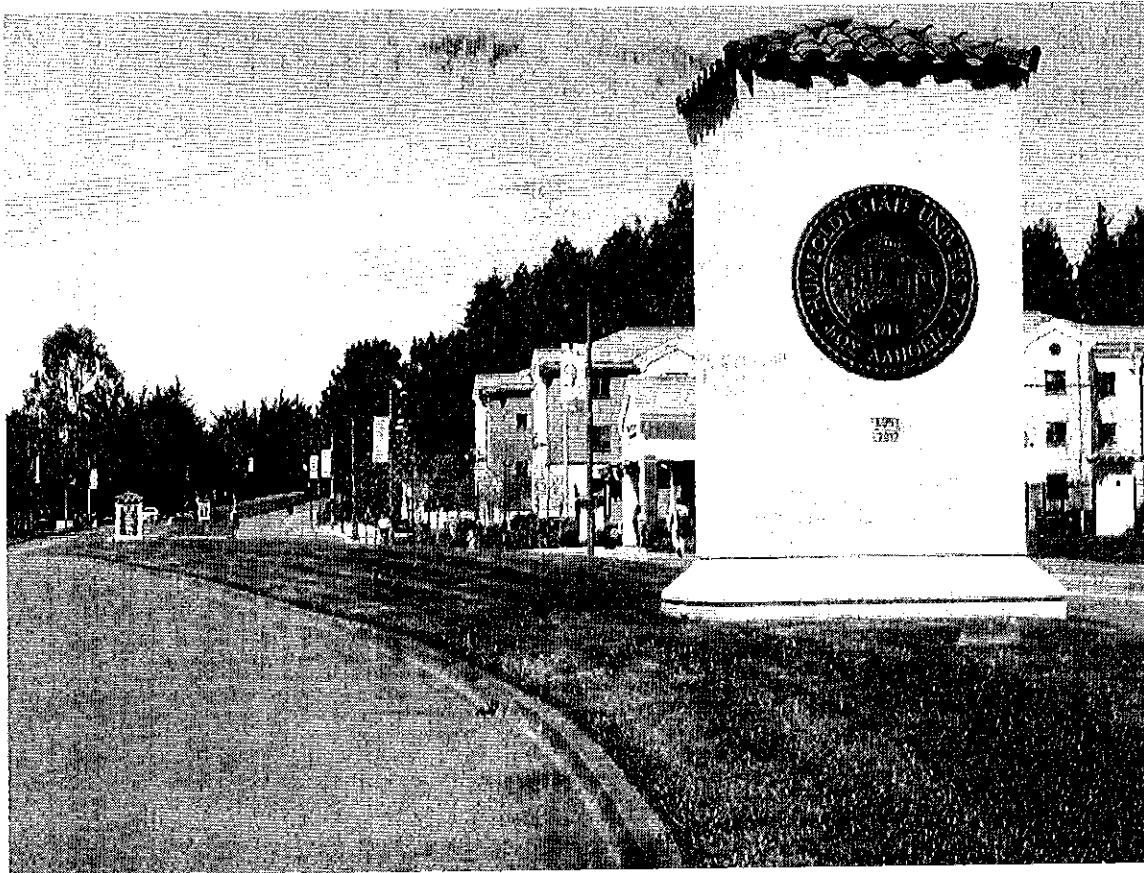


**Improving the LK Wood Boulevard Median Landscaping  
To Promote Sustainability at Humboldt State University**



**ENVS 411: Sustainable Campus**

**Humboldt State University**

**Spring 2012**

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## Problem Statement (Issues/History)

Humboldt State University's current landscaping methods along the LK Wood Boulevard medians is an inefficient use of campus resources and space. Humboldt State University (HSU) prides itself for taking steps towards being a more energy efficient and ecologically centered campus. In recent years HSU has tried to implement both systematic as well as selective methods in maintaining the campus as a whole in an effort to become sustainable. A necessary step towards making HSU sustainable is to address the problem of resource use with chosen landscaping and existing landscaping on campus. These resources include the allocation of funds, the chosen vegetation, fuel, water, and fertilizer. Among the many concerns are water usage, maintenance costs, and aesthetic appeal both to students and Arcata's community members. The "CSU is also committed to promoting the continued economic and ecological viability of the State" while promoting responsibility and increased efficiency in resource use and management (CSU 2001). As a part of the CSU system and through finding new and more efficient methods in promoting sustainability Humboldt State University can be a more enjoyable place to visit and can become a leader for other campuses to follow.



Figure 1. LK Wood Boulevard medians facing south; close-up of current turf grass species which includes species from the acquired seed mix along with buttercup, clover, and moss.

Our group chose to focus on the issue of the LK Wood Boulevard medians running along the most western length of the campus. These medians are very visible to the public and community and we believe that they communicate a strong message for what Humboldt State stands for in terms of sustainability. As it currently stands the medians along LK Wood Blvd are open strips of lawn. The medians are composed of 60 percent cool-season Manhattan Perennial Ryegrass, *Lolium perenne* and 40 percent Creeping Red Fescue, *Festuca rubra* L. Manhattan perennial ryegrass is a commonly used turf grass that does well in the Pacific Northwest climates. It requires four to eight pounds of nitrogen application per 1000 square feet, which is more than most other turf grasses (OSU 2009). Creeping Red Fescue is another commonly used turf grass suitable to the Pacific Northwest climates. It requires one to two pounds of nitrogen fertilizer per 1000 square feet during the growing season (UC IPM 2011).

Deciduous trees lined the medians prior to a remodeling of the campus in the mid-2000s. When the trees were removed much of the surrounding community and campus community (including campus employees) objected (Scott-Goforth 2011). The replacement of these trees with grass may not have been the most efficient option for the medians. One of the current goals in the HSU master plan is to, "Bring the Forest environment into the campus" (HSU 2004). Visual schematics of the campus in the master plan show the introduction of trees throughout campus but it does not seem to include the LK Wood Boulevard medians. For this report trees will not be considered as an alternative to grass because of safety and maintenance concerns.

For six months out of the year the LK Wood medians are "watered 20 minutes every other day" (Mann 2012). If trees were planted in the medians they would only need one-inch of rain every 7-10 days (Trier 2011). HSU has implemented some efforts to minimize water usage. Areas of campus that are in need of watering at a greater frequency than others are monitored to minimize over watering (Green Scene 2012). Other water conservation practices include drip irrigation, conversion of lawn areas to mulch and shrubs, planting other more water efficient grasses, and putting in shrubbery and other landscaping features to help reduce the need for additional water (Sustainable2ndCentury 2011). Over-watering along the medians has often produced pools of water that can be found along the edges and have been known to spill over onto the pavement creating additional hazards for motorists, cyclists, and pedestrians (Grange 2011). This may simply be a result of unnecessary irrigation amounts and timing.

While HSU is located in a region that has a consistent source of water and a temperate climate where it rains during a significant portion of the year, it is also located in the City of Arcata, a city that is a pioneer in resource management and conservation. Both the City and region surrounding HSU have emphasized using sustainable practices and the efficient use of resources. We as a group feel that HSU's current management practices along the medians could be improved upon to conserve resources, thereby taking a necessary step towards sustainability and creating an influential example for future landscaping projects on-campus.

### **Goals and Objectives**

- Determine the economic and environmental impact of the LK Wood Blvd medians.
  - 1) Determine by April 5th, 2012, the resource and water consumption pertaining to no-mow grass "fine" fescue species and other no-mow grass alternatives compared to the current turf grass being used in the medians along LK Wood Blvd.
  - 2) Compare labor costs for no-mow and current grasses by April 5th, 2012.
  - 3) Determine and compare CO2 emissions that are emitted, per year, for the current seed mix and the no-mow alternative.
- Reduce monetary expenditures for the medians along LK Wood Blvd (both labor and fertilizer/fuel) through the future implementation of an alternative.
- Determine the feasibility of landscaping the medians along LK Wood Blvd with low-impact, resource efficient, native plant species.
- Make the medians along LK Wood Blvd more aesthetically appealing.
- Promote improved energy use, safety, and efficiency
- Determine the specific no-mow grass species for the LK Wood median and the kinesiology building.
- Develop a transitional planting design with an artistic rendition of the un-landscaped sections of the Kinesiology Building area to aesthetically blend into the Community Forest.

## Possible Solutions

### Xeriscape using local vegetation (convert all medians to low maintenance native grasses and shrubs)

Justification: Reduce overall resources used by planting species that require less physical maintenance and watering throughout the year, that are local and or native to the region. Examples of this type of landscaping can be found near or at the South Campus Market and between the events field and Science D Building here on the HSU campus. Vegetation may include native California bunch grasses, California poppies, low growing shrubs such as ground manzanita, ground cover such as native strawberries and violets; etc.

Cons: Grass is a typical landscaping choice for safety and aesthetic appeal along LK Wood. Xeriscape may not be as aesthetically appealing as it does not offer the same manicured appearance. Maintenance costs may be equal to grass that is already there and this would not contribute to our overall goals of the project.



Figure 2. Xeriscaping example of aesthetically pleasing, low-maintenance design

### Planting medians with no-mow grass

Justification: There has been success with the small scale implementation of no-mow grass planted at Library Circle under and around the maple tree at the entrance to the campus center. The robust nature of the grass has worked well with the local climate and student use. This grass requires little to no maintenance and is aesthetically appealing.

Cons: Rodents and other small mammals might use no-mow grass to make homes and concern has been raised over safety and public health. Although the grass does not need to be cut the no-mow grass in the library circle is occasionally trimmed.

### Making medians into bioswale runoff catchment areas

Justification: The lower point in LK Wood Boulevard would be useful as bioswale runoff catchments to capture excessive runoff during storm events. Extensive paved areas on campus lead to large amounts of runoff which overwhelm drainage systems and concentrate pollutants; bioswales serve to capture runoff, slow down water during storms, and help filter out pollutants and debris. An example of this can be found at Samoa Blvd., improvement project in Arcata, CA.

Cons: The bioswale may be initially expensive and might attract unwanted small mammals.

Maintenance costs may be comparable to the already present grass.

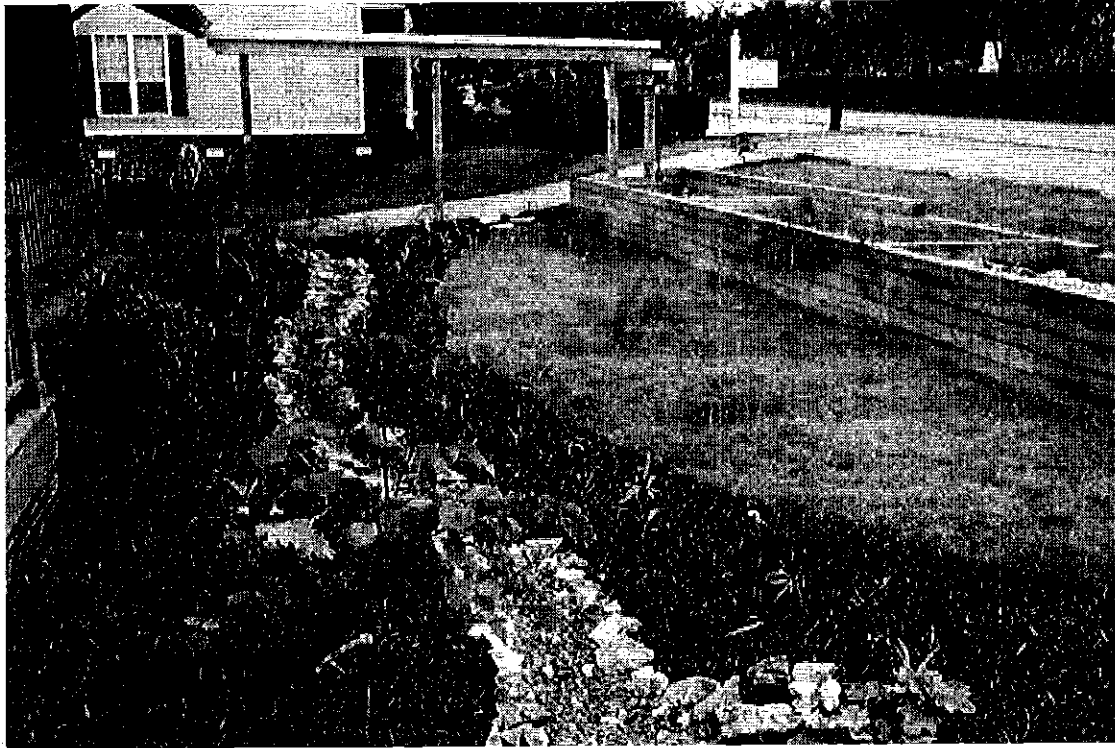


Figure 3. Bioswale landscape project example to reduce overland runoff during heavy rainfall.

#### Alternate medians with different types of vegetation

Justification: Different plant communities can be established since there is variation in the medians in terms of moisture, sunlight, driver visibility, and size. A variety of native trees, shrubs, and grasses could be used for landscaping depending on the median in question.

Cons: Although having a variety of plant communities will cater to the individual micro ecosystems of low slope and high points along the LK Wood medians it will not offer a uniform aesthetic.

#### Replace grass with rock and low maintenance urban design

Justification: Using rock, brick, and decorative stone work would drastically reduce maintenance needs and reduce resource use. An example of this has been in Eureka, at the intersection of



Myrtle Ave., and 5th and 4th streets, as well as in other cities such as San Jose and San Francisco. This modification is aesthetically pleasing and creates a surface which can either be sealed or left porous with geotextile, tarping, or sand beneath.

Cons: By replacing vegetation with rocks and other decorative materials infiltration rates will increase. Rocks are not currently utilized as a landscaping technique throughout HSU campus and may not work well with the overall planning design of Humboldt State.

## Selected solution

### Planting medians with no-mow grass



Figure 4: Foreground: No-mow grass currently planted on HSU campus at Library Circle area. Background: current seed mix.

#### *Reasoning/justification:*

The declining available budget of Humboldt State University can severely limit the ability to drastically change landscaped areas or implement large projects that are related to landscaping.

No-mow grass utilizes native California grasses and provides a very affordable solution to using non-native turf grasses on the LK Wood Boulevard medians. The no-mow grass has already been in place at Library Circle at HSU for a few years. It has been successful and shown to be aesthetically pleasing while requiring much less attention for the landscaping crew.

No-mow grass has been documented as being a cost effective alternative to traditional lawns (Diboll 2008). No-mow grass is suited for the climate in Arcata. It requires less nitrogen

fertilization and maintenance (Delta Bluegrass Company 2012). The no-mow grass from the HSU supplier is made up of Sheep Fescue, Hard Fescue, Chewing Fescue, Creeping Red Fescue (Delta Bluegrass Company 2012). Aesthetically it is not identical to the current seed mix that is planted on the LK Wood medians as it offers a windswept look which appears soft and dynamic (see figure 5).

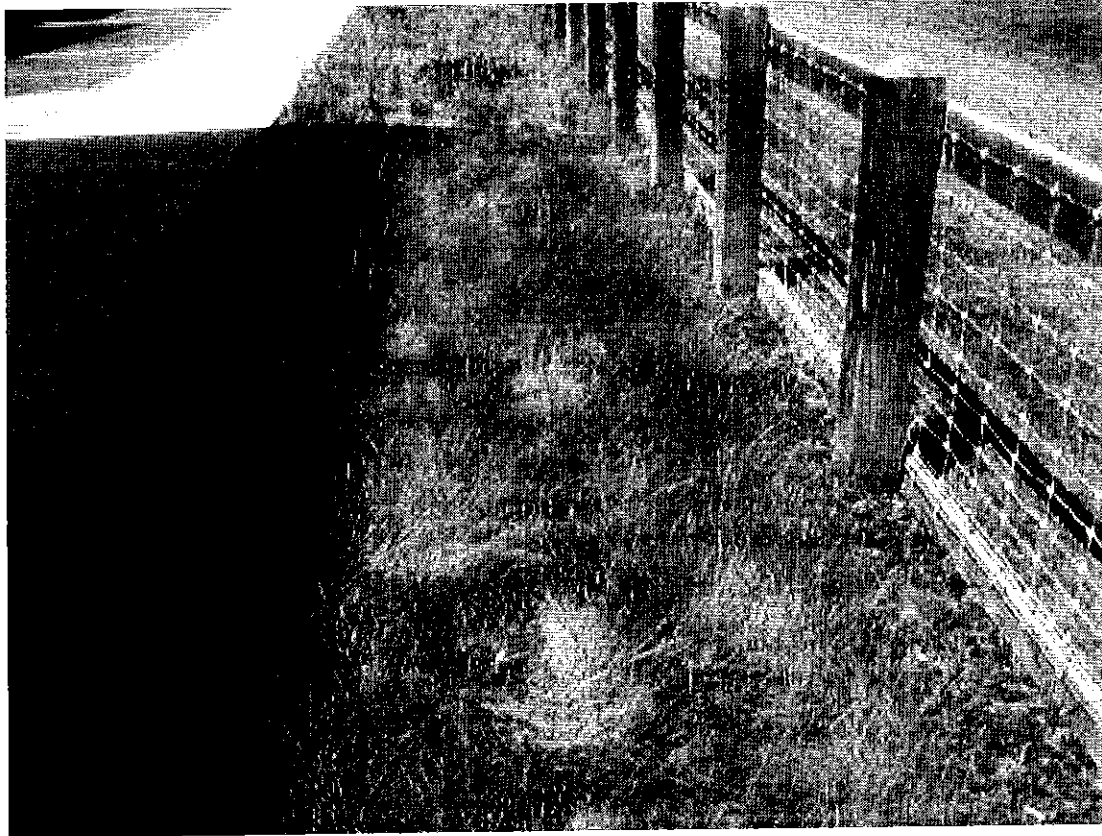


Figure 5. No-mow native California grass mix from Delta Bluegrass Company which is the current supplier of HSU's no-mow grass seed mix.

### **Implementation Strategies**

The primary strategy for our implementation of our findings will be to offer this report to Traci Ferdolage who is the Director of HSU's Planning and Design and to Tall Chief Comet (T.C.) who is the HSU Campus Sustainability Coordinator. The hope of providing this report to Traci and T.C. will be to provide further evidence for the need to convert the LK Wood Medians to a more ecologically and economically feasible alternative. If enough interest is gained through this

report then students at later date could present these findings along with any additional information to the Humboldt Energy Independence Fund (HEIF) committee. HEIF is concerned with saving energy and making the HSU campus sustainable and its mission statement is, "to reduce the environmental impact of energy use at Humboldt State University through student driven projects" (14). A basic monitoring plan has been laid out in the section labeled "monitoring" and this could serve as a template for the report that would be submitted to the HEIF committee.

At a meeting with Traci Ferdolage she mentioned that the LK Wood medians were not a high priority in comparison with other areas of the campus. Traci Ferdolage mentioned that the area adjacent to the kinesiology building was of a high priority. (personal correspondence with director of Planning and Design for HSU, Traci Ferdolage). In order to bring this report to the forefront as a project which could be beneficial for HSU we suggest that the no-mow alternative for the LK Wood Medians could be coupled with the Kinesiology area as a singular project.

The area adjacent to the kinesiology building is sheltered from direct sunlight through the morning and evening hours. This area could work well for no-mow grass and could be jointly implemented with the LK Wood Medians.

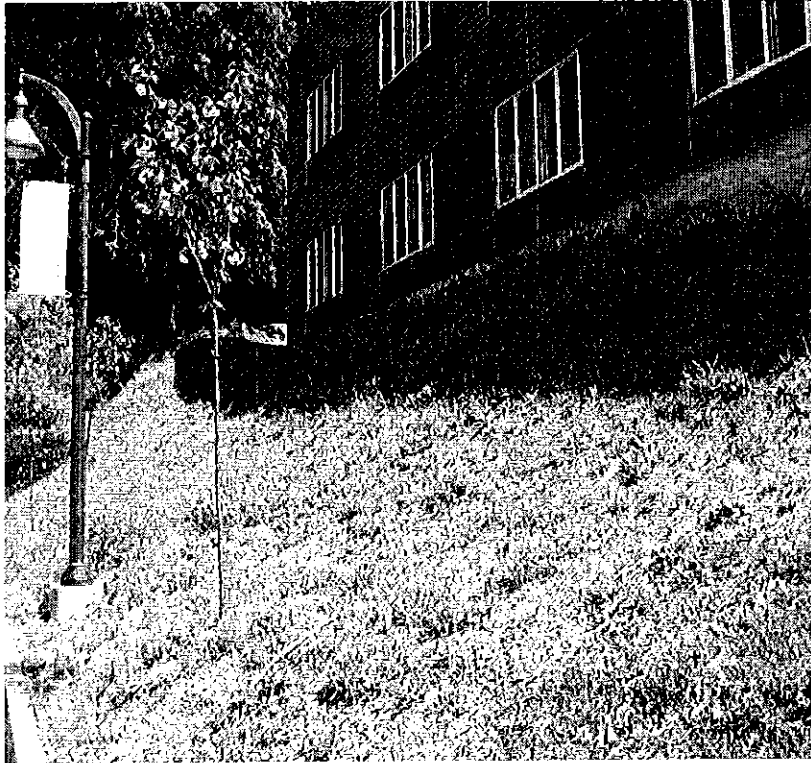


Figure 6. North side of HSU Kinesiology Building

### **Monitoring Plan**

The planting scheme proposed is to institute a pilot study of no-mow grass on one of the LK Wood medians. If a pilot planting scheme was implemented on campus either on the LK Wood Boulevard medians or elsewhere, such as the proposed area along the Kinesiology building, plant survival, watering requirements, and maintenance could be monitored. A follow-up evaluation of cost effectiveness could be implemented to show that the new plants actually reduced overall costs in the long run, and could serve as an example for future sustainable landscaping on-campus.

The monitoring plan will keep track of four areas of concern. The four areas are: overall aesthetic appearance, water usage, maintenance costs, and fertilizer use. The latter three areas could be tracked using quantitative data and aesthetics could be monitored through weekly photographs. Water usage monitoring would need to be implemented a year prior to the no-mow grass pilot project and would require that the sprinklers on the medians be metered. By metering

the sprinklers on the LK Wood Medians precise calculations could be obtained prior to and after the implementation of the project. The monitoring plan in question could be performed by a paid student intern through HEIF for the duration of 2 years, where the student intern will compile the qualitative and qualitative data into a report will be created after 2 years. The feasibility of the no-mow grass alternative could then be reevaluated upon the acquisition of new monitoring information.

## **Evaluation**

Aesthetic appearance will involve weekly pictures of the medians taken from the same location and a brief report with commentary from landscaping staff and students on their thoughts about the new no-mow grass.

Preliminary water usage estimated from this paper will serve as a template for what may be expected in terms of water usage. Water usage data will be estimated from water bills and from the newly installed meters on the LK Wood medians. Those estimates will then be compared to the suggested water usage to see if there is any discrepancy between the suggested amount and the actual usage. This water usage will be included in the final evaluation and report. When the weekly pictures are taken they must also coincide with the end of a watering session to see that excessive water is not overflowing onto the LK Wood.

Maintenance costs will be deduced from the salary wages of the landscaping personnel and their work hours. Maintenance costs will then be compared to the costs associated with the current grass seed mix.

The goal of this class is to influence change on the campus of Humboldt State University, and to encourage and increase sustainability in landscaping techniques and reduce the overall costs to the campus budget. Since beginning this project, one major problem has been of significant issue: The amount of administrative approval needed for projects, and the communication between students and staff, faculty, and administration. Most staff are not as open minded about

drastic change(s) to the campus but are so only to small changes because of a stringent budget to work within, and the series of high level people to please.

## **Preliminary Comparison**

### Water and land area

We were unable to perform a comparison of water usage because the sprinklers on the LK Wood medians are not metered. Below is current information regarding water usage.

- Current funds allocated for watering is \$297 per year. Current water usage is approximately 58,968 gallons of water per year.
- Rough estimated total area of LK Wood Medians is 3,386.24 meters squared or 36,449.184 sq. feet (<http://www.sketchandcalc.com/>) and measurements from tape measure.

### Fuel and carbon dioxide

#### *Current Seed mix*

The total funds allocated to LK Wood medians for fuel per year is \$485. This equates to approximately \$8.40 per week. This was found by dividing \$485 by 52 weeks and subtracting a 10% factor for rainy weeks. With the price of gas in 2011 at around \$4/gallon (15) then approximately 2 gallons of gas were used per week and 2 gallons of gas is equal to approximately 40 pounds of CO<sub>2</sub> (16). For a full year the current seed mix planted on the LK Wood median emit 2,080 pounds of CO<sub>2</sub>.

This calculation may be slightly conservative as diesel mowers are also used. Taking into account diesel use could reduce CO<sub>2</sub> emissions slightly. Currently one hustler gas powered zero-turn mower and one hustler diesel powered zero-turn mower (31 horsepower) are used to mow the LK Wood medians. Trimmers are also used for manicure work. Cal emissions 4 cycle

engines are used along with the old 2 cycle engines for trimming. The occasional use of a Bobcat and Kubota are used for hauling trimmings and and the trimmers to and from the LK Wood Medians.

#### *No-Mow grass alternative*

If a no-mow grass alternative was implemented CO2 emissions will also decrease. The decrease in labor hours for mowing will lessen the use of fuel. If LK Wood Blvd only needed to be mowed 2-4 times per year than the CO2 emissions would amount to 160 pounds of CO2/year. This was estimated by the previous calculation that \$8.40 was spent per maintenance session on the current seed mix and that amounted to 40 pounds of CO2 emissions. This calculation is most likely conservative as mowing will most likely occur more than 2-4 times per year to maintain safety standards.

#### Fertilizer

##### *Current Seed mix*

Doug Kokesh, HSU grounds manager, said the lawns campus wide typically use 16-6-8 (N-P-K) at a rate of 5 lbs. per 1000 sq. ft. The rough area calculated for this project using a tape measure was 36,449.184 sq. ft. At a rate of 5lbs per 1,000 square feet and an application rate of 4-6 times per year the total amount of fertilizer used on the LK Wood medians is 720 to 1,080 lbs per year.

$$5\text{lbs} \times 36 \times 4 = 720 \text{ lbs per year}$$

$$5\text{lbs} \times 36 \times 6 = 1,080 \text{ lbs per year}$$

##### *No-Mow grass alternative*

Based on the recommendations of Delta Bluegrass the no-mow grass should be fertilized at a rate of 16 lbs. per 4,000 sq. ft every 8-10 weeks. If scaled down this would equal 4 lbs. per 1,000 sq. ft. 5-6 times a year. This would equal 720 lbs to 864 lbs of fertilizer used per year. Therefore the no-mow grass would equal or be less than the amount used on the current turf grass. It is important to note that during installation of the no-mow grass the one time starter fertilizer application rate would be 8 lbs per 600 ft (personal correspondence with Delta Bluegrass).



4lbs x 36 x 5 = 720 lbs per year

4lbs x 36 x 6 = 864 lbs per year

### Labor

#### *Current Seed mix*

Total funds allocated to the LK Wood medians per year (not including fertilizer) is \$4,310.72. According to Paul Mann, official spokesperson for Humboldt State University News and Information, at the rate of \$15.58/hour for what is deemed seasonal labor, the aforementioned labor costs equate to 5 hours per 52 weeks subtracting a 10% factor for rainy weeks, thus equaling \$3,645.72 total (Mann, 2012).

#### *No-mow grass alternative*

Doug Kokesh the HSU grounds manager estimated that the no-mow grass currently planted near the library circle is maintained 2-4 times per year. Estimated labor cost to maintain the no-mow grass would be approximately \$155.89 to \$311.60. This was calculated by assuming an hourly wage of \$15.58/hour and a 5 hour work day for the mowing of the LK Wood no-mow grass and a maintenance frequency of 2-4 times per year. This estimate is conservative and will most likely be more than \$155.89-311.60 because the no-mow grass will most likely be cut more than 2-4 times per year to maintain the proper grass height and uphold safety standards.

## Conclusions

No-mow grass would be a sustainable alternative based off of the initial calculations of CO2 emissions, labor cost, and fertilizer rates. It requires less maintenance overall and emits less CO2 as a result and requires less fertilizer. It is also a good candidate because it will meet the safety requirements of 42 inches for shrubs and perennials. While the no-mow grass provides a good incentive for change based off of these factors it does provide a different aesthetic look. Any changes to the Campus and its aesthetic look will have to gain the approval of HSU's administration. Based off of the the other alternatives discussed in this paper the no-mow grass would also induce the least amount change to the overall aesthetic look of the medians.

The goal of this class is to influence change on the campus of Humboldt State University and our goal in writing this paper was to encourage and increase sustainability in landscaping techniques and reduce the overall costs to the campus budget. By implementing a no-mow alternative for the LK Wood Medians Humboldt State University can take one more step towards sustainability.

## **Acknowledgements**

Traci Ferdolage, Director, Campus Planning & Design, Humboldt State University.

Tall Chief Comet, Office of Sustainability, Humboldt State University.

Doug Kokesh, Grounds Manager, Plant Operations, Humboldt State University.

Iliana Vest, Groundskeeper, Plant Operations (2010-2012), Humboldt State University.

Paul Mann, University Spokesman, News and Information, Humboldt State University.

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## APPENDIX A

### Current Vegetation

#### *Creeping red fescue*

Creeping Red Fescue performs best in well-drained soils with a pH of 5.5 to 8.0. Fertilize using 1-2 lbs of nitrogen during period of active growth which are March - June and October - December. With good drought tolerance a low to moderate amount of irrigation is required. Water 1-2 times a week during the warm season as red fescue can go dormant in the summer months if watered too little. Also adjust irrigation frequency if Creeping Red Fescue is in full sunlight. Monitor the water needs of Creeping Red Fescue in shady areas as trees may soak up available water (<http://www.fescue.com/info/creepingred.html>)

#### *Manhattan 4 perennial ryegrass*

Climatic Conditions: All (except high altitude)

Soils: Sandy to heavy clay. Not good for extremely wet or shaded areas.

pH range: 5.5 to 8.5

Fertilization: 2 to 4 pounds of actual nitrogen per 1000 sq ft per year. Use a balanced fertilizer with a 3:1:2 ratio of NPK with sulphur.

Mowing height: 1/2 to 1-1/4 inches in cool seasons, 1-1/2 to 2 inches in warm seasons.

([http://www.stoverseed.com/p\\_turfgrass\\_91.html](http://www.stoverseed.com/p_turfgrass_91.html))

## APPENDIX B

Email Correspondence from Paul Mann (02/15/12):

from: **Paul S. Mann** Paul.Mann@humboldt.edu  
to: pas56@humboldt.edu,  
pstringall@gmail.com  
cc: psm7001@humboldt.edu  
date: Wed, Feb 15, 2012 at 9:45 AM  
subject: your queries re: LK Wood  
median strip conversion  
mailed- humboldt.edu  
by:

Dear Mr. Stringall:

In answer to your questions for your ENVS 411 class:

How many people does it takes to maintain the medians and to what extent? - one

How many hours do individual maintenance workers provide in maintaining this area of campus? - about five hours a week

Can you supply a rough estimate of current average wages of the personnel involved and how much does this apply to your overall budget?

- \$15.58/hour for typically seasonal labor x5 hours x52 weeks minus 10% factor for rainy weeks:  
\$3,645.72

What is the estimated cost of fuel to run equipment, if any? - \$485 annually

What type of grass is currently planted along the medians? - 60% cool season Manhattan perennial ryegrass and 40% creeping red fescue

What are the limits on vegetation types and height? - Typically shrubs and perennials do not exceed 42 inches. Factoring in a median strip's mounding height, plants have to be considerably less than that. Trees must be single-trunk, standard upright, with canopies a minimum 13.5 feet above the road surface.



What are the dimensions of the medians? - unknown

Are the medians along LK Wood Blvd. being currently metered and if so, are there records of usage? -- I checked with Tim Moxon, Senior Director of Plant Operations, who said he believes they are not separately metered. However, please confirm that with Silas Biggin at 826-5899, who can also provide you with information about water bills. Mr. Moxon has alerted him you'll be getting in touch. As for water usage, typically the system is shut down five to seven months a year for the rainy season. The rest of the time, irrigation usually runs 20 minutes every other day in the very early morning hours.

Paul Mann  
News & Information 826-5105

## APPENDIX C

### Time Log (Hours):

Total:

Oskar: 35.55 hours

Sabrina: 26.25 hours

Peter: 35.95 hours

Rebecca: 31 hours

HOURS LOG					
Date	Oskar	Sabrina	Peter	Rebecca	
2/2/2012		1	1	1	1
2/3/2012					
2/4/2012					
2/5/2012					
2/6/2012					
2/7/2012		1	1	1	1
2/8/2012				1	
2/9/2012		2	1	1	1
2/10/2012					
2/11/2012					
2/12/2012					
2/13/2012			1.5		
2/14/2012		1	1	1	1
2/15/2012				1	
2/16/2012		1	1	1	1
2/17/2012				3	
2/18/2012					
2/19/2012					
2/20/2012					
2/21/2012		1	1	1	1
2/22/2012					
2/23/2012		1	1	1	1
2/24/2012					
2/25/2012					
2/26/2012		1			
2/27/2012					
2/28/2012		1	1	1	1
2/29/2012				1	
3/1/2012		1	1	1.25	1
3/2/2012					
3/3/2012					
3/4/2012					
3/5/2012			1.5		
3/6/2012		2	1	2	1
3/7/2012					
3/8/2012		1	1	2	
3/9/2012		1			1
3/10/2012				1	
3/11/2012			1		
3/12/2012					

3/13/2012				4
3/14/2012				
3/15/2012	1			1
3/16/2012				
3/17/2012			1	
3/18/2012				
3/19/2012		1.5		
3/20/2012	1	1	1	1
3/21/2012				
3/22/2012	1	1	1.25	1.5
3/23/2012	1			
3/24/2012				
3/25/2012				
3/26/2012		1.5		
3/27/2012	1	1	2	1
3/28/2012				
3/29/2012	0.45		0.45	1
3/30/2012	1			
3/31/2012				
4/1/2012				
4/2/2012				
4/3/2012	0.45		1	1
4/4/2012		1.25		
4/5/2012	0.45	1		1
4/6/2012	1			
4/7/2012				
4/8/2012				
4/9/2012	1			
4/10/2012	1.2		2	1.5
4/11/2012				
4/12/2012				
4/13/2012				
4/14/2012				
4/15/2012				
4/16/2012				
4/17/2012	1	1	1	1
4/18/2012	1			
4/19/2012	1	1	1	1
4/20/2012				
4/21/2012				2
4/22/2012				
4/23/2012		1		2
4/24/2012	2			1
4/25/2012	1			
4/26/2012				1
4/27/2012				
4/28/2012				2
4/29/2012				
4/30/2012	0.5			
5/1/2012			1	
5/2/2012	3.5			
5/3/2012	2		5	
Total hours	37.55	26.25	36.95	34

