# APPENDIX L
## REVEGETATION PLAN

# Final Cover Revegetation Plan
# Jungo Disposal Site

**Prepared for:**
Jungo Land & Investments
50 California Street, 24th Floor
San Francisco, CA 94111

**Prepared by:**
Western Botanical Services, Inc.
5859 Mr. Rose Highway
Reno, NV 89511
775-849-3223

and

Stantec Consulting Services Inc.
3875 Atherton Road
Rocklin, CA 95765
916-773-8100

June 2011

# Table of Contents

**1.0 INTRODUCTION ..... 1.1**

**2.0 REVEGETATION PREPARATION AND IMPLEMENTATION ..... 2.1**
2.1 SITE PREPARATION AND GRADING ..... 2.1
2.1.1 Noxious Weed Abatement for Revegation ..... 2.1
2.2 MATERIALS ..... 2.2
2.2.1 Seed ..... 2.2
2.2.2 Soil Medium ..... 2.3
2.2.3 Soil Amendments ..... 2.3
2.2.4 Soil Inoculants ..... 2.3
2.2.5 Mulch ..... 2.4
2.2.6 Tackifier ..... 2.4
2.3 IMPLEMENTATION ..... 2.5
2.3.1 Soil Sampling and Testing ..... 2.5
2.3.2 Noxious Weed Control ..... 2.5
2.3.3 Seed Bed Preparation ..... 2.5
2.3.4 Application of Soil Inoculants ..... 2.5
2.3.5 Seeding ..... 2.5
2.3.6 Hydraulic Applications ..... 2.6

**3.0 POST IMPLEMENTATION ..... 3.1**
3.1 MAINTENANCE ..... 3.1
3.2 CONTINGENCY ..... 3.1

# 1.0 Introduction

The purpose of this Final Cover Revegetation Plan is to provide guidance and direction on obtaining permanent stabilization upon final closure of a landfill cell. The recommendations should be implemented in conjunction with the Final Closure Plan, which will be prepared approximately two years prior to closure of a landfill cell.

# 2.0 Revegetation Preparation and Implementation

## 2.1 SITE PREPARATION AND GRADING

Prior to initiating revegetation work, the growth media (e.g., soil) will be tested by a credible lab to determine the suitability of the proposed media to support native Great Basin scrub vegetation. The sample will be taken from the soil that will form the final cover that will be revegetated. The soils samples will be taken within six months of revegetation.

Prior to initial ground disturbance for the landfill, existing percent vegetation coverage on site will be measured by a qualified professional. Three random locations will be measured using the line-point interception method (Herrick, et al, 2009) or other equivalent method.

All finished slopes where vegetation will occur will be de-compacted using rippers or tines to loosen soils, so that final compaction within the first 6 inches is not greater than 85% of maximum compaction. Additionally, prior to seeding, the soil surface will be roughened by track walking or imprinting perpendicular to the prevailing winds.

Best Management Practices (BMPs) will be implemented during site preparation and revegation to control wind- and water-borne erosion such as straw, mulch, tackifier, and possibly snow fencing. The *Nevada Contractor's Field Guide for Construction Site Best Management Practices*, June 2008 should be referenced for appropriate BMPs.

### 2.1.1 Noxious Weed Abatement for Revegation

A Noxious Weed Abatement Plan specific to revegetation of the final cover will be prepared prior to revegetation work as part of the Jungo Disposal Site's Final Closure Plan. A separate Weed Management Plan for operations at the site has been prepared and is part of the site's Plan of Operations. The Noxious Weed Abatement Plan for revegetation activities will identify the boundaries of the specific revegetation work to be completed.

As part of the revegetation work, noxious weeds will be controlled. At a minimum, inspections of the revegation area will be performed during the growing season following revegetation for occurrence of noxious weeds. Control and abatement, at a minimum, will consist of mechanical treatment (e.g., pruning and removal of vegetation and dead material) in combination with approved herbicide applications or Integrated Pest Management methods. The UNR Extension Service is a source of information.

## 2.2 MATERIALS

### 2.2.1 Seed

The seed used for final cover revegetation will conform with all laws and regulations pertaining to the sale and shipment of seed required by the Nevada State Department of Agriculture and the Federal Seed Act. All shipments of seed will be reported to the Nevada State Department of Agriculture for inspection. Seeds delivered to the site will be tagged and labeled in accordance with the State Agricultural Code.

Seed will be of a quality having a minimum Pure Live Seed ("PLS") as specified. Weed seed will not exceed 0.25%of the pure live seed and inert material. Individual seed test results, by species and lot number, will be provided 30 days prior to commencing the work, prior to acceptance, and before seed is blended. Weed seed will not exceed 0.25% of the pure live seed specified and shall not include any seed of cheatgrass (*Bromus tectorum*) or Sweet clovers (*Melilotus officinalis, M. alba*). Crop seed shall not exceed 1%. The seed will be rejected if other undesirable species are present in excessive quantities. All seed tags and lab tests will reflect the most recent test date.

Seed tags must show the following information:

- Scientific name
- Common name
- Lot number
- Percent purity
- Percent germination, including hard and dormant seed
- Percent weed seed
- Origin

Table 1 shows the proposed seed mix to use for revegetation. In the event that there area any changes to the species and/or varieties, Nevada Department of Wildlife will be notified.

**Table 1**. Revegetation Seed Mix

| Botanical Name | Common Name/Variety | PLS lbs/acre |
|---|---|---|
| *Achnatherum hymenoides* | Indian ricegrass | 2.00 |
| *Agroyron fragile* | Siberian wheatgrass | 3.00 |
| *Atriplex canescens* | Four-wing saltbrush | 4.00 |
| *Atriplex confertiloia* | Shadscale saltbrush | 2.00 |
| *Distichlis stritcus* | Saltgrass | 2.00 |
| *Elymus elymoides* | Squirreltail | 3.00 |
| *Grayia spinosa* | Spiny hopsage | 2.00 |
| *Sarcobatus vermiculatus* | Greasewood | 2.00 |
| *Spharalcea grossularia* | Globemallow | 0.25 |
| TOTAL | | 20.25 |

### 2.2.2 Soil Medium

Topsoil that is excavated during landfill construction will be stockpiled and maintained separately to ensure that it is not mixed with subsoil horizons. The stockpiled topsoil may be temporarily vegetated to minimize the potential of erosion, and monitored and treated for weeds while it is stockpiled. Maintaining the stockpiled topsoil will be important for ensuring revegetation success.

### 2.2.3 Soil Amendments

Soil amendments may be added to provide a suitable growth media. The soil amendments must be in an organic slow-release form compatible with native vegetation establishment. The appropriate soil amendment will be identified upon completion of the soil testing.

### 2.2.4 Soil Inoculants

Soil inoculants are bacteria or fungi that can be added to the soil to improve plant growth. Although not required, the use of soil inoculants may be considered. Mycorrhizal inoculants consist of spores, mycelium, and mycorrhizal root fragments in a solid carrier suitable for handling in dry applications. The carrier must be the material in which the inoculum was originally produced and may include organic materials, vermiculite, perlite, calcined clay or other approved materials consistent with proper application, and good plant growth.

Each endomycorrhizal inoculum will carry a supplier's guarantee of number of propagules per unit weigh or volume of bulk material. Inoculum shall contain Glomus intraradices, G.

deserticola, and G. etunicatum and have a propagule count of 120 per gram of which a minimum of 20 spores per gram present at random tested sampling. The product should be AM – 120-3 or equal or the most current quality product available and should be applied at 60 lbs/acre.

A representative 100 gram sample (from a re-mixed bag in order to obtain a homogeneous sample) will be drawn from the inoculant bags. This sample will be submitted to an authorized laboratory thirty days prior to application for verification of spore count.
If the inoculant spore-density is below specified counts, additional material will be supplied to meet specifications. Inocula will be transported and stored in areas with a temperature of less than 90 degrees Fahrenheit. A dust mask should be used when handling the material.

### 2.2.5 Mulch

Mulch may be used as a protective cover placed over the soil to retain moisture, reduce erosion, enhance germination, and reduce weed growth. Some typical forms of mulch include recycled paper, straw, and wood fiber. All mulch must be free from weeds or other foreign matter toxic to seed germination. Recycled paper mulch consists of degradable green-dyed, 100%-recycled paper products, produced from newsprint, chipboard, corrugated cardboard, or a combination of these materials.

### 2.2.6 Tackifier

Tackifiers are chemical compounds used in formulating adhesives to increase the adherence of a mulch to the soil surface. Tackifier should be an organic, plant-derived substance containing psyllium, guar gum, or cornstarch such as PT-TAC, Reclamare 2400, Ecology M-Binder, Eco-tak, FischStick or approved equal. Material shall form a transparent 3-dimensional film-like crust permeable to water and air and containing no agents toxic to seed germination.

## 2.3 IMPLEMENTATION

Revegetation work should take place in late spring or the fall, following the onset of plant dormancy.

### 2.3.1 Soil Sampling and Testing

A qualified professional familiar with soils sampling, handling, and analysis shall oversee or conduct the soil sampling. Since the landfill will be constructed and closed in phases, each landfill cell will require its own sample(s) and analysis. Parameters to be tested include at minimum the following:

> Saturation percent, Soil Texture, Infiltration Rate, pH, Conductivity, Total Dissolved Salts, Cation Exchange Capacity, Potassium, Sodium, Calcium, Magnesium, Nitrate & Phosphate, Sulfate, Chloride, Boron, Sulfur or Lime Requirement, Gypsum Requirement, Sodium Absorption Ratio, Exchangeable Sodium Percent, Organic Matter.

In the event that the proposed growth media is not suitable to support the species in the Revegetation Mix, a qualified professional will be consulted to provide proposed amendments.

### 2.3.2 Noxious Weed Control

The Noxious Weed Abatement Plan protocol will be followed as discussed in Section 2.1.1 above.

### 2.3.3 Seed Bed Preparation

Any existing strands of native vegetation need to be protected. Slopes will be track walked up and down the slope or imprinted perpendicular to the slope(s) and prevailing wind direction. Final surfaces shall be non-uniform and rough.

### 2.3.4 Application of Soil Inoculants

In the event that inoculants are used, a dust mask must be used when handling inoculants. Inoculants will be applied by hand broadcasting or with hydraulic applications. If hand broadcasting, inoculants will be incorporated by raking.

### 2.3.5 Seeding

The seed labels will be removed from the seed bags at the time of seeding to verify species in the mix and application rates. Seeding may be accomplished by drilling or hydroseeding. Drilled seed can be used for slopes 3(H):1(V) or less. Tackifier will be applied over drilled seed at the

rates listed below in Section 2.3.6. Alternatively, the seed can be applied using a hydraulic application as listed below in Section 2.3.6.

### 2.3.6 Hydraulic Applications

Soils must be moist prior to application and applied at the following rate:

| Materials | Rate |
|---|---|
| Seed | As specified |
| Mulch | 2,000 lbs/acre |
| Tackifier | 150 lbs/acre |
| Water | As needed |

A hydroseeder with a paddle wheel agitator may be used to evenly apply the mixture and keep it under suspension.

# 3.0 Post Implementation

## 3.1 MAINTENANCE

The revegetated area will be maintained and monitored for three years as part of landfill post closure maintenance following the completion of revegetation work to ensure proper establishment of vegetation and control of erosion. The revegetated area will be maintained to minimize erosion, including sheet erosion, rills, or gullies.

The revegetated area must achieve 70% desirable vegetation (i.e. seed mix species or native species that have naturally been recruited) of pre-disturbance native plant cover. Non-desirable weedy species (non-natives) will not exceed 15% of the vegetation community composition three years following revegetation implementation.

The percent of revegetation establishment will be measured annually during the three year monitoring period at a minimum of three random transects using the same methodology as used in the initial vegetation measurement (see Section 2.1). The line-point intercept method (Herrick et al, 2009) or equivalent method will be used. The results from these annual measurements will guide adaptive management techniques such as re-application of seed, soil amendments, mulches, and tackifiers or modification of the seed species composition.

## 3.2 CONTINGENCY

Supplemental treatments will be required if revegetation efforts are unsatisfactory following completion of work. This re-treatment(s) may include re-application or adjustment of the seed mix, soil amendments, soil inoculants, mulch, and tackifier.