SP5800000 LANDSCAPING
COMMENTS FROM INTERNAL/INDUSTRY REVIEW

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Comments: (11-20-18, Internal)
I have concern with the addition below.

580-2.5 Soil Enhancement:

580-2.5.1 *Enhance soil in accordance with the Contract Documents.*

580-2.5.2 *Excavate and dispose of existing soil in accordance with the Contract Documents. Provide landscape soil meeting the requirements of Section 987. Place landscape soil in no greater than 12 inch, non-mechanically compacted lifts.*

This should be project specific and done as a plan note, putting it in the overall specs will make it to confusing as to when is it required. Also need to make sure this is not for sod.

Response:

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Jeff Norcini

Comments: (11-29-18, Internal)
Based on input from Cheryl Mackowiak and soil specs written by Ed Gilman, Jim Urban, FASLA, and Brian Kempf and Tyson Carroll of the Urban Tree Foundation, it seems that the % organic matter (on a dry weight basis) of a landscape soil mix should be 2.5 to 4%. Cheryl noted that "…we try aiming for 2 to 3% organic matter…[since] it is often not possible to reach 3% (rate of C mineralization* greater than C deposition), while Ed noted 2.75 to 4%. Based on what Cheryl said about mineralization, you might start out at 4% OM but that's not sustainable over the long term in our soils.

My concern, however, and I think that this issue was raised before, is the narrow range for % OM. We could aim for 2-5%, but nothing higher based on Cheryl's comments.

**Note: Mineralization – the breakdown of the chemical components of organic matter to CO2, water, and other inorganic compounds*

Tree anchorage and the likelihood of a tree falling over is complex issue that's affected more than by soil type and % OM. The two articles that Cheryl sent do a good job of explaining the intricacies.

Response:

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Chery Machowiak

Comments: (11-28-18, Internal)

I attached a couple of reprints that may come in handy. The first showed that conifers on organic soils (peat soils) actually did better than on gleyed (naturally saturated mineral soils) for holding tees. The second report is a great (at least I learned a thing or two!) review the type of uprooting that can occur and the factors involved. Page 6 begins the section you will be most interested in. They make a general statement that gleyed and organic soils may have more uprooting, but the citations are quite old. I think non-wetland trees in a gleyed soil will uproot much more likely than the same tree in an organic soil. I like the first paper for explaining how they got the results that they did.

I agree with the second paper that anything inhibiting deep root penetration will be more likely to lead to uprooted trees. Hurricane Michael really gave us a recent example of under what conditions that occurred. I have several uprooted trees on my property (live oaks, pecans and a spruce pine). In all cases, the roots looked kind of shallow, likely due to a shallow hardpan and wetter/more gleyed like soils. Also, those trees with lots of leaves (full canopy vs open canopy), seemed more susceptible to uprooting under high wind.

I cannot think of a situation where adding organic matter to a Florida mineral soil will weaken root anchoring. I only see it helping. Trees growing in muck soils (the natives) already compensate by their buttressing nature. None of my gum trees came down.

Now to address the suggested organic matter content, below. That is just ridiculously high! Organic matter over 5% is considered an organic soil (not a mineral soil). Therefore, in site plantings, I would think that they would want to aim to keep organic matter closer to what it is in nature (maybe add some extra to help hold moisture and nutrients). Only muck soils would be that high. At best, we try aiming for 2 to 3% organic matter, but it is often not possible to reach 3% (rate of C mineralization greater than C deposition).

To summarize, I think the organic matter requirement is excessive for reasons beyond tree/shrub anchorage. I doubt it will have much of an affect on tree anchorage unless the root growth is impeded, lets say because they are having rewetting issues with the high organic matter soils. (:

Ed Gilman et al (https://hort.ifas.ufl.edu/woody/details-specs.shtml)

Dr. Ed Gilman from University of Florida, Jim Urban, FASLA, and Brian Kempf and Tyson Carroll of the Urban Tree Foundation have developed a modern, up to date and peer reviewed set of details and specifications in AutoCAD and PDF formats for the green industry. These are designed specifically for landscape architects, engineers, architects, contractors, urban foresters, arborists, municipalities and state agencies. All are open source, free and can be edited by the user. You and your colleagues are free to use them in projects without charge and without credit to the Urban Tree Foundation or any of the project team members. Although we encourage modification to fit your specific site and project needs, make your changes only after carefully considering all the pertinent variables at the planting site.

From: 32 9100 Planting Soil
https://hort.ifas.ufl.edu/woody/CDF%20Education%20Grant/Specification/PDF's/UTF%20Planting%20Soil%20Final%20Version.pdf

1.9
F. Drainage: The rate at which soil water moves through the soil transitioning the soil from saturated condition to field capacity. Most often expressed as saturated hydraulic conductivity (Ksat; units are inches per hour). Note to specifier: The following is a general introduction to soil drainage terminology and is intended for the benefit of the specifier only. Do not include the following information in the completed specifications. The drainage rate of any soil is also influenced by the drainage rate of the soil lower in the profile. A compacted hard pan or Cliché layer below a free drainage soil can create poor drainage in the upper soil profile. To understand soil drainage one must investigate the total profile. Measured drainage rates are also highly influenced by soil compaction particularly in installed soil. A soil that drains at 1 inch per hour at 200 psi might become anaerobic if compacted to 350 psi. The amount of organic matter also influences drainage particularly if the organic matter is the result of adding Compost to the soil. A little Compost (10% by volume) will almost always increase drainage, but at higher amounts of Compost above 20% by volume will begin to slow drainage in the lower level of the profile because the Compost also holds water. In general it is not advisable to add much Compost to Planting Soil Mixes that are to be placed deeper than 12 inches but lots of Compost can be added to the upper 6 inches of the soil profile

My comment: The above specs are based on % compost by volume, not by weight; in a soil test, as Ben noted, % OM is a ratio based on weight

2.1. IMPORTED TOPSOIL A. Imported Topsoil definition: Fertile, friable soil containing less than 5% total volume of the combination of subsoil, refuse, roots larger than 1 inch diameter, heavy, sticky or stiff clay, stones larger than 2 inches in diameter, noxious seeds, sticks, brush, litter, or any substances deleterious to plant growth. The percent (%) of the above objects shall be controlled by source selection not by screening the soil. Topsoil shall be suitable for the germination of seeds and the support of vegetative growth. Imported Topsoil shall not contain weed seeds in quantities that cause noticeable weed infestations in the final planting beds. Imported Topsoil shall meet the following physical and chemical criteria:
Note to specifier: Make adjustments in the following to account for the fact that these ideal soils may not be available in your area.
1. Soil texture: USDA loam, sandy clay loam or sandy loam with clay content between 15 and 25%. And a combined clay/silt content of no more than 55%.
2. pH value shall be between 5.5 and 7.0.
3. Percent organic matter (OM): 2.0-5.0%, by dry weight.
4. Soluble salt level: Less than 2 mmho/cm.
5. Soil chemistry suitable for growing the plants specified.

2.6 EXISTING SOIL (Acceptable for planting with minimum modifications) Note to specifier: If existing soil is to be retained and reused, it is prudent to document the condition of this soil prior to the start of construction. Documentation (called a soil report) should include standard agricultural chemical soil testing, soil profile condition, as well as documenting soil penetration resistance to anticipated rooting depth. Such testing is typically already needed in order to make the decision of reusing this resource and the testing and observations can easily be inserted into this section of the specification.

Undisturbed soil or soil with minor disturbance to soil profiles (e.g. farming) has at least two of the following attributes:
A. Site soils not excessively graded or not compacted at root limiting or above.
B. Soils previously disturbed have a restored A horizon (min 2.5% organic matter dry weight) at least 6 inches deep and B and/or C horizons that drain and have acceptable compaction.
C. Soils are currently supporting mature tree and or large shrub growth with high vitality.
D. Sufficient soil volumes meeting the above criteria above rock or other limiting structures to support the proposed plants.

In addition to the above, the soil organic matter, pH, and chemistry in the A horizon should be suitable for the proposed plants, or may need to be modified if required. In dry climates and sandy soils plants are often adapted to grow in soil with very low organic matter and high pH. Raising the organic matter too high or lowering the pH may negatively impact native or adapted plant performance.

2.8 PLANTING SOIL MIXES
Note to specifier: The subject of Planting Soil Mixes is quite complex and requires significant information about the goals of the planting. Mixes can include free draining high use turf planting soil mixes, bio-retention mixes, specialty mixes for palm planting or slow draining mixes designed to reduce water use and maintenance. The specifier will need to design the Planting Soil Mix that is best for each part of the project. The following specification is for a moderately slow draining Mix that would be good for trees and shrubs and can serve as a template for other mixes. The key adjustment for most applications is to change the proportion Topsoil/Coarse Sand and Compost. Local suppliers may also have their own specification or Mix design. These can be inserted into this specification. Note that the topsoil and planting mix is not to be screened or mixed in a sol blending machine. Screening and blending breaks down important topsoil peds and reduces drainage in the soil. Machine blended and screened mixes typically will require more sand
A. General definition: Mixes of Existing Soil or Imported Topsoil, Coarse Sand, and or Compost to make a new soil that meets the project goals for the indicated planting area. These may be mixed off site or onsite, and will vary in Mix components and proportions as indicated.
B. Planting Mix - moderately slow draining soil for trees and shrub beds
1. A Mix of Imported Topsoil, Coarse Sand and Compost. The approximate Mix ratio shall be:

Mix component % by moist volume	
Imported Topsoil unscreened	45-50%
Coarse sand	40-45%
Compost	10%

2. Final tested organic matter between 2.75 and 4% (by dry weight).
3. Mix the Coarse Sand and Compost together first and then add to the Topsoil. Mix with a loader bucket to loosely incorporate the Topsoil into the Coarse Sand/Compost Mix. DO NOT OVER
MIX! Do not mix with a soil blending machine. Do not screen the soil. Clumps of Soil, Compost and Coarse Sand will be permitted in the overall Mix.
4. At the time of final grading, add fertilizer if required to the Planting Soil at rates recommended by the testing results for the plants to be grown
5. Provide a two gallon sample with testing data that includes recommendations for chemical additives for the types of plants to be grown. Samples and testing data shall be submitted at the same

time.

Response:

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