Soil Parameter	Acceptable	Ideal	Non Ideal - Possibly Toxic	Notes
pH	5.8-8.4	6.0-7.5	<5.8 and >8.5	Low pH is corrected by addition of lime or other pH raising amendment. The lab can test the soil, using the buffer pH test, to inform the rate needed to raise the pH. analysis). High pH is difficult and typically unnecessary to correct. Rather, the main impact is nutrient availability, which can be addressed by relatively higher fertilizer rates based on soil test.
EC, dS/m	<4	<1	>4	The salt concentration can be lowered by leaching with good quality water (note: if there are also sodium problems, these need to be corrected first). Labs use different units when reporting EC--use the following conversions if needed: 1dS/m = 1mS/cm = 1mmho/cm = 1000 µS/cm = 640 ppm.
$CaCO_3$ (calcareousness), %	<15	<1	>15	Removing the carbonates from soil and water is done through addition of acid materials, but this is typically not practical or affordable. One of the main impacts of the limestone is lowering the availability of nutrients in the soil and, thus, relatively higher fertilizer (phosphorus, zinc, iron, manganese, and copper) are needed based on soil tests.
SAR[3] (ESP)	<13 (<15)	<4 (<5)	>13 (>15)	The ratio of sodium can be lowered by adding a soluble calcium source, most commonly gypsum. Soil test labs can perform tests to determine the rate needed.
OM, %	>1.0	>3.0	N/A	
Sand %[4]	<85%	<75%	N/A	
Silt/Clay ratio	<2 if total of two is 25-35% (ratio is not critical if outside this range)			
CEC[5],	>12	15-25	N/A	
color	all	red, brown, black (avoid gray & yellow if possible)	N/A	
aggregate (5-20 mm) stability, not dispersed (cloudy)	>30 seconds	>30 minutes	N/A	
Saturated Infiltration Rate (as measured after 3 full irrigations)	>0.2 inch/hour	>0.6 inch/hour	<0.1 inch/hour	difficult to correct; select different soil
Subsoil drainage rate	>0.04 inch/hour	>0.1 inch/hour	<0.01 inch/hour	difficult to correct; select different soil
Bulk Density, g/cm^3	1.3-1.6	1.3-1.5	< 1.0 and >1.7-1.8	correct with tillage, but does not always correct problem permanently
NO_3-N[6], ppm	typically 5-15, but plants will often tolerate high levels as long as the salt level doesn't become too high; high levels represent increasing environmental risk		see EC	add fertilizer to meet plant needs
P - Bicarbonate, ppm	<50	10-30	>50	add fertilizer to meet plant needs; if P is high = environmental problems
P - Bray P1, ppm (only noncalcareous)	<100	15-45	>100	add fertilizer to meet plant needs; if P is high = environmental problems
P - Mehlich 3, ppm (only noncalcareous)	<100	17-50	>100	add fertilizer to meet plant needs; if P is high = environmental problems
K, ppm	any	>150	N/A	add fertilizer to meet plant needs
Ca, ppm	any	>500	N/A	add fertilizer to meet plant needs
Mg, ppm	50-800	100-800	N/A	add fertilizer to meet plant needs
Na	see SAR (ESP)			
S[7], ppm	any	<200	see EC	add fertilizer to meet plant needs
Zn, ppm	>1.0	<1.0-5.0	>100?	add fertilizer to meet plant needs if value is low; if too high then reject soil
Fe, ppm	>4	>6 (and pH <7.2 or tolerant species)	Unlikely	Unlike most other soil tests, the test for iron is very poorly calibrated to plant nutrition.
Mn, ppm	>6	>8	>80?	add fertilizer to meet plant needs if value is low; if too high then reject soil
Cu, ppm	0.2-2.0	0.4-2.0	>20?	add fertilizer to meet plant needs if value is low; if too high then reject soil
B, ppm	0.8-2.0	1-2	>2-4	add fertilizer to meet plant needs if value is low; if too high leach B from soil
Cl, ppm	any	12-175	>175-700	add fertilizer to meet plant needs if value is low; if too high leach Cl from soil
*Al, ppm	1.0-10	0	>10-20	if high, raise soil pH to greater than 5.5 with lime (see pH)

[1]Al becomes soluble at pH < 5.5 and, therefore, toxicity can occur if the pH is very low AND Al is toxic. However, some plants do very well at low pH.

2Sodic soils (SAR >12) generally have pH >8.5. The problem with sodic soils isn't high pH, but rather Na. If pH is >~9, then the pH can be toxic to plants.

[3]SAR is a more accurate measure than ESP. ESP is less costly and is often what is shown on a soil test report. Use ESP as a general guide, but request SAR if the ESP is high.

[4]Not applicable for USGA and ASTM spec golf/sports turf fields.

[5]Acceptable to use estimated CEC method (sum of cations) for noncalcareous soils. Calcareous soils require actual CEC measurement.

[6]Unlike most other soil tests, soil nitrate concentrations fluctuate with water movement, plant growth, temperature, and so forth. Nitrate testing can be used to evaluate how much is there at any one point of time, but it is not predictive of season long availability. It is best to establish a nitrogen fertilization schedule that is acceptable and follow it. If the nitrate value is high, this can be considered and the next application rate reduced. In terms of toxicity, nitrate is a salt and if the concentration of this nutrient is too high, then the EC can be high and possibly toxic.

7Similar to nitrate, the soil sulfate concentration fluctuates and is not very reliable in terms of predicting season long sulfur availability. The soil organic matter (OM) is often a better predcitor of liklihood of sulfur fertilizer response. Unless the soil and/or water is very high in sulfur, it is best to establish a fertilization schedule based on OM content. OM <2% more likely to respond to fertilization. In terms of toxicity, sulfate is a soluble salt and if the concentration of this nutrient is too high, then EC can be high and possibly toxic.