



October 04, 2006

Mr. Charles Baker  
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**SUBJECT: Planting Plan for the StabiliGrid Research Project at Horizon Village,  
Grants Pass Oregon**

Dear Mr. Baker,

Cascade Earth Sciences (CES) has been contracted to design and implement a plan to assess the performance characteristics of the StabiliGrid product being installed in the Horizon Village. As part of that project, this Planting Plan was developed to identify grass, thyme and other ground cover varieties that will be used to assess performance and aesthetics during the changing seasons.

**1.0 PLANTING PLAN**

CES has proposed dividing the driveway into four sections, each of which is planted with a different grass and/or broadleaf variety. The four test plots were selected based on different project objectives as outlined below.

- A test plot to evaluate grasses with tolerance to xeric (dry) conditions encountered during the summer and early fall months.
- A test plot to evaluate drought tolerance of a vegetation mixture including thyme.
- A test plot to evaluate “ecologically-friendly” conditions that will require the use of fewer and/or less fertilizer(s) and herbicide(s).
- A lawn-style plot to test ideal conditions for an aesthetically pleasing vegetation mixture.

Varieties of grasses or other ground cover varieties were selected on the following criteria.

- Varieties that are durable and can withstand compaction.
- Varieties that are aesthetically acceptable.
- Varieties that are reasonably available from seed suppliers.

The StabiliGrid driveway will be divided into four sections from the homes to the street, each approximately 25 feet long. One test plot will be located in each section. Irrigation typical for the rest of the landscaped areas at Horizon Village will be applied to the right side (facing the site from the street), and reduced irrigation to conserve water will be applied to the left side. In this way, two watering scenarios for each of the four test plots will be observed. The four test plots and the selected varieties that are recommended for this evaluation are discussed in the following subsections.

### **1.1 Test Plot 1: Drought Tolerant with Tall Fescue**

A dwarf-type tall fescue variety will likely provide the best drought tolerance and durability for the StabiliGrid driveway. According to personnel at Prolawn Services in Medford, Oregon, new mixtures of tall fescue grows rhizomes and repairs itself, has a deep root system, and has provided excellent results in the Rogue Valley (Prolawn, 2006).

#### **1.1.1 Soil Medium**

In general, native soils in the Rogue Valley range from infertile decomposed granite to black clays (Cook, 2004). As such, native soil may not be adequate for the driveway and the selected vegetation mixtures. However, tall fescue tends to grow well in clay soils with high organic matter (Duble, 2006). As such, CES recommends blending the native soil with a sandy-organic topsoil. Moreover, CES recommends using a soil conditioner called “Turface”, which works well to absorb moisture and prevent soil compaction, especially in clayey soils. If used, the conditioner should be tilled with the topsoil prior to planting.

Seeding rates for turf-type tall fescue should generally be about 7 to 10 pounds per 1000 square feet. Uniform distribution of the seeds is essential to develop complete cover. Germination and survival of the seedlings will be increased if the seeds are lightly covered with soil (Duble, 2006).

#### **1.1.2 Irrigation Requirements**

Irrigation requirements for this drought-tolerant plot should be minimal based on the tall fescue mixture planned for the plot. However, the objective of irrigation of every newly planted mixture is to keep the seed wet to begin the germination process (Cook, 2004). Following planting, the plot should be irrigated several times a day until germination has occurred. After germination, weekly irrigation should suffice until a dense, uniform stand has been established. If planted during the fall months, the plot should be able to tolerate drought periods during the first summer following planting.

During the first summer of growth following planting, three to four irrigation events over the summer should be sufficient for the plot. These irrigation events will require 1.5 to 2 inches of water per event, although shorter, more frequent irrigation events may be necessary to avoid runoff due to the clayey soils. In total, this will amount to about 1/3 to 1/4 of the irrigation requirement of a typical lawn in Western Oregon (Cook, 2005).

### **1.1.3 Fertilization Requirements**

Fertilizer should be applied immediately before or after seeding. In general, turf fertilizers low in nitrogen and potassium, and high in phosphorus (starter fertilizer) will be ideal for rapid establishment of the plot. Approximately one month following planting, a complete fertilizer should be applied at the rate of one pound of nitrogen per 1,000 square feet.

### **1.1.4 Maintenance Requirements**

Tall fescue tends to perform well if kept below three inches. The grass test plots should be mowed as needed to maintain desirable grass height.

## **1.2 Test Plot 2: Mixture of Drought Tolerant Thyme with Covar Sheep Fescue**

At the request of the client, a drought-tolerant plot with a thyme mixture will be planted in the second plot of the driveway. According to personnel at Prolawn, establishment of this plot may be difficult, since grasses tend to out compete thyme in a lawn setting. Additionally, thyme is a “creeping” species and thus, is not readily available in seed form. Personnel at Sunmark Seeds in Troutdale, Oregon suggested seeding low-growing Covar sheep fescue and interspersing plugs that included creeping thyme.

### **1.2.1 Soil Medium**

Covar sheep fescue does not perform well in expanding clayey soils (Roche and White, 2002). According to individuals at Sunmark, this plot will need better drainage than the tall fescue drought-tolerant plot at the Site. Therefore, CES recommends using a sandy-organic topsoil for maximum drainage within the plot.

Seeding rates for Covar sheep fescue should be about 1 to 4 pounds of mix per 1,000 square feet. Seeding depth should be no greater than 3/8 inches deep (Morrison and Kelley, 1981). As previously mentioned, creeping thyme plugs should be interspersed with the fescue during planting.

### **1.2.2 Irrigation Requirements**

Creeping thyme requires thorough irrigation once or twice a week for the first few weeks following planting. Following rooting and initial growth, irrigation can be cut back to once every 7 to 10 days. Watering requirements for Covar sheep fescue should be minimal, considering its drought tolerant qualities and ability to survive on about 10 to 18 inches of precipitation per year. Since the plot will be located adjacent to the other drought-tolerant plot (Test Plot 1), a similar irrigation scheme should be used once the plot has been established.

### **1.2.3 Fertilization Requirements**

Covar sheep fescue is adapted to soils with low fertility (Harivandi and Gibeault, 1990). Therefore, fertilization requirements should be fairly low for this species. Autumn application of a complete fertilizer for the creeping thyme should assist with establishment of this species within the plot.

### **1.2.4 Maintenance Requirements**

Based on the limited growth of thyme (about two inches in height), and the low growth-habit of Covar sheep fescue, limited mowing is expected and CES recommends mowing as needed to maintain plant height at 1½ to 2 inches.

## **1.3 Test Plot 3: Ecologically Friendly Test Plot with Perennial Ryegrass, Hard Fescue, Broadleaf Mixture**

Ecologically-friendly mixtures usually incorporate grasses with selected broadleaf plants to produce an ecologically stable mixture, which may require less maintenance than a typical lawn. One challenge to developing an ecologically sound lawn mixture is to select grass species that will not be so competitive as to crowd out the broadleaf species. In Western Oregon, perennial ryegrass is the least competitive turf grasses in low maintenance situations (Cook, 2005). Advantages of perennial ryegrass include wear tolerance in hard use areas and quick establishment (OSC, 2006). As such, perennial ryegrass was selected to be the dominant grass species within this plot that will include selected broadleaf varieties and hard fescue.

The broadleaf components selected include strawberry clover, Dutch white clover, yarrow, dwarf English daisy, dwarf white alyssum, and baby blue eyes. Advantages of clover include nitrogen fixation, which will reduce dependence on fertilizers, and drought tolerance. A drawback of clover may be the tendency to attract bees. Yarrow is an excellent drought and wear tolerant species that provides aesthetic appeal after grasses have gone dormant. In addition, yarrow looks like grass from a distance, due to the upright feathery leaves.

CES proposes using the “Ecology Mix” from Sunmark Seeds in Troutdale, Oregon for this plot. Representatives from Sunmark indicated the mix will require irrigation similar to that used for the drought-tolerant plots and works well in clayey soils. The mixture for this plot is as follows:

- 45% dwarf ryegrass
- 30% hard fescue
- 8% strawberry clover
- 5% Dutch white clover
- 5% baby blue eyes
- 3% dwarf white alyssum
- 2% white yarrow

### **1.3.1 Soil Medium**

As previously mentioned, the Ecology Mix performs well in clayey soils. As such, CES recommends a mixture of native soil and organic topsoil with “Turface”, similar to that identified in Section 1.1.1. Seeding rates for the ecological mixture are about 2 to 5 pounds per 1,000 square feet.

### **1.3.2 Irrigation Requirements**

Typically, an ecologically-friendly lawn should be somewhat drought-resistant, and therefore, should not require much irrigation. Three to four irrigation events should be sufficient to allow attractive turf in the summer without forcing growth. Care should be taken not to over-irrigate this plot, as additional mowing may be required to control the height of grasses.

### **1.3.3 Fertilization Requirements**

Although perennial ryegrass has high nitrogen requirements (CTC, 1972), inclusion of legumes (nitrogen fixers) such as clover, should produce adequate nitrogen to keep grasses healthy. However, the health of the plot is dependent upon survival of the clover. If the clover is able to survive, minimal fertilization, if any, is necessary for this plot. If fertilization becomes necessary, use a complete fertilizer low in nitrogen and high in phosphorus and potassium.

### **1.3.4 Maintenance Requirements**

Mowing at regular intervals is essential keep ecological friendly mixture of species in balance. Perennial ryegrass prefers to be mowed between 1½ and 2½ inches. Mowing at about 2 inches should allow the low growing flowers to compete with the grasses and keep the desired species balance.

## **1.4 Test Plot 4: Lawn Style Plot**

A lawn-style plot is proposed as the fourth plot within the StabiliGrid driveway. Based on conversations with personnel at Sunmark Seeds in Portland, Oregon, the Pro Sports mixture will likely provide the most aesthetically pleasing and durable turf in high traffic situations (Sunmark, 2006). This mixture includes 60% turf-type tall fescue, 30% perennial ryegrass, and 10% Kentucky bluegrass.

### **1.4.1 Soil Medium**

CES recommends using the sandy-organic topsoil discussed in Section 1.2.1 for maximum drainage within this plot. Seeding rates for this mixture should be between 8 to 10 pounds per 1,000 square feet.

### **1.4.2 Irrigation Requirements**

During germination, the seedbed will need to be kept wet without having the soil saturated for extended periods of time. Following germination, the lawn-style plot should be irrigated about one to two times per day. In the third week following germination, the plot should be irrigated once every second or third day. By week four, the number irrigations can be reduced to one to two times per week. Weather conditions and the health of the plot will determine the necessity for watering events in the summer months. For instance, 3-5 inches of water in July (3/4 to 1 ½ inches per week) may be required to maintain the health of this plot.

### **1.4.3 Fertilization Requirements**

Establishment of the plot will require the use of a starter fertilizer during the initial stages of growth. Following establishment, a complete fertilizer should be applied at the rate of 1 to 2 pounds of nitrogen per 1,000 square feet. Regular nitrogen additions will be necessary to allow the Kentucky bluegrass and perennial ryegrass to compete with the tall fescue.

### **1.4.4 Maintenance Requirements**

The lawn-style mix should be mowed at regular intervals to keep grass height at about two inches.

## **CONTACTS**

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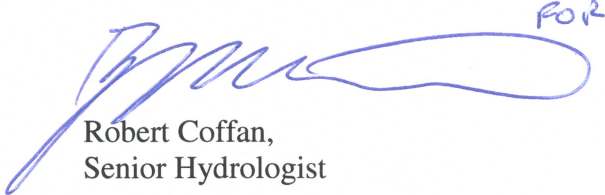
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Thank you for this opportunity to offer our services to assist you. You can contact me at (541) 779-2280 with any questions or concerns

Sincerely,

**CASCADE EARTH SCIENCES**

  
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