San Jose Office
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Report 17-283-0104

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Attn: Robin Kim

RE: Los Medanos College, Brentwood

Background

Four samples were processed on October 10, 2017 identified as site soil from an area where new landscaping is scheduled for installation. The samples were analyzed for horticultural suitability, fertility, and physical characteristics. Fertilizer and amendment recommendations were requested. The results of the analyses are attached.

Analytical Results and Comments

The reaction of the samples ranges from slightly acidic at a pH of 6.4 in sample A to neutral at a pH of 7.0 in samples 3 and 4. These are all within the range preferred for most plants. Salinity (ECe), sodium and boron are safely low in all four samples. The sodium adsorption ratio (SAR) indicates that sodium is adequately balanced by soluble calcium and magnesium in all four samples: this balance is important for soil structure quality, which relates to the rate at which water infiltrates the soil.

According to the USDA Soil Classification system, the texture of the less than 2mm fraction of the soil is classified as loam in sample A, clay loam in sample B and clay in samples C and D. Organic matter content is low in all four samples. The 20.1% gravel present in sample B classifies it as gravelly. The 38.8% gravel present in sample C classifies it as **very gravelly.** Based on this information the estimated infiltration rate ranges from favorable at 0.31 inch per hour in sample A to moderate at 0.21 inch per hour in sample B and **slow** at 0.10 inch per hour in sample C and 0.14 inch per hour in sample D. Infiltration rates may vary due to differences in compaction across the site.

The elevated silt and clay present in all four of the samples indicates that these soils will have a **strong** potential for issues with slow drainage and high water holding capacity and irrigation timing should take this into account. Additional subdrainage is recommended for larger specimens being installed in these soils. Plant selection should take into account the strong potential for drainage issues.

In terms of soil fertility, nitrogen is low in sample C and phosphorus is low in all four samples. Potassium, calcium and magnesium are sufficient in all four samples and sulfate is low in sample B only. Of the micronutrietns; manganese is sufficient in all four samples and copper is fair in sample B while zinc and iron are low in all four samples.

Recommendations

If these soils will be used for planting purposes despite the elevated silt and clay content and potential for drainage issues, then nitrogen, phosphorus and sulfate fertilizers are recommended at the time of planting. Incorporation of a nitrogen stabilized organic amendment or composted greenwaste product is also recommended in order to improve soil nutrient holding capacity and porosity. If a composted

greenwaste amendment is chosen, that would provide additional phosphorus and potassium as well as supplemental micronutrients, product depending.

The primary symptom of zinc and iron deficiencies is a general yellowing of leaves with veins remaining green. In severe cases, leaves may become pale yellow or whitish, but veins remain green. Brown spots may develop between veins and leaf margins may turn brown. Zinc deficiencies typically appear first on older, interior leaves. Iron deficiency shows first and more severely on the newer growth at branch tips. If these symptoms are present after plant installation they may be treated with an application of a chelated micronutrient product at the manufacturer's recommended rate. Incorporation of a composted greenwaste amendment would also provide additional micronutrients and may be sufficient to negate any deficiency, product depending.

To Prepare for Mass Planting:
Drainage of the root zone should be improved by first loosening the top 10 inches of any undisturbed or compacted soil. The following materials should then be evenly spread and thoroughly blended with the top 6 inches of soil to form a homogenous layer:

Material	Amount per 1000 Square Feet	Area
Nitrogen Stabilized Organic Amendment*	5 cubic yards	All Sample Areas
Ammonium Sulfate (21-0-0)	7 pounds	Sample C Area Only
Triple Superphosphate (0-45-0)*	3 pounds	All Sample Areas

*The rate may change based on the analysis of the chosen organic amendment. This rate is based on 270 lbs. of dry weight of organic matter per cubic yard of amendment. If a composted greenwaste amendment is chosen that provides a substantial amount of phosphorus, the triple superphosphate should be reduced or omitted accordingly.

To Prepare Backfill For Trees and Shrubs:

- 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	Site Soil **All Sample Areas**
1 part	Nitrogen Stabilized Organic Amendment*

Uniformly blended with:

Amount per Cubic Yard of Backfill	
1/3 pound	Ammonium Sulfate (21-0-0) **Sample C Area Only**
1/4 pound	Triple Superphosphate (0-45-0)* **All Sample Areas**

- Backfill below 12 inches required for 24 inch box or larger material should not contain the organic amendment or ammonium sulfate but should still contain the triple superphosphate at the recommended rate.
- 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.

- 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.

Maintenance

Maintenance fertilization should rely primarily on a nitrogen only program supplemented with a complete fertilizer in the fall and spring. Beginning 45-60 days after planting in the sample C area and as plant color and growth dictates in the other sample areas, ammonium sulfate (21-0-0) should be applied at a rate of 5 pounds per 1000 square feet with reapplication every 45-60 days. Alternatively, slow release Sulfur-coated Urea (43-0-0) may be applied at 6 pounds per 1000 square feet every 90 days. Once plants are performing satisfactorily, the frequency of fertilization may be decreased depending on color and rate of growth desired. In the winter for a quick greening effect, calcium nitrate (15.5-0-0) may be applied at a 6 pound rate if applicable. Early fall and spring, substitute a complete fertilizer such as 15-15-15 to help insure continuing adequate phosphorus and potassium.

Alternatively, Blood Meal (12-0-0) provides available nitrogen fairly rapidly while materials such as Feather Meal (12-0-0), Soybean or Cotton Seed Meal (7-1-1) are slower to provide available nitrogen, but they extend the length of time they make this contribution. In order to provide a good supply of nitrogen for a 3-4 month time frame a good combination would be 6 pounds Blood Meal and 14 pounds Feather Meal per 1000 square feet. The first application should be 3-4 months after planting if soils have been amended as suggested. The long term maintenance program should consider spring and fall applications of an organic fertilizer blend such as General Purpose 5-5-5, Ringer 10-2-6 Lawn Restore or E.B. Stone 10-1-4 Lawn that would also supplement phosphorus and potassium nutrition to a greater extent.

If we can be of any further assistance, please feel free to contact us.

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Project : Los Medanos College
Brentwood

COMPREHENSIVE SOIL ANALYSIS

Report No : **17-283-0104**
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Sample Description - Sample ID	Half Sat % / TEC	pH / Qual Lime	ECe dS/m	NO_3-N ppm	NH_4-N ppm	PO_4-P ppm	K ppm	Ca ppm	Mg ppm	Cu ppm	Zn ppm	Mn ppm	Fe ppm	Organic % dry wt.	Lab No.
				Sufficiency Factors											
A	18	6.4	0.6	8	31	11	275	1867	433	1.5	1.2	31	18	2.2	23072
	136	None		1.1		0.5	1.8	0.9	1.7	1.0	0.2	2.3	0.3		
B	20	6.6	0.6	2	28	3	248	2177	721	0.9	0.7	19	7	0.9	23073
	173	None		0.8		0.1	1.3	0.9	2.2	0.4	0.1	1.1	0.1		
C	21	7.0	0.8	2	16	2	204	2253	563	1.0	0.8	8	7	1.4	23074
	161	None		0.4		0.1	1.0	0.9	1.6	0.5	0.1	0.5	0.1		
D	19	7.0	0.8	6	43	4	265	1815	534	1.2	0.8	14	12	1.7	23075
	140	None		1.3		0.2	1.5	0.8	1.8	0.7	0.1	1.0	0.2		

Saturation Extract Values						SAR	Gravel %		Percent of Sample Passing 2 mm Screen					USDA Soil Classification	Lab No.
									Sand			Silt	Clay		
Ca meq/L	Mg meq/L	Na meq/L	K meq/L	B ppm	SO_4 meq/L		Coarse 5 - 12	Fine 2 - 5	Very Coarse 1 - 2	Coarse 0.5 - 1	Med. to Very Fine 0.05 - 0.5	.002-.05	0-.002		
4.1	1.6	1.0	0.6	0.17	2.3	0.6	2.5	1.6	1.4	4.2	33.1	37.1	24.1	Loam	23072
3.9	2.3	0.7	0.5	0.12	1.3	0.4	14.2	5.9	2.6	6.0	22.5	30.4	38.4	Gravelly Clay Loam	23073
5.6	2.7	0.9	0.5	0.13	1.7	0.4	25.9	12.9	4.6	6.8	19.7	28.4	40.4	Very Gravelly Clay	23074
6.6	2.9	0.5	0.6	0.09	2.0	0.2	5.4	4.2	1.8	3.8	21.5	28.4	44.4	Clay	23075

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(SO_4), Sodium(Na). Gravel fraction expressed as percent by weight of oven-dried sample passing a 12mm(1/2 inch) sieve. Particle sizes in millimeters. Organic percentage determined by Walkley-Black or Loss on Ignition.

* LOW , SUFFICIENT , HIGH