

August 14, 2008

Mr. Joshua L. Martin, Director  
Department of Planning, Preservation, and Economic Innovation  
City of Charleston  
75 Calhoun Street, Third Floor  
Charleston, SC 29401

**Re:** Angel Oak Village Plans; Grading and Drainage Plan and Drainage Report, 6-24-08; Tree Variance Master Plan, 7-16-08

Dear Mr. Martin:

As you are aware, I have served as the principal arboricultural advisor for evaluating, planning, and designing the tree conservation and protection plan at the proposed Angel Oak Village Planned Unit Development on Johns Island. Dr. James Gregory, Principal of Watershed Hydrology Consultants LLC, is advising on hydrology, stormwater management, wetlands, and soils issues related to the site development. The initial objective for Dr. Gregory and me was to collaborate with the Angel Oak Village planning and design team to develop strategies that would ensure that the Angel Oak was not damaged or negatively impacted by development on the adjacent site.

**Protection/Conservation Area Around the Angel Oak:**

Typically, development and construction impacts on trees are related to mechanical damage to root systems and above ground portions of trees; altered soil aeration resulting from soil compaction, soil fill, and paving; soil contamination; and changed water availability, either too little or too much. The preferred means of avoiding all those impacts, except changed water availability, is to exclude all development or construction activity from a critical root zone (CRZ) or undisturbed tree protection zone (TPZ) around a tree. The current arboricultural standard is to establish a TPZ radius equal to 1.5 feet for each inch of trunk diameter measured at 54 inches above ground. Construction can occur closer to a tree, but doing so requires implementing special approaches and treatments and increases the risk of tree damage.

For the Angel Oak, that standard recommendation would establish a TPZ radius of approximately 150 feet. The current boundaries of Angel Oak Park (which is slightly more than two acres) are 200 feet to the north of the tree, 100 feet to the south, and 150 feet to the east and the west. The development team committed to establishing an additional 150 feet of buffer around the west, north, and east sides of the park. Further, approximately three additional acres will remain relatively undisturbed in a conservation area immediately west of the buffer, extending the protection zone an additional 240 feet at its narrowest point. As a result, the Angel Oak will remain 300 feet from possible construction activity to the east and between 350 and 540 feet to the north and west, significantly exceeding the recommended TPZ radius of 150 feet.

The rather large area around the Angel Oak (over nine acres, including the current Park) that will remain essentially undisturbed ensures that no damage will occur to the Angel Oak during construction. Further, the size of the area is sufficient to allow its continued ecological functions, including soil water infiltration around the Angel Oak.

**Hydrological Issues**

The Angel Oak and the other trees that will be conserved on the Angel Oak Village site are adapted to the existing water regimes of the site. A significant objective of this project is to preclude any negative impacts on soil water availability and the groundwater regime. Dr. Gregory is working with the planning and design team to implement an innovative stormwater management system that will promote retention and infiltration of stormwater to maintain the pre-construction water table regime and soil water availability to the Angel Oak and other trees to be conserved on the development site. Dr. Gregory has provided you with details on this,

and I concur with his assessment that the system as designed and proposed in the Stormwater System Management Plan completed by HLA and the Angel Oak Village development team will meet our objective.

### **Conservation of Grand and Other Protected Trees**

The development team is committed to conserving as many grand and other protected trees as possible. Obviously, all of the trees in the buffer area around Angel Oak Park will be conserved as will essentially all trees in the conservation area west of the Park. However, the development team recognized that conserving grand trees on the portion of the site to be developed would require special arboricultural expertise and experience. Local arborist P. O. Mead conducted some early tree evaluations, and after I joined the team in 2007, he and I jointly revisited and assessed the 94 grand trees that were identified on that "built" portion of the site.

My assessment focused on tree health and tree structure issues that could potentially damage future buildings and property and injure people using the area post development. I categorized the trees as worthy of keeping, needing to be re-inspected (depending on proximity to specific design/development details), or needing to be removed because of poor health or structure if close to future structures or occupied areas. Additionally, some trees were recommended for removal because they were dead or did not meet the City's definition of a grand tree (those having a trunk dbh of 24 inches or more, including those with multiple trunks whose cumulative dbh equals or exceeds 24 inches).

My initial assessment included 32 trees that I recommended worthy of keeping or re-inspecting and potentially keeping, depending on location in the development. I also recommended that 62 trees should be removed, either because they were dead, were not grand trees (per Eric Schultz), or would present potential hazards and liabilities if ultimately close to structures or users in the development. Following my assessment, Mr. Schultz and I visited the site together and observed approximately one-half of the trees that I had evaluated. Of those trees, we were in total agreement on the recommendations except for one, which Mr. Schultz suggested moving from the "re-inspect" to the "keep" category.

I believe the "removal" recommendation number was rather high because the trees are generally not high quality or well-formed. Many of the trees have multiple stems that make them inherently prone to failure as they mature. Further, many of the trees have been damaged in past years by Hugo and other storms that caused broken tops, resulting weakly attached sprout growth, and various wounds that developed significant decay. Despite these negative aspects, not all trees designated as "remove" will be removed. A number will be in the conserved wetlands or other areas, where they will pose no liability after development.

I am continuing to collaborate with the planning and design team to refine design ideas, including attempts to connect tree conservation areas, and tree protection approaches and treatments that will minimize construction impacts on trees that are conserved. Additionally, we will implement rigorous construction and tree protection monitoring standards during the construction phases to minimize harm to trees that are being conserved.

### **Further Considerations to Benefit the Angel Oak**

No development will occur south of the Angel Oak Park, but some ideas have evolved and initial discussions have taken place between the development team and the City to consider some changes to Angel Oak Park that would reduce the non-development related human impacts to the tree. The ideas include:

- Closing or rerouting Angel Oak Road to the south of the tree to provide at least an additional 100 feet of conservation area on the south side.
- Moving the entrance drive, parking lot, and visitor building further away from the tree to prevent future soil compaction in the root zone of the tree; mitigate the soil compaction in these areas with an Air Spade or other appropriate device.
- Review design ideas that would improve visitor experience around the tree but not promote soil compaction or other negative impacts.

The development team members have been pioneers on this project and have openly supported recommendations that have exceeded requirements of the current ordinance. Essentially, the arboricultural assessments and recommendations have steered the hydrology planning and the site design. I am very confident that our primary objective of ensuring that no construction activities or post construction conditions damage the Angel Oak will be met. Additionally, those very efforts have also resulted in conserving larger

tree or forested areas that will continue to be ecologically functional. We estimate conserving nearly double the average number of trees per acre for the entire site than is required by the current ordinance. Further, using only the conservation, buffer, and wetland areas in the calculation, the estimated canopy coverage exceeds 26% for the entire site. That percentage is probably higher than what will be required for areas zoned like Angel Oak Village when the new tree protection ordinance, currently under development, is implemented. Conserving large areas of trees is especially gratifying, since that will be a primary objective of the new Charleston City tree protection ordinance.

I will continue to work with the team to maximize conservation of other trees on the development site through the design and implementation phases. If you have questions, please contact me.

Sincerely,

A handwritten signature in cursive script that reads "Donald L. Ham".

Donald L. Ham  
Principal