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April 2, 2012

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Honorable Norma Drummond, Chair
Zoning Board of Appeals
Town of East Fishkill
330 Route 376
Hopewell Junction, NY 12533

RE: Homeland Towers application at
23 Dartantra Drive
ZBA Appeal No.: 3569

Dear Chairperson Drummond and Members of the Board:

I have been asked by residents of the Town of East Fishkill to review the Visual Resource Evaluation for the proposed 150' telecommunications tower proposed for 23 Dartantra Drive. This review focuses only on the quality and completeness of the materials found in the Visual Resource Evaluation produced by IVI Telecom Services for Homeland Towers, dated January 30, 2012.

George M. Janes & Associates (GMJ&A) is a planning firm that specializes in the use of technology in visual simulation for planning and urban design. Prior to founding GMJ&A, I was Executive Director of the Environmental Simulation Center, a not-for-profit organization that helped to develop many of the techniques currently used in the practice of visual simulation. Previously, I managed several of IBM's modeling and simulation programs. More on my qualifications can be found on my website, www.georgejanes.com.

Summary

There are many serious deficiencies in the Visual Resource Evaluation (VRE) for the proposed action, which together make this evaluation flawed and incomplete. These deficiencies include flawed base photography which inexplicably uses a wide-angle lenses that have the effect of diminishing the scale of the proposed action; and photosimulations that are actually artist renderings. The applicant also appears to mix and match different standards, selecting the standard that best suits their evaluation, and does not include the assumptions they used for the viewshed mapping, which renders it impossible evaluate or even fully understand.

The materials found in the VRE should not be used to assess impacts on visual resources as they may not represent the proposed tower as it will actually appear, nor fully describe the proposed action. The ZBA should find the VRE incomplete and instruct the applicant to correct its deficiencies before resubmitting.

Specific findings

Base photography

There are two serious problems with the base photography, which effectively render them insufficient for assessing impacts on visual resources. First, the applicant used a wide angle lens, which will make objects in the photograph appear smaller than they would to the human eye. Second, the quality of the photographs in the version of the VRE that I reviewed are extremely poor. While this may be partially due to print quality, glare from the sun and blurry images materially impact their suitability to be used as evidence, and certainly do not represent the “reasonable worst case” standard these evaluations require.

Lenses

The nature and quality of the base photograph used is critical to understanding how the action would appear to the human eye. Wide angle lenses will make objects in a photograph seem smaller than they would to the human eye. Telephoto lenses will make objects seem larger than they would to the human eye. In visual resource assessments we most often use a normal lens or 50mm lens to mimic the distance relationships of the human eye.

The applicant took the photographs with a Nikon D5000 digital camera with an 18mm lens (which is equivalent to a 28.8mm lens on a 35mm film camera). This is a wide-angle shot, which will render the images seen in the photograph much smaller than they would to the human eye. The applicant explained the selection of the wide angle lens was to compensate for cropping that narrows the field of view when photographs are taken with this camera. For an action like a cellular tower, which is confined to a small part of the field of view, this is not a reasonable reason for using a wide-angle lens.

There are limited times when a wide angle is appropriate: when the viewpoint is extremely close to an object a wide angle lens may be the only way the entire action can fit within the frame of the photograph, for instance. But to use a wide angle to compensate for the field of view for a cellular tower, which has a very narrow profile, is simply not reasonable.

Further, assuming that the desire for a wide field of view was reasonable, most professionals use a full-frame digital camera, which produces an image with the same field of view as captured by 35mm film. Simply, if the applicant had used a different camera the field of view would have matched that of 35mm film regardless of the lens used.¹

The best way to understand the meaning of lens selection on the image captured is to visit the viewpoints with the photographs in hand and see the image with

¹ It is also acceptable to use photographs taken with 35mm film cameras, which was another choice the applicant could have made that would have allowed a normal field of view with a normal lens.

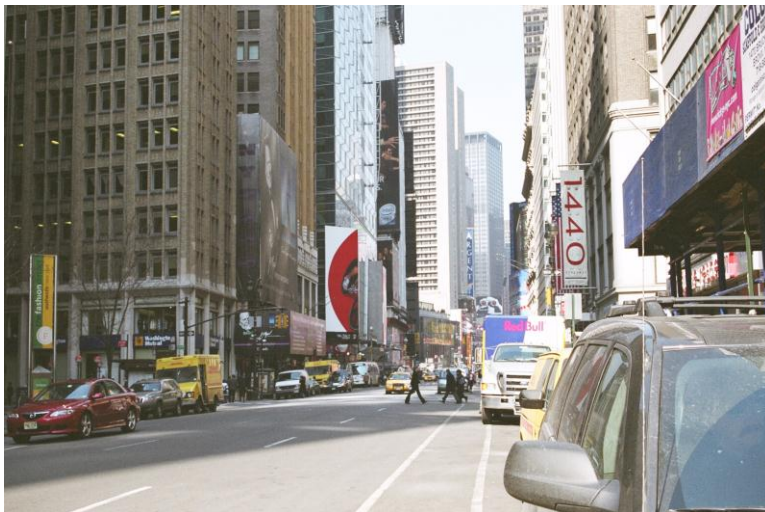
your own eyes. You will notice that everything seems relatively smaller in the photographs than they do in person. To illustrate this point, the following series of photographs were taken from the same location using different lenses.



Wide Angle (28mm)

Objects appear smaller and further away than they would to the human eye.

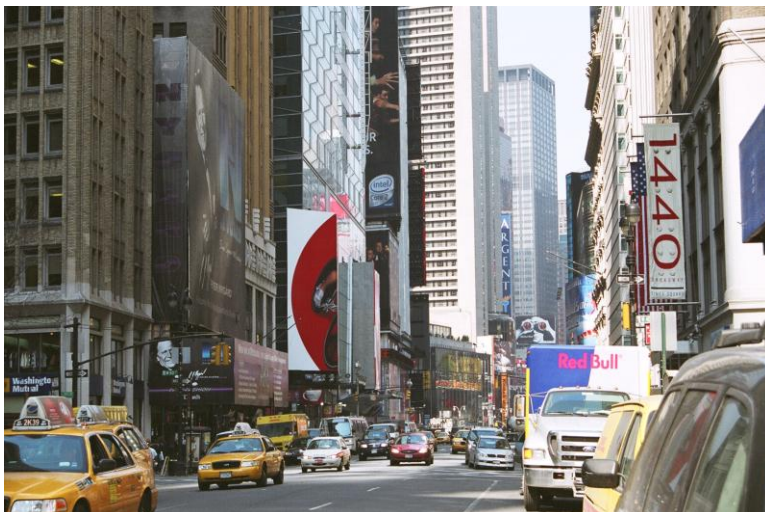
This lens is very close to what the applicant used.



Normal (50mm)

Closely approximates the relative distances as seen by the human eye.

The applicant should have used this lens.



Telephoto (80mm)

Objects appear closer and larger than they would to the human eye.

Sometimes used in visual assessments to simulate the acuity of the human eye in longer range shots.

It is difficult to overstate the inappropriateness and inadequacy of using a wide-angle lens on a 150-foot-tall telecommunications tower when the scale of the action will likely be the most important visual issue. For this issue alone the VRE should be found incomplete, but there are several other issues which also need to be addressed.

Quality of the images

The quality of the images is important because they demonstrate how the view from a particular viewpoint appears to the human eye. The quality of a viewpoint matters when assessing visual impacts and the photograph is an essential part of assessing the quality of the view.

The quality of many of the images I reviewed was very poor, and in my view obviously not of publishable quality. While some of the quality issues may simply be due to printing issues with the particular copy I reviewed, others clearly have problems with glare. This is a workmanship issue. If a viewpoint is affected by glare from the sun in the morning, the photographs should be taken later in the day, or lens shades or hoods can be attached to the camera. Images such as those that appear below cannot be considered of acceptable quality because they do not represent normal vision on a day that represents reasonably worst case conditions.



The above is a replica of Viewpoint 3, which has clearly been negatively impacted by glare. It is not clear even what the circled area shows. Are the balloons visible or not?

Similarly, Viewpoint 4 seems to be out of focus:



It appears as if these images were taken through the windshield of a moving car, which probably contributed to the fact that the image is blurry. While it is acknowledged that it is difficult to stop on some parts of the Taconic, this image is not an acceptable alternative. A person in the passenger seat admiring the view would not perceive a blur as is captured by a moving camera.

A good quality photograph helps to explain why a view should be valued or not and is fundamental to understanding how an action changes that. It is impossible to say much about the views that are captured from locations 3, 4 and others published in the VRE; they may be excellent views, they may not. We simply cannot tell from many of the photographs.

Photosimulation Methods

In the VRE the applicant produced five reported photosimulations (Locations 1, 5, 11, 12, 23.) The applicant describes how these reported photosimulations were produced as follows:

“Select representative photographs showing the balloon to be visible were merged with images of the proposed Undertaking using Corel Paintshop Pro Photo X2 software, which is a computer based graphics program similar to Adobe Photoshop. Utilizing this process the simulation can be scaled to the correct size and adjusted so that images in the foreground and background appear as they would if the Undertaking were to be built.” (Page 5)

Producing photosimulations using solely a 2D image editing software like Photoshop or Paintshop is contrary to current best-practices in the production of photosimulations. Best practices photosimulations use a 3D digital model of the action, which is then rendered using a computer camera set to mimic the real world camera, and then merged with the photograph using references that exist in both the 3D model and the photograph. Image processing software like Photoshop is used only to process the images and treat the existing vegetation. Because of the amount of operator judgment necessary to produce the “photosimulation” images that appear with Viewpoints 1, 5, 11, 12 and 23, they should not be considered photosimulations, but merely artist renderings that use photographs as media.

Verifiable digital photomontages

To minimize human judgment and to ensure accuracy and repeatability, photosimulations should be performed as Verifiable Digital Photomontages. This is the technical term for the process of creating a 3D computer model of an action, that is measurable and located in 3D space, rendering an image of that action using a camera that is set up to mimic a camera used to take a photograph and then finally merging the rendered image with the photograph. At its best, the process is mechanical, meaning the results will be very similar regardless of the operator producing the simulation. Artist renderings, even artist renderings that look like photographs, will have much more variation between operators, and are much less reliable a source for evidence as to an action’s impact on visual resources.

But more than just repeatability, true photosimulations will show the action with shading, shadow and lighting that is accurate to the location, time of day and year and which change with the azimuth of the action. This is important because light impacts our perception of objects, especially on sunny days when portions of the object that are exposed to direct sun are contrasted with objects that are darker because they are not exposed to direct sun. This contrast changes depending on the direction in which the object is being viewed, the time of day and the season.

None of this complexity of shading, light and shadow is captured by the method used to produce the images found in the VRE.

Accuracy

More important than the issues of lighting are issues of accuracy. The applicant indicates use of Paintshop to scale the image, but does not specify *how* Paintshop is used to scale the image. In a true photosimulation, an image is not “scaled;” it

is simply rendered with the computer camera that matches the real-world camera. This results in an accurately dimensioned, rendered image that is then merged with the photograph as-is, without requiring the operator to estimate scale.

In a true photosimulation, the 54' offset of the balloon to the location of the tower is not an issue. The balloon is used as a reference in the 3D model and it does not need to be in the same location as the tower. Without the use of an accurate 3D model, however, the balloon offset will create additional error when using a 2D image editor to place the proposed tower, because this again relies upon the operator judgment to locate the tower.

Balloon as reference

Balloons are often used as a reference in photosimulations, and while they can be difficult to use, they can be very good references. They can also be poor references, depending on the wind. Fieldwork with balloons is most often conducted with a two person team in radio communication. One person is stationed at the balloon and communicates to the person taking the photograph when the balloon is perpendicular to the ground so that the height and location is accurately reflected in the photograph. It does not appear that this assessment used a two person team since only one person is mentioned in the documentation, and because in several images the balloons are clearly not perpendicular to the ground.



Reproduction of Location 6 where balloons are clearly affected by wind.

If the wind is blowing it not only affects the location of the balloon, but also its height, and consequently, the quality of the balloon as a reference. As shown in the photograph the balloons should be seen as an approximation of the height and location of the tower.

Treatment of vegetation

Understanding how the action relates to 3D space also helps the operator locate and remove existing vegetation that will be cleared as part of the action. This is important because we cannot leave trees to screen the action in the photosimulation if they will be removed as part of the action. The curious method of treatment of the existing vegetation in VRE's photosimulations needs to be mentioned. In the merging of the image of the tower with the existing photograph, they seem to show the tower on top of existing vegetation that will conceal it from the viewer, especially at the base in Viewpoints 1, and 11, but we do not see any attempt to remove trees from the simulations that will be cut down. The proposal calls not only for the tower and the equipment shed, but the plan also shows the removal of 69 trees. This tree removal is also a part of the proposed action and when evaluating the action's impact, the entire action needs to be shown. After close evaluation, we cannot find evidence that any vegetation

was removed from the photosimulations, and we believe that it is likely that at least some of the trees to be removed are visible from viewpoints 5, and 11.

There is also no sense that the proposed equipment sheds and fence have been simulated, but it is not clear if these would be visible from any of the viewpoints analyzed.

Other comments

Standards and guidance

The New York State Department of Environmental Conservation provides clear guidance on the assessment and mitigation of impacts on visual resources. The applicant did not follow this guidance, and instead followed guidance from FCC, NYSHPO and East Fishkill's own guidelines, which limits the Area of Potential Effect (APE) studied in the visual analysis to 0.5 miles.

This is not unreasonable, since the DEC's guidelines are more appropriate for larger actions, and uses an APE of five miles. However, it appears that the applicant did follow the DEC's guidelines regarding limiting the evaluation to publicly accessible areas. Under the State's environmental laws we are concerned about impacts from publicly accessible visual resources, like the Taconic. But zoning and the ZBA must be concerned about the project's impact on neighboring residents. It is likely that the largest, but not only, impacts will occur from the rear yards of the closest neighbors that face the project, not from the streets in front of those properties, and none of these potentially impacted private areas were studied. The applicant should have sought permission from potentially affected neighbors within the 0.5 mile APE so that areas likely to experience the largest impacts could have been accessed.

The applicant cannot simply pick and choose which standard they will follow depending on how it benefits their analysis. If they want to use the smaller APE of the standards they followed, they need to evaluate the impacts on private property as well as public property.

Viewshed Map

It is not clear what data and assumptions went into the viewshed map. From the results, it is clear that existing vegetation was used when performing the viewshed map, but we do not know the source of those data, the assumed height of the trees and the assumptions used as to the transparency, or lack thereof, of existing vegetation² or if the data were edited to take into account trees that will be removed by the action. The lack of documentation on how the viewshed was made makes it impossible to evaluate.

² Details regarding where to get data, and how to perform a viewshed can be found here: <http://www.georgejanes.com/PDF/TechnicalMethods/TechnicalMethods001-Viewsheds.pdf>

Close

The state of the practice of visual simulation is a moving target, as methods evolve and new technologies are developed the state of the practice changes. Producing simulations solely using image processing software like Paintshop or Photoshop, however, has not been the state of the practice, in my experience, for many years. I encourage the ZBA to reject this VRE as incomplete and ask that the applicant resubmit with proper base photography and photosimulations that are not artist renderings, as well as addressing the other issues presented in this letter. Without better evidence you cannot know what the actual project's impacts on visual resources will be.

I do hope that I have been articulate enough in my expression of concern regarding these materials and that the ZBA does not make any decision regarding the project's impact on visual resources using these materials as evidence. This is a visually sensitive area and the methods used to simulate the project need to follow best practices.

I appreciate the opportunity to comment on this application and invite you to contact me directly should you have any questions or concerns.

Sincerely,

A handwritten signature in black ink, appearing to read 'G. M. Janes', written in a cursive style.

George M. Janes, AICP
Principal

cc: Honorable James Meier
Honorable Aziz Ahsan
Honorable Tara Franco
Honorable Jennifer Glasheen
Honorable John Hickman
John Klarl, Esq.

Resources for further reading:

A primer on the use of visual simulation in SEQR. Has a good graphic depiction of how to produce a photosimulation:

http://www.georgejanes.com/Presentations/Visual_Simulation_Under_SEQR.swf

A visual primer on cell tower design:

<http://www.georgejanes.com/html/conclusion.html>

A dated, but still useful, in depth discussion on telecommunications siting:

http://www.georgejanes.com/PDF/Wireless_Telecommunications_Facilities_Manual.pdf