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Ms. JoAnn Hanson
Planning Board Chair
Village of Tuxedo Park
80 Lorillard
Tuxedo Park, NY 10987

RE: Review of Visual Simulations
The Witte Residence
Village of Tuxedo Park
Orange County, New York

Dear Ms. Hanson:

The Village of Tuxedo Park asked my office to review materials submitted as a part of the application for the Witte residence, especially focusing on the visual simulations contained therein, and to comment on their accuracy. This letter is a summary of my opinion of the quality of those materials.

Summary

The visual simulations found in the application appear to be an accurate expression of intent of the designer, but cannot be considered verifiable. This means that the actual appearance of the house may be quite different than that which is shown in the visual simulations found in the application. If the Planning Board wants to see simulations that are a more reliable representation of the proposal, other techniques summarized below can be used to produce such materials.

Specific Findings

The materials I reviewed are a part of an eight page packet labeled Exhibit 2 and dated August 4, 2008. I also spoke with the landscape architect from Esposito & Associates who produced the materials found in the packet to get clarification on how the materials were produced.

The last two pages of the packet I reviewed contain visual simulations showing the site across from Tuxedo Lake. My comments in this letter refer to these visual simulations and their accuracy. A reproduction of a portion of Visual Simulation 1 (Figure 8) appears below, with annotation I have added.

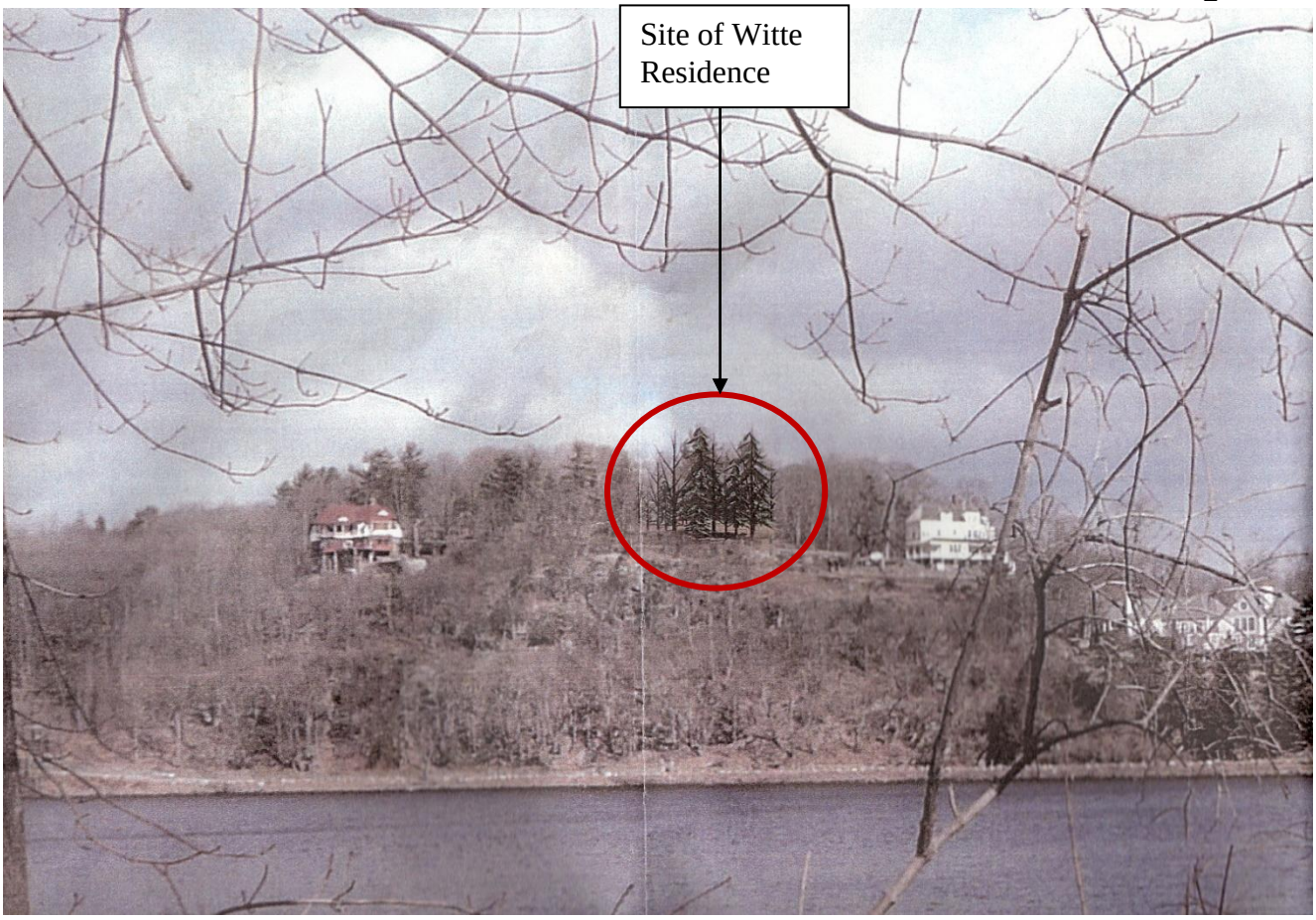

Figure 1: Reproduction of a portion of Visual Simulation 1 found in application (annotation added)

The visual simulation shows that the house that is proposed is nearly completely obscured by existing trees. These trees are shown as computer generated trees, which have a different visual quality than the surrounding trees in the photosimulation. Visual Simulation 2 is materially similar to Visual Simulation 1 and shows a similar result from a nearby viewpoint.

The process of making the visual simulations is detailed on Figures 5 and 6 of the packet I reviewed. In summary, a digital 3D model of the proposed residence was modeled and placed onto a graded terrain model of the site. Existing trees on the site were represented by computer generated trees and reflect the location, height and species of trees found on the site and nearby. This 3D model was then rendered and superimposed on the existing conditions photograph to show proposed conditions.

I believe that these simulations are a reflection of design intent, but cannot be considered verifiable and should not be used as definitive evidence as to how the house may appear from the viewpoints analyzed. This is especially true as it regards the visibility of the house from across the lake, and the possibility that the house will break the forested ridgeline.

Simply, the landscape architect did not have the tools required to produce what are known as "verifiable digital photomontages," (e.g. photosimulations) nor the experience using these tools to produce verifiable photosimulations. These tools allow the 3D model of the action to be rendered from the exact same location and lens used to take the photograph, and to be matched to and existing conditions photograph using references that exist in both the 2D photograph and the 3D model. Separately, the representation of existing trees with computer generated trees is non-standard and potentially misleading.

Should the Planning Board need to make any decisions regarding the visibility of the action from across the lake, or regarding the action breaking the existing forested ridgeline, these materials should not be used as a part of that decision-making process. Photosimulations produced as verifiable digital photomontages can be produced to help in this decision-making process. Attached to this letter is a description of the process used to produce such photosimulations.

Close

To be clear, the materials found in the packet are good. They provide excellent information on the project site, existing visual quality, essential information on the project that is proposed, and the intent of the designer regarding the visibility of the house from points across the lake. Nevertheless, Visual Simulations 1 and 2 should be considered artist's interpretations, not verifiable photosimulations, and should not be used in decision-making regarding building visibility or the affect on the ridge. A different, more involved, process--which is described in the attached--would be required to produce verifiable simulations.

Should you have any questions or comments please do not hesitate to contact me.

Sincerely,

George M. Janes, AICP
Principal

Verifiable digital photomontage

To meet standards regarding accuracy and verifiability for decision-making, photosimulations must be performed as "verifiable digital photomontages." Verifiable digital photomontage is a technique that merges an existing conditions photograph with an elevated, 3D computer model of a proposed action. It is "verifiable" since a computer model of the action can be measured and its placement in the terrain checked for accuracy. A key part of making a photosimulation verifiable is the use of references that exist in both the existing conditions photograph and in the 3D model. References ensure that the computer camera used with the 3D computer model matches the camera used to take the photograph, adjusting to proper location, pitch, roll, yaw and lens.

In built-up areas, references are usually existing buildings that can be seen in the photographs of existing conditions, and which are then included into the 3D computer model of the action for camera match purposes. In rural areas, these elements are usually added to the scene before photographs are taken. Cranes, balloons or other elements of a known size, shape and location are placed into the scene and the photograph is taken with these elements in the scene. These same elements are built into the 3D model and the photo and the model are matched to these known points. Common rural elements such as tree lines or ridges are not considered to be acceptable references.

The actual references to be used for any photosimulation will vary and they are typically left to the discretion of the professional who produces the simulation. In the case of the Witte residence, the nearby houses or introduced references would be acceptable. The applicant should ensure that at least three match points are used when using high accuracy GPS systems to record reference location, or five if less accurate consumer grade GPS systems are used to locate the references.

Representation of the action

The photosimulations should represent the action using photorealistic textures that accurately portray the color and materials used in the proposed action. The sunlight in the simulations should be set to the same day and time as when the photographs were taken. Software used to render the action should support a computer camera that can mimic the lens and location of the camera used to take the existing conditions photograph to ensure that the action is rendered from the exact same perspective.

Existing trees should be represented by trees that can be seen in the existing conditions photograph, not computer generated trees. Properly representing how the residence will filter through this existing vegetation will require a high resolution photography and perhaps survey work to relate the trees to remain and those to be removed with those in the photograph. Still, the filtering of the action through existing vegetation is a part of the simulation that maintains an element of artistry, meaning that two technicians may make different but still acceptable judgments regarding this filtering. This process needs to be guided by the accepted principal of showing worst case conditions and whenever judgments

need to be made regarding the visibility of the action, the technician needs to err on the side of disclosure.

Photographs

Existing condition photographs should be taken during leaf-off conditions when atmospheric conditions are clear. No snow should appear in the trees. Photographs should be taken near mid-day, when shadows are short and the light from the sun is bright, though another time of day is acceptable if a viewpoint suffers from glare at this time, or otherwise better discloses the action. The applicant is advised to use either 35mm film or a full-frame digital camera to take the photographs used for existing conditions, to ensure proper aspect ratio and lens interpretation. Photographs should be taken in landscape orientation and most of them should use a normal lens (see below).

Lenses

Most photographs used for photosimulation should be taken using a normal, or 50mm lens. This lens has been shown to create an image where distance relationships are similar to the human eye. Simply, lenses less than 50mm will make elements in the photograph appear smaller that they would to the human eye, while larger lenses will make elements of the photograph appear larger. If more than two viewpoints are selected for analysis, one or two photosimulations may be done using a zoom lens to simulate the acuity of the human eye when it focuses on an object in the distance. For an action of this magnitude, panoramic lenses (or the use of panoramic stitching) should not be used.

Presentation of results

For each viewpoint analyzed, the photosimulations need to be paired with an existing conditions photograph, shown at the same size and resolution. The only changes from existing conditions shown in the photosimulation should be due to the proposed action. The photosimulations should be accompanied by a key map showing from where all the viewpoints have been taken and a discussion of how the photosimulations have been performed. The applicant should also provide written documentation not only of the methods used to produce the simulations, but which also discusses the existing landscape character and visual setting to establish the baseline visual conditions from which change is evaluated. The action's impact on the viewpoints analyzed should include not only a quantitative analysis (e.g., the action is, or is not, visible) but also a qualitative analysis using generally accepted criteria used to evaluate visual impacts on a landscape (e.g. form, line, color, texture, scale, and spatial dominance.) Finally, if visual impacts are shown, a mitigation program should be discussed.