ENVIRONMENTAL

SIMULATION

CENTER, LTD.

April 9, 2007

Mr. Don Bartles, Jr., Chairman, and Members of the Board
Town of Pine Plains Planning Board
Pine Plains Town Hall
3284 Route 199
Pine Plains, New York 12567

RE: SEQRA
Review of Visual Resources and
Community Character,
Carvel Property Development,
Towns of Pine Plains and Milan,
Dutchess County, New York

Dear Mr. Bartles:

261 WEST 35TH STREET
SUITE 1408
NEW YORK, NY 10001

T 212.279.1851
F 212.279.5350
www.simcenter.org

MICHAEL KWARTLER, FAIA
President

GEORGE JANES, AICP
Executive Director

At the request of Pine Plains United, the Environmental Simulation Center (ESC) examined materials produced in Chapter 7 and Appendix 7.1 of the Carvel PDEIS. This letter details our findings. The ESC is a not-for-profit organization that does not advocate for or against particular development projects. Accordingly, the ESC takes no position as to the appropriateness or need for the Carvel Property Development. Rather, this review considers if the materials as presented in the PDEIS accurately and completely describe the action and disclose impacts on visual resources.

This letter addresses two broad issues: 1) the assumptions used to create visual simulations used to assess visual impacts, and 2) the methods used to create the visual simulations used to assess impacts on visual resources.

Summary

There are fundamental errors in the visual simulations and/or viewshed analyses that were produced to analyze impacts on visual resources. Since these materials are used as the basis for determining impacts on visual resources, the PDEIS should not be found complete to commence the public review. The Applicant should reproduce the materials found in Chapter 7 and Appendix 7.1 using reasonable worse-case assumptions and methods that are typically used in visual resource assessment under SEQR.

This letter makes no substantive comments as to impacts on visual resources as those impacts cannot be accurately described using materials published in the PDEIS.

ENVIRONMENTAL
SIMULATION
CENTER, LTD.

PART I: REASONABLE WORSE-CASE ASSUMPTIONS

Fundamental to SEQR is conducting an analysis using reasonable worse-case assumptions. This section focuses on how the PDEIS does not use reasonable worse-case assumptions and gets into specifics on grading, colors and lenses.

Reasonable worse-case assumptions: Grading

An action of this type can be described by its components:

- buildings,
- ancillary components (roads, retention ponds, etc.), and
- grading and site disturbance required for the buildings and ancillary components.

According to the PDEIS, buildings, roads and retention ponds are a part of the simulations and the viewshed analyses featured in Appendix 7.1. The third component, grading, has only been included for roads, retention ponds, and for a rectangular box on lots and labeled as "building site."

Nevertheless, the PDEIS is also clear that building sites will have to be graded so that they are buildable. Figure 1 calls out a small section of the site plan and shows how disturbance in this section might appear. A section of this figure appears below, showing the extreme southeastern portion of the project site:

Figure 1: Reproduction of a portion of PDEIS Figure 7.34

All existing vegetation would be removed in the areas marked as "Typical Lot Disturbance" as this area would be graded to create a site for the building and driveway.

ENVIRONMENTAL

SIMULATION

CENTER, LTD.

Figure 2 shows the "building sites" used in the visual simulation for the exact same portion of the site from Figure 7.53 in the PDEIS:

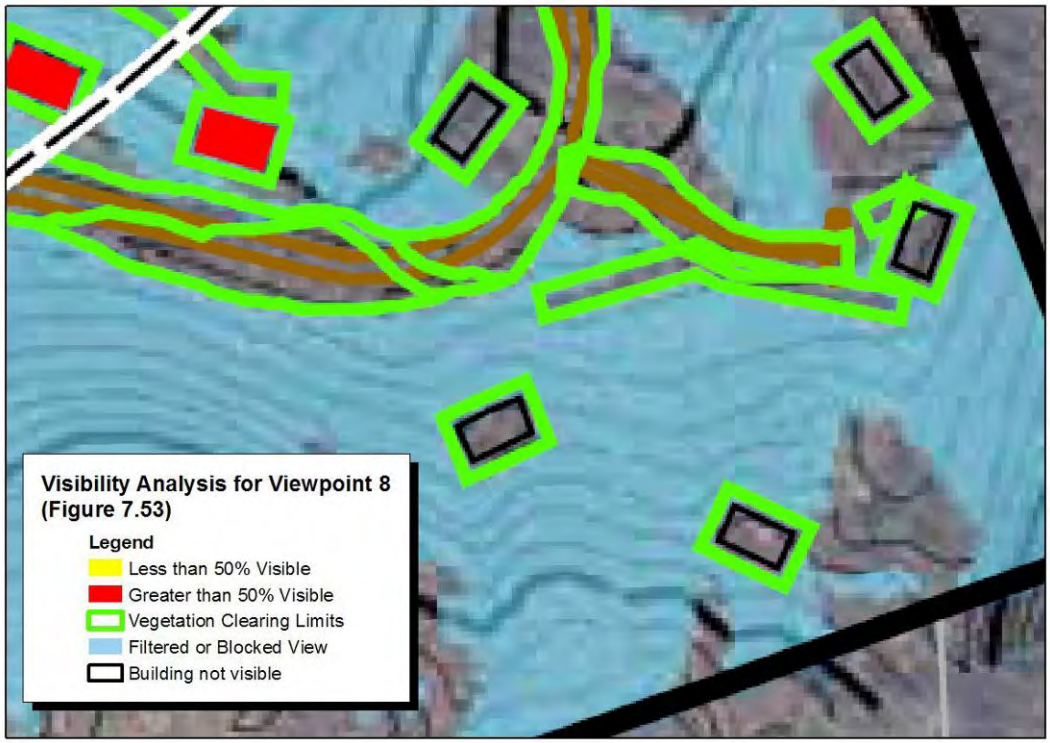


Figure 2: Reproduction of a portion of PDEIS Figure 7.53

The areas outlined in green are the areas where the vegetation has been removed for the visual simulations and viewshed analysis.

Figure 3 overlays the previous two images at the same scale:

ENVIRONMENTAL
SIMULATION
CENTER, LTD.

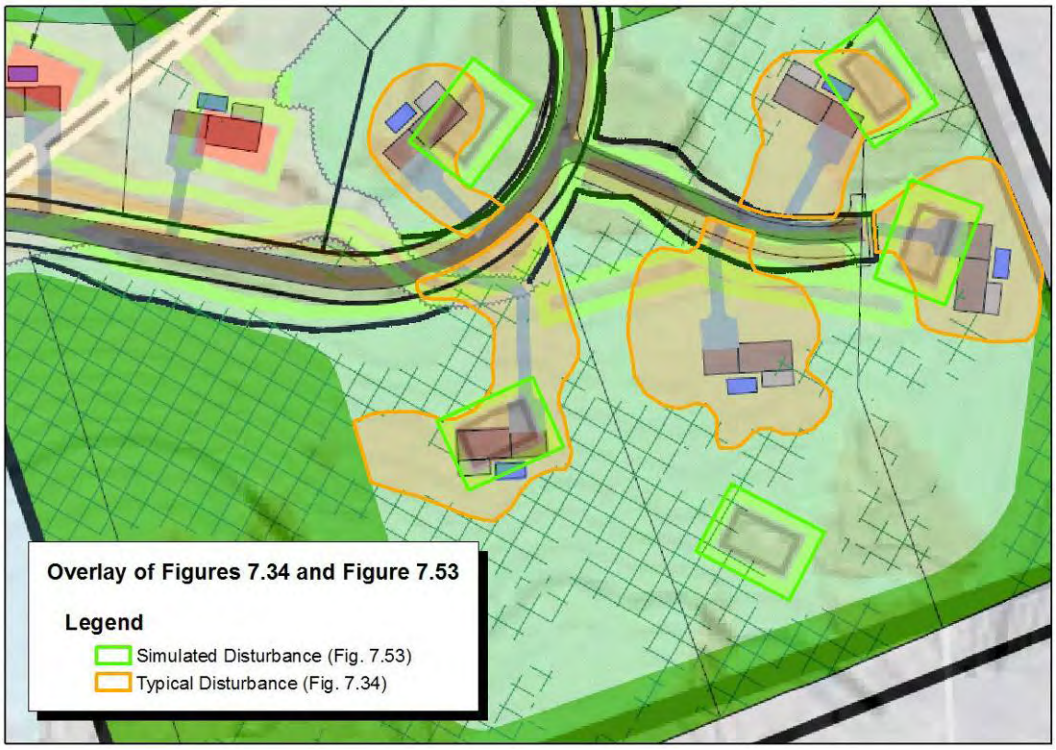


Figure 3: Overlay of PDEIS Figures 7.34 and 7.53

For the sites in this example, the simulated disturbance is always less than the typical disturbance. Table 1 shows the difference between the typical disturbance shown in the PDEIS vs. disturbance used in simulations and viewshed analysis:

Lot	Typical Disturbance (SF)	Simulated Disturbance (SF)	Difference (SF)	Percent Difference
1	15,503	9,071	6,432	71%
2	37,632	9,071	28,561	315%
3	21,231	9,071	12,160	134%
4	34,833	9,071	25,762	284%
5	24,742	9,071	15,671	173%

Table 1: Difference between "Typical Disturbance" and "Simulated Disturbance" in the PDEIS

In the PDEIS, the "typical site disturbance" is only detailed for these five lots. In visual resource analysis a grading plan is required. If a grading plan is not available, then a grading plan that represents a reasonable worse-case is developed solely for visual resource assessment. Instead, the Carvel PDEIS uses this "building site" as the graded area of the site, which appears to underestimate site disturbance.

Why is this important? One of the three main components of the action is systematically underestimated, essentially leaving too many existing trees on the landscape. This creates an overestimate of the amount of existing vegetation to remain, which renders null the assumptions used in the viewshed analysis of what

ENVIRONMENTAL
SIMULATION
CENTER, LTD.

is visible through vegetation to remain.[1] More vegetative screening also makes buildings less visible than they should be in the photosimulations. The standard "building site" method used for site disturbance is contrary to the concept of using reasonable worse-case assumptions and, by itself, is enough to render the analysis incomplete for the purpose of commencing public review.

Reasonable worse-case assumptions: Color

Contrasts in color affect the visibility of an action by adding discontinuity to a view. Typically, the more contrast in color, the more visible an action will be.

It is reasonable to assume that the disturbed areas will be recovered in a manner that creates color contrast between the old farm fields that dominate many of the views and what will become the yards of these new houses. The simulations, however, do nothing to show what may happen in these areas and simply show the yards, even in areas that would be disturbed, remaining as old farm fields.

[1] If more than 500 feet of vegetation is to remain, any view through that vegetation is assumed to be blocked.

ENVIRONMENTAL

SIMULATION

CENTER, LTD.

Examine the following three figures. Figure 4 shows existing conditions as published in the PDEIS. Figure 5 shows the published simulation. Figure 6 shows what the buildings might look like if they used a lighter, though still "natural" shade, along with a green lawn for the yard.

Figure 4: Viewpoint 19, existing panoramic view (as published in the PDEIS)

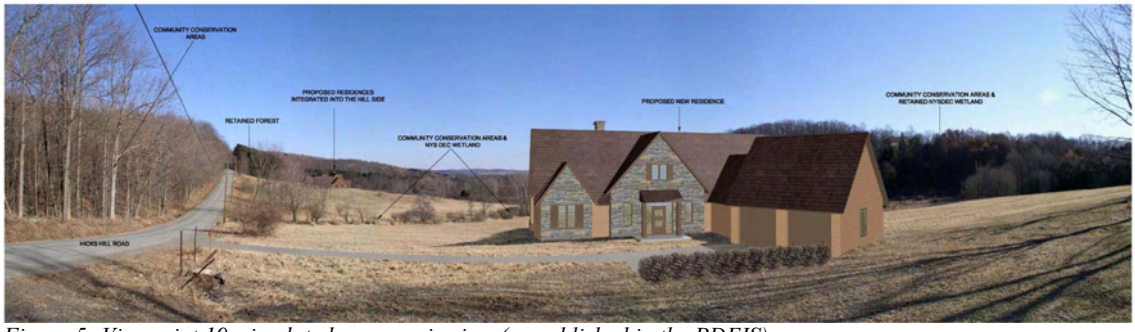


Figure 5: Viewpoint 19, simulated panoramic view (as published in the PDEIS)

Figure 6: Viewpoint 19, simulated panoramic view (as altered to represent reasonable worse-case condition)

It is reasonable to assume that buildings built on old fields will have sod lawns, as many home-owners prefer grass. Sod lawns are also a good way to recover areas disturbed by grading. Lawns generally stay green in the winter, whereas the old fields turn brown. In the winter, the green of a lawn abutting an old field will create a contrast in color on the landscape.

The color selection of the buildings is a fairly uniform shade of brown. The PDEIS states:

ENVIRONMENTAL

SIMULATION

CENTER, LTD.

"Natural colors and building materials such as rough-hewn wood, clapboards, field stone and brick will be incorporated. In general, design of structures located within the valleys will mimic traditional farm styles, and structures located on in [sic] wooded areas will be more rustic.[2]"

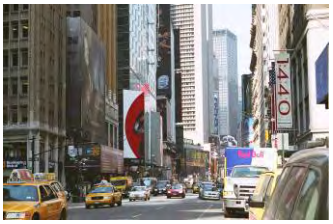
A reasonable worse-case is that at least some buildings, the ones mimicking farmhouse styles, should be white, or use light colors, as do farmhouses in the area. Again, the simulations need to show reasonable worse-case so building color in the above color alteration was lightened, making them more visible.

The color contrast added to the simulation makes the action much more visible than published information, and all that was done to these simulations was to apply reasonable worse-case color assumptions to the existing simulation. Following SEQR standards, these should have been published using such assumptions and the choice of color and the treatment of disturbed areas is another example of how the analysis in Chapter 7 does not follow standard SEQR practices and understates the visual impact of the action.

28 mm lens

35 mm lens

50 mm lens



80 mm lens

Reasonable worse-case assumptions: Lenses

The PDEIS most often uses a panoramic view composed of multiple photographs taken with a 35mm equivalent lens. This is contrary to what has become standard in visual assessments in New York State: the 50mm or so-called "normal" lens. Under SEQR, visual impacts are usually measured using a human perspective of an action. This has come to mean 50mm perspectives, non-panoramic views. This lens has been shown to create a view that is similar to the human eye. Simply, lenses less than 50mm will make elements in the photograph appear smaller than they would to the human eye, while lenses greater than 50mm will make elements of the photograph appear larger[3].

While this might seem technical, a quick visit to any of the viewpoints with the images printed in the PDEIS in hand demonstrates what the human eye sees is different than what is printed in the EIS. Objects in the distance that seem far away in the published images, appear to be much closer and larger when experienced with the human eye. This would be true for both existing objects in the photograph as well as portions of the action that are simulated in the photosimulations.

The sequence on the left of this page illustrates the issue with lenses. They show the same view taken with four different lenses. Notice how much closer objects appear when the lens size increases.

[2] Page 7-117. Others who have examined earlier versions of the entire PDEIS tell me that there will be deed restrictions on the color of houses. I have not been able to find reference to this commitment in Chapter 7, but it may be in other portions of the PDEIS. Deed restrictions that limited the color palette available would be useful in guiding color selection in the simulations.

[3] There is variation from person to person, but the image most people see falls within a 50mm to 55mm lens. A 52 or 55mm lens is perfectly acceptable, but 50mm is most often used.

ENVIRONMENTAL
SIMULATION
CENTER, LTD.

The following figures use Viewpoint 19 as an example:

Figure 7: Viewpoint 19 (panorama from 35mm lens as published)

Figure 8: Viewpoint 19 (panorama from 35mm lens taken by ESC; March 7, 2007)

Figure 9: Viewpoint 19 (panorama from 50mm lens taken by ESC; March 7, 2007)

Figure 7 is a reproduction of what is published in the EIS. Figure 8 comes from photos taken with a 35mm lens using a film camera on March 7, 2007. Figure 9 comes from photos taken with a 50mm lens on the same date. All images are scaled to approximately the same height and field of view.[4] The ESC created the second image to recreate the published panorama with conditions at the time additional photographs were taken so that the 35mm panorama could be compared to a 50mm panorama in an apples-to-apples fashion.

[4] Scaling panoramas made by stitching images together is inexact. They were each assembled using software (as opposed to being created with a panoramic camera) that will trim the images. This means that they cannot be exactly scaled. Instead, they have been scaled according to the height of the image and to show approximately the same field of view. A tripod was not used in the viewpoints taken in March 2007 so none of these views were taken from exactly the same location.

ENVIRONMENTAL
SIMULATION
CENTER, LTD.

The human perspective of the relative sizes of the objects in the photograph is best represented by the third panorama. The hill in the center right of the image is appropriately prominent in the panorama made from 50mm photographs, while in the panorama made from 35mm photographs shows this hill as appearing much further away from the viewer. This also means is that objects in the photosimulations of this viewpoint will appear smaller in the 35mm view than they would to the human eye.

The standard under SEQR is to use a 50mm lens as that lens best represents the human perspective. At times, other lenses can be used when they add additional information (e.g. a wide-angle view to show development on both sides of a street, or a telephoto of a distinctive object far in the distance) but they are used in conjunction with 50mm perspectives that mimic the human eye. I am unaware of any 50mm photographs in this PDEIS.

The net effect is that, again, the PDEIS does not present a reasonable worse-case in the photosimulations, as the lenses used systematically makes the action appear smaller than the human eye would perceive it.

Reasonable worse-case assumptions: Combination effects

The improper assumptions used in the PDEIS compound each other. Understated grading plans will not remove enough vegetation; vegetation that will be removed is used as a part of the viewshed visibility analysis; color selection is best-case, not worse-case; and the lens used in the photos make everything appear smaller and further away than it does to the human eye. The net impact of these flaws is larger than each taken individually as it creates a smaller impact in each of the visual simulations than they should show.

PART II: METHODS

The previous examples detail problems with assumptions used in creating the simulations. This next section deals with problems with the methods used to create the simulations.

Methods are best evaluated in an audit done face-to-face with the individuals that produced the simulations. This way, the process could be evaluated directly, rather than examining output to determine the process that produced the materials. This second way is much less exact and much more time-consuming. To augment this “after the fact” examination, I called the person that performed the simulations and asked questions, the answers to which were helpful in understanding the methods used in the PDEIS.

As the following should show, there are serious methodological issues with the simulations that have been produced and that the simulations cannot be considered reliable representations of the action. The full extent of the methodological errors could be determined through a methodological audit, which should be conducted if the Applicant does not agree to reproduce the materials in Appendix 7.1.

ENVIRONMENTAL

SIMULATION

CENTER, LTD.

Methods: Study of Viewpoint 15, photograph and viewshed
Figure 10 is a portion of the viewshed map for Viewpoint 15:

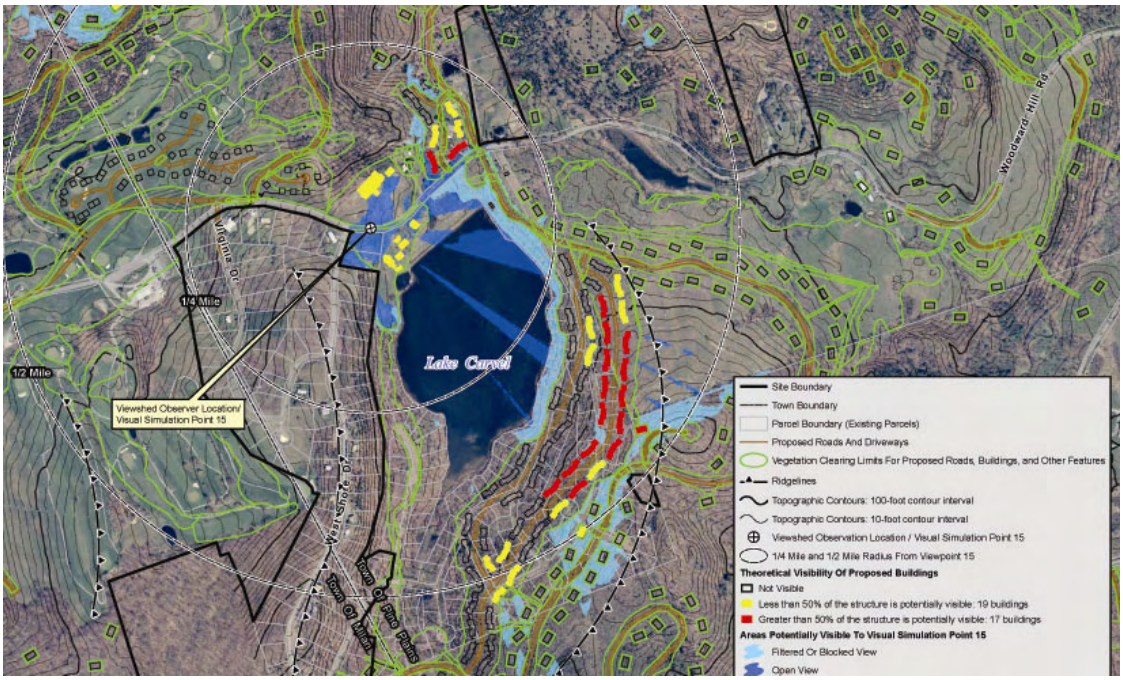


Figure 10: Portion of PDEIS Figure 3.4.1-1

This analysis tells the reader that there are buildings near to the viewpoint (called out by the small beige box) and many larger buildings across the Lake Carvel, stepping about 120 feet up a steep hillside.

Figures 11 and 12 are what were published in the PDEIS from this viewpoint and its photosimulation.

ENVIRONMENTAL

SIMULATION

CENTER, LTD.

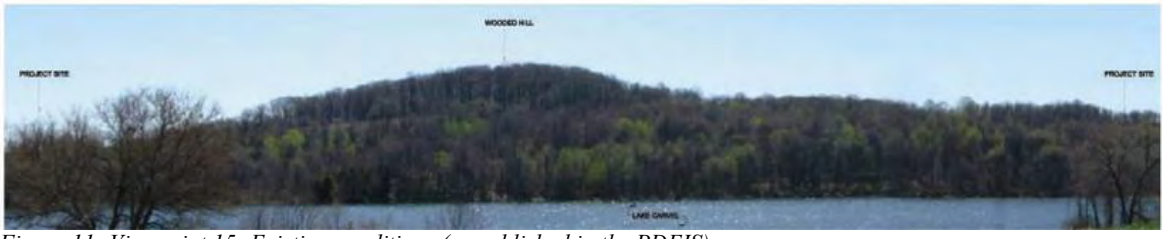


Figure 11: Viewpoint 15: Existing conditions (as published in the PDEIS)

Figure 12: Viewpoint 15: Proposed conditions (as published in the PDEIS)

Figure 13 is a 50mm panorama taken from the same location again on March 7, 2007.

Figure 13: Viewpoint 15: Existing conditions (taken with 50 mm digital camera on March 7th)

At first glance the comparison between 35mm published shot and the 50mm shot is surprising as the 35mm shot shows a much smaller area, which is the opposite of what one would expect.

Upon further analysis, the panoramic photograph published in the PDEIS is most likely a 35mm panorama that has been cropped to eliminate the foreground and then enlarged.

Viewshed analysis on the previous page shows buildings in what is the foreground of the 50mm panoramic photograph and these buildings will, presumably, block line of sight to the first two rows of buildings at the far shore of the lake. Again, the viewshed analysis says that buildings nearest to the shore should not be visible, and the only buildings across the lake that should be visible

ENVIRONMENTAL

SIMULATION

CENTER, LTD.

from this viewpoint are buildings that are on higher ground, above the buildings that are in the foreground.

The photosimulation clearly shows the shoreline of Lake Carvel, which, according to the viewshed analysis should not be clearly visible. If the shoreline is clearly visible, then the buildings at the shoreline should be visible along with the buildings on the higher ground. While it is impossible to say for sure without a grading plan, considering those buildings step up about 120 feet elevation in about 750 feet of distance (16% slope), it is likely that a viewer from this viewpoint would see four rows of buildings stepping up the side of the hillside. Instead, the simulation shows two lines of buildings "nestled" in the trees.

If the simulation from this viewpoint had been done using a 50mm perspective (seen again below), such a simulation would show a materially different result than the one published. A properly performed photosimulation from this viewpoint--assuming the viewshed analysis is correct--would show buildings in the foreground, covering much of the image and obstructing most of the views to the lake. Over those buildings in the foreground would be larger buildings in the background stepping up the side of the hill visible in the center of the photo. The simulation should show that the view from this viewpoint will be quite urban and most of the view of the lake will be obstructed by buildings.

Figure 14: Viewpoint 15 image indicating where proposed buildings will be seen

The photograph from this viewpoint should have not been cropped to remove the foreground. The action is in both the foreground and the background from this viewpoint and should have been represented as such. Regardless, even if the photograph did not include the foreground, if this simulation were done properly, the buildings in the foreground would still block the view to the far side of the Lake, and they do not, suggesting another serious methodological error in the production of this simulation.

These errors are material, rendering the simulation unable to be used to assess impacts on visual resources.

ENVIRONMENTAL

SIMULATION

CENTER, LTD.

Methods: Study of Viewpoint 15, matchpoints

Photosimulations, or verifiable digital photomontages, is the process of merging a dimensionally accurate CAD model of an action with an existing photograph of the action. This match is done using two techniques in combination. First, the camera that took the photograph is replicated in the digital model considering its location, lens, pitch and yaw. Then, objects that exist in both the digital model and the photograph are used as matchpoints to match the photo to the digital model.

There is wide variation as to the matchpoints used in photosimulations. In urban areas, these are most often neighboring buildings. In rural areas, where existing buildings are sparse or nonexistent, matchpoints are often elements that the photographer introduces to the photograph. In long distance views, balloons and cranes are often used. In shorter distance views other objects of known size are introduced to the photograph with their exact location. My office recently started using a surveyor's leveling rod, but there is much latitude as to the objects introduced for matchpoints. What is important, though, is that there must be objects that exist in both the photograph and the 3D digital model and these objects need to be of a known size and location. Simply entering a digital camera location without these matchpoints, based upon information provided by a GPS unit will not produce a simulation that can called reliably accurate. It may be accurate, but there is no way to ensure that it is accurate.

The PDEIS says:

> "proposed conditions were then aligned with the photographs of the existing conditions. The photographs were scaled into the real world dimensional model using objects of known dimensions, such as existing buildings, roads, utility poles and landforms." (Page 7-75)

While I am not entirely sure what this statement means[5], I believe it was an imprecise attempt to say that buildings, roads, utility poles and landforms were used as matchpoints. Objects like street signs or utility poles are not usually good matchpoints in rural areas, as they are often not perpendicular to the ground and their tilt and size is not easily captured, but if information on their current conditions is carefully collected, they can be used. Buildings are better, but many viewpoints do not have buildings. Landforms, especially landforms covered with vegetation, are considered poor matchpoints due to the obvious difficulty of reproducing a forested ridgeline. Roads can be good matchpoints, but in most viewpoints roads are in the foreground (as are utility poles and street signs). Multiple matchpoints in the foreground, middleground and background of an image is ideal. In short, most viewpoints do not have good matchpoints native to the image, and some have none. When asked, the individual who performed the

[5] For example, I don't know what a "real world dimensional model" is. If it is a model, then it is not of the real world. Photographs would not be scaled. The firm that produced the photosimulations (Elabd Architectural Illustrations) did not write this section, so the person that wrote it was not the person that actually implemented the method, perhaps explaining the lack of precision with language.

ENVIRONMENTAL
SIMULATION
CENTER, LTD.

simulations stated that he used GPS camera location and no matchpoints when there were no matchpoints in the image to match to the 3D model. Viewpoint 15 is such an image. Consequently, even if the lens was correct and the buildings in the foreground had been modeled, there is no way to ensure that this simulation is reliably accurate. This then becomes an artist interpretation of what this view may look like from this location, and can no longer be considered a photosimulation.

Methods: Viewshed mapping Viewpoint 19

The following is from the viewshed map for Viewpoint 19. Why are the buildings in the red box below shown as being not visible? The viewshed appears to show line of sight to them, the photos show that there is little in the way of existing vegetation to block the view, and, in fact, the simulation of this viewpoint shown earlier in this letter seems to show at least some of these buildings, yet they are not highlighted in the analysis below.

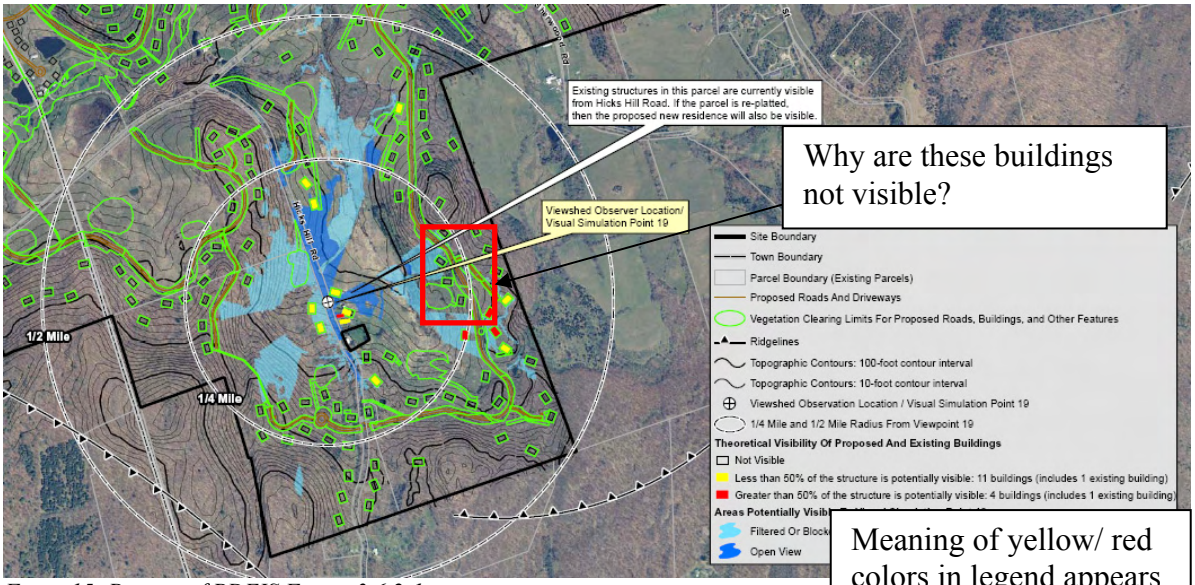


Figure15: Portion of PDEIS Figure 3.6.2-1

I believe several of the viewshed maps show a similar problem, where their results are inexplicable considering the evidence as published in the PDEIS, as well as being inconsistent with what the visual simulations show.

Methods: Study of Viewpoint 19, panoramas

Virtually every photograph published in this PDEIS is a panorama created by stitching together individual 35mm shots with software that fits the images together and alters the original images so that they do fit together. A person stitching together individual photographs produces something that looks like Figure 16 in next page:

ENVIRONMENTAL
SIMULATION
CENTER, LTD.

Figure 16: Panorama from 50mm lens assembled manually with Photoshop

The same image processed by software looks like Figure 17 and Figure 18:

Figure 17: Panorama from 50 mm lens processed by stitching software

Figure 18: Panorama from Figure 17, cropped

The software alters the individual images to create a view that is seamless and more readable, but, importantly, it alters the images.

The only way this office knows how to develop a verifiable digital photomontage using stitched photomontages is to create a photomontage for each of the photographs that make up the photomontage and then stitch the image together after each individual photosimulation has been made. This is because a single camera lens has one focal point. If a panoramic picture is comprised of multiple images, and hence, multiple focal points, then one camera lens will not be enough to reproduce that panorama. It does not appear that the photomontages were done in this manner, so it is difficult for us to verify how they were done and any method that would produce them as published is suspect.

ENVIRONMENTAL
SIMULATION
CENTER, LTD.

Methods: how could this have happened?
In my discussion with the professional that performed the visual simulations, I learned that this was the *first* SEQR visual simulation job his out-of-state firm had undertaken. Other than the DEC visual policy document, there is no manual that I am aware of on how to produce materials for visual analysis under SEQR. Rather, there is an evolving body of work that forms the standard practice. If the professional was unfamiliar with this body of work, but is experienced in producing architectural illustrations and renderings, it would be quite easy to produce materials that at a glance look acceptable, but upon inspection fall short of standard practice under SEQR.

The visual simulation work for this project site is not trivial. It is a vast patchwork of trees and fields with difficult topography and few matchpoints. While everyone has to start somewhere, the bar for the Carvel DEIS is set quite high. To use this project as an introduction to visual simulation for SEQR introduces a risk that the Lead Agency should find unacceptable.

Close
There are other problems with the PDEIS, but this letter should detail more than enough flaws to require the Applicant to produce materials that support conclusions on impacts on visual resources. This letter makes no substantive comments as to impacts on visual resources as those impacts cannot be accurately described using materials published in the PDEIS.

I appreciate the opportunity to comment and I hope that you have found this letter useful. Should you have any questions or require additional materials, I encourage you to call me at 212-279-1851.

Sincerely,

George M. Janes, AICP
Executive Director
Environmental Simulation Center, LTD.