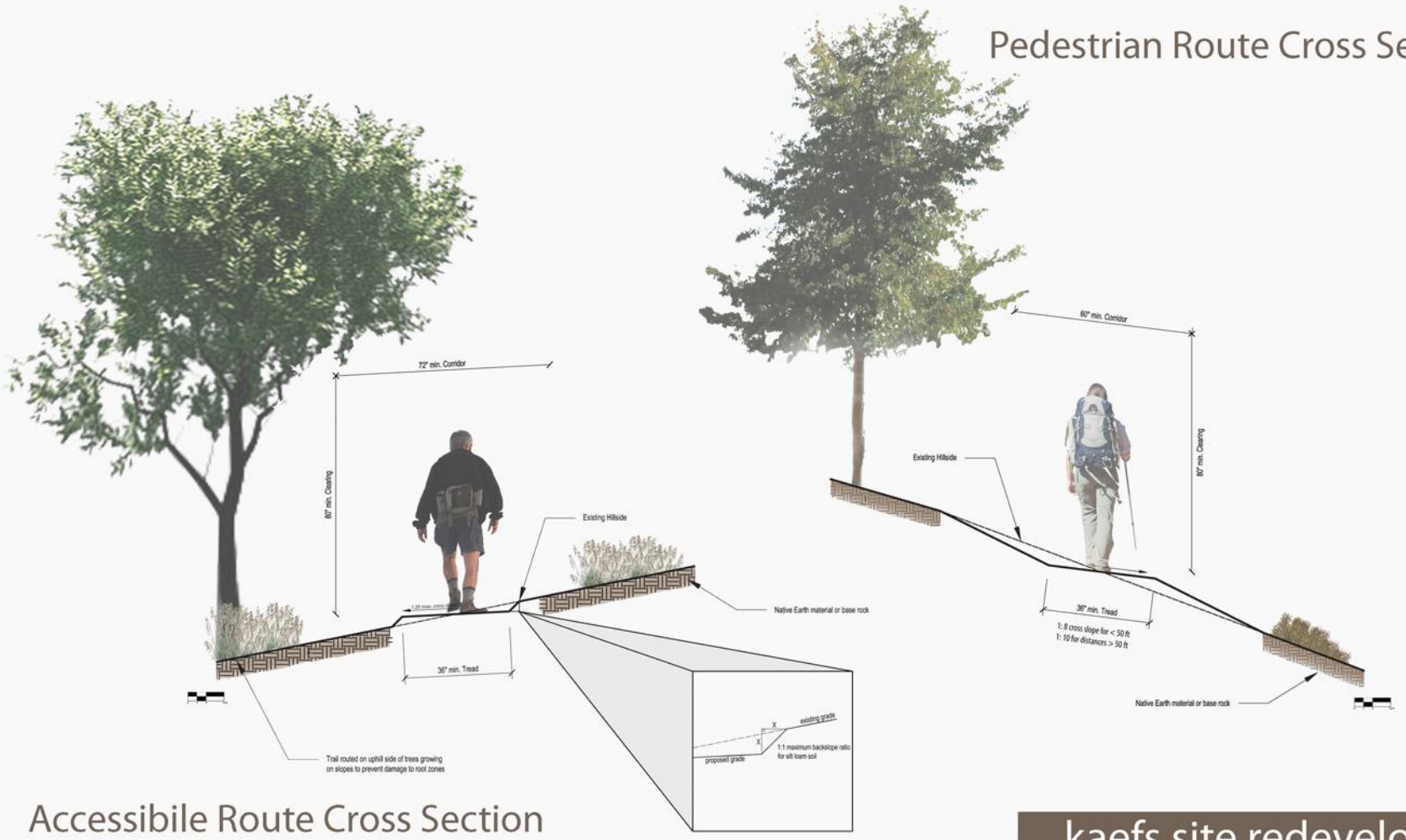




kaefs site redevelopment

conor cummings
la 5525 professors loon & williams
division of landscape architecture
university of oklahoma
spring 2012

Pedestrian Route Cross Section



Accessibile Route Cross Section

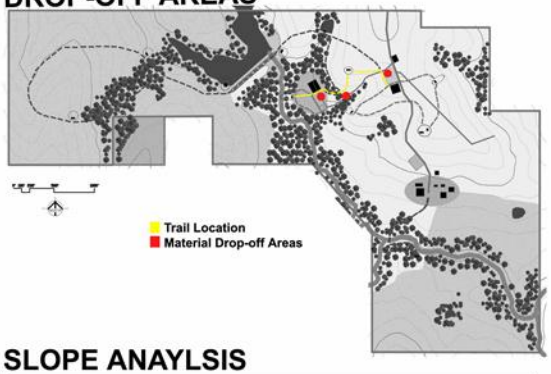
kaefs site redevelopment

conor cummings
la 5525 professors loon & williams
division of landscape architecture
university of oklahoma
spring 2012

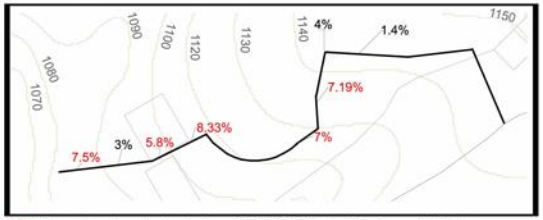
CHILDREN-PECONET TRAIL

LESLIE NOVOTNY. UNIVERSITY OF OKLHAHOMA. COLLEGE OF ARCHITECTURE. DIVISION OF LANDSCAPE ARCHITECTURE. L A-5545-001 - L A INTERM GRAD STUDIO IV. PROFESSOR LEEHU LOON & SCOTT WILLIAMS. SPRING 2012

TRAIL LOCATION AND MATERIAL DROP-OFF AREAS



SLOPE ANAYLSIS



(x)% - Slopes in red require handrails per 2010 ADA Standards for Accessible Design

TRAIL PERSPECTIVE

MATERIAL DROP-OFF AREAS AND MATERIAL

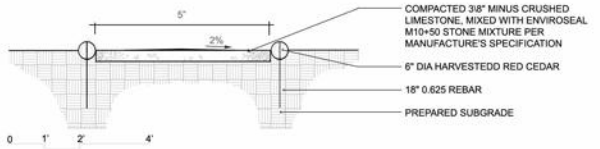
There are very few restrictive landforms or vegetation along the route of designated trail. However, the conservation efforts of the project will limit the material drop areas to minimize the destruction of established vegetation. Drop zones are established in areas where a road is currently established or construction will occur. This will limit large heavy machinery destroying the landscape established. A skid-steer loader, compact track loader, compact tractor, or similar sized or smaller machinery may be used to transport material from drop-off areas to designated trail. This will reduce the amount of construction damage experienced on the site.

The materials used to surface the trail will be compacted 3\8" minus limestone, mixed with Enviroseal m10+50 stone mixture per manufacture's specification. This material will not create opening that allow the passage of a ½ inch diameter sphere according to the 2010 ADA Standards for Accessible Design. 6" diameter Eastern Red Cedar harvested from site will line the outer line of the trail to ensure stabilization of surface material. The Eastern Red Cedar will be secured 18" into subgrade to prevent shifting.

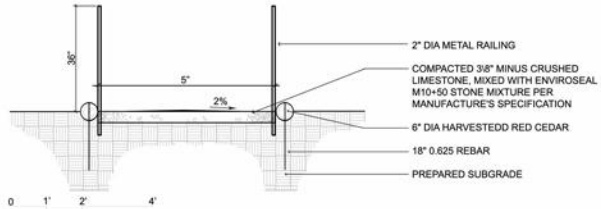
ADA ACCESSIBLE TRAIL

The Children-Peconet Trail will meet ADA Standards. The Department of Justice 2010 ADA Standards for Accessible Design in accordance of Americans with Disabilities Act of 1990 will be followed to allow access to all users of any ability. The width of the trail will be 5' minimum to allow for adequate passage of users. The slopes of the trail that range from 0% to 4.9% meet the standards for a ADA walkway and will require minimum construction of grading and surfacing. Construction of this portion of the trail is explained by (1) 0%- 4.9% ADA Trail Detail. The portion of the trails that consist of slopes of 5.0% to 8. 33% will require handrails to meet compliance standards. Construction of the portion of the trail is explained by (2) 5% - 8.33% ADA Trail Detail and (3) ADA Trail Railing Detail. Slopes greater than 8.33% are illegal slopes for ADA accessible routes. If route of trail exceeds the 8.33% slope, this portion will be regraded or rerouted to meet ADA standards.

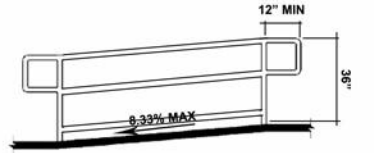
TRAIL DETAILS



1 0%- 4.9% ADA TRAIL DETAIL
SCALE: 1\8" = 1"

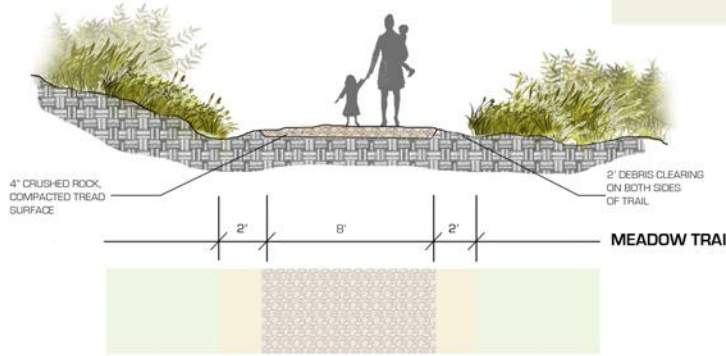


2 5%- 8.33% ADA TRAIL DETAIL
SCALE: 1\8" = 1"



3 ADA TRAIL RAILING DETAIL
NOT TO SCALE

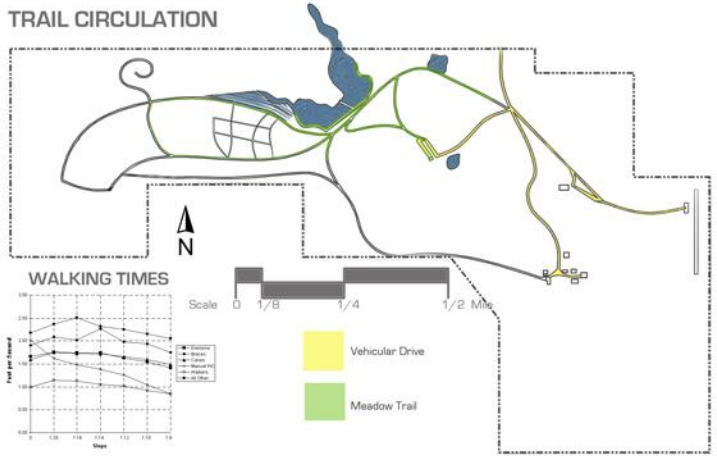
Kessler Atmospheric and Ecological Field Station Trail Details



MEADOW TRAIL SECTION

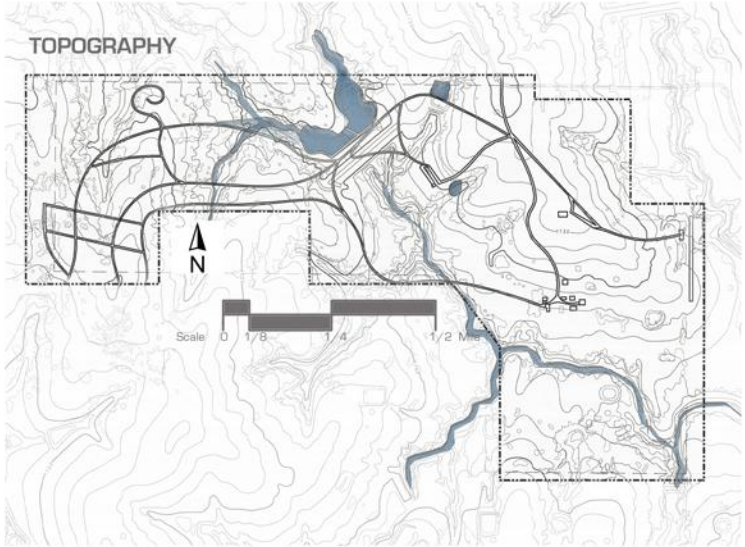
VEHICULAR DRIVE SECTION

TRAIL CIRCULATION



WALKING TIMES

TOPOGRAPHY



For Oklahoma Communities?

- What worked?
- What did not work?
- What almost worked?
- Future community projects

Geodesign Center at OU

- New initiative in the College of Architecture
- Working to connect to…
  - On-campus partners
  - Off-campus partners
- Find the people who…
  - Are asking the questions
  - Want the answers
- Identify…
  - Potential projects
  - Funding sources

Questions/ Comments

Utilizing GIS, Service Learning, and Landscape Architecture to Assist Oklahoma Communities

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