SIMULATIONS

010 Long Point Camps
Early Morning
SIMULATION

010 Long Point Camps
Early Morning
Siemens SWT-3.6-107
10 nm
Simulation
010 Long Point Camps
Early Morning
Siemens SWT-3.6-107
10 nm

GENERAL INFORMATION

Base Photograph
Photo Name: LPM_0170-UV2
Date: June 3, 2012
Time: 6:17 AM
GPS Coordinates: lat 34.898961°, long -76.255103°
Viewpoint Elevation: 11°

Sun and Weather
Sun Angle/Azimuth: 74°
Sun Elevation: 16°
Lighting Angle: Back lit
Weather Conditions: Sunny
Visibility: 10 mi
Wave Height: 1 - 2'
Period: 7 - 8 sec.

Camera
Camera Make/Model: Nikon D7000
Sensor Dimensions: 23.6 mm X 15.6 mm
Lens Make/Model: Nikkor DX AF-S 35 mm
Lens Focal Length: 35 mm
35 mm Equivalent Focal Length: 52.5 mm
Horizontal and Vertical Angles of View:
37.3° wide and 25.3° high
Camera Height: 1.5 m (5')
Camera Azimuth: 117°

Wind Turbine Information
Number: 200
Make and Model: Siemens SWT-3.6-107
Height/Dimensions:
Support Structure/Monopile Ht.: 13 m (43')
Hub Ht. (above Monopile): 80 m (262')
Rotor Diameter: 107 m (351')
Total Height to Tip of Blade: 147 m (481')
Service Platform: A bldg. 50’H X 100’W X 200’ L
  elevated 50’ above the water

VIEWING INSTRUCTIONS
The simulation is properly printed on an 11” X 17” sheet at actual size.
If viewed on a computer monitor, use the highest screen resolution.
The simulated image is at the proper perspective when viewed at 23.5” from the eye, or at a distance of approximately twice the image height.

NOTES
• The image was taken with a UV filter.
• Refraction Coefficient (k) = .075

PANORAMA

Simulation location within the panorama view (190° X 60°)
from the Long Point Camps site

T. J. Boyle Associates
landscape architects • planning consultants
SIMULATION

010 Long Point Camps
Early Morning
Siemens SWT-3.6-107
15 nm
Simulation location within the panorama view (190° X 60°) from the Long Point Camps site
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Siemens SWT-3.6-107
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Simulation location within the panorama view (190° X 60°)
from the Long Point Camps site

T. J. Boyle Associates
landscape architects • planning consultants
VISUALIZATION STUDY FOR
OFFSHORE NORTH CAROLINA

SIMULATION

010 Long Point Camps
Early Morning
Vestas V164-7.0 MW
10 nm
Simulation 010 Long Point Camps Early Morning Vestas V164-7.0 MW 10 nm

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Photo Name: LPM_0170-UV2
Date: June 3, 2012
Time: 6:17 AM
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Sun Elevation: 16°
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35 mm Equivalent Focal Length: 52.5 mm
Horizontal and Vertical Angles of View: 37.3° wide and 25.3° high
Camera Height: 1.5 m (5')
Camera Azimuth: 117°

Wind Turbine Information
Number: 200
Make and Model: Vestas V164-7.0 MW
Height/Dimensions:
Support Structure/Monopile Ht.: 13 m (43')
Hub Ht. (above Monopile): 105 m (345')
Rotor Diameter: 164 m (538')
Total Height to Tip of Blade: 200 m (656')
Service Platform: A bldg. 50' H X 100' W X 200' L elevated 50' above the water

PANORAMA

Simulation location within the panorama view (190° X 60°) from the Long Point Camps site

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T. J. Boyle Associates landscape architects • planning consultants
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Vestas V164-7.0 MW
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- Sun Elevation: 16°
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- Weather Conditions: Sunny
- Visibility²: 10 mi
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PANORAMA

Simulation location within the panorama view (190° X 60°) from the Long Point Camps site
GPS Coordinates
Location coordinates as used in WindPRO to register the wireframe diagram to the photograph. Due to slight errors and lens distortion,
these values may differ at the fourth significant digit as obtained from a handheld GPS device at the time the photographs were taken and
as shown on the Project Location Map.

Visibility
Visibility is obtained from the closest airport weather station (see chart at right). The chart shows which weather station was used
for each site. Visibility is measured up to ten statute miles.

Camera Azimuth
Camera azimuth was obtained using a magnetic compass at the
time of photography. However magnetic anomalies in the study
area make some of these measurements unreliable. The camera
azimuth reported here is for true north and reflects the bearing
used to register the wind turbines to the photograph in WindPRO.

Refraction Coefficient
The correction for refraction comes from Technical Appendix
F Earth Curvature and Refraction of Light, in the report Visual
Representation of Windfarms Good Practice Guidance, prepared
for Scottish Natural Heritage (h+m 2006). The coefficient of
refraction k is commonly defined as the ratio between the radius
of the earth and the radius of the light in the line of sight between
an object and the observer (Hirt 2010). The value reported
here is half this value, but it is multiplied by two in the Technical
Appendix’s equation.

ABBREVIATIONS
nm nautical miles
mi statute miles
mm millimeters
m meters
sec. seconds
’ feet
” inches
° degrees
lat latitude
long longitude

REFERENCES

Hirt C., Guillaume S., Wisbar A., Bürki B. and Sternberg, H. 2010. Monitoring of the refraction coefficient of the lower atmosphere using a
2010JD014067