Attachment 4

KANSAS STATE UNIVERSITY

Office of Faculty Senate

November 19, 2015

President Kirk Schulz
Kansas State University
110 Anderson Hall
Manhattan, Kansas 66506

Dear President Schulz,

On behalf of the Joint Leadership Committee of Faculty Senate, Student Senate, and University Support Staff Senate, we submit our prioritized recommendations regarding the City/University Funds allocations. This was the first year that the three senate bodies worked together to submit a joint recommendation and we feel that the list below accurately captures the preferences of our constituencies. In short, we propose the expenditure of $182,500 to support five projects. Below, we briefly summarize each project. Attached you will find supporting documentation.

1. Lighting Additions to Bike Path from Jardine Dr. to College Ave. -- $100,000
   This path is increasingly used by the university and Manhattan community but is poorly lit. This proposal asks for the construction of 9 or 10 lights using an economical wooden pole.
2. Professional design for water runoff mitigation rain garden at Hale Library -- $15,000
   Water runoff from the university area contributes to flooding along campus creek and to the larger city south and east of campus. This project builds on an award-winning student design (http://water.epa.gov/infrastructure/greeninfrastructure/crw_2013winners.cfm#ksu) to capture water on campus and slowly release it back into the soil alleviating some runoff pressure on campus creek. The design element is estimated at 10 percent of the future cost of building the catchment. The attached files show the original student concept, the revised concept, and an estimated budget.
3. Pioneer Lane Sidewalk North Side between Manhattan Ave. & McCain Lane -- $35,000
   There currently is no sidewalk along this walkway frequently used by students creating a dangerous pedestrian environment.
4. Traffic Flow Study -- $30,000
   Current pedestrian activated crossing beacons on and around the perimeter of campus are not on a delay and create a dangerous crossing situation because pedestrians push the buttons and immediately step into the street. These outdated beacons need updated but only after a thorough traffic study is completed to determine the impact.
5. Bike Repair Stations at Hale Library and Cardwell Hall -- $2,500
   Current bike repair stations are in need of repair and expansion. These stations increase the ease of bike use on and around campus.

Thank you for your consideration.

Sincerely,

Fred Guzek
Faculty Senate President

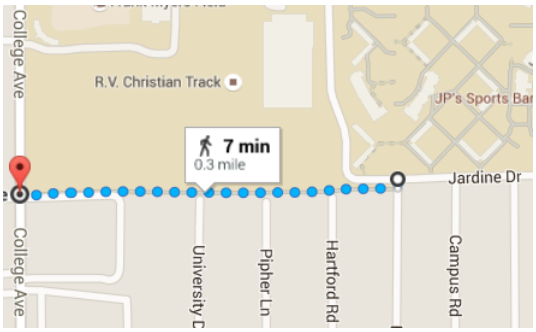
Pam Warren
Unversity Support Staff Senate President

Andy Hurtig
Student Senate President

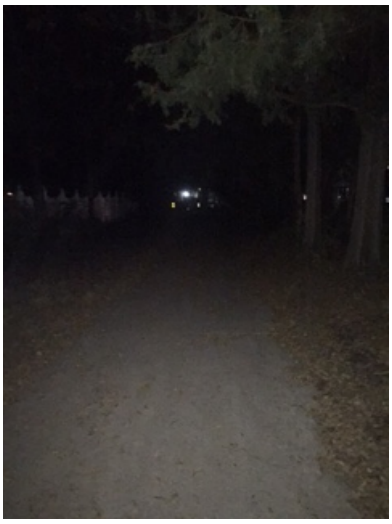
Attachments

211 Fairchild Hall, Manhattan, KS 66506-1105 | (785) 532-6053 | Fax: (785) 532-5944 | www.k-state.edu/facsen

# Lighting Additions to Bike Path from Jardine Dr. to College Ave.

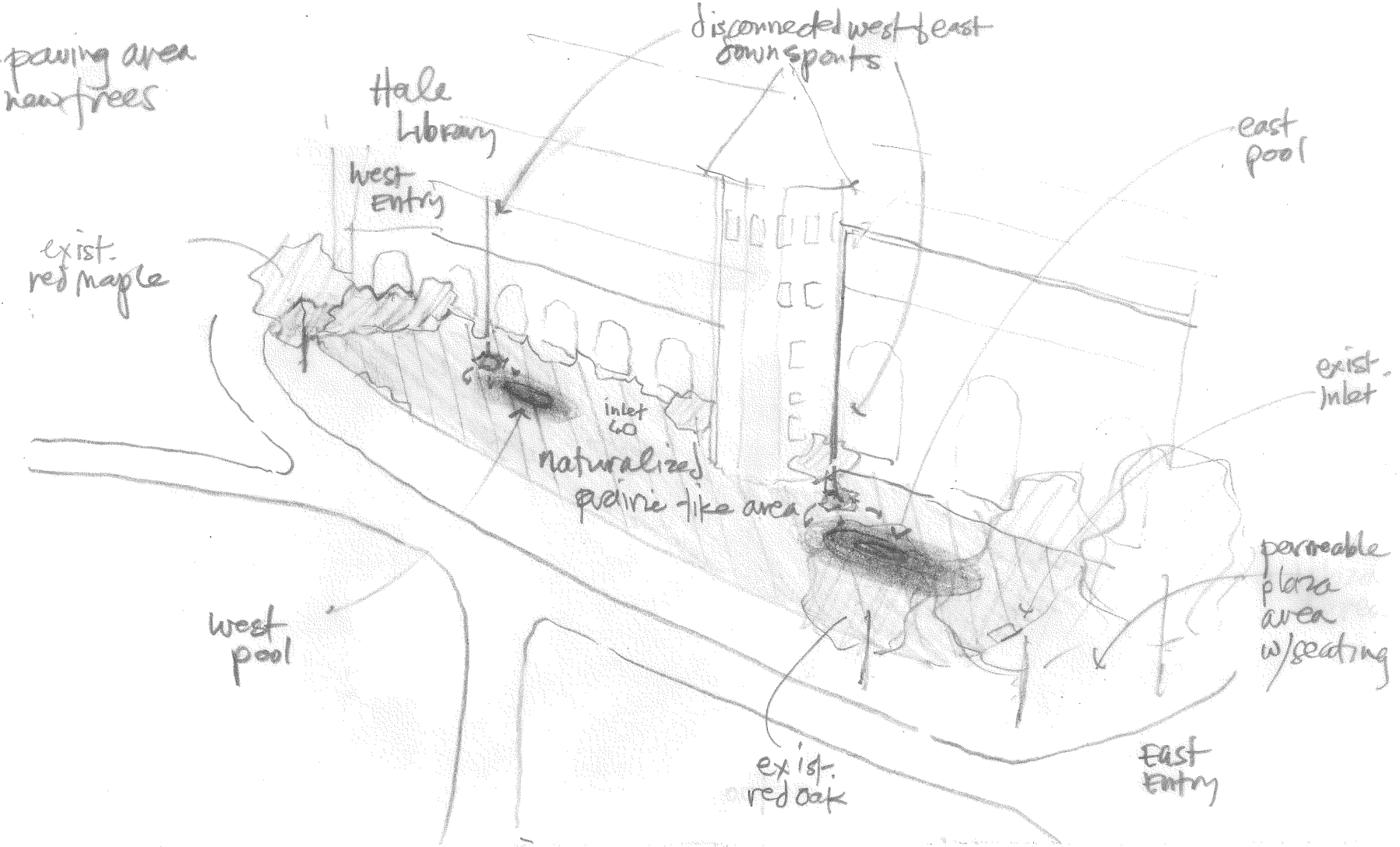



The City/University Projects Fund has been crucial in providing the funding to improving the safety of areas surrounding the university. One area that Joint Leadership Committee felt needed to be addressed is the bike path from Jardine Dr. to College Ave. A sizeable trees and an insufficient number of lights make it a hazard to be traverse after sundown. With the new women's soccer stadium and a decreasing amount of parking available on campus, we foresee that this path will continue see an uptick in traffic, especially during the months with the fewest hours of daylight. Our proposal is to add 9 or 10 wooden light poles with LED lights to illuminate this path.



Phase I - relocate irrigation pipes, regrade & plant prairie-like area; disconnect downspouts after establishment
naturalized prairie like area
w/ two pools & two downspouts disconnected & naturalized energy dissipators

Phase II
permeable paving area
w/ seating & new trees

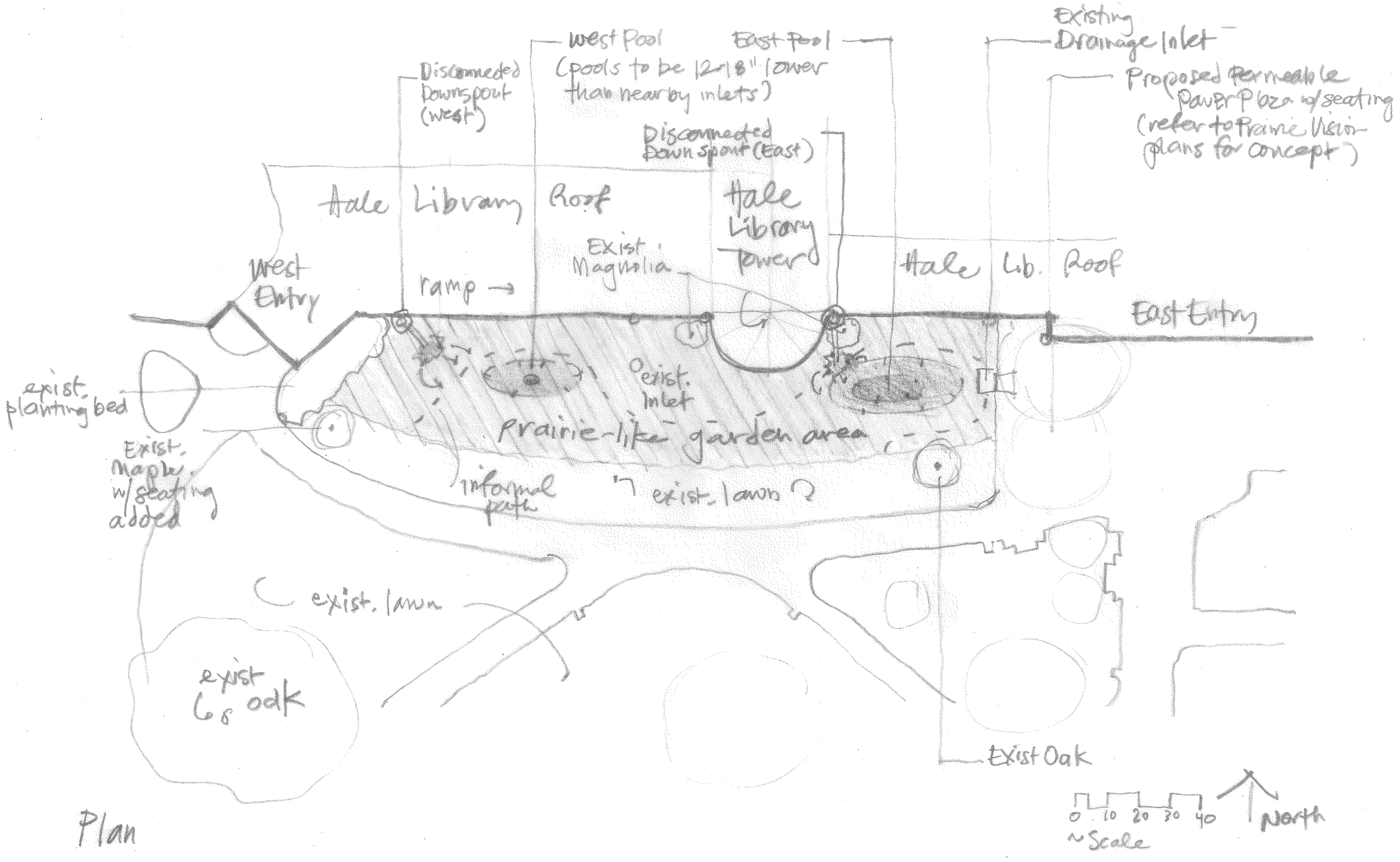



Oblique

Prairie Vision Adapted - LRS Oct 5, 2015

ref pg 9

# Hale Library Site Plan




Plan

Prairie Vision Adapted - LRS Oct 5, 2015

Designed Storm Levels

ref pg 12


Section

**Hale Library "Prairie Vision Adapted" Preliminary Design & Implementation Budget**
(Oct. 6, 2015 draft – lrs/mt)

Design Fees (10% of estimated construction cost - $120,000) - $12,000

Topo Map & Existing Utilities Location/Relocation Assessment - $5,000

Irrigation & Utility Relocations - $10,000 (more if there are electrical or fiber optic cables)

Site Preparation, Earthwork, Finish Grading & Erosion Controls - $20,000

Downspout daylighting and stormwater dissipation work - $5,000

Limestone and gravel purchase & installation - $20,000 (for terraces and stepping stones)

Plant materials - $25,000 (incl. ~7,000 sf of native prairie plants for Phase I; trees & shrubs for Phase II)

Concrete pavers with 12-inch gravel sub-base - $9,000 (300 sf of permeable paving near east entrance)

Bench removal (3) and relocation/setting (4) - $5,000 (incl. two new benches)

Two-year Maintenance Contract - $16,000

Educational sign - $5,000

Contingency (~15% of total cost - $132,000) - $20,000

Estimated total cost = $152,000

# Prairie Vision

## Hale Library's New Front Porch

### Envisioning a sustainable Campus model for stormwater management Design

**Kansas State University**

**Manhattan, KS**

**Registration Number:** S44

**Team Members:**

Lauren Heermann- Landscape Architecture
Amanda Kline- Landscape Architecture
Noura Saadi- Civil Engineering
Jared Sickmann- Landscape Architecture
Benjiman Williamson- Landscape Architecture

**Consultants:**

Zakary Ratajczak- Biology
Joseph Weeks- Agronomy
Katie Burke- ENVD PhD
Stacy Hutchinson- Biological & Agricultural Engineering
Timothy Keane- Landscape Architecture

**Faculty Advisors:**

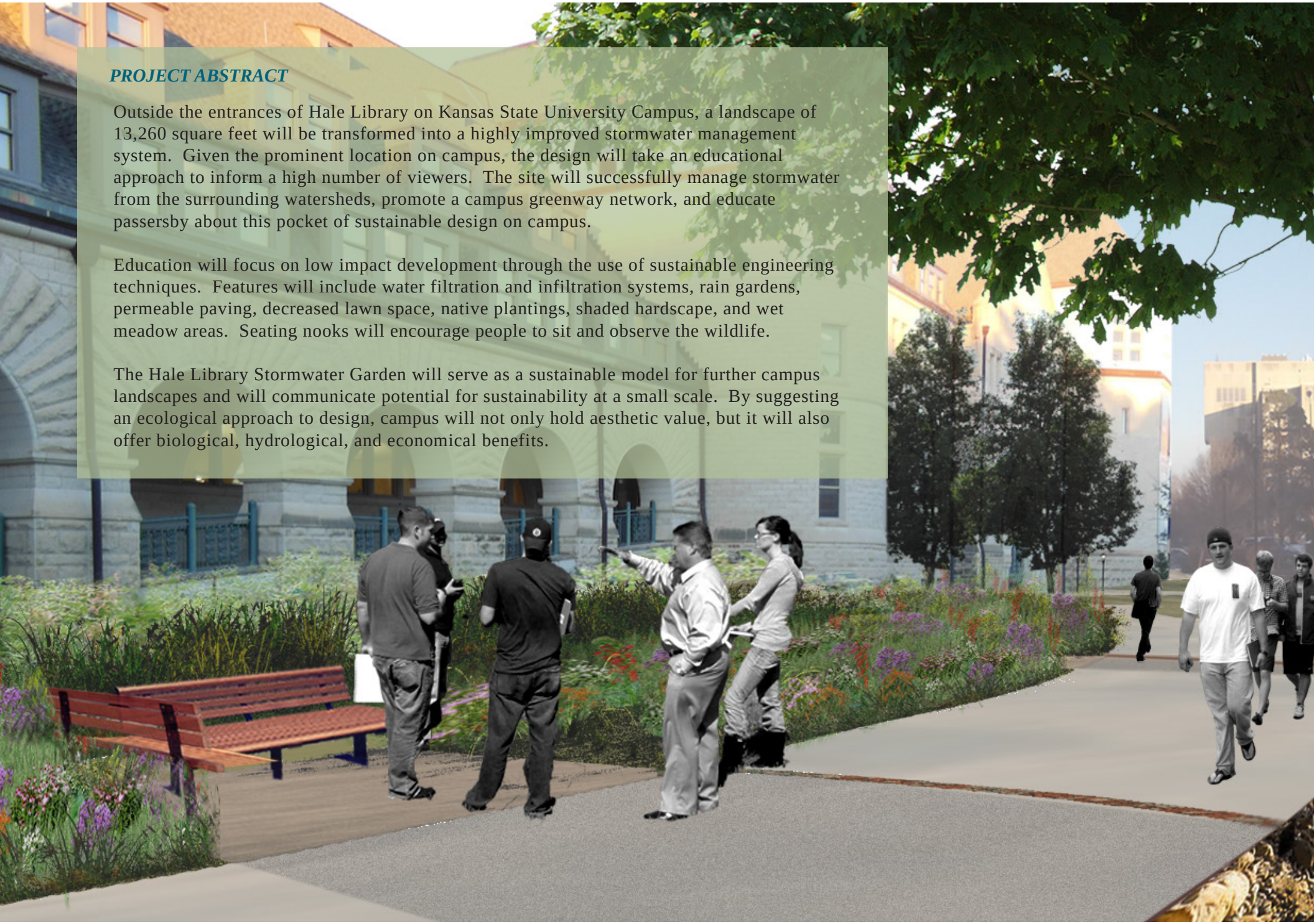
Lee Skabelund- Landscape Architecture
Jessica Canfield- Landscape Architecture
Ryan McGrath- Civil Engineering

**Facility Advisor:**

Mark Taussig- University Landscape Architect

**Facilities Advisor Department:**

Campus Planning and Facilities Management



## *PROJECT ABSTRACT*

Outside the entrances of Hale Library on Kansas State University Campus, a landscape of 13,260 square feet will be transformed into a highly improved stormwater management system. Given the prominent location on campus, the design will take an educational approach to inform a high number of viewers. The site will successfully manage stormwater from the surrounding watersheds, promote a campus greenway network, and educate passersby about this pocket of sustainable design on campus.

Education will focus on low impact development through the use of sustainable engineering techniques. Features will include water filtration and infiltration systems, rain gardens, permeable paving, decreased lawn space, native plantings, shaded hardscape, and wet meadow areas. Seating nooks will encourage people to sit and observe the wildlife.

The Hale Library Stormwater Garden will serve as a sustainable model for further campus landscapes and will communicate potential for sustainability at a small scale. By suggesting an ecological approach to design, campus will not only hold aesthetic value, but it will also offer biological, hydrological, and economical benefits.

***APPROACH FROM THE WEST VIEWING STORMWATER DESIGN***

***LANDSCAPE PERFORMANCE BENEFITS***

- Restores a total of **9,147.60 ft2. (0.21 acres) of native vegetation** including prairie grasses and forbs found in the Flint Hills region
- Retains **100% of the stormwater** from a one year storm, or approximately **24,000 gallons.** In a ten year storm, **65% of stormwater** is retained, or approximately **45,900 gallons.**
- Removes **303.5 $ft^2$ of impervious concrete** to make way for two new planting beds and a **permeable paver** seating plaza totaling **870.5 $ft^2$** adjacent to the east entrance
- Removes **12,500 $ft^2$** of irrigated lawn, reducing water consumption and minimizing motorized maintenance
- Provides a new outdoor **amenity** for the more than **24,000 students, faculty and staff** of Kansas State University and the greater community
- Promotes **environmental awareness and stewardship** by exposing campus users to a site scale example of green infrastructure

**As a prospective student, I don't know much about Kansas State University. How does campus manage stormwater?**

# SITE LOCATION

Located south of Hale Library on Kansas State University Campus, the selected site offers **13,260 square feet** to potentially showcase a highly **improved stormwater management system**. As a high traffic and frequently photographed area, the site has great potential to effectively communicate sustainable landscape design to students and visitors. **Thousands of gallons** flow through the site during storm events, both above ground on a turf surface and below ground through drainage pipes. Little infiltration and filtration occurs however, creating **high levels of rainwater runoff**, which move quickly off-site to **Campus Creek**. The site was chosen to more successfully manage stormwater from the surrounding watersheds entering the site and to educate passersby about this proposed **pocket of sustainable design** on campus.

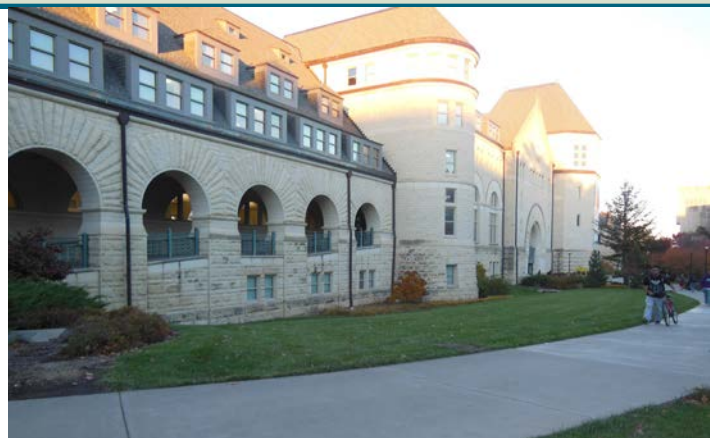
### *PROJECT GOAL*

The overall goal is to create a sustainable campus model for stormwater management and promote a future campus greenway network.

### *PROJECT OBJECTIVES*

- Communicate and educate stormwater management in an aesthetically pleasing, engaging way
- Use green infrastructure and native vegetation
- Hold stormwater on site and reduce runoff into Campus Creek
- Use biological water processes such as infiltration, filtration, evapotranspiration, and detention
- Enhance the prominence of Hale Library's front porch

**This site has so much potential. What a great opportunity to implement natural processes and green infrastructure!**

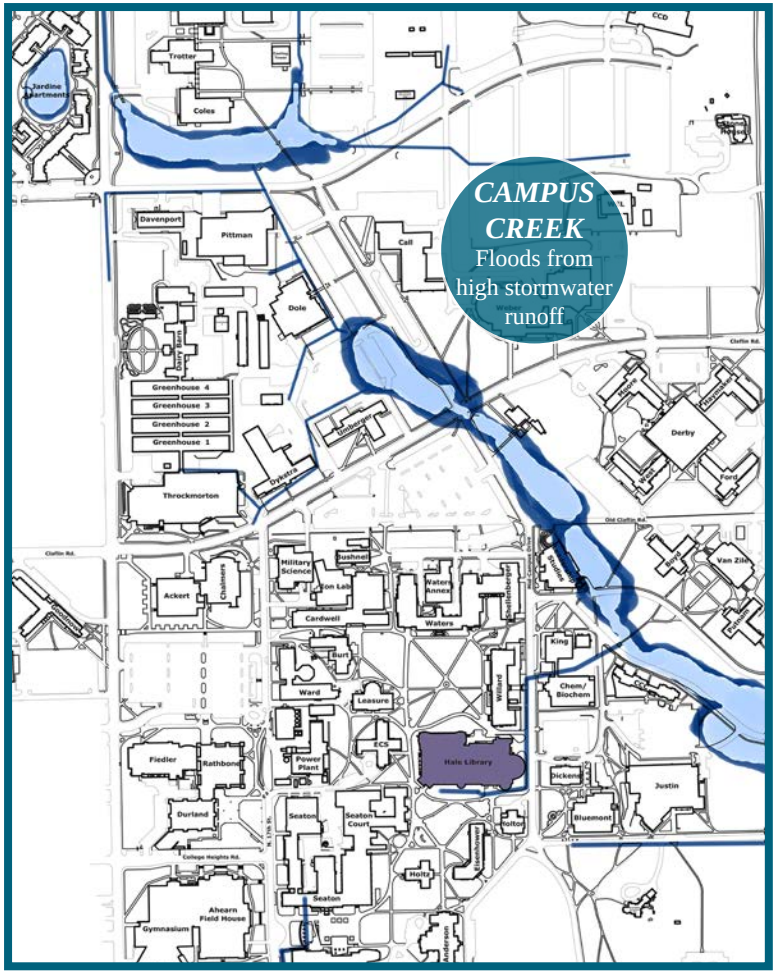


# Relationships

### *RELATIONSHIP TO CURRENT CAMPUS APPROACHES*

Engineering consultants have recently recommended a $5.1 million improvement of "deficient stormwater areas." The project would upsize underground pipe capacities, transfer water downstream at higher rates, and eliminate flooding on campus. To facilitate this large campus update, BG Consultants suggested more comprehensive low-impact development stormwater policies (Weathers, 2013). Kansas State University would clearly benefit from a series of infiltration gardens to reduce, detain, and filtrate rainwater from entering campus creek.

Sustainable management attempts have previously been made on campus to restore Campus Creek conditions at small scales. The International Student Center Rain Garden, implemented 2007, is a collaborative design-build project. The rain garden captures and infiltrates rooftop and surface runoff, while it also educates students, faculty, administrators, and campus visitors on low-impact stormwater management. Ultimately, the design restores the "natural hydrological cycle along the Campus Creek riparian corridor (ASLA, 2009)."




***Site Relationship to Campus Stormwater System***

Because campus creek often overflows during storm events, engineering plans are underway to expand underground pipe capacity and direct water more efficiently further downstream (Weathers, 2013).

### *CURRENT SITE RELATIONSHIP TO CAMPUS STORMWATER SYSTEM*

Most rainwater runoff from Coffman Commons and surrounding buildings flows into the low lying site. As the stormwater runs through the campus watershed, it picks up fertilizer, runs over sidewalks, and waterlogs turf on site. Runoff on sidewalks creates a safety hazard for pedestrians. Rainwater runoff also carries lawn chemicals and sidewalk salt to a drain inlet on the east side of the site and to campus creeks downstream, harming native wildlife habitat (Keane, 2013). Hale Library directs roof water through six downspouts, which immediately channel underground to the drain inlet. All water directed to the drain inlet on site continues east within an underground piping network to Campus Creek.

Conditions at Campus Creek consist of erosion and flooding due to unstable creek banks, a lack of riparian vegetation and root stability, and high volumes of rainwater runoff flowing through the system. A water quality assessment was done on the campus creek watershed in 2006. Base flow samples contained exceedingly high amounts of pollutants and caused concerns for students interacting with the water (Kansas WaterLINK).

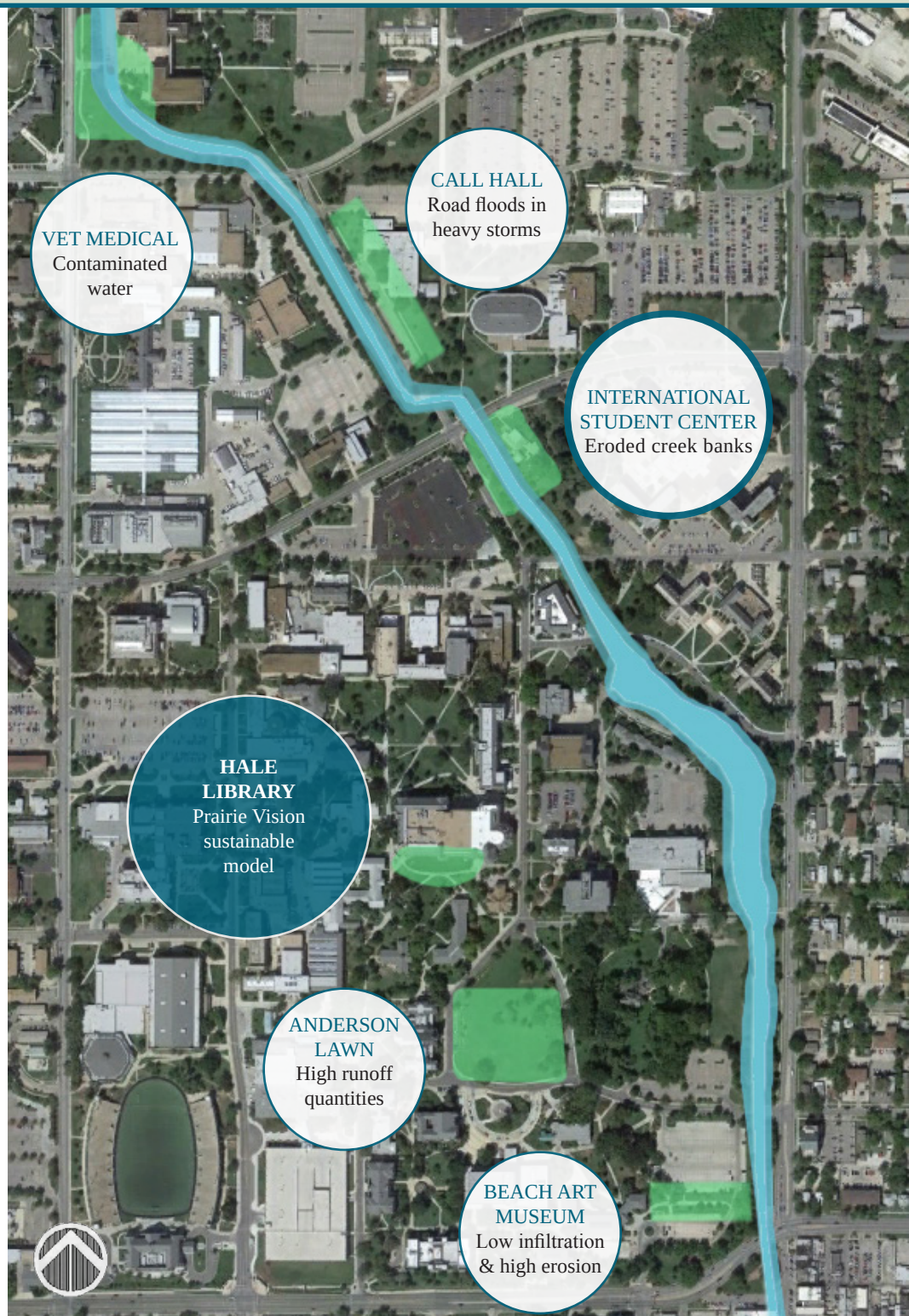
# Bigger Picture Connections

### *CORE CAMPUS OPPORTUNITIES*

The Campus RainWorks Challenge offers Kansas State University an opportunity to introduce resilient solutions and improve water management infrastructure within a prominent location on campus. Hydrological systems will be restored to their original state by using prairie vegetation and natural processes in an engineered environment. The appearance and stability of Campus Creek will be improved as many similar projects are inspired. Natural vegetation will allow the site to re-establish itself, visually accent the library, adapt to local ecosystems, and expose visitors to native concepts of green infrastructure.

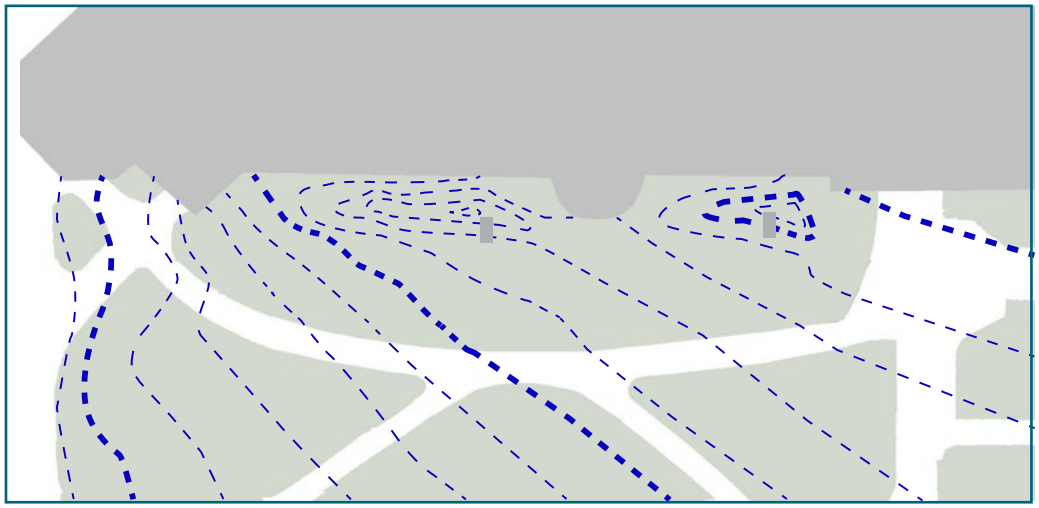
### *GREENWAY NETWORKS ON CAMPUS*

Following the example of the rain garden at the International Student Center, Prairie Vision will act as another link in creating a sustainable campus greenway network. By suggesting an ecological approach to design, campus will not only hold aesthetic value, but it will also offer biological, hydrological, and economical benefits. Although no single rain garden will dramatically reduce the deteriorating conditions at Campus Creek, a future network of sustainable rainwater systems will restore hydrological channels to healthy and functioning conditions. A stormwater pocket garden outside of Hale Library will create ideal spaces for "casual transit and recreation," will improve urban creeks, will educate through physical interaction with the site, and will promote "underutilized urban sectors (Fay Jones, 22)."



# Site Comparisons

***EXISTING SITE TOPOGRAPHY***



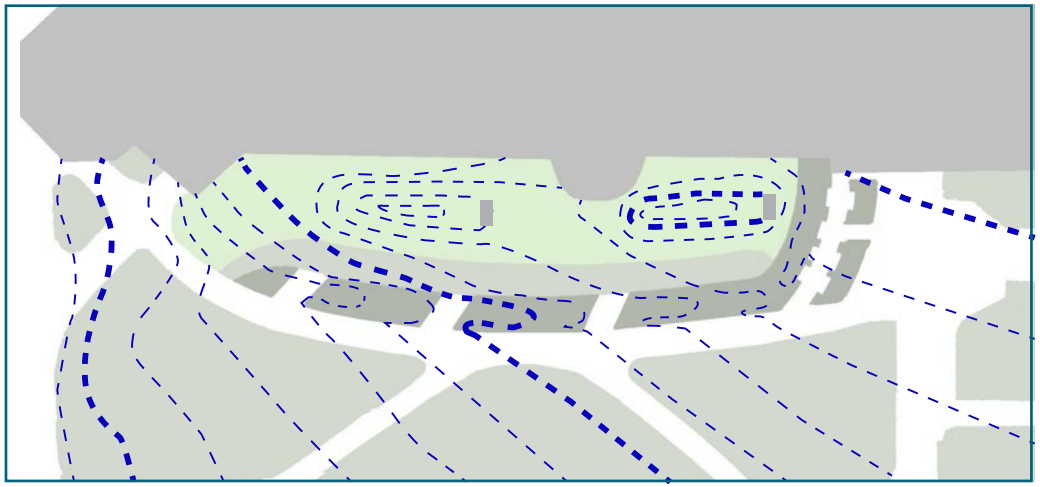
***EXISTING TOPOGRAPHY***

Between the south sidewalk and the north library facade, the site currently forms two depressions. The turf easily floods and washes towards the structure, however there are no current seepage problems in the library basement. The site drops four feet from sidewalk to structure with a two feet deeper depression about ten feet from the building. Topography rises towards the center of the entire site, where the building extends outward

***EXISTING SOILS***

Topsoil on site reaches six foot deep with an unknown subsoil depth. Further south within the Coffman Quadrangle, topsoil reaches a depth of twelve feet. All topsoil within the quadrangle comprises of Smolan silt loam is moderately well drained (USDA, 2013). Denison Hall once stood where the south quadrangle now spans, suggesting soil compaction during the 1980's building demolition and library expansion (Brokesh, 2013).

***PROPOSED SITE TOPOGRAPHY***



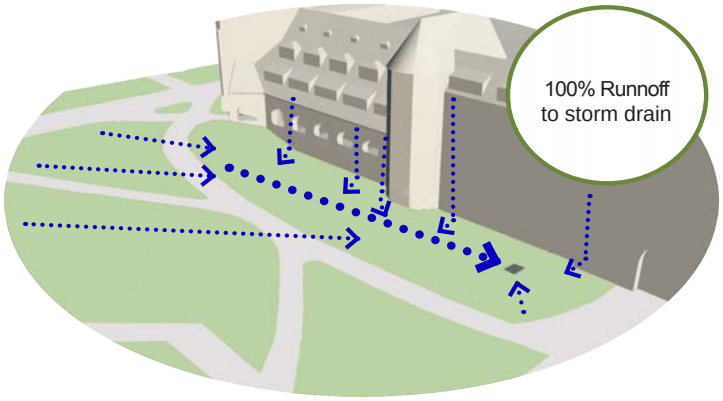
***PROPOSED TOPOGRAPHY***

New smaller one foot depressions will be made within the proposed butterfly rain gardens. The larger depression basins will be moved further away from the building. The basins will also be widened to hold more water and reduce scalping of the topsoil slopes by mowers.

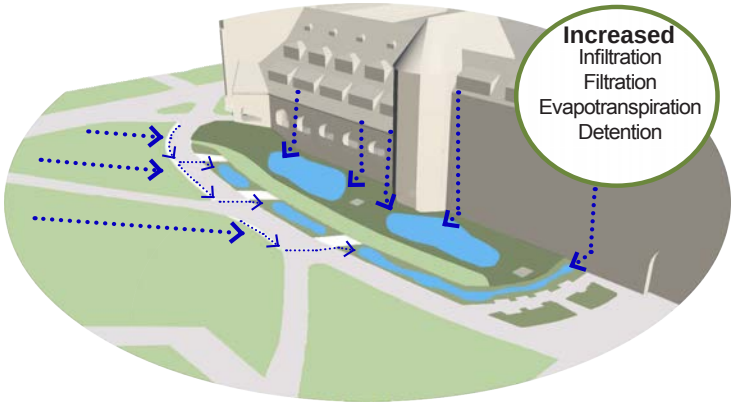
***PROPOSED SOILS***

Based on an infiltration rate of .3 -.5 inches per hour for Smolan silt loam and the expected peak flows, the existing soil will be reused for the new project (Design infiltration rates, 2013) (USDA, 1990).

***EXISTING WATER DRAINAGE***




***PROPOSED WATER DRAINAGE***




| Peak Flows for Individual Areas and 10-yr Storm | | | | |
|---|---|---|---|---|
| **Location** | **Pervious Area (Ac)** | **Impervious Area (Ac)** | **$Q_{PEAK}$ (cfs)** | **$V_{PEAK}$ ($ft^3$)** |
| SW Corner | 0.15 | - | 0.35 | 880.81 |
| South Section | 0.14 | - | 0.34 | 856.96 |
| North Half | 0.28 | - | 0.66 | 1,658.80 |
| Roof | - | 0.11 | 0.66 | 1,646.97 |
| Western Sidewalk | - | 0.03 | 0.17 | 433.36 |
| Eastern Sidewalk | - | 0.02 | 0.12 | 300.80 |
| **Total** | **0.57** | **0.15** | **2.31** | **5,777.69** |

| Peak Flows for Entire Area | | | | | |
|---|---|---|---|---|---|
| **Storm Design (yr)** | **Intensity (in/hr)** | **$Q_{PEAK}$ (cfs)** | **Cumulative Rainfall (in)** | **$t_D$ (s)** | **$V_{PEAK}$ ($ft^3$)** |
| 1 | 4.63 | 1.47 | 2.64 | 2052.70 | 3,026.41 |
| 2 | 5.40 | 1.72 | 3.36 | 2240.00 | 3,851.79 |
| 5 | 6.48 | 2.06 | 4.32 | 2400.00 | 4,952.31 |
| 10 | 7.26 | 2.31 | 5.04 | 2499.17 | 5,777.69 |
| 25 | 8.41 | 2.68 | 5.76 | 2465.64 | 6,603.08 |
| 50 | 9.31 | 2.96 | 6.48 | 2505.69 | 7,428.46 |
| 100 | 10.20 | 3.25 | 7.21 | 2544.71 | 8,265.31 |

The new design retains 100% of the stormwater from a one year storm or approximately 22,700 gallons (3,026.41 $ft^3$). In a ten year storm, the new design retains 65% of stormwater or approximately 43,200 gallons (5.777.69 $ft^3$).

Left: The chart shows the process for calculating potential storm water flow for a one year storm. Each location has calculations showing the peak flow, feeding into the Prairie Vision site. Total peak flows for each year are used to calculate the peak flows for the entire area. Calculations were done using the Modified Rational Method and Manning's Method.

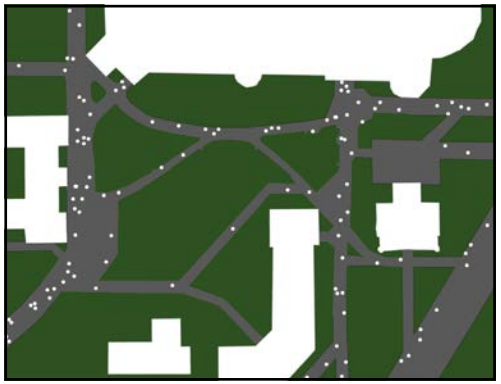
Left: Chart shows total peak flows for all contributing areas based on major storm event years. Highlighted portions indicate year storms for which the design was intended to manage.

Below: All intensity and rainfall values were acquired from the City of Manhattan, KS.

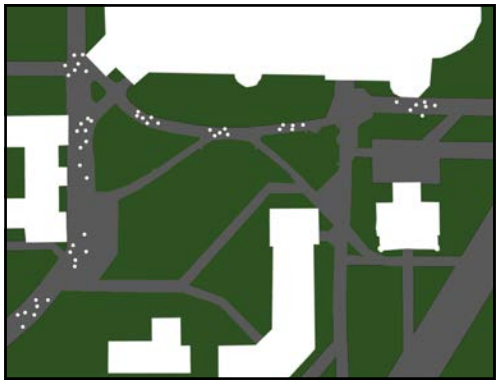
| **Area** | **C** | **CA** |
|---|---|---|
| Impervious | 0.85 | 0.13 |
| Pervious | 0.33 | 0.19 |
| **∑CA** | | **0.32** |

# Pedestrian Analysis

*Movies on the Lawn*



*Passing Period*



*Tour Groups*

***RELATIONSHIP TO USERS ON SITE***

Both entries into Hale Library sit adjacent to the outdoor site. Although no pedestrians enter the site on a regular basis, hundreds of visitors pass the site at two primary points on an hourly basis. User data was twice recorded at the two entrances in thirty minute passing periods on November 19th, 2013. The library's primary entrance, located at the west edge of the site, sees about fifty less passersby than the secondary library entrance, oppositely located to the east of the site. Users primarily pass the site on foot and occasionally stop to converse. Bicyclists are the second most users, followed by skateboarders and maintenance vehicles.

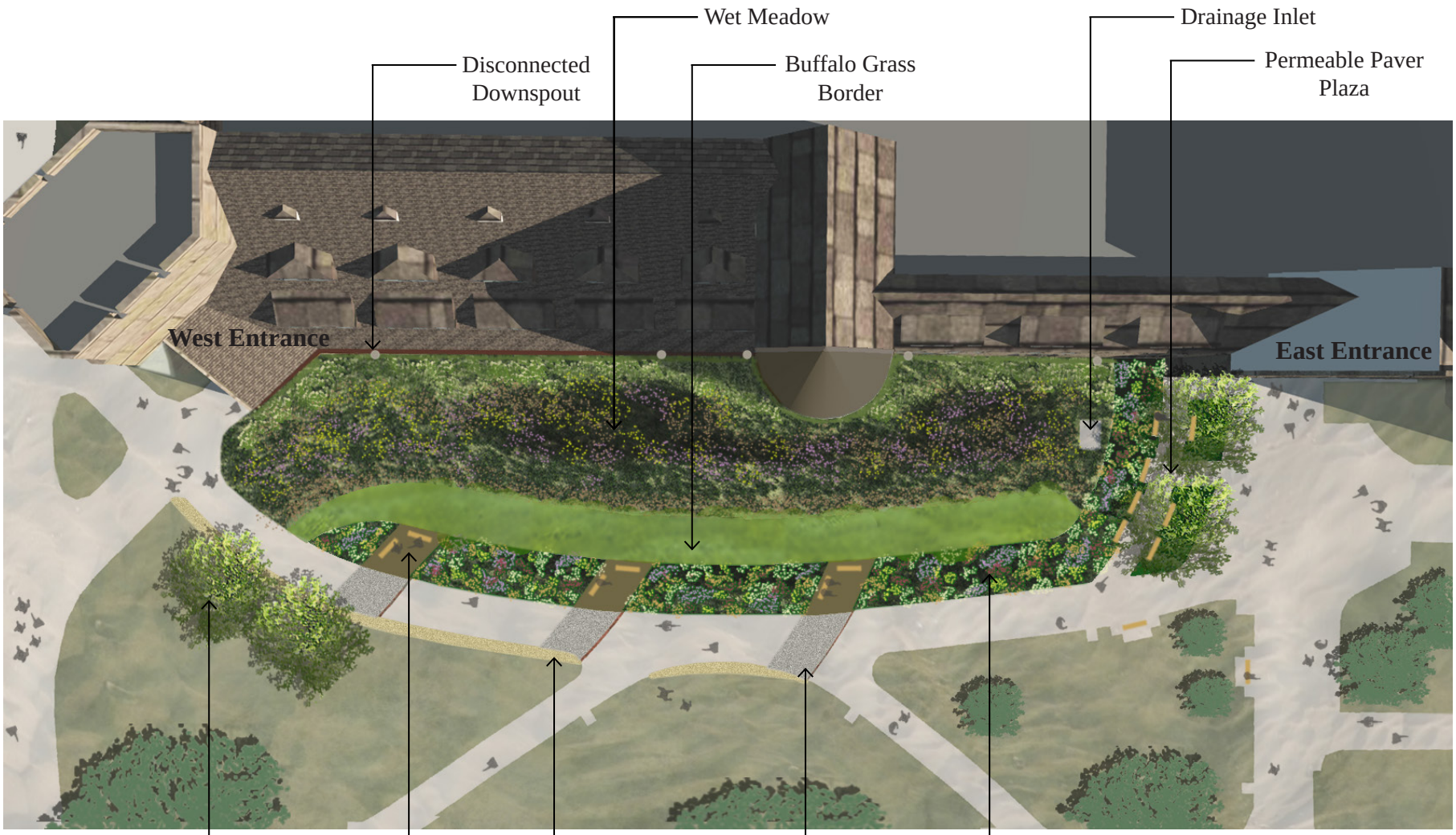
A ten foot wide sidewalk serves as a maintenance drive. During warm weather, Coffman Commons directly south of the site serves as a seating lawn for student recreation films. Minimal seating and conversational spaces force visitors to travel further distances to sit and to block sidewalk traffic when stopping to converse.

***EDUCATIONAL PURPOSE***

Given the high traffic passing the location, the design will take an educational approach to inform a high number of viewers. Education will focus on low impact development through the use and explanation of design techniques. Educational design features will include water filtration systems, decreased lawn space, permeable paving, native plantings, shaded hardscape, and bioretention areas. The proposed design will serve as a sustainable model for further campus landscapes and will communicate the potential for sustainability at the small scale. The site will encourage users to learn and implement sustainable design on a local level.

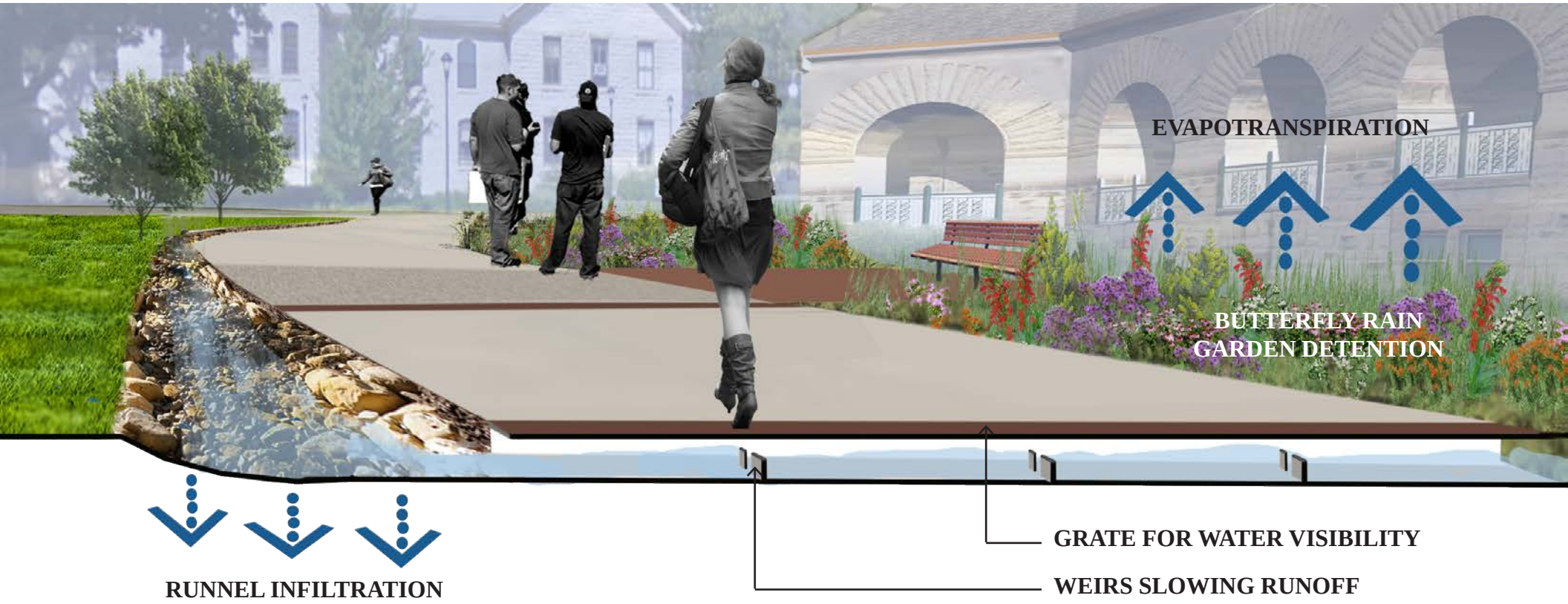
**Such a prominent location on campus. I walk by it everyday with my friends!**

# Hale Library Site Plan



# Re-establishing natural water Processes

***COBBLE RUNNEL & BUTTERFLY RAIN GARDEN WATER PROCESS***




**Visible water processes! It will show users how a natural prairie ecosystem handles stormwater.**

*DISCONNECTED DOWNSPOUT WITH LIMESTONE LEVEL SPREADER*

### *DISCONNECTING DOWNSPOUTS & DAYLIGHTING WATER RUNOFF*

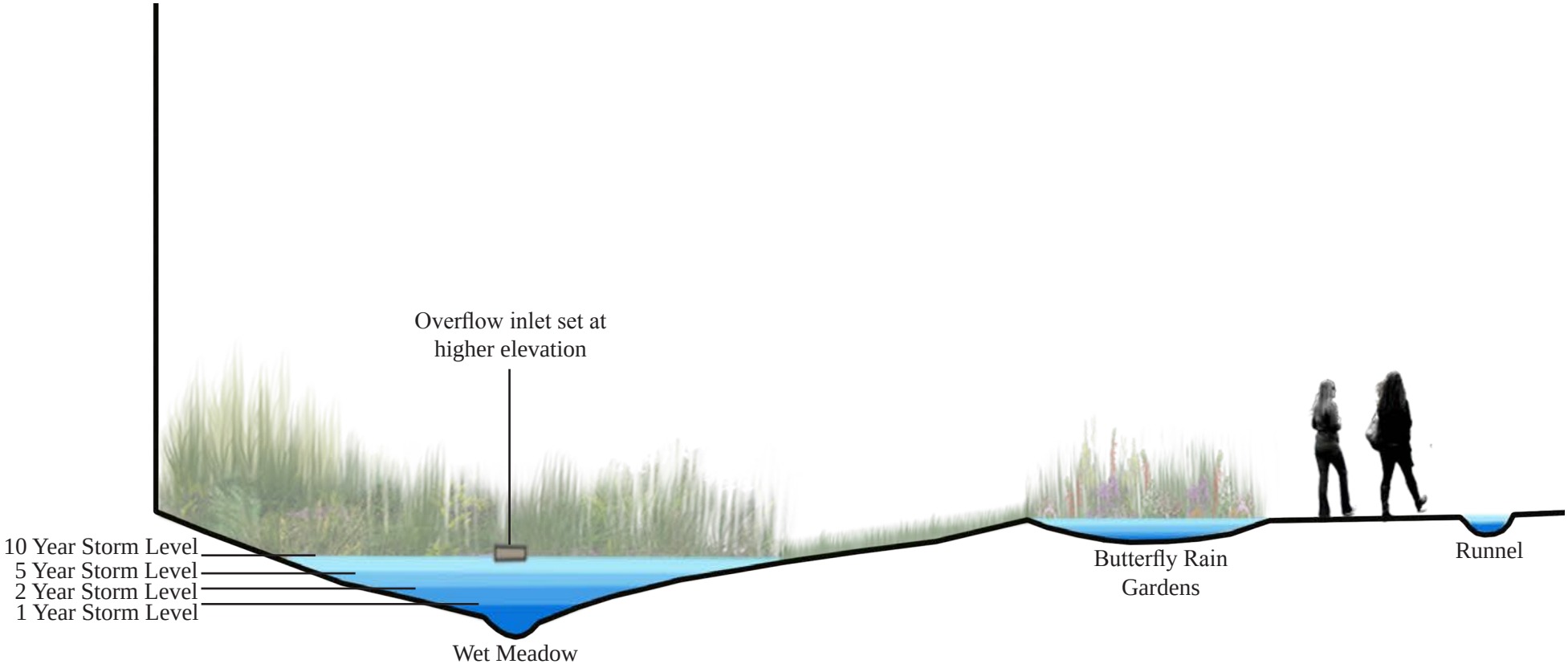
On-site techniques to slow rainwater will further the implementation of low-impact development and will decrease the concentrated discharges to stormwater inlets. Downspouts will open to a level spreader on the ground surface, rather than channel directly underground and enter the campus stormwater system. Water in the new design will now flow into one of two wet meadow pockets away from the building facade. Water slows, recharges the soil, and absorbs into the added native plant material.

The designed hydrological system will facilitate water in up to a ten year storm. The amount of rainwater from an average yearly storm will flow into the open stormwater runnel and wet meadows without overflowing them. The runnel and grate system will keep rainwater from running over the sidewalks. In the event of a ten year storm, water will fill the runnel and the butterfly rain gardens to the brim with little overflowing. An overflow drain set at a higher elevation within the meadow depressions will absorb overflow volumes and direct them downstream to the east end drain inlet and later to Campus Creek.

The proposed wet meadows, planting beds, and stormwater runnels will infiltrate, slow, and retain rainwater through a system of native vegetation, level spreaders, weirs, and aggregate to help minimize the excessive amounts of stormwater runoff into Campus Creek.

**Hey cool! Now most water will remain on the site instead of funneling down and causing problems at Campus Creek!**

# Designed Storm levels



# Preserved & Proposed Vegetation

***EXISTING VEGETATION ON SITE***

Existing vegetation on-site follows campus quadrangle guidelines. Traditional elements of lawn and trees dominate the manicured landscape. Shrubs serve as secondary design elements (Landscape Design Guidelines, 2012). No native vegetation existing on-site, and the pampas grass, honeysuckle, and lily turf may be considered invasive. Plants are in fair to good condition, yet the only mature tree, a Douglas fir, is nearly dead. Two memorial trees, red maple and red oak, were recently planted on each end of the site.

***PRAIRIE ECOSYSTEM PROPOSAL***

The proposed vegetation design will reflect natural Kansas prairie ecosystems. All non-native vegetation will be removed, and the two memorial trees will be transplanted on the southwest side of the sidewalk. Two wet meadow basins hold grass and forb species, which will create a biodiverse ecosystem and grow more biomass for evapotranspiration to occur. The design proposes native plantings to better regionally adapt, attract more pollinator wildlife, require lower maintenance after vegetation establishment, and restore natural Kansas ecosystems.

Tall grass species naturally dominate prairie ecosystems and create dense massings, which minimize weed growth and soil erosion. Native grass massings also provide protection for flowering forbs and wildlife. Using taller, more mesic to dry prairie plantings near the library facade will create an ecotone buffer and reflect natural changes in prairie ecosystems. As elevation changes, amounts of water availability would naturally alter vegetation types (Lady Bird Johnson Wildflower Center, 2).

# Planting Palette

***WET MEADOW***

***BORDERING THE BUILDING BASE***


Prairie Willow


American Plum


Redtwig Dogwood

***TRANSITION EDGES***


Side Oats Grama

***THROUGHOUT ENTIRE MEADOW***


Switch Grass


Little Blue Stem


Prairie Dropseed


New England Aster


Goldenrod


Indian Grass

***IN BASIN LOW SPOTS***


Cord Grass


Swamp Milkweed


Tussock Sedge

Additional vegetative masses will retain more water, allow more evapotranspiration, and lessen water entering storm drain systems. Restoring tallgrass prairies promotes evapotranspiration, the process of water moving through plant roots, up stem systems, and into the atmosphere though evaporation. The combination of roots and soil also increases carbon sequestration. Wet meadow basins will detain water for a short time until overflowing into the storm drain. The butterfly rain gardens will provide a similar effect, slowing and filtering overflow from surrounding watersheds.

The wet meadows will hold native grasses, such as switch grass, cord grass, side oats grama, and little blue stem. New England aster, swamp milkweed, and various sedges will grow in lower meadow elevations to tolerate wetter soils and to provide protected wildlife habitats. Along the library perimeter, lower vegetation transitions into taller shrubs, such as redtwig dogwood, American plum, and prairie willow to add texture, color, and diversity (Collins 2012). Taller plantings will reduce the large vertical scale of Hale Library.

## *BUTTERFLY RAIN GARDENS & BUFFALO GRASS BORDER*


Purple Coneflower


New England Aster


Wild Bergamot


Cardinal Flower


Common Boneset


Goldenrod


Butterfly Milkweed


Prairie Dropseed

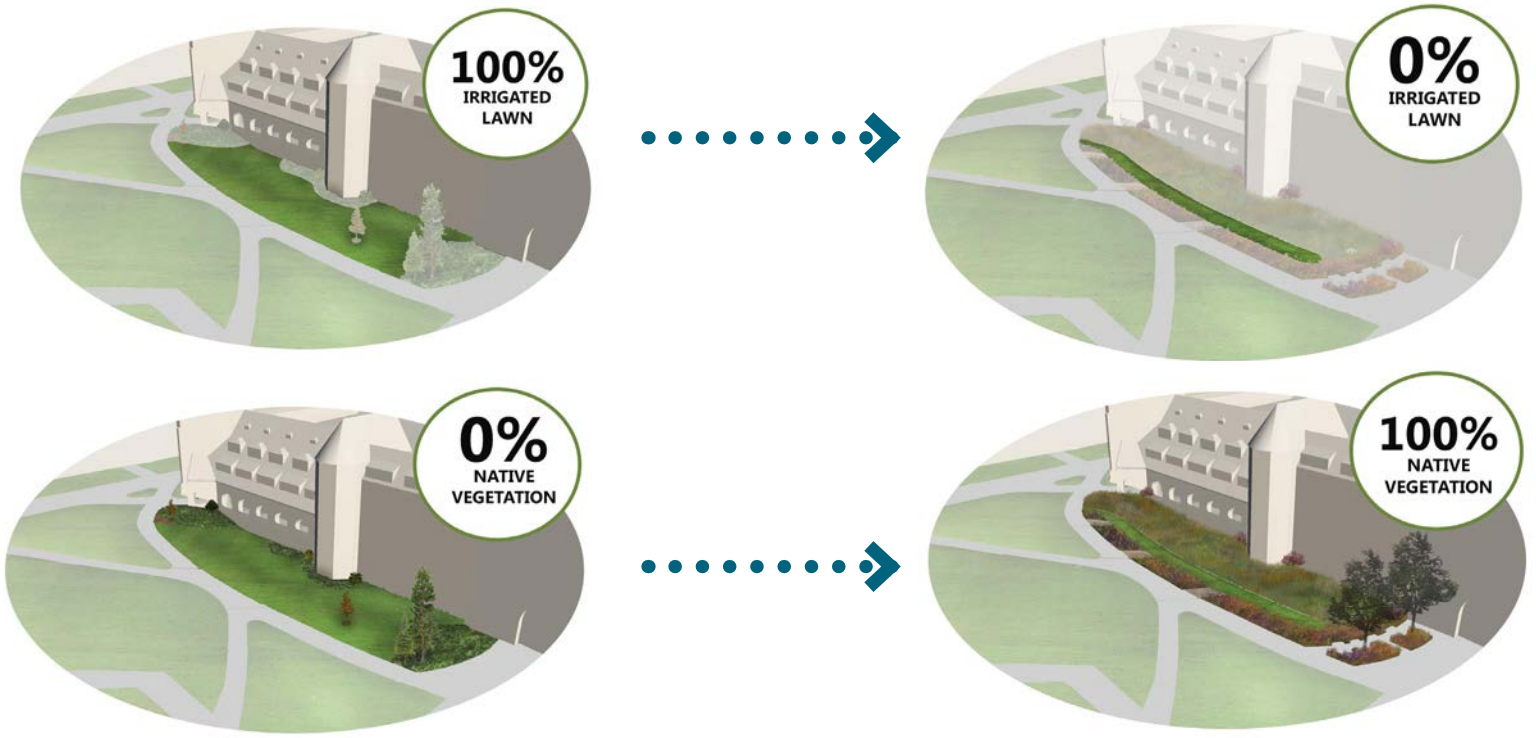

Buffalo Grass

Lawn space will provide a visual break between wet meadows and butterfly rain gardens. Native buffalo grass will minimize erosion on steeper slopes, where water will flow over during 100 year storm events and will need minimal maintenance.

Native forbs, such as goldenrod, cardinal flower, common boneset, butterfly milkweed, and New England aster will dominate butterfly rain gardens. Insects and butterflies will find habitats in these beds, where people can observe from seats nearby. Some species, such as milkweed, will provide a specific habitat for insects such as monarch butterflies (Taylor Creek Restoration Nurseries 2010).

# Landscape performance benefits

***EXISTING VEGETATION*** ***PROPOSED VEGETATION***



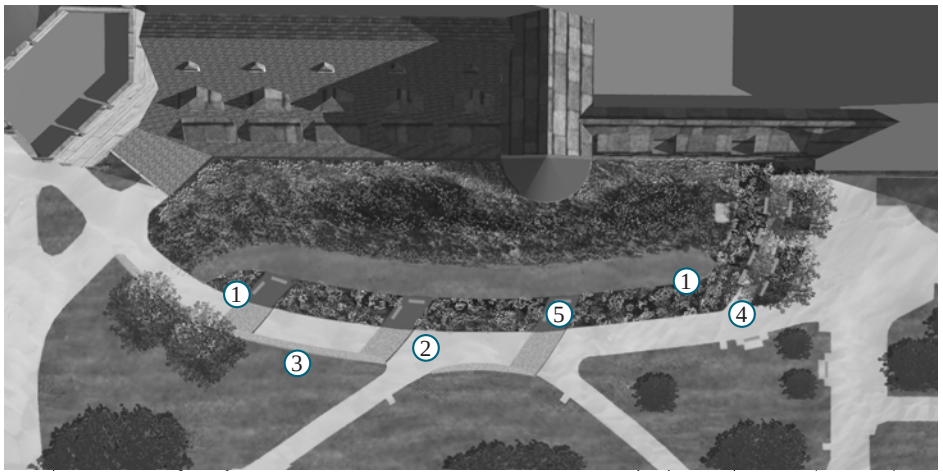

***SIGNIFICANT OVERALL BENEFITS***

- Restores a total of **9,147.60 ft2. (0.21 acres) of native vegetation** including prairie grasses and forbs found in the Flint Hills region
- Retains **100% of the stormwater** from a one year storm, or approximately **24,000 gallons.** In a ten year storm, **65% of stormwater** is retained, or approximately **45,900 gallons.**
- Removes **303.5 $ft^2$ of impervious concrete** to make way for two new planting beds and a **permeable paver** seating plaza totaling **870.5 $ft^2$** adjacent to the east entrance
- Removes **12,500 $ft^2$** of irrigated lawn, reducing water consumption and minimizing motorized maintenance
- Provides a new outdoor **amenity** for the more than **24,000 students, faculty and staff** of Kansas State University and the greater community
- Promotes **environmental awareness and stewardship** by exposing campus users to a site scale example of green infrastructure

# MATERIALITY

Material choices will preserve the overall campus design style and color scheme as well as keep costs down. The seating nooks will be constructed of composite decking for longevity of life and durability. Material color scheme will accent the local building construction. The runnel south of the sidewalk will be lined with steel edging. This will lower labor and material costs. Local cobble will line the runnel basin for ornamental and functional purposes to create a larger water storage area on-site.

***MATERIAL LOCATIONS***




1 Benches follow the typical design of Kansas State benches but will be made of recycled material. They will be similar in color to limestone to blend more seamlessly with surrounding architecture.

2 Steel grates will have a flowing water design. Color will be of a rusted color to stand out from the pavement.

3 Rock will be local recycled limestone to enhance the existing building material. Boulders will accent points throughout the system to showcase water. Cobble will be used to infiltrate water.

4 Permeable interlocking concrete pavers on a gravel sub-base will be used for the seating plaza, adjacent to the east library entrance. These can be easily replaced and will infiltrate water in an impervious space.

5 Composite decking will be used in seating nooks. Composite decking has a long life and is resistant to decay and warping. Pressure treated pine will be used for the posts and joists due to its strength and resistance to decay.

6 Steel edging will border the runnels and butterfly rain gardens. This durable and inexpensive material will clearly delineate and separate spaces.

# Feasibility Costs

### *CAPITAL COSTS*

Our goal is to keep all construction costs under $30,000. Apart from labor costs, the largest estimated cost will be plant material. All vegetation will be replaced with native plantings. Permeable pavers in the plaza and decking for the seating nooks will be the next largest cost.

### *POTENTIAL FUNDING RESOURCES*

In addition to funding provided by different grants and loans, the costs for the Prairie Vision garden could be partially funded through donor pavers. These permeable pavers could be implemented where seating is located near the east entrance of Hale Library.

Much of the proposed project also could be funded by Dr. James R. Coffman, a faculty member of Kansas State's Department of Surgery and Medicine and Department of Animal Sciences and Industry, for whom the surrounding quadrangle was originally named (Kansas State University, 2013).

**Hot dang! Just over a year's tuition! This design is affordable AND resilient!**

### *COST ESTIMATION*

| Location | Material | Unit | Quantity | Cost |
|---|---|---|---|---|
| **Butterfly Rain Garden** | | | | |
| | Rock | cuyd | 6 @ $100/cuyd | $600 |
| | Channel Rock | cuyd | 6.5 @ $100/cuyd | $650 |
| | Boulders | pound | 500 lbs @ $.50/lb | $250 |
| | Butterfly Shrubs | Individual | 40 | $1,000 |
| | Butterfly Flowers | Individual | 80 | $500 |
| | Butterfly Grasses | Individual | 80 | $750 |
| | Butterfly Edging | 8 LF | 21 | $210 |
| | Channel Edging | 8 LF | 16 | $160 |
| | | | | **$4,120** |
| **Wet Meadow** | | | | |
| | Meadow Seed Mix | Pounds | 2 | $150 |
| | Meadow Trees | Individual | 10 | $1,500 |
| | Meadow Shrubs | Individual | 20 | $500 |
| | Boulders | Pound | 600 lbs @ $.50/lb | $300 |
| | | | | **$2,450** |
| **Seating Nooks (x3)** | | | | |
| | Decking | 16 LF/board | 72 | $2,900 |
| | Joists | 16 LF/board | 9 | $180 |
| | Facia | 16 LF/board | 9 | $180 |
| | Posts | 8 LF/board | 3 | $30 |
| | Hardware | | | $250 |
| | Benches | Individual | 6 | $1,500 |
| | Storm Grate | Individual | 3 | $1,500 |
| | | | | **$6,540** |
| **Paver** | | | | |
| | Paver Installation* | $8.00/per SF installed | 520 | $4,200 |
| | Benches | Individual | 7 | $1,750 |
| | | | | **$5,950** |
| **Labor** | | | | |
| | | | | |
| | 5 Man Crew | Hours | 80 | $6,000 |
| | Grading | SY | 1500 | $1,500 |
| | Equipment Rental | Days | 2 | $600 |
| | | | | **$8,100** |
| | | | | |
| | | **Totals** | Materials | $13,110 |
| | | | Pavers | $5,950 |
| | | | Labor | $8,100 |
| | | | **Total** | **$27,160** |

# Maintenance

***WET MEADOW***

The wet meadow, being comprised of native grasses and forbs, will be relatively maintenance free. Annual mowing will take place in late fall, and raking will remove cut material to keep the area clean. After vegetation establishment, seed top dressing will take place as necessary to keep the meadow full and lush using competition to help keep out weeds.

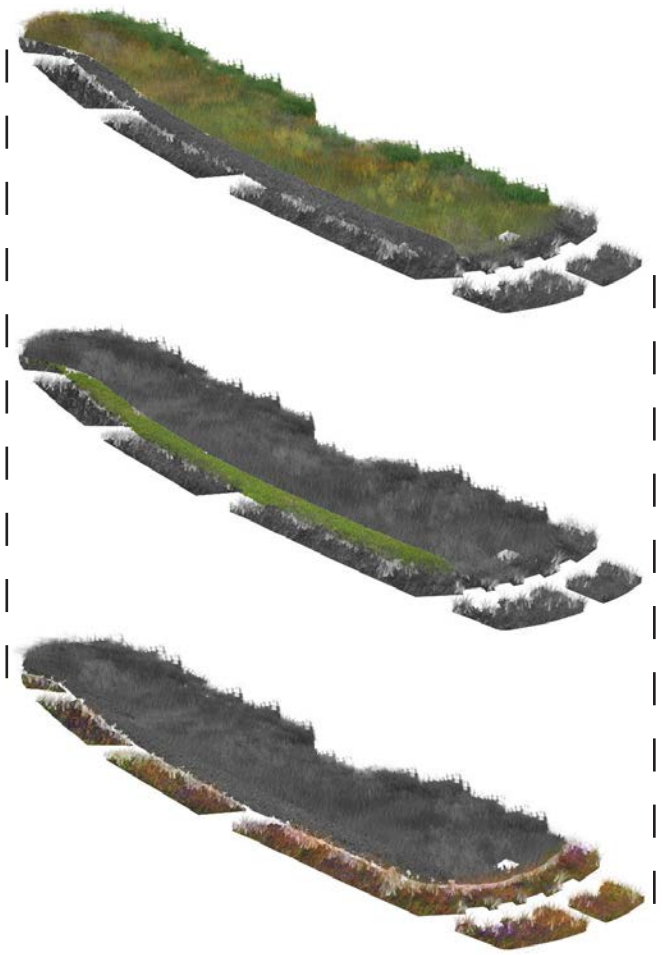
***BUFFALO GRASS BORDER***

Existing manicured lawn will be replaced with buffalo grass (Bouteloua dactyloides). This will cut down on weekly maintenance needs of the Prairie Vision site. Monthly cutting will keep the space in a more manicured state to allow campus visitors and guests a possible place to walk.

***BUTTERFLY RAIN GARDENS***

Butterfly rain gardens will be mostly native forbs and will be mostly maintenance free. More weeding will be required than the other two spaces. Bi-weekly checks will be made through the site by maintenance personnel to keep weeds at a minimum.

Pest management plan for the area will be consistent with the existing plan implemented at Kansas State University.



# Conclusion

The design at Hale Library offers a resilient and affordable solution for improving stormwater management at Kansas State University. By re-establishing Hale Library's water infrastructure system back to its original prairie state, the design will improve water quality by effectively detaining and treating stormwater runoff on-site through the use of native vegetation. Future problems at Campus Creek, such as erosion, flooding, and contamination will be prevented. The new green infrastructure system will serve as an artful amenity, instilling native Kansas ecosystems. The site's prominent location on campus will allow it to serve an educational purpose for members and visitors. It will ultimately serve as another stepping stone for Kansas State University to link a future series of sustainable stormwater management systems across campus.

**What a great model for future green infrastructure on the Kansas State University campus!**

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# Pioneer Lane Sidewalk North Side between Manhattan Ave. & McCain Lane


The safety of K-State students, staff and visitors continues to be a top priority for City University Funds. This request is to assist with sidewalk improvements along the north side of Pioneer Lane from Manhattan Ave. to McCain Lane. This route from campus is used by hundreds of students that live in the residence hall, Greek houses, and apartment complexes located in a close proximity to this sidewalk. Currently there is not a sidewalk provided and many pedestrians chose to walk on the street. Our proposal is to build a sidewalk along the north side of the street to offer a much safer alternative than what is currently available.

## Pam Warren

**From:** Peter Clark <clarkp@cityofmhk.com>
**Sent:** Wednesday, September 30, 2015 5:30 PM
**To:** Pam Warren
**Cc:** Kiel Mangus; Robert Ott; Brian Johnson; Gayle Donaldson; Eric Fitzsimmons
**Subject:** Denison and N. Manhattan Pedestrian Crossings

Pam,

As per our phone discussion, my first recommendation would be to have a traffic engineering study for these two corridors to look at the traffic and pedestrian volumes and accident patterns, analyze the level of service and safety that is currently there, and explore a couple of potential alternatives while also taking into account the future traffic and pedestrian volumes that we will likely see over the next 20 years. I anticipate that this type of study could cost anywhere from $30-50k.

I know that you are very interested in the pedestrian traffic signal options as a replacement for the warning beacons that we have now, and those are definitely one of the systems that could be considered. Though each location is unique, and the costs would vary, I would say that a system such as the one at the Goodnow Hall crossing and Denison, which does not actuate for a side street, but for pedestrians only, is likely to cost in the $75k range. This is much more expensive than what was paid for the current warning beacon systems, that cost approximately $10k each. A full traffic signal for an intersection with cars on a side street, similar to what was done at Platt and Denison, is much more expensive, likely in the $150-200k range, and that is if no major geometric work is needed to change sidewalk or curbs.

I highly encourage that the study be done first and foremost, to determine what the best solution is, and then base any further expenditures on those recommendations. I know that Dr. Fitzsimmons in the Civil Engineering Department would likely be very interested in assisting in such a study, and has the necessary data collection equipment and expertise to make this happen. It could save quite a bit of money, but I do not know what his schedule is, or workload.

**Peter Clark, P.E., PTOE**
Civil Design/Traffic Engineer - 785.587.4590 - clarkp@cityofmhk.com

City of Manhattan Kansas

City of Manhattan Traffic Division
Bike Manhattan
www.kautc.org

# Bike Repair Stations at Cardwell Hall and Hale Library

The City/University Projects Fund has provided resources in the past which have greatly improved the bicycling environment for the Manhattan community and Kansas State University. In recent years we have seen growth in the number of bicycles traveling in to and from our campus. It is inevitable that bikes break down or have flats. Therefore, we are requesting support to provide additional bike repair stations at two popular locations on campus. These stations will benefit those who currently ride bikes and encourage additional members of our community to consider bicycles as a convenient method of transportation to and from campus.