

# Green Roof Management Plan

## Hillside Auditorium Green Roof

Office for Sustainability  
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### Initial Green Roof Planting



*Figure 1. Hillside Auditorium green roof shortly after installation.*

### Overview

This proposal includes two segments. The first segment is an assessment of the current status of the installation. The second segment includes recommendations to recover both the ecological and aesthetic aspects of the original installation. These are presented for each section highlighted on Figure 2.

Very few, if any, of the original plantings remain. Sections A, B, C & E would be easier to recover and maintain as they are the least deteriorated. These sections are also more visible than section D. Each of those sections contains some of the original plantings that still survive and thus show that, even with the current management plan, they are sustainable. Additionally, the sections could be renovated individually based on severity of need, budget and timing.

## HILLSIDE AUDITORIUM GREEN ROOF DIAGRAM

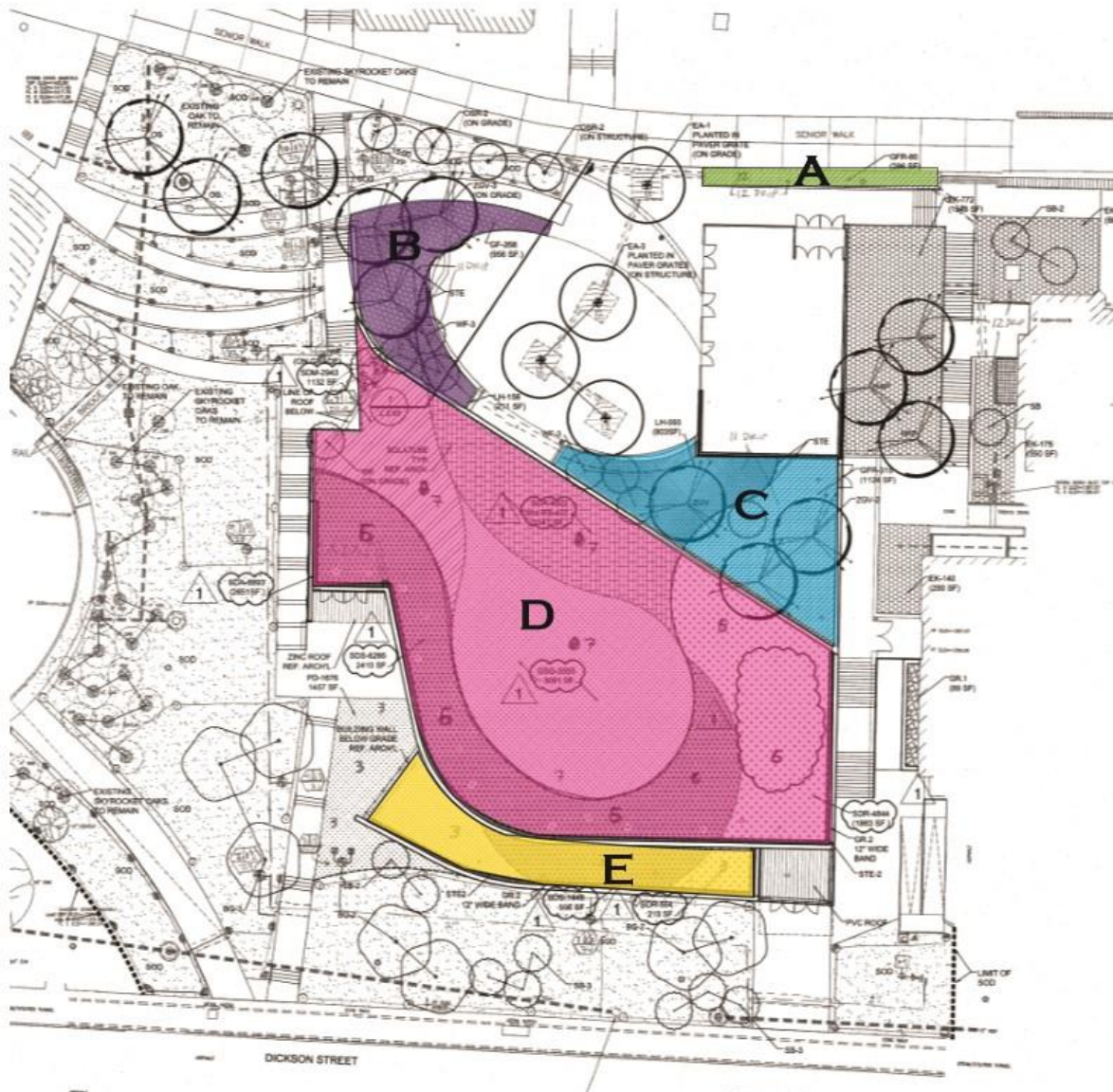


Figure 2. Diagram of the sections within the Hillside Auditorium green roof.

### **Current Status**

**Section A (green):** There are two or three plants left of the original *Calamagrostis x acutiflora* (Feather Reed Grass.) Sporadic weeds & grass permeate the decorative rock that covers the rest of the bed. This area seems to have experienced some drainage issues previously. See Appendix I Section A.

**Section B (purple):** Aside from the loss of the lavender hidcote and three elm trees, the remaining *Pennisetum alopecuroides* (Fountain Grass) appears to be thriving as does the *Itea* (Virginia Sweetspire) and the *Chionanthus virginicus* (White Fringe tree.) It was pointed out by Todd Furgason on our tour of the area in October that some significant settling has occurred in this section as well. See Appendix I Section B.

**Section C (blue):** The only remaining vegetation in this section is the *Chionanthus virginicus* (White Fringe trees) and the *Zelkova serrata* (Zelkova Green Vase trees.) What did not survive were the ground covers of lavender hidcote and *Calamagrostis x acutiflora* (Feather Reed Grass), leaving bare ground. See Appendix I Section C.

**Section D (pink):** The area has been completely taken over by weeds. Currently, the roof is mowed periodically (monthly or every 2 weeks) in season and the edges and railing are sprayed with an herbicide, most likely glyphosate (Round-Up.) The weeds are numerous and invasive, a partial listing includes:

- Carolina Geranium
- Speedwell
- White Clover
- Sow Thistle
- Lamb's Quarters
- Crabgrass & Johnson Grass
- Oxeye Daisy
- Plantain
- Catchweed Bedstraw
- Curly Burdock
- Yellow Wood Sorrell
- Dandelions

There is no sign of the *Butela curpendula* (Sideoats Grama grass) and only a few sporadic spots of the sedum species originally planted are present. Some evidence of the grasses remains in spots but has been mowed to ground level. There are a few *Perovskia atriplicifolia* (Russian Sage) plants remaining and thriving near the gate along with two *Chionanthus virginicus* (White Fringe trees.) See Appendix I Section D.

**Section E (yellow):** Original plantings included some of the same species planted on the middle roof area. In this section the *Butela curpendula* (Sideoats Grama grass) seems to be thriving where it has not been mowed. The area where the grama grass has been mowed has been invaded by the Bermuda grass. The sedum species are splotchy at best being overtaken by weeds and grass. (**NOTE:** *Sporobolus heterolepis* (Prairie Dropseed) may have been substituted for Sideoats Grama from the original plans.) See Appendix I Section E.

### **A Note on Weeds**

The key to managing weeds is first prevention. Once weeds are on site these management practices should be priority: 1) preventing weeds from emerging, 2) preventing weeds from going to seed and 3) preventing distribution of weed seeds into the soil seed bank. The biggest defense against a weed population in any environment is, first, the development of a crop canopy and, second, zero tolerance for all weeds. Crop canopy prevents both the much-needed light and the soil temperature fluctuations that weed seeds need to germinate and can be enhanced with mulch. Bare soil is an open invitation for weeds.

- Mowing mature weeds without catchment distributes the weed seeds across the area and could possibly transport the weed seeds to other areas on campus via the equipment.

- Weeds are luxury consumers and use any fertilizer or organic matter supplements to their advantage to the detriment of other crops or ornamentals with which it competes. Mowing without catchment adds this organic matter to the area and only enriches the soil thus exacerbating the situation by giving weeds the upper hand.
- Utilizing the same herbicide consistently over and over on the same area can develop resistance among the weed population resulting in either the use of higher rates of herbicide and/or loss of efficacy of the herbicide.
- The planting media now has a substantial seed bank built up that will most likely need to be managed on an ongoing basis no matter what is replanted in the area.

#### **Installation Structural Issues**

- The planting media has eroded whether from wind, rain, compaction or the use of machinery exposing most of the irrigation lines and reducing the planting depth and may need to be supplemented.
- Many of the irrigation lines have been punctured with equipment. It is not currently known if this irrigation system is in operation.
- As mentioned earlier, there has been significant settling in section B.

## **Recommendations:**

In order to reclaim this site, the weed problem needs to be addressed first. Section D is the key section in need of weed control. Complete eradication may be possible due to the contained area and small size. However, this should not be an expectation due to the extensive weed seed bank now in the planting media. A change in the current management practices of the site alone will not fix the weed issue. Once the weed issue has been addressed, it is recommended that the sections be planted with a minimal number of species and to supplement the ones that are already present and thriving with the same species.

- 1) Eliminate the weeds in Section D as much as possible prior to planting.
- 2) Treat weed issues individually in other sections with glyphosate. These sections do not have as severe a weed issue as Section D.
- 3) Replant/revive each section per recommendations below.
- 4) Ongoing maintenance should include:
  - a. A weed management plan to prevent emergence, propagation and transport of weeds into the area.
  - b. No irrigation except on trees and some perennial shrubs once established.
  - c. No soil amendments for prairie grasses such as mulch mowing or fertilization.
  - d. Replace lost plants with same or like species as soon as possible.

### **Section A (green)**

1. Keep the current plantings of *Calamagrostis x acutiflora* (Feather Reed Grass) and plant additional mature plants to fill in the area.
2. Correct the drainage issues and mulch well. Do not irrigate or mow.

### **Section B (purple)**

1. Keep the current plantings of *Pennisetum alopecuroides* (Fountain Grass) and plant additional mature plants to fill in the area where the elm trees were removed.
2. Mulch well and try to restrict irrigation to the remaining trees and *Itea* (Virginia Sweetspire).
3. Correct settling issues if appropriate.
4. Keep weeds in check and replace any dead grasses with like species as soon as possible for both sections A and B.

### **Section C (blue)**

1. Plant and mulch the area with a good shade tolerant native ground cover.
2. Maintain mulch depth to keep weeds in check and replant any bare/dead spots as needed.

## **Section D (pink)**

1. Weed Eradication
  - a. Consult with UARK Weed Science on types of weeds and recommended cultural, mechanical and chemical management practices to reduce current weed problem without high herbicide residual activity.
  - b. This vegetation will then need to be completely removed from the area and planting media added.
2. It is recommended to leave the White Fringe trees and the Russian Sage that is thriving and to seed/plant the remaining area with similar prairie grasses that are thriving in other sections of the green roof. Recommended is *Pennisetum alopecuroides* (Fountain Grass) or *Sporobolus heterolepis* (Prairie Dropseed.)
3. Keep weeds in check and replace any dead grasses with same or like species.
4. Do not irrigate or mow this area on an ongoing basis. Mowing will be seasonal only, 1-3 times per year.

## **Section E (yellow)**

1. Plant the entire area with the grasses currently thriving near the gate in this section to replace the lost sedums from the initial planting.
2. It is recommended that the lower section of this area be installed with Bermuda grass sod leaving only the upper area with the prairie grasses extending from the wall to the sidewalk and remove the fencing.
3. Supplement planting media &/or mulch to hide irrigation lines.
4. Do not irrigate or mow this area on an ongoing basis. Mowing will be seasonal only, 1-3 times per year.

## **Summary**

In summary, the recommendations by section are as follows.

- **Section A**-Plant additional mature plants of existing grasses, correct drainage issues.
- **Section B**-Fill out the bare areas with additional Fountain Grass, add mulch and irrigate only trees and *Itea*. (**NOTE:** *Itea* will grow in a wide range of soils but, unlike native prairie grasses, prefers moist to wet soils to thrive.) Correct settling issues if appropriate.
- **Section C**-Replace eroded mulch and plant with good, native shade tolerant ground cover.
- **Section D**-Eradicate invasive weeds, including vegetation removal and replant area with native drought tolerant prairie grass such as those located in other sections. Leave remaining White Fringe trees and Russian Sage.
- **Section E**-Plant the bare areas with the grasses currently thriving. Change the naturalized area to end with the upper section extended from the edge of the wall and remove fencing.



## **Appendix I**

### **Current Photos of Hillside**

#### **Section A**



#### **Section B**





## Section C



## Section D

Mowed in Mid-June



Not Mowed-late July





## Section E

