SIMULATIONS

013 Cape Point
Early Morning
Simulation
013 Cape Point
Early Morning
Siemens SWT-3.6-107
10 nm

GENERAL INFORMATION

Base Photograph
Photo Name: CPM_0001-UV1
Date: April 17, 2012
Time: 10:08 AM
GPS Coordinates: lat 34.583206°, long -76.533865°
Viewpoint Elevation: 3'

Sun and Weather
Sun Angle/Azimuth: 122°
Sun Elevation: 53°
Lighting Angle: Front lit
Weather Conditions: Sunny
Visibility: 10 mi
Wave Height: 2 - 4'
Period: 4 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
35mm 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: 85°

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
- Turbine heights were adjusted to the image’s horizon line, which was
  slightly curved due to camera lens distortion..
- The image was taken with a UV filter.
- Refraction Coefficient (k) = .075

PANORAMA

Simulation location within the panorama view (190° X 60°)
from the Cape Point site
SIMULATION

013 Cape Point
Early Morning
Siemens SWT-3.6-107
15 nm
Simulation
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Early Morning
Siemens SWT-3.6-107
15 nm

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  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

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PANORAMA

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

37.3° x 25.3°
013 Cape Point
Early Morning
Siemens SWT-3.6-107
20 nm
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Siemens SWT-3.6-107
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Lighting Angle: Front lit
Weather Conditions: Sunny
Visibility²: 10 mi
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37.3° wide and 25.3° high
Camera Height: 1.5 m (5’)
Camera Azimuth³: 85°

WTG Information
Number: 200
Make and Model: Siemens SWT-3.6-107
Height/Dimensions:
Support Structure/Monopile Ht.: 13 m (42.65’)
Hub Ht. (above Monopile): 80 m (262.46’)
Rotor Diameter: 107 m (351.05’)
Total Height to Tip of Blade: 146.5 m (480.64’)
Service Platform: 100’H X 100’W X 200’L

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PANORAMA

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

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

013 Cape Point
Early Morning
Vestas V164-7.0 MW
10 nm
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Early Morning
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10 nm

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Horizontal and Vertical Angles of View:
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Camera Height: 1.5 m (5')
Camera Azimuth: 85°

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

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from the Cape Point site
1**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.

2**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.

3**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.

4**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.

### Closest Airport Weather Station to Sites

<table>
<thead>
<tr>
<th>Site</th>
<th>Weather Station Location NC</th>
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<tbody>
<tr>
<td>001 Corolla Lighthouse</td>
<td>Kill Devil Hills</td>
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<tr>
<td>002 Beach at Duck</td>
<td>Kill Devil Hills</td>
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<tr>
<td>003 Kitty Hawk</td>
<td>Kill Devil Hills</td>
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<tr>
<td>004 Coquina Beach</td>
<td>Kill Devil Hills</td>
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<td>005 Bodie Island Lighthouse</td>
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<tr>
<td>006 Cape Hatteras Lighthouse</td>
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<tr>
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<td>008 Ocracoke Beach</td>
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<td>016 Oak Island</td>
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<td>017 Holden Beach</td>
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<td>018 Sunset Beach</td>
<td>Southport</td>
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### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
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<tbody>
<tr>
<td>nm</td>
<td>nautical miles</td>
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### References
