



# *Soil and Plant Laboratory, Inc.*

[www.soilandplantlaboratory.com](http://www.soilandplantlaboratory.com)

## LANDSCAPE PREPLANT W/ SERPENTINE CONDITIONS

### BACKGROUND

The sample received was described as representing site soil to 6 inches in depth from an area scheduled for landscape installation with trees, shrubs, groundcover and coastal ornamentals.

### ANALYTICAL RESULTS

Particle size data show a clay classification by USDA standards. Silt and clay account for 70% of soil particles, this reflects a very high moisture retention capacity and slow drainage. Organic content is fair and the estimated infiltration rate is 0.15 inch per hour. Loosening the soil and increasing the organic content will help to create a more porous soil environment for the roots but irrigation management should be carefully monitored to prevent overwatering.

Reaction is slightly alkaline and within the range preferred by most landscape plants. Lime is favorably absent. Salinity, boron and sodium are safely low and the SAR value shows soluble sodium well balanced by calcium and magnesium.

Nutritional data reveal low nitrogen, phosphorous, potassium, calcium, manganese, iron and sulfate. Copper is fair with zinc sufficient. Magnesium is elevated to a level of excess that suggests the presence of serpentine conditions.

### DISCUSSION

The quality of this soil for planting purposes is questionable. Excessive magnesium can interfere with the availability of other plant nutrients required for plant health and development. Plants installed in this soil will be very susceptible to calcium deficiency which weakens the plants physiological development processes and in turn makes the plant susceptible to pests and disease. An aggressive calcium supplementation program may improve the immediate environment however some plants may simply never do well in these conditions. In addition to the magnesium issue, the high clay content of the soil creates physical conditions that are slow to dry and may subsequently be more conducive to pathogens. It is very possible that installing plants directly into this soil will result in a landscape of marginal quality.

The alternative would be to import a topsoil with better physical and chemical characteristics to be placed on top of the existing soil and for use as backfill in enlarged planting pits. Specifications for selecting a suitable topsoil are provided below for your reference. Recommendations for amending the import topsoil would be based on test results.

Methods for preparing the existing site soil without importing a better topsoil are provided with the understanding that importing a more suitable topsoil is the primary recommendation.



## LANDSCAPE PREPLANT W/ SERPENTINE CONDITIONS

### RECOMMENDATIONS

To improve drainage of the root zone the soil of any undisturbed or compacted area should first be loosened to a 10-inch depth. The following materials should then be evenly spread and thoroughly incorporated with 6-inches of soil to form a homogeneously blended layer:

#### Amount/1000 Square Feet

4 cubic yards	Nitrogen Stabilized Organic Material
10 pounds	6-20-20 Commercial Fertilizer
15 pounds	Potassium Sulfate 0-0-50 (a.k.a. Muriate of Potash)
5 pounds	Iron Sulfate*
120 pounds	Agricultural Gypsum

The above organic amendment rate is based on an organic content of 270 pounds per cubic yard and may be adjusted based on the amendment selected.

#### To prepare backfill:

- Excavate planting pits at least twice as wide as the diameter of the rootball.
- Soil immediately below the root ball should be left undisturbed to provide support but the sides and the bottom around the side should be cultivated to improve porosity.
- The top of the rootball should be at or slightly above final grade.
- The top 12-inches of backfill around the sides of the rootball of trees and shrubs may consist of the above amended soil or may be prepared as follows:

3 parts	Pulverized Site Soil
1 part	Nitrogen Stabilized Organic Amendment

Blended with 1/2 pound 6-20-20, 3/4 pound potassium sulfate, 1/4 pound iron sulfate\* and 6 pounds gypsum per cubic yard backfill.

Backfill below 12 inches required for 24-inch box or larger material **should not contain** the organic matter but should consist of native soil blended with all of the above referenced nutrients.

- Ideally a weed and turf free zone should be maintained just beyond the diameter of the planting hole. A 2-4 inch deep layer of coarse mulch can be placed around the tree or shrub. **Mulch should be kept a minimum 4 inches from the trunk.**



## LANDSCAPE PREPLANT W/ SERPENTINE CONDITIONS

- Irrigation of new plantings should take into consideration the differing texture of the rootball substrate and surrounding soil matrix to maintain adequate moisture during this critical period of establishment.

*\*Apply the iron sulfate cautiously* avoiding contact with moist concrete since staining can result.

## MAINTENANCE

General maintenance fertilization for new plantings may rely on nitrogen fertilization rotated with a complete fertilizer. During the winter, plants in need of nitrogen to maintain suitable color may respond best to calcium nitrate (15.5-0-0) applied at a rate of 6 pounds per 1000 square feet rotated with 21-7-14 at a 5-pound rate. During the warmer months, ammonium sulfate (21-0-0) is a good source of nitrogen applied at a 5-pound rate and rotated with 16-6-8 applied at a 6-pound rate. **Larger tree plantings will require a less aggressive fertilizer regime and applications at half the given rate will be sufficient.** The first application of calcium nitrate should be made 30 days after planting is complete with retreatment scheduled at 45 to 60 day intervals.

A twice-yearly application of gypsum at 40 pounds per 1000 square feet followed by a thorough irrigation will benefit the plants installed in this area. This can be done in conjunction with the fertilizer application.



LANDSCAPE PREPLANT W/ SERPENTINE CONDITIONS

IMPORT LANDSCAPE TOPSOIL SPECIFICATION GUIDELINES

PHYSICAL PROPERTIES

USDA Classification of fraction passing 2.0 mm sieve:

Designation: Silty Clay Loam, Clay Loam or Loam and must comply with the following:

<u>Class</u>	<u>Particle Size Range</u>	<u>Max %</u>	<u>Min %</u>
Coarse Sand	0.5-2.0 mm	15	0
Silt Plus Clay	<0.05 mm	50	25
<u>Other Classes</u>			
Gravel	2-13 mm	20	0
Rock	½-1 inch	10% by volume w/ none > 1 inch	
Organic		15%	0

CHEMISTRY-SUITABILITY CHARACTERISTICS

1. Salinity: Saturation Extract Conductivity (ECe) less than 3.0 dS/m @ 25° C.
2. Sodium: Sodium Adsorption Ratio (SAR) less than 6.0
3. Boron: Saturation Extract Concentration less than 1.0 ppm
4. Reaction: pH of saturated paste: 5.5 – 7.5



# Soil and Plant Laboratory, Inc.

[www.soilandplantlaboratory.com](http://www.soilandplantlaboratory.com)

LANDSCAPE PREPLANT W/ SERPENTINE CONDITIONS

## COMPREHENSIVE SOIL ANALYSIS (AO5-1, AO5-2 or AO5-3)

Sam ple #	Half Sat%/ TEC	pH/ Qual Lime	Ece	-----Parts Per Million Parts Dry Soil-----											Organic % dry wt.	Sample Description & Log Number
				NO3 N	NH4 N	PO4 P	K	Ca	Mg	Cu	Zn	Mn	Fe			
1	38 365	7.2 None	0.7	8	8	29	190	2830	2690	4.5	16	14	78	5.2	Site Soil To 6 In	

  

Sam ple #	-----Saturation Extract Values-----							---Gravel---		Percent of Sample Passing 2 mm Screen					USDA Soil Classification
	Ca me/l	Mg me/l	Na me/l	K me/l	B ppm	SO4 me/l	SAR	Coarse 5-12	Fine 2-5	Very Coarse 1-2	Med. to Coarse 0.5-1	V. Fine 0.05-.5	Silt .002-.05	Clay 0-.002	
1	2.4	4.8	1.2	0.2	0.10	1.0	0.6	5.0	3.3	3.0	4.6	21.3	28.6	42.5	Clay

Sufficiency factor (1.0=sufficient for average crop) below each nutrient value. N factor based on 200 ppm constant feed. SAR = Sodium adsorption ratio. Half Saturation %=approx field moisture capacity. Nitrogen(N), Potassium(K), Calcium(Ca) and Magnesium(Mg) by sodium chloride extraction. Phosphorus(P) by sodium bicarbonate extraction. Copper(Cu), Zinc(Zn), Manganese(Mn) & Iron(Fe) by DTPA extraction. Sat. ext. method for salinity (Ece as dS/m), Boron(B), Sulfate(SO4), Sodium(Na) and SAR. TEC(listed below Half Sat) = Est.Total Exchangeable Cations(meq/kg). Gravel fraction expressed as percent by weight of oven-dried sample passing a 12mm(1/2 inch) sieve. Particle sizes in millimeters.