



Anaheim office
Lab No: 16-043-0021
February 24, 2016

GeoTek Inc.
710 E. Parkridge Ave.
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Attn: David Benson

NEWPORT RANCH JOB #1414-CR

Attached are the results of the analyses performed on three soil samples that were collected from the above mentioned project site by the client and received by our laboratory on February 12, 2016. These samples were analyzed in preparation for a new landscape installation.

Analytical Results:

Salinity (ECe) is elevated in the 'B-1' sample at 4.4 dS/m and in the 'B-2' sample at 2.9 dS/m. This could cause some plants to show burning of foliage, beginning on the oldest growth. In the 'B-1' sample, elevated soluble calcium is the greatest contributor to salinity while magnesium and sodium contribute to a lesser extent. In the 'B-2' sample, soluble sodium is the greatest contributor to the salinity level while high nitrogen also contributes. In both samples, sodium is properly balanced by calcium and magnesium in regards to its effect on soil structure and water infiltration, as indicated by the favorably low sodium adsorption ratio (SAR) values.

In order to reduce salinity in the root zone in both areas, thorough leaching irrigations should be applied. In the 'B-1' area, we estimate that approximately 1 ½ inches of water should move through the soil profile. In the 'B-2' area, two or three irrigations should be sufficient. Drainage must be sufficient for leaching to be effective. The soil should be allowed to dry slightly between irrigations to avoid creating anaerobic soil conditions.

Salinity and SAR values are safely low in the 'B-7' sample. Boron is safely low, yet sufficient for plant nutrition, in all three samples.

Nitrogen is low in the 'B-1' sample. In the 'B-2' sample, nitrogen is high and will likely remain sufficient for plant nutrition, even after leaching. Nitrogen is optimum in the 'B-7' sample. Phosphorous is sufficient for plant nutrition throughout and, in fact, will not require addition in the 'B-1' and 'B-7' areas for at least a year and probably longer. Potassium is ample throughout and will not require addition in any of these areas for at least a year. Calcium is sufficient in the 'B-1' sample and low in the 'B-2' and 'B-7' samples. Magnesium is well supplied throughout. Copper and zinc, though not problematically high, will not require addition for at least a year in any of these areas. Manganese and iron are at good levels for plant nutrition. The organic content of the soil at this site is low, ranging from 0.4% to 1.5% of the soil by total dry weight.

The texture of the soil at the site ranges from 'sandy loam' to 'loam' with an average estimated water infiltration rate of 0.30 inches per hour. The actual rate of water infiltration may vary with the degree of soil compaction.

Analytical Results Continued

The 'B-1' sample is slightly alkaline at 7.2 on the pH scale, which is suitable for a broad range of plants and no pH adjustment is recommended for that area.

The other two samples are moderately alkaline, each with a pH value of 7.7. This could cause some plants to show yellowing of younger foliage. Qualitative lime is low to absent, indicating that the soil is weakly buffered against downward pH changes. Incorporating soil sulfur at the provided rate and depth in those areas will adjust the soil pH downward. However, that change will happen slowly and only as deeply as sulfur is incorporated. Plants that are chosen for those areas should have some tolerance for alkaline soil conditions.

Recommendations

Surface Soil Preparation for Turf, Groundcover and Mass Planting

If feasible, prior to amending the areas where severe compaction exists, the surface soil should be ripped or tilled to a 9-inch depth. Uniformly broadcast and blend the following with existing soil to a 6-inch depth.

Materials	Amount per 1000 sq.ft.	Sample Location(s)
Nitrogen fortified organic amendment (compost* or redwood or fir sawdust)	4 cu. yards	All sample locations
Soil sulfur	10 lbs.	'B-2' and 'B-7'
Gypsum	50 lbs.	'B-2' and 'B-7'
Ammonium sulfate (21-0-0)	7 lbs.	'B-1'

*Rates and fertilizers may have to be adjusted depending on analysis of selected compost.

Tree and Shrub Planting Guidelines

1. Excavate planting pits at least twice the diameter of the rootball.
2. The top of the rootball should be at or slightly above final grade.
3. To improve soil chemistry, uniformly blend 1 lb. of iron sulfate per cubic yard of backfill soil in the 'B-2' and 'B-7' areas. Handle iron sulfate with caution since it will severely stain moist concrete.
4. Uniformly blend 2 lbs. of gypsum per cu. yd. of backfill soil in the 'B-2' and 'B-7' areas.
5. Organic material is not required in the backfill; however if you wish, the amended surface soil or a soil blend consisting of no more than 20% by volume organic matter can be placed in the upper 12 inches of backfill only. Soil below this depth should not contain any added organic matter because of the threat of plant disease and/or anaerobic soil conditions developing.

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Tree and Shrub Planting Guidelines Continued

6. Place slow release fertilizer tablets in the upper 12 inches of backfill at manufacturer's recommended rates. If fertilizer amended soil is used as a backfill the addition of slow release fertilizer tablets is not necessary.
7. Do not cover the original rootball with other soil. Ideally, a temporary soil berm is often constructed around the outer edge of the rootball to help channel water into the rootball and then into surrounding soil until roots are established in the backfill and the rootball is no longer the sole source of water for the plant.
8. Ideally, a weed and turf free zone, preferably 2-3 ft. in diameter, 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 4-6 inches from the trunk.

Maintenance Fertilization

For turf, groundcover and mass planting areas, uniformly broadcast sulfur coated urea at the rate of 5 lbs. per 1000 sq. ft. The first application should occur approximately 45 days after planting, with repeat applications every 60-90 days or as growth and color dictate. In early fall and spring, make an application of triple superphosphate (0-45-0) in the 'B-2' area at the rate of 3 lbs. per 1000 sq. ft. to ensure a continuing supply of phosphorus in that area. Tree and shrub plantings can be maintained with the above fertilizers; however, the frequency between applications should be every 120 days, with the first application 90 days after planting. Follow each fertilization with a thorough irrigation. When plants have become well established, fertilizer applications can be less frequent.

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



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Project : Newport Ranch
Job: #1414-CR

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Page : 1 of 1

COMPREHENSIVE SOIL ANALYSIS

Sample Description - Sample ID	Half Sat %	pH	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.
	TEC	Qual Lime		Sufficiency Factors											
B-1 @ 0-5'	15	7.2	4.4	2	5	96	492	819	199	4.8	8.4	12	54	1.5	30454
	59	Low		0.2	5.3	5.0	0.8	1.5	6.3	2.8	1.8	1.9			
B-2 @ 2.5'	13	7.7	2.9	61	294	12	338	385	142	10.8	14.3	12	14	0.4	30455
	58	None		14.1	0.8	4.1	0.4	1.2	15.2	5.2	2.0	0.5			
B-7 @ 0-2.5'	18	7.7	2.1	18	32	62	965	622	214	6.0	6.7	8	34	1.1	30456
	73	Low		1.4	2.9	8.3	0.5	1.3	6.3	1.8	1.0	0.9			

Saturation Extract Values						SAR	Gravel %		Percent of Sample Passing 2 mm Screen					USDA Soil Classification	Lab No.
Ca meq/L	Mg meq/L	Na meq/L	K meq/L	B ppm	SO ₄ meq/L		Coarse 5 - 12	Fine 2 - 5	Sand			Silt .002-.05	Clay 0-.002		
								Very Coarse 1 - 2	Coarse 0.5 - 1	Med. to Very Fine 0.05 - 0.5					
31.6	15.5	19.1	2.2	0.59	21.2	3.9	0.3	2.0	8.6	11.2	30.2	28.8	21.0	Loam	30454
13.4	8.2	16.2	2.5	0.55	7.8	4.9	0	5.3	9.0	11.6	37.4	28.8	13.0	Sandy Loam	30455
5.3	3.9	7.4	5.7	0.65	7.5	3.4	1.4	5.6	6.0	9.4	28.6	34.8	21.0	Loam	30456

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). 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