



Kitty Hawk Wind



AVANGRID

Construction and Operations Plan

Appendix Q - Radar and Navigational Aid
Screening Study

September 30, 2022

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Appendix Q – Radar and Navigational Aid Screening Study

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KITTY HAWK NORTH WIND PROJECT
RADAR AND NAVIGATIONAL AID SCREENING STUDY
SEPTEMBER 30, 2022

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INTRODUCTION

The proposed Kitty Hawk North Wind Project (Project) consists of 69 wind turbine generator (WTG) positions and one electrical service platform (70 total proposed locations) located on approximately 19,441 hectares of ocean (Wind Development Area) within the northwestern section of Bureau of Ocean Energy Management (BOEM) Lease Area OCS-A 0508 (Lease Area) off the coast of North Carolina.¹ This report provides the results of a radar and navigational aid screening study conducted by Westslope Consulting, LLC (Westslope) for the Project using a blade-tip height of 1,042 feet (ft) (317.5 meters [m]) above mean sea level (MSL).

This study includes the following:

- Research into radar sites and Very High Frequency Omnidirectional Range (VOR) navigational aid sites near the Project.
- An Air Route Surveillance Radar (ARSR) and Airport Surveillance Radar (ASR) line-of-sight (LOS) analysis.
- A Relocatable Over-the Horizon Radar (ROTHR) screening analysis.
- An Advanced Dynamic Aircraft Measurement System (ADAMS) screening analysis.
- A Next Generation Radar (NEXRAD) weather radar screening analysis.
- A coastal High Frequency (HF) radar LOS analysis.

RESEARCH

ARSR and ASR Sites

Research conducted by Westslope identified the following four ARSR and ASR sites that may be potentially affected by the Project:

- Binns Hall Common Air Route Surveillance Radar (CARSR)
- Naval Air Station (NAS) Oceana Airport Surveillance Radar-11 (ASR-11)
- Norfolk Airport Surveillance Radar-9 (ASR-9)
- Oceana Air Route Surveillance Radar-4 (ARSR-4)

In addition to the Department of Defense (DoD) and Department of Homeland Security (DHS) using these radar sites for air defense and homeland security, the DoD uses the NAS Oceana ASR-11 for air traffic control at the NAS Oceana Radar Air Traffic Control Facility. The Federal Aviation Administration (FAA) uses the Binns Hall CARSR, Norfolk ASR-9, and the Oceana ARSR-4 for air traffic control at multiple facilities, including the Washington Air Route Traffic Control Center and the Norfolk Terminal Radar Approach Control.

¹ KTHN_layout_20210617.shp, KTHN_WDA_20210617.shp, and KittyHawk_LeaseArea.kmz.

Co-Located Secondary Surveillance Radar

Research conducted by Westslope identified the following secondary surveillance radar systems co-located with the ARSR and ASR systems:

- An Air Traffic Control Beacon Interrogator-6 is co-located with the Binns Hall CARSR and the Oceana ARSR-4.
- A Mode S is co-located with the Norfolk ASR-9.
- A Monopulse Secondary Surveillance Radar is co-located with the NAS Oceana ASR-11.

In general, secondary surveillance radar systems are less susceptible to interference from WTGs than primary surveillance radar systems, such as the ARSR and ASR systems.

ROTHR

Research conducted by Westslope identified the Virginia ROTHR near the Project.

The DoD uses this radar site at the United States Southern Command for drug interdiction.

ADAMS

Research conducted by Westslope identified the ADAMS radar facility near the Project.

The DoD uses the ADAMS at the Atlantic Test Range on the NAS Patuxent River for radar cross section measurements.

VOR Sites

Research conducted by Westslope identified no navigational aid sites near the Project.

NEXRAD Weather Radar Sites

Research conducted by Westslope identified the following three NEXRAD weather radar sites that may be potentially affected by the Project:

- Dover Air Force Base (AFB) Weather Surveillance Radar-1988 Doppler (WSR-88D)
- Morehead City WSR-88D
- Norfolk WSR-88D

Research conducted by Westslope shows that the lowest elevation angle scanned by these radar sites is 0.5 degrees.

The National Weather Service uses these radar sites for weather operations at multiple facilities, including the Wakefield Weather Forecast Office (WFO) and the Newport/Morehead City WFO. In addition, the DoD uses the Dover AFB WSR-88D for weather operations at Dover AFB.

HF Radar Sites

Research conducted by Westslope identified the following six HF radar sites that may be potentially affected by the Project:

- Assateague Island HF radar
- Cape Hatteras HF radar
- Cedar Island HF radar
- Core Banks HF radar
- Duck HF radar
- Little Island Park HF radar

The Assateague Island HF radar, Cedar Island HF radar, and the Little Island Park HF radar are operated by Old Dominion University, and the Cape Hatteras HF radar, Core Banks HF radar, and the Duck HF radar are operated by the University of North Carolina.

In partnership with the National Oceanic and Atmospheric Administration (NOAA) Integrated Ocean Observing System (IOOS), various federal agencies use the ocean surface current and wave data provided by these HF radar sites in support of multiple missions.

ANALYSIS

ARSR and ASR LOS Analysis

Westslope conducted an ARSR and ASR LOS analysis using United States Geological Survey (USGS) 3-Dimensional Elevation Program (3DEP) data. This analysis shows whether WTGs at a blade-tip height of 1,042 ft (317.5 m) MSL will be within line-of-sight of one or more ARSR or ASR sites.

Westslope conducted the LOS analysis for the following four ARSR and ASR sites:

- Binns Hall CARSR
- NAS Oceana ASR-11
- Norfolk ASR-9
- Oceana ARSR-4

Binns Hall CARSR

The LOS analysis results show that the 70 proposed locations will not be within line-of-sight of and will not interfere with the Binns Hall CARSR at a blade-tip height of 1,042 ft (317.5 m) MSL.

As a result, Westslope does not expect any radar effects at or below this blade-tip height.

NAS Oceana ASR-11

The LOS analysis results show that 63 of the 70 proposed locations will be within line-of-sight of and may interfere with the NAS Oceana ASR-11 at a blade-tip height of 1,042 ft (317.5 m) MSL. See Figure 1.

Westslope also conducted a LOS analysis using the 3DEP data and a Digital Surface Model (DSM) created using Light Detection and Ranging (LiDAR) data for the southeastern Virginia and northeastern North Carolina area. The DSM captures topographical features, such as buildings and trees, which are not accounted for in the bare earth 3DEP data.

The LOS analysis results using the 3DEP data and the DSM show that the 70 proposed locations will not be within line-of-sight of and will not interfere with this radar site at a blade-tip height of 1,042 ft (317.5 m) MSL. See Figure 2.

As a result, Westslope does not expect any radar effects at or below this blade-tip height.

Norfolk ASR-9

The LOS analysis results show that eight of the 70 proposed locations will be within line-of-sight of and may interfere with the Norfolk ASR-9 at a blade-tip height of 1,042 ft (317.5 m) MSL. See Figure 3.

Westslope also conducted a LOS analysis using the 3DEP data and the DSM, which shows that the 70 proposed locations will not be within line-of-sight of and will not interfere with this radar site at a blade-tip height of 1,042 ft (317.5 m) MSL. See Figure 4.

As a result, Westslope does not expect any radar effects at or below this blade-tip height.

Oceana ARSR-4

The LOS analysis results show that 69 of the 70 proposed locations will be within line-of-sight of and may interfere with the Oceana ARSR-4 at a blade-tip height of 1,042 ft (317.5 m) MSL. See Figure 5.

Westslope also conducted a LOS analysis using the 3DEP data and the DSM, which shows that 31 of the 70 proposed locations will be within line-of-sight of and may interfere with this radar site at a blade-tip height of 1,042 ft (317.5 m) MSL. See Figure 6.

The radar effects will include unwanted radar returns (clutter) resulting in a partial loss of primary target detection and a number of false primary targets over and in the immediate vicinity of the proposed locations within line-of-sight in the Project.

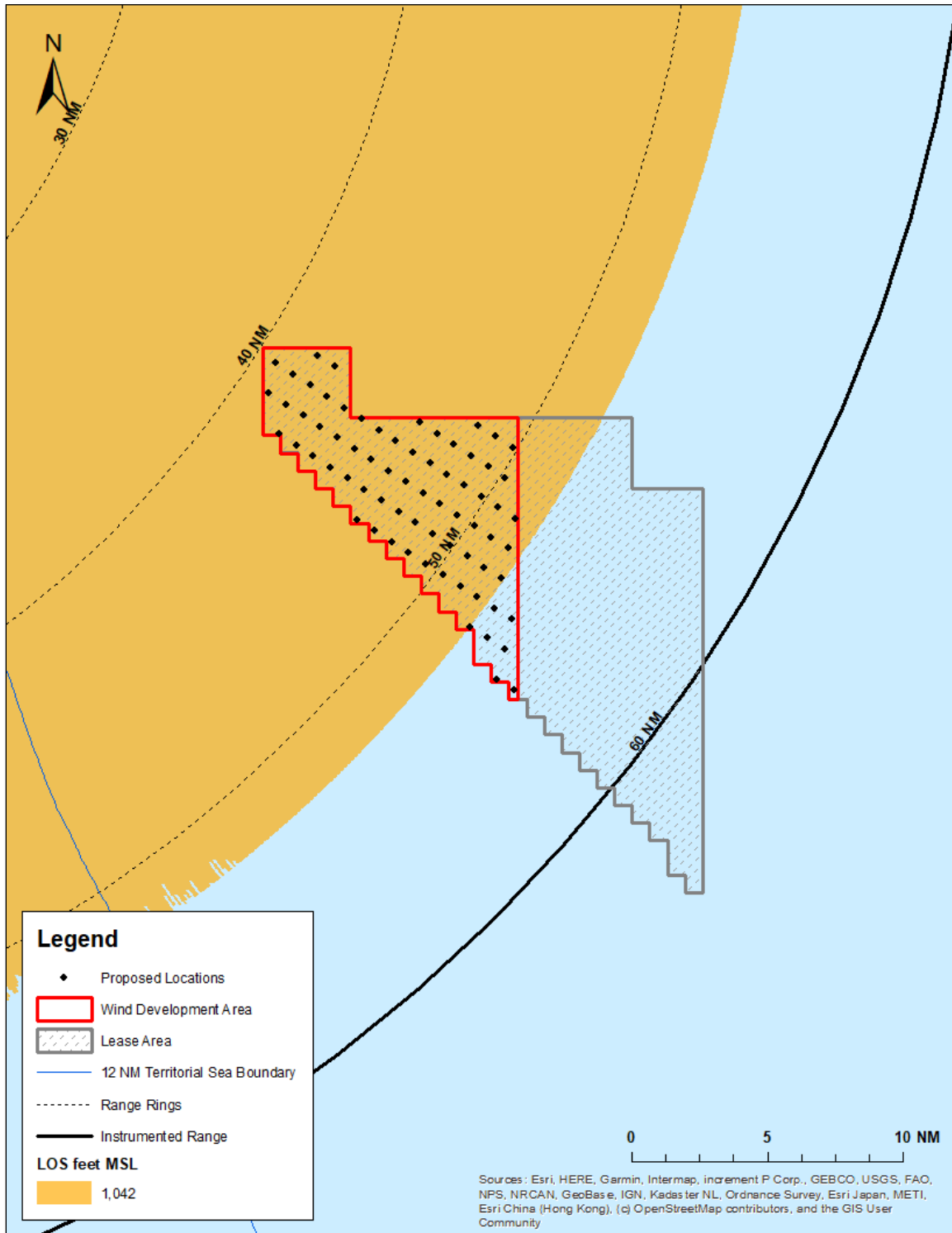


Figure 1 LOS Analysis Results for the NAS Oceana ASR-11 using 3DEP Data

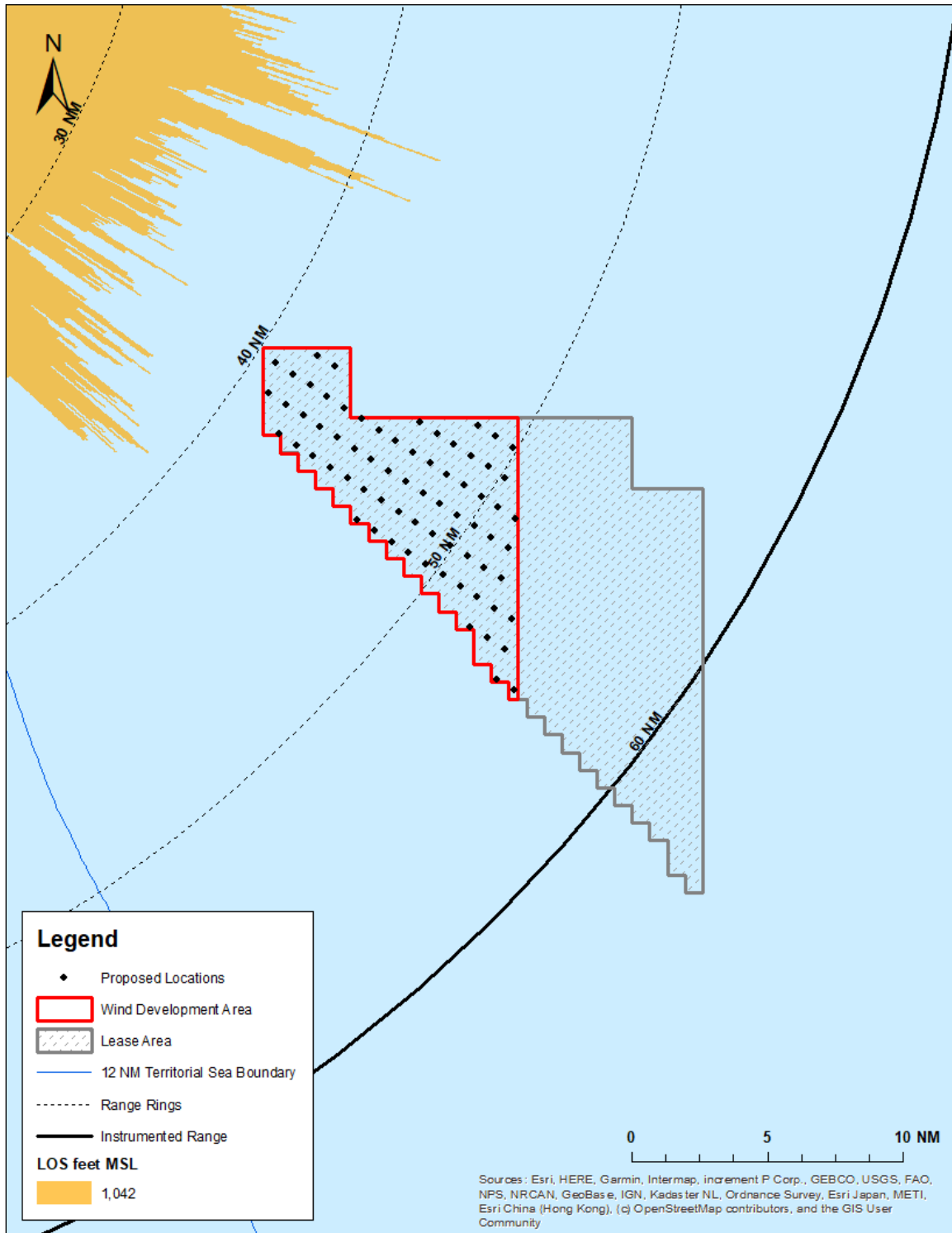


Figure 2 LOS Analysis Results for the NAS Oceana ASR-11 using 3DEP Data and the DSM

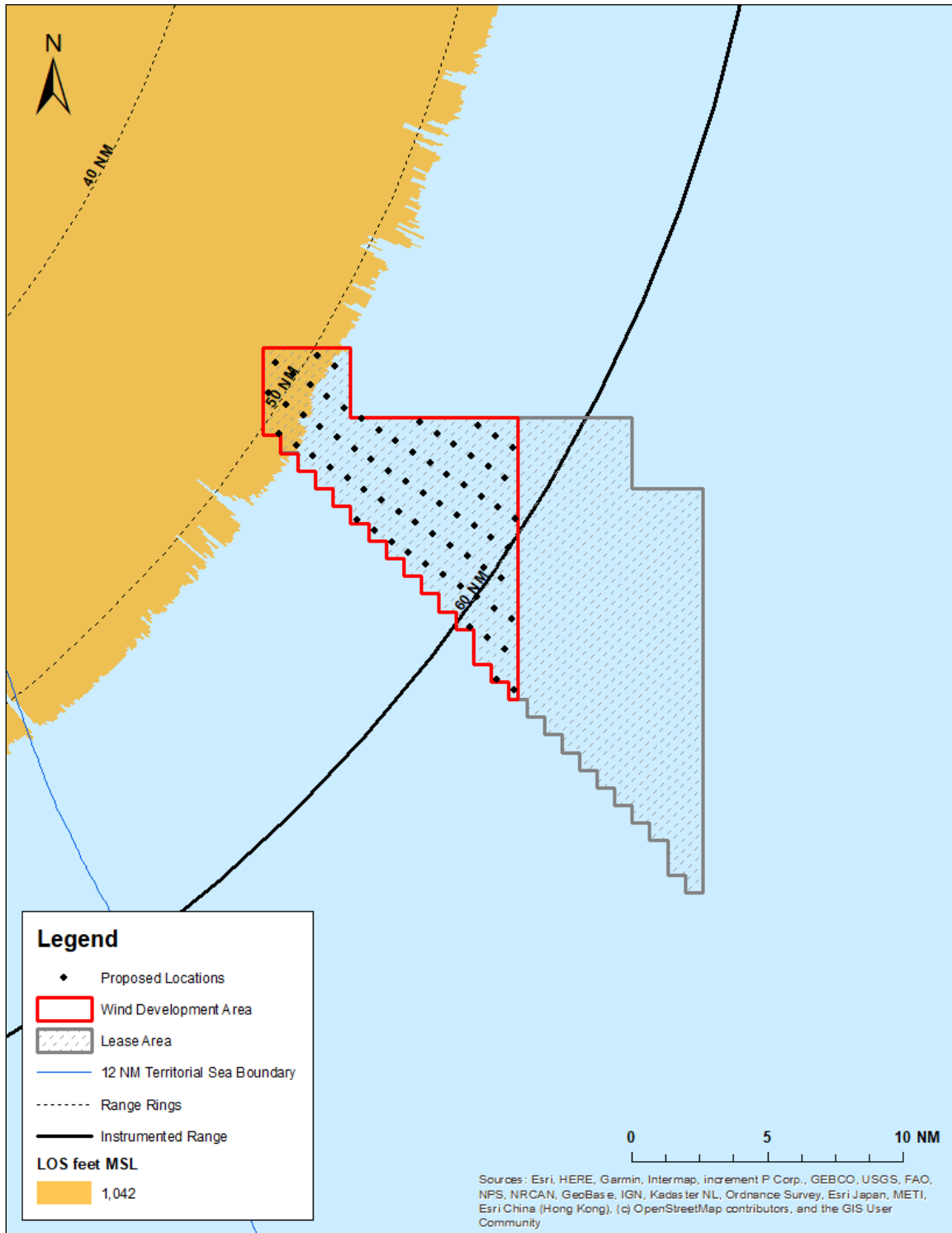


Figure 3 LOS Analysis Results for the Norfolk ASR-9 using 3DEP Data

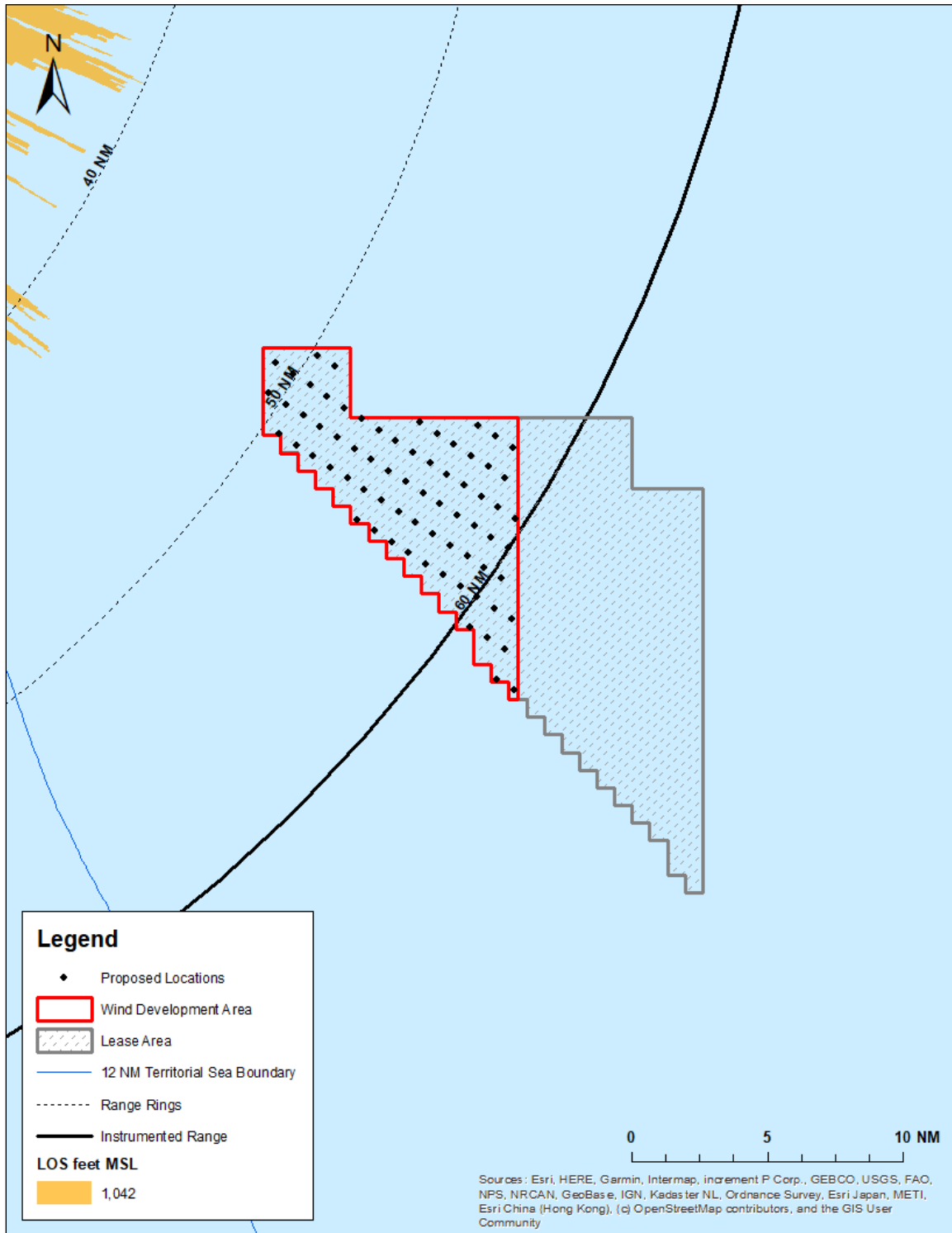


Figure 4 LOS Analysis Results for the Norfolk ASR-9 using 3DEP Data and the DSM

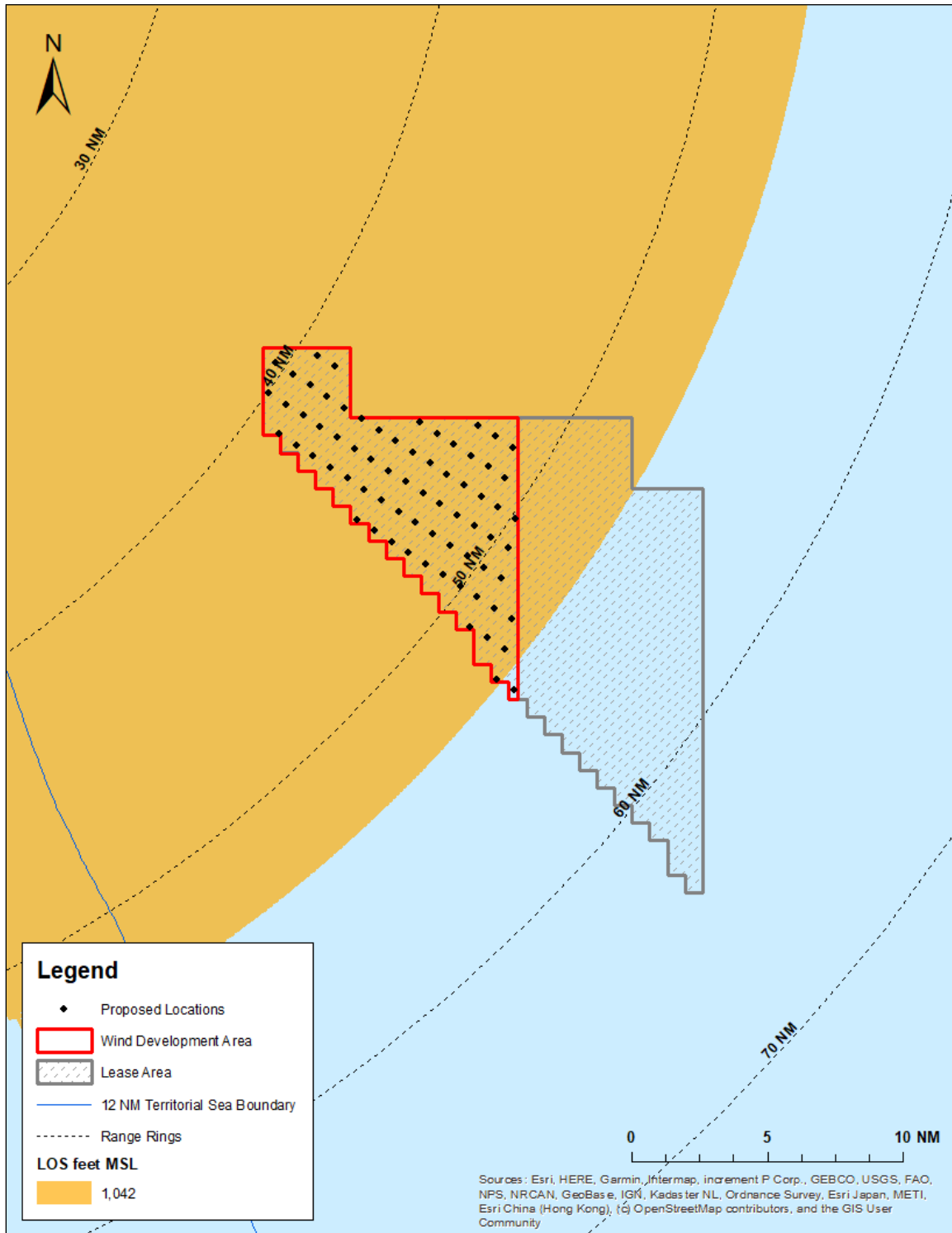


Figure 5 LOS Analysis Results for the Oceana ARSR-4 using 3DEP Data

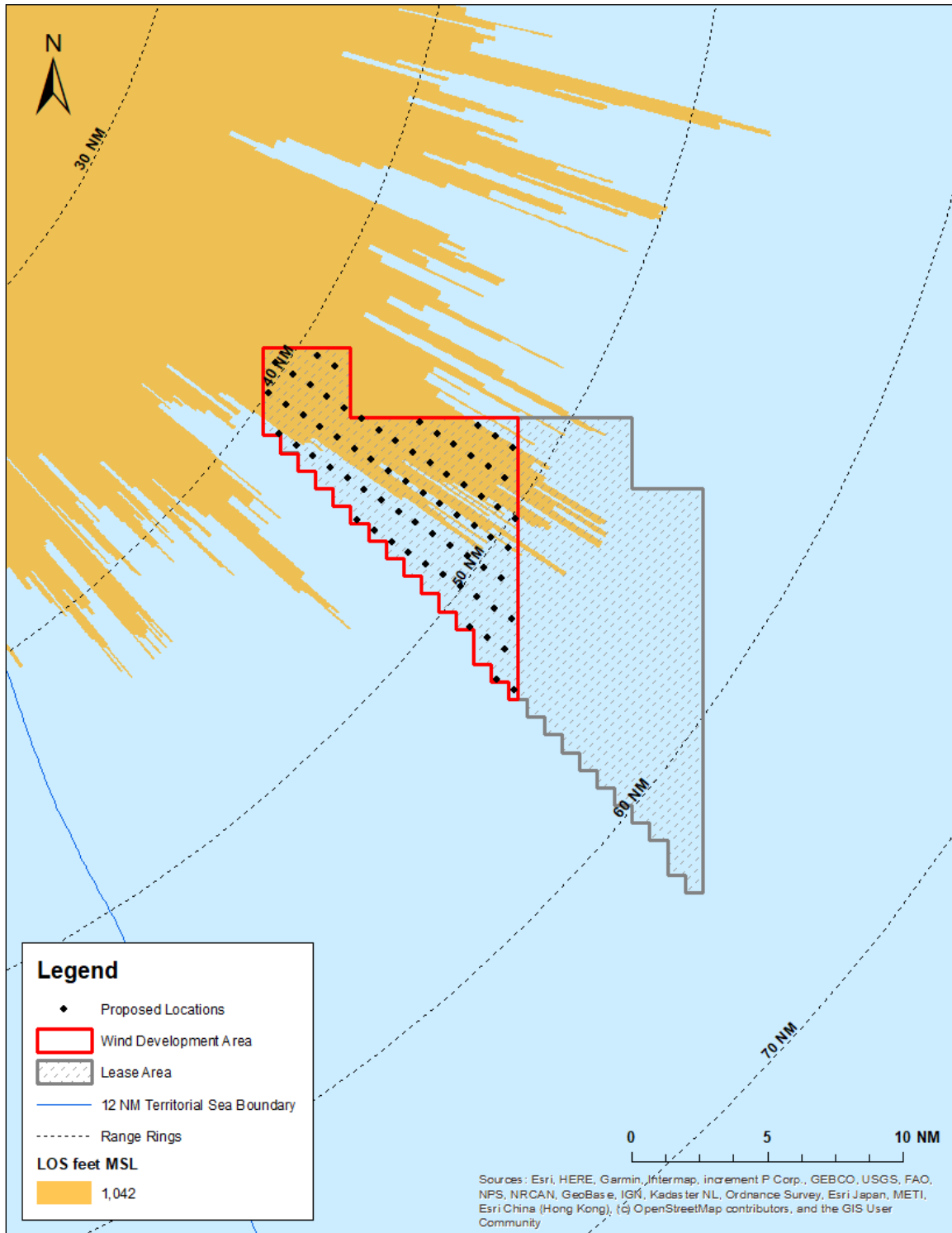


Figure 6 LOS Analysis Results for the Oceana ARSR-4 using 3DEP Data and the DSM

ROTHR Screening Analysis

Westslope conducted a screening analysis for the Virginia ROTHR. This analysis includes a review of the counties identified by the DoD as a concern for this radar site and shows whether WTGs will fall within Westslope's offshore screening area for the Virginia ROTHR transmit and receive sites.

Virginia ROTHR

The ROTHR screening analysis results show that the 70 proposed locations will not fall within the impacted counties for the Virginia ROTHR. The results also show that the 70 proposed locations will fall within Westslope's offshore screening areas for both the Virginia ROTHR transmit site and the Virginia ROTHR receive site. See Figures 7 and 8. As such, it is possible that the DoD may have concerns with the proposed locations that could interfere with the ability of the Virginia ROTHR to detect targets in parts of the North Atlantic Ocean and the South Atlantic Ocean.

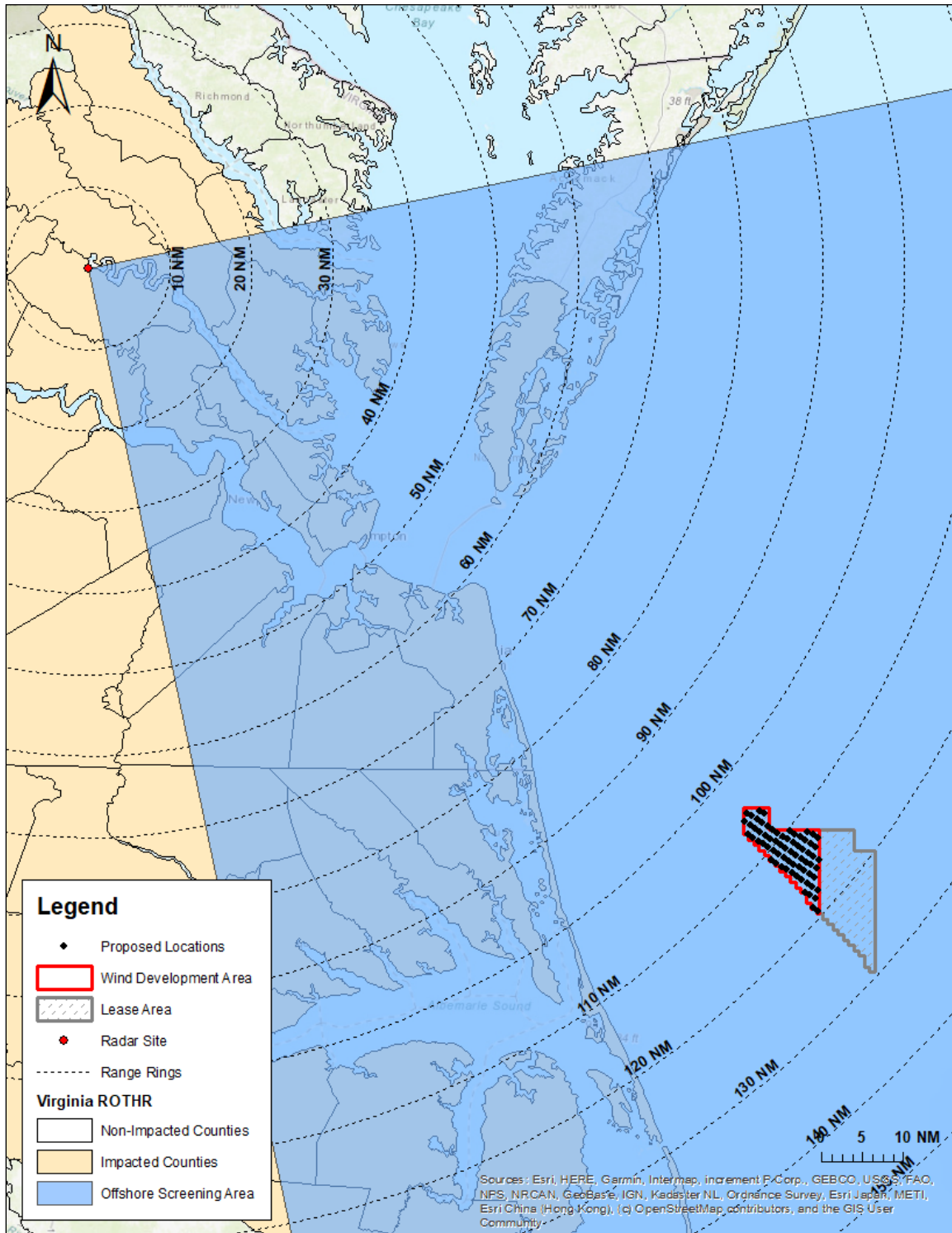


Figure 7 Virginia ROTH Transmit Site Counties of Concern and Offshore Screening Area

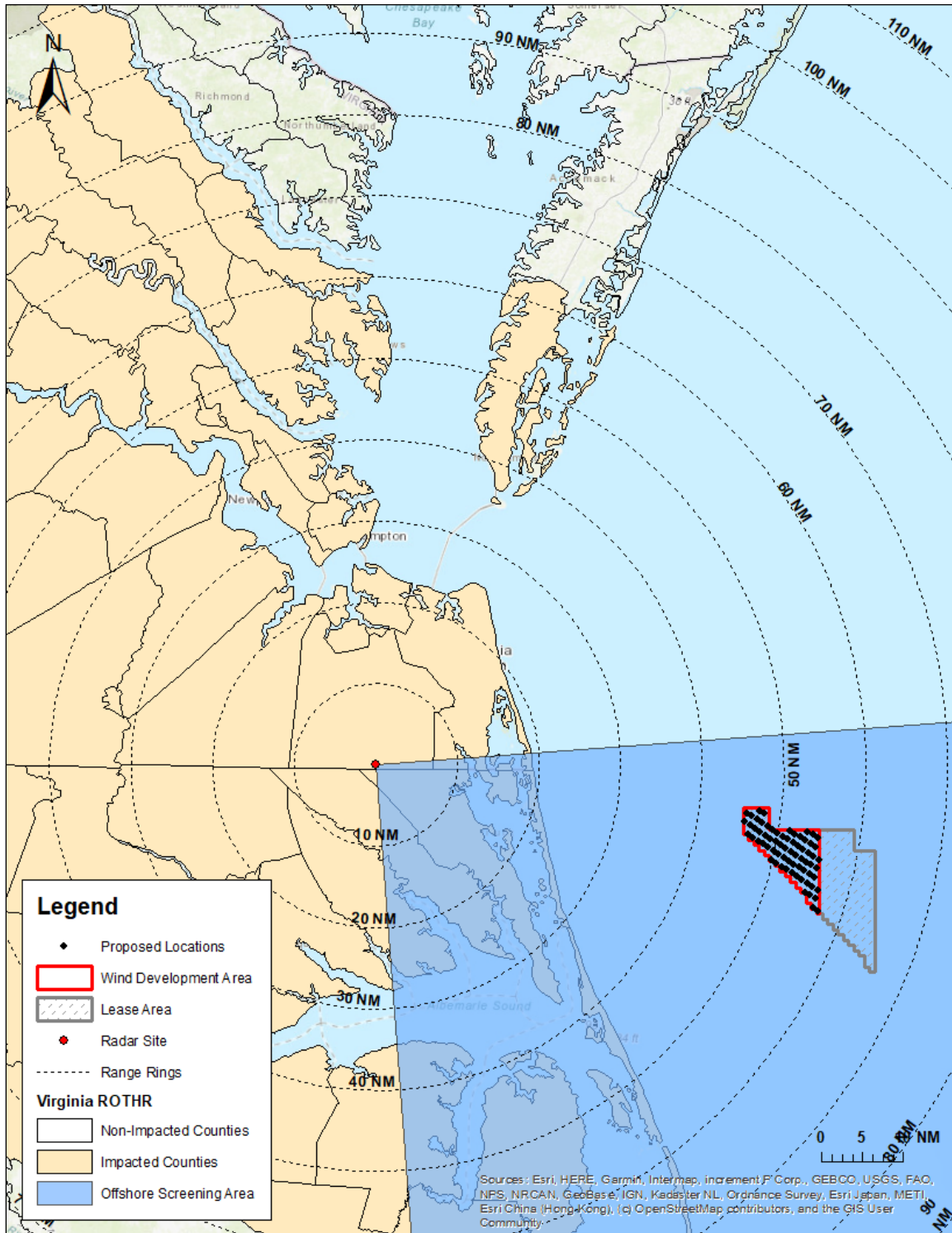


Figure 8 Virginia ROTH Receive Site Counties of Concern and Offshore Screening Area

ADAMS Screening Analysis

Westslope conducted a screening analysis for the ADAMS using a 4/3 earth's radius model and USGS 3DEP data. A 4/3 earth's radius model accounts for the refraction of radio waves as these waves propagate through the lowest layer of the atmosphere under standard atmospheric conditions.

Westslope's analysis shows whether WTGs at a blade-tip height of 1,042 ft (317.5 m) MSL will be within line-of-sight of the ADAMS and reviews whether WTGs will fall within the proposed NAS Patuxent River Geographic Area of Concern (GAOC). [1][2]

The ADAMS screening analysis results show that the 70 proposed locations will not be within line-of-sight of and will not interfere with the ADAMS at a blade-tip height of 1,042 ft (317.5 m) MSL under standard atmospheric conditions. The results also show that all 70 proposed locations will fall within the "ducting impact region" of the GAOC. See Figure 9. The ducting impact region represents an area where radio waves can propagate further than line-of-sight under standard atmospheric conditions. See Figure 10. Ducting can occur when the atmosphere is calm, that is, when wind speeds are relatively low and when moisture settles along the coastline. However, when the atmosphere is turbulent and wind speeds are high enough such that wind turbines are likely operational, ducting is less likely to occur.

Under standard atmospheric conditions, Westslope does not expect any effects to the ADAMS at or below this blade-tip height. Under ducting conditions, it is possible that the 70 proposed locations may fall within line-of-sight of the ADAMS, in which case the radar effects will include clutter that may affect the ability of the ADAMS to accurately measure the radar cross sections of targets.

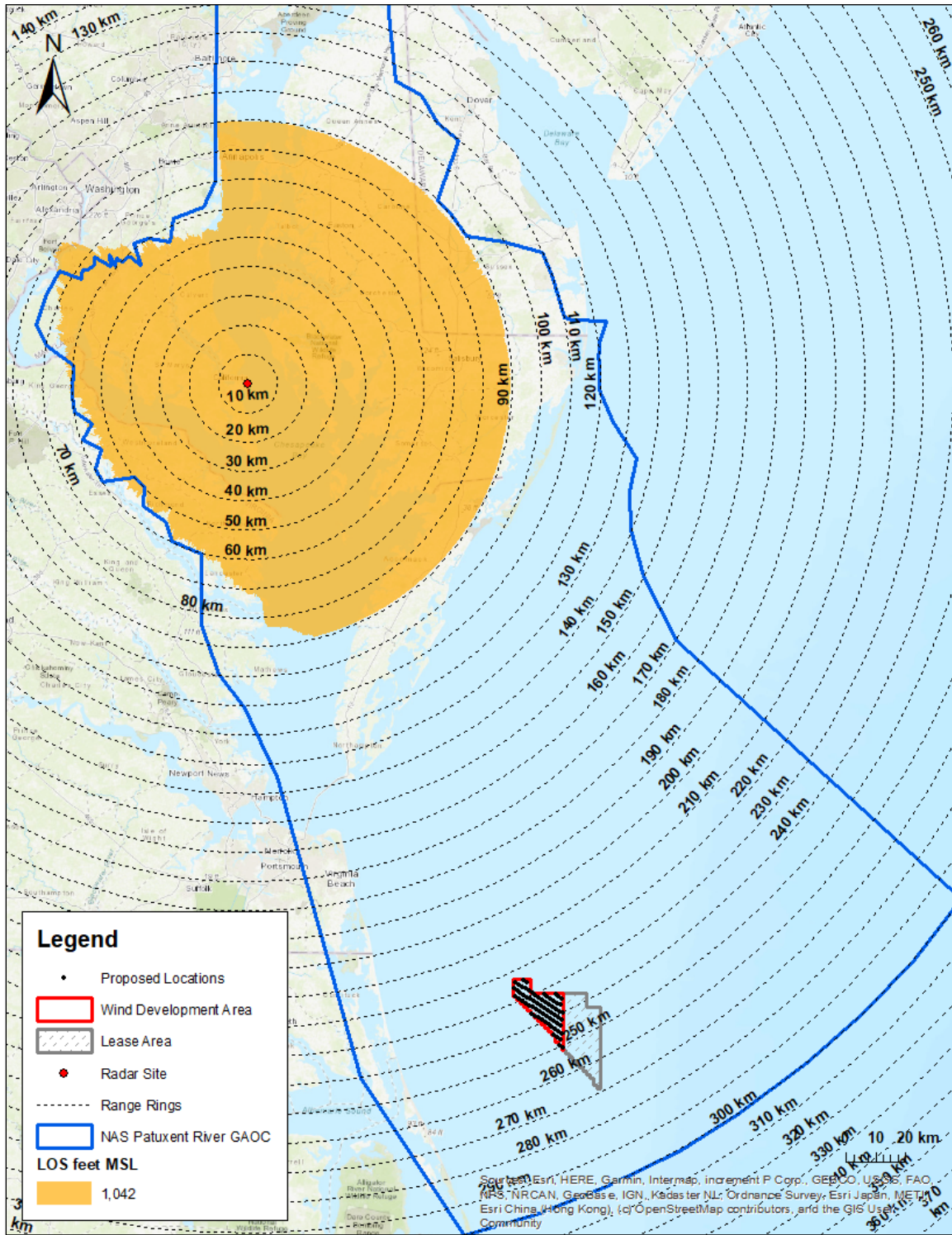


Figure 9 LOS Analysis Results for the ADAMS using 3DEP Data

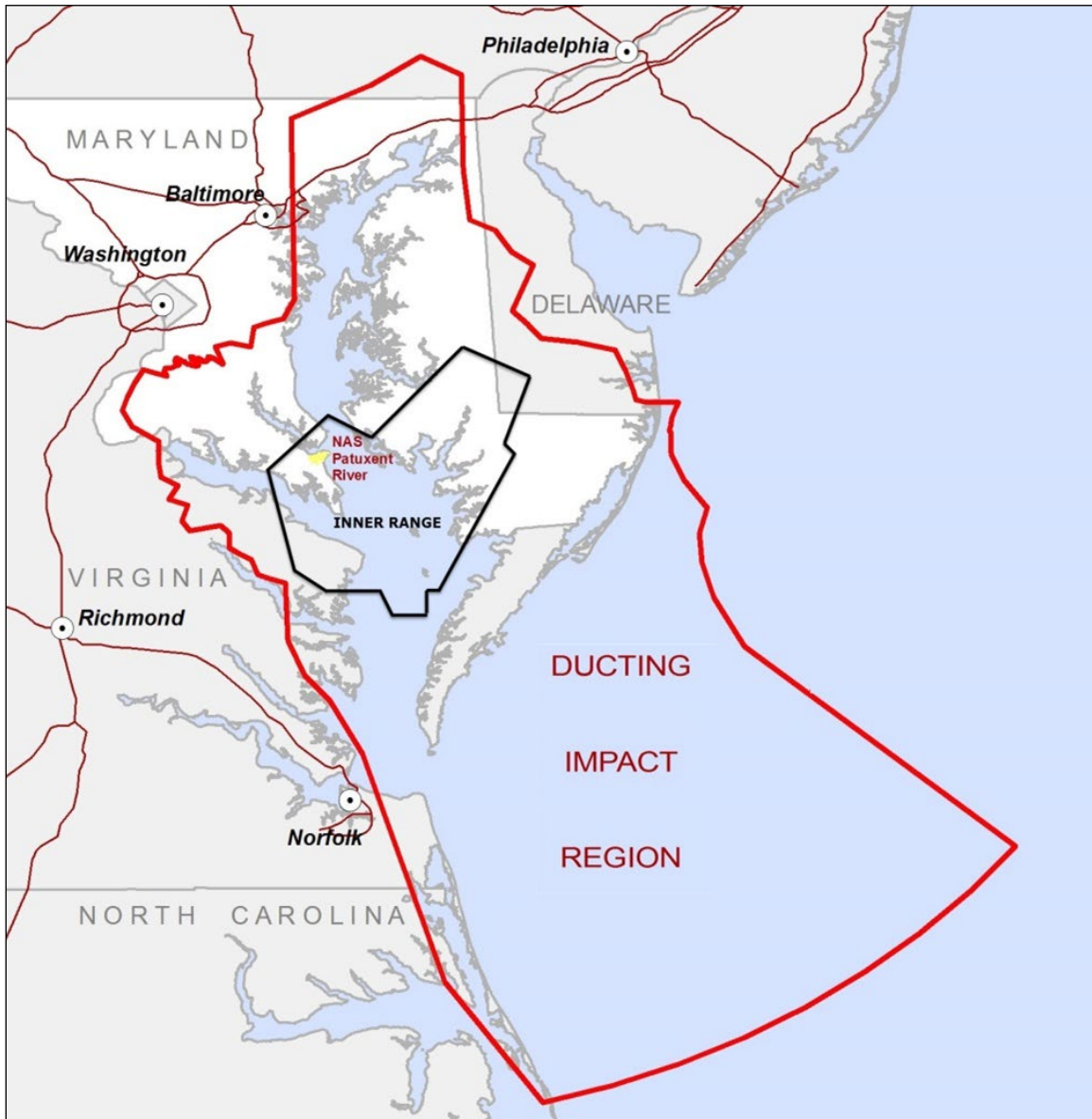


Figure 10 Ducting Impact Region

NEXRAD Weather Radar Screening Analysis

Westslope conducted a NEXRAD weather radar screening analysis using USGS 3DEP data. This analysis shows whether WTGs at a blade-tip height of 1,042 ft (317.5 m) MSL will be within line-of-sight of one or more WSR-88D sites and incorporates the NOAA Radar Operations Center (ROC) wind farm impact zone scheme.

Westslope conducted the NEXRAD weather radar screening analysis for the following three radar sites:

- Dover AFB WSR-88D
- Morehead City WSR-88D
- Norfolk WSR-88D

Dover AFB WSR-88D

Westslope's NEXRAD weather radar screening analysis shows that the 70 proposed locations will not be within line-of-sight of and will not interfere with the Dover AFB WSR-88D at a blade-tip height of 1,042 ft (317.5 m) MSL. The results also show that the 70 proposed locations at a blade-tip height of 1,042 ft (317.5 m) MSL will fall within a NOAA green area for this radar site. A green area, or "No Impact Zone," indicates that impacts are not likely to WSR-88D operations. See Figure 11.

Morehead City WSR-88D

Westslope's NEXRAD weather radar screening analysis shows that the 70 proposed locations will not be within line-of-sight of and will not interfere with the Morehead City WSR-88D at a blade-tip height of 1,042 ft (317.5 m) MSL. The results also show that the 70 proposed locations at a blade-tip height of 1,042 ft (317.5 m) MSL will fall within a NOAA green No Impact Zone for this radar site. See Figure 12.

Norfolk WSR-88D

Westslope's NEXRAD weather radar screening analysis shows that the 70 proposed locations will not be within line-of-sight of and will not interfere with the Norfolk WSR-88D at a blade-tip height of 1,042 ft (317.5 m) MSL. The results also show that the 70 proposed locations at a blade-tip height of 1,042 ft (317.5 m) MSL will fall within a NOAA green No Impact Zone for this radar site. See Figure 13.

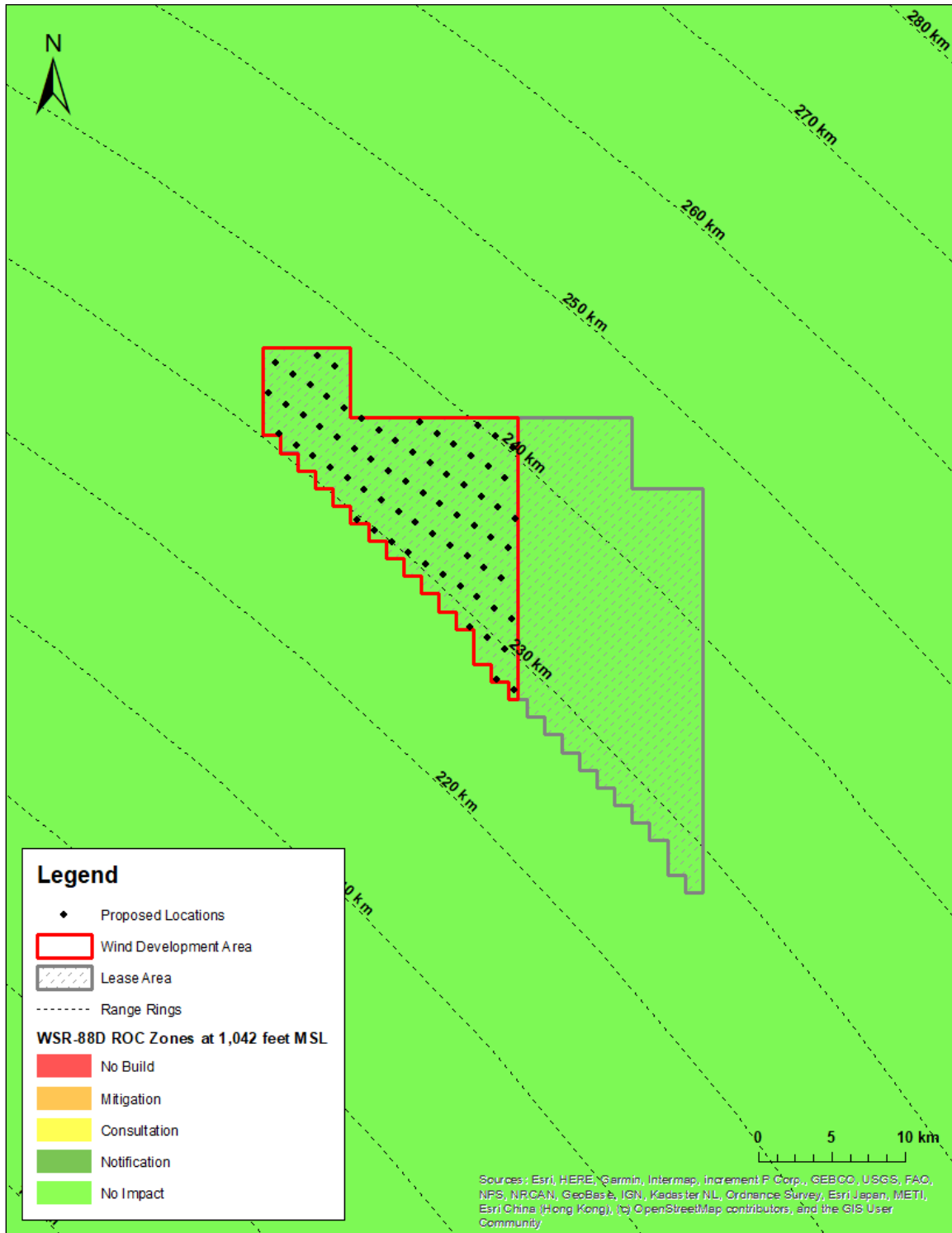


Figure 12 WSR-88D ROC Zone Results at 1,042 ft (317.5 m) MSL for the Morehead City WSR-88D using 3DEP Data

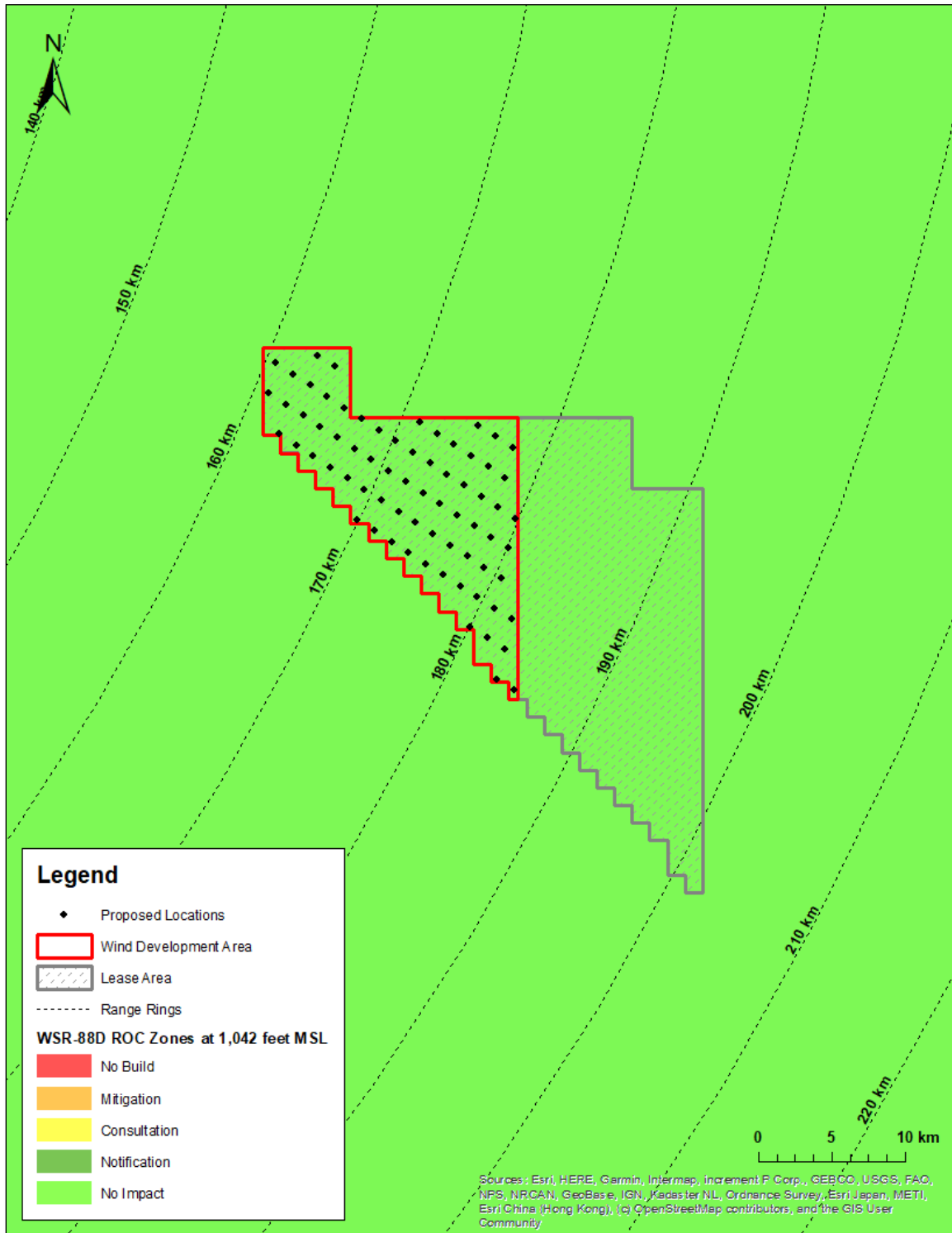


Figure 13 WSR-88D ROC Zone Results at 1,042 ft (317.5 m) MSL for the Norfolk WSR-88D using 3DEP Data

HF Radar LOS Analysis

Westslope conducted an HF radar LOS analysis using USGS 3DEP data. This analysis shows whether WTGs at a blade-tip height of 1,042 ft (317.5 m) MSL will be within line-of-sight of one or more HF radar sites.

Westslope conducted the LOS analysis for the following six HF radar sites:

- Assateague Island HF radar
- Cape Hatteras HF radar
- Cedar Island HF radar
- Core Banks HF radar
- Duck HF radar
- Little Island Park HF radar

All of these HF radar sites have an instrumented range of 200 km. See Figure 14.

Assateague Island HF Radar

The LOS analysis results show that the 70 proposed locations will not be within line-of-sight of the Assateague Island HF radar at a blade-tip height of 1,042 ft (317.5 m) MSL. See Figure 15. Although the proposed locations will not be within line-of-sight of this radar site, radar effects are still possible beyond line-of-sight due to the propagation of HF electromagnetic waves over the ocean surface.

Cape Hatteras HF Radar

The LOS analysis results show that the 70 proposed locations will not be within line-of-sight of the Cape Hatteras HF radar at a blade-tip height of 1,042 ft (317.5 m) MSL. See Figure 16. Although the proposed locations will not be within line-of-sight of this radar site, radar effects are still possible beyond line-of-sight due to the propagation of HF electromagnetic waves over the ocean surface.

Cedar Island HF Radar

The LOS analysis results show that the 70 proposed locations will not be within line-of-sight of the Cedar Island HF radar at a blade-tip height of 1,042 ft (317.5 m) MSL. See Figure 17. Although the proposed locations will not be within line-of-sight of this radar site, radar effects are still possible beyond line-of-sight due to the propagation of HF electromagnetic waves over the ocean surface.

Core Banks HF Radar

The LOS analysis results show that the 70 proposed locations are beyond the instrumented range of the Core Banks HF radar and will not be within line-of-sight of this radar site at a blade-tip height of 1,042 ft (317.5 m) MSL. See Figure 18. As a result, Westslope does not expect any radar effects at or below this blade-tip height.

Duck HF Radar

The LOS analysis results show that all 70 proposed locations will be within line-of-sight of the Duck HF radar at a blade-tip height of 1,042 ft (317.5 m) MSL. See Figure 19. The radar effects will include clutter in the vicinity of the proposed locations in the Project. As a result, impacts to Duck HF radar operations are possible.

Little Island Park HF Radar

The LOS analysis results show that all 70 proposed locations will be within line-of-sight of the Little Island Park HF radar at a blade-tip height of 1,042 ft (317.5 m) MSL. See Figure 20. The radar effects will include clutter in the vicinity of the proposed locations in the Project. As a result, impacts to Little Island Park HF radar operations are possible.

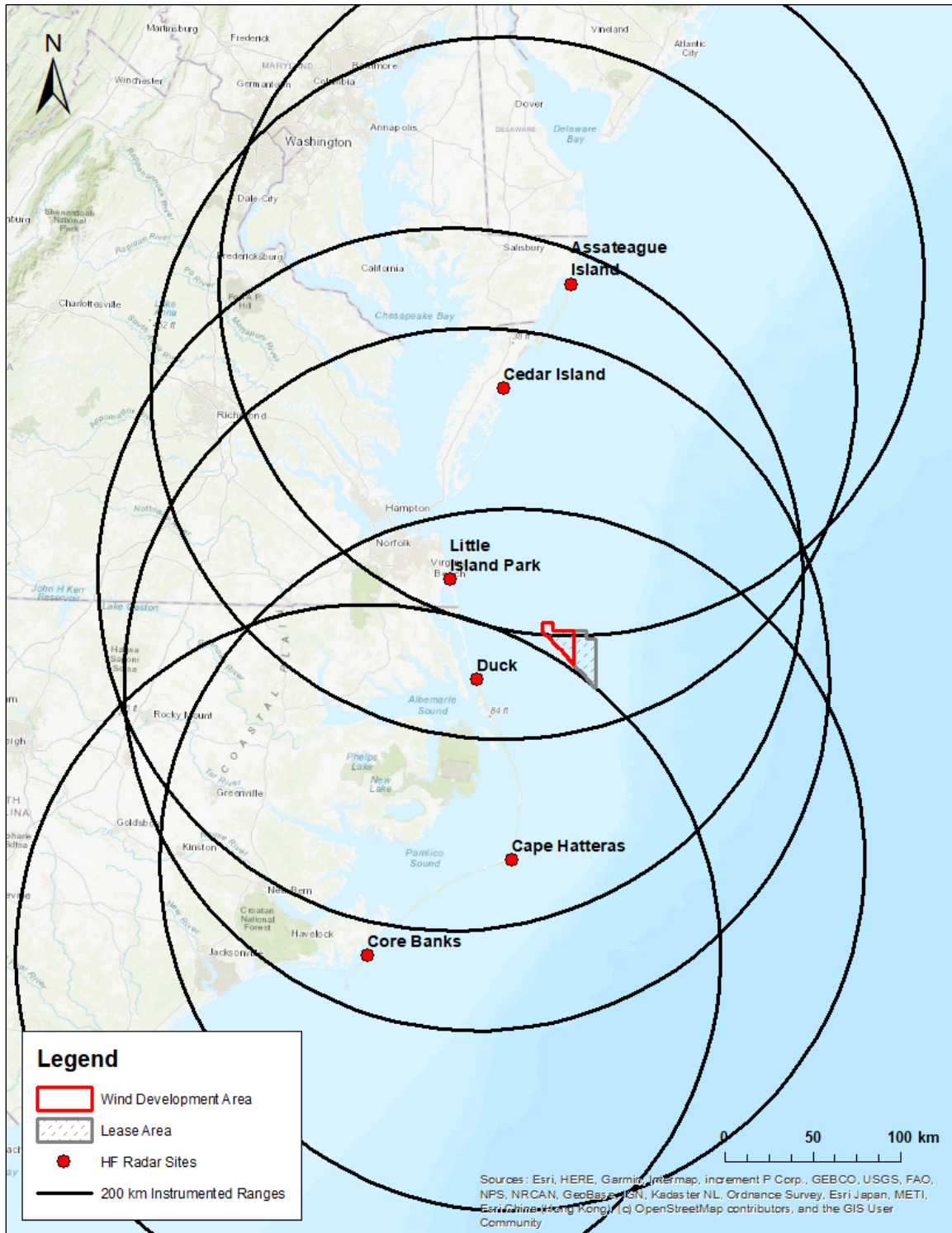


Figure 14 HF Radar Overview

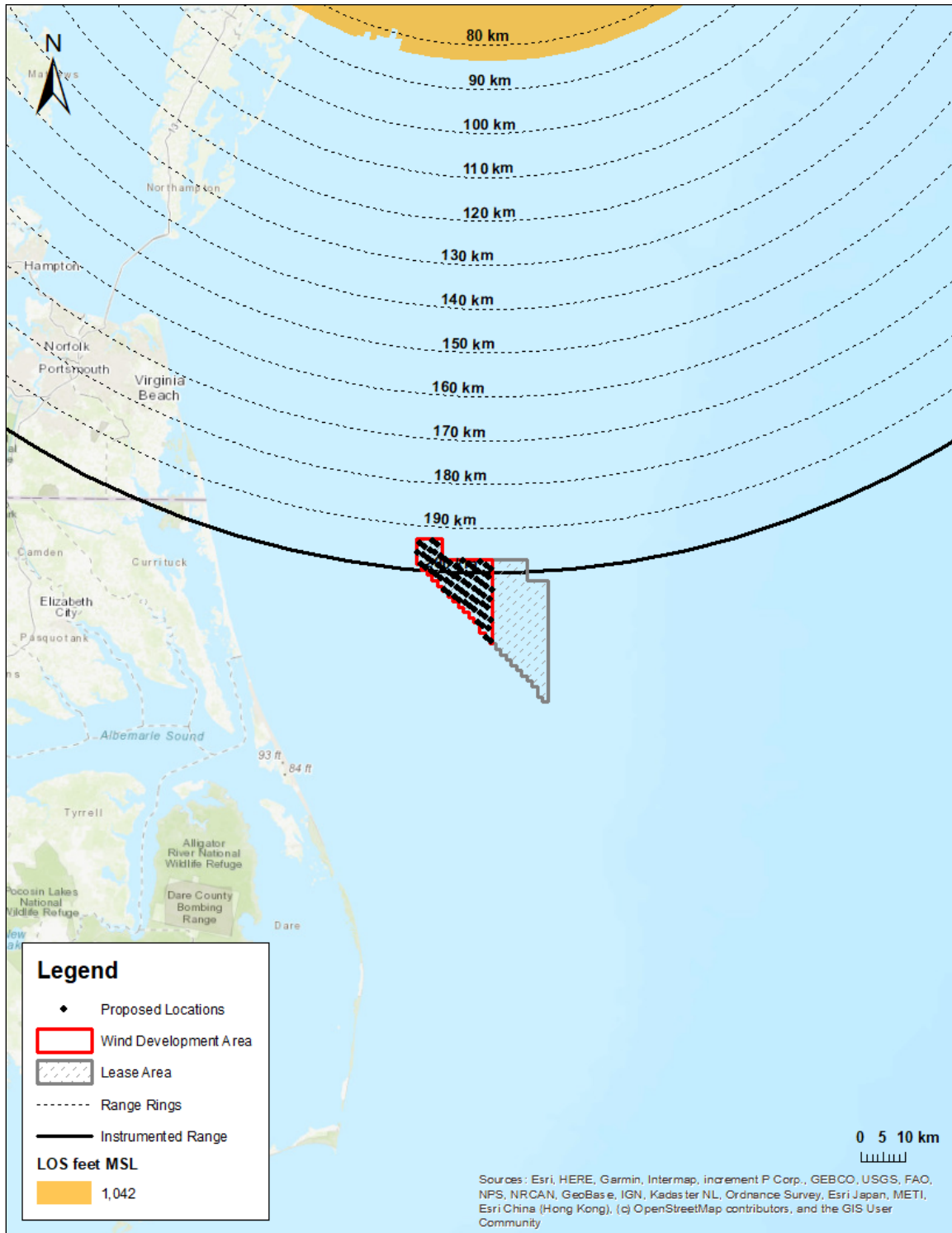


Figure 15 LOS Analysis Results for the Assateague Island HF Radar using 3DEP Data

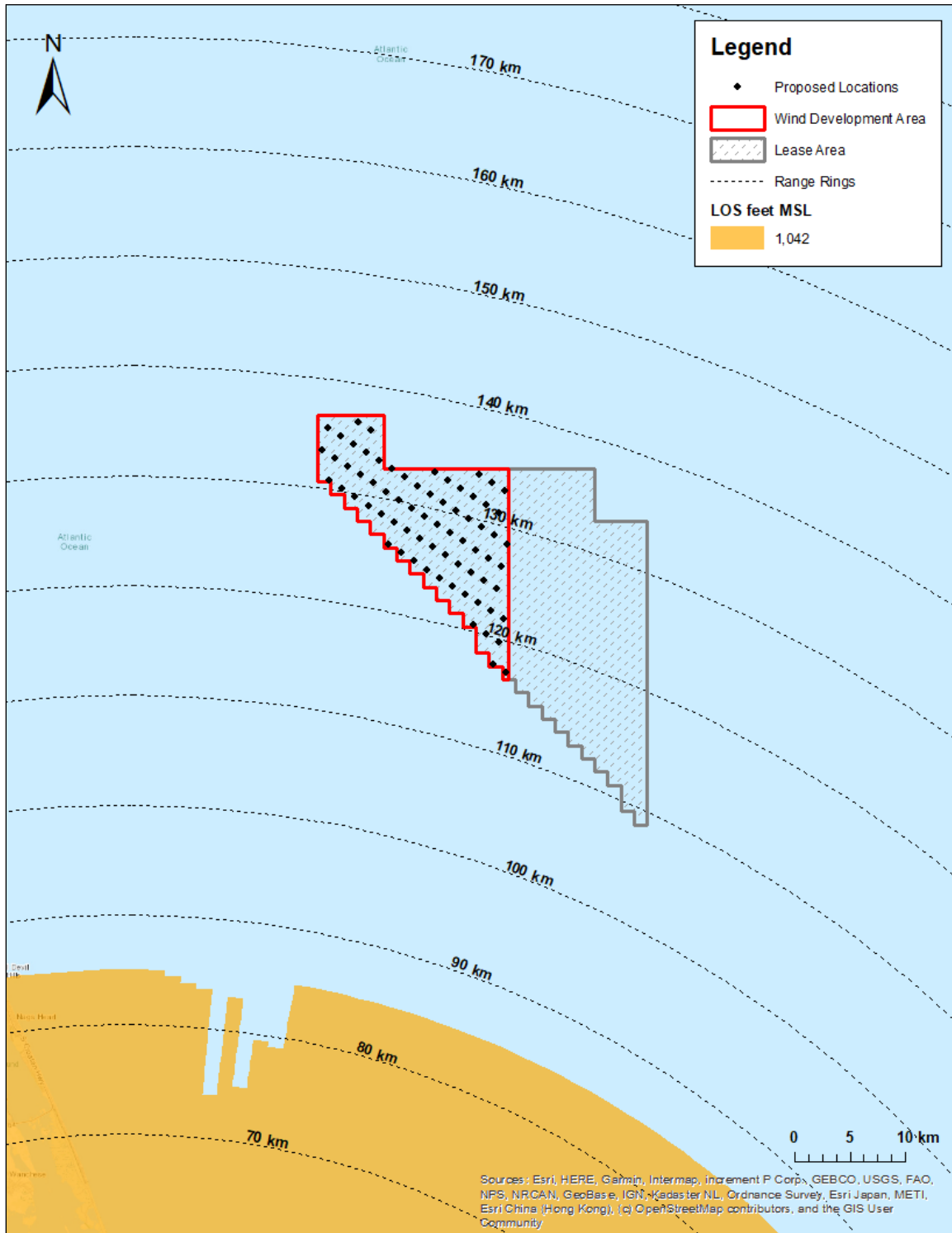


Figure 16 LOS Analysis Results for the Cape Hatteras HF Radar using 3DEP Data

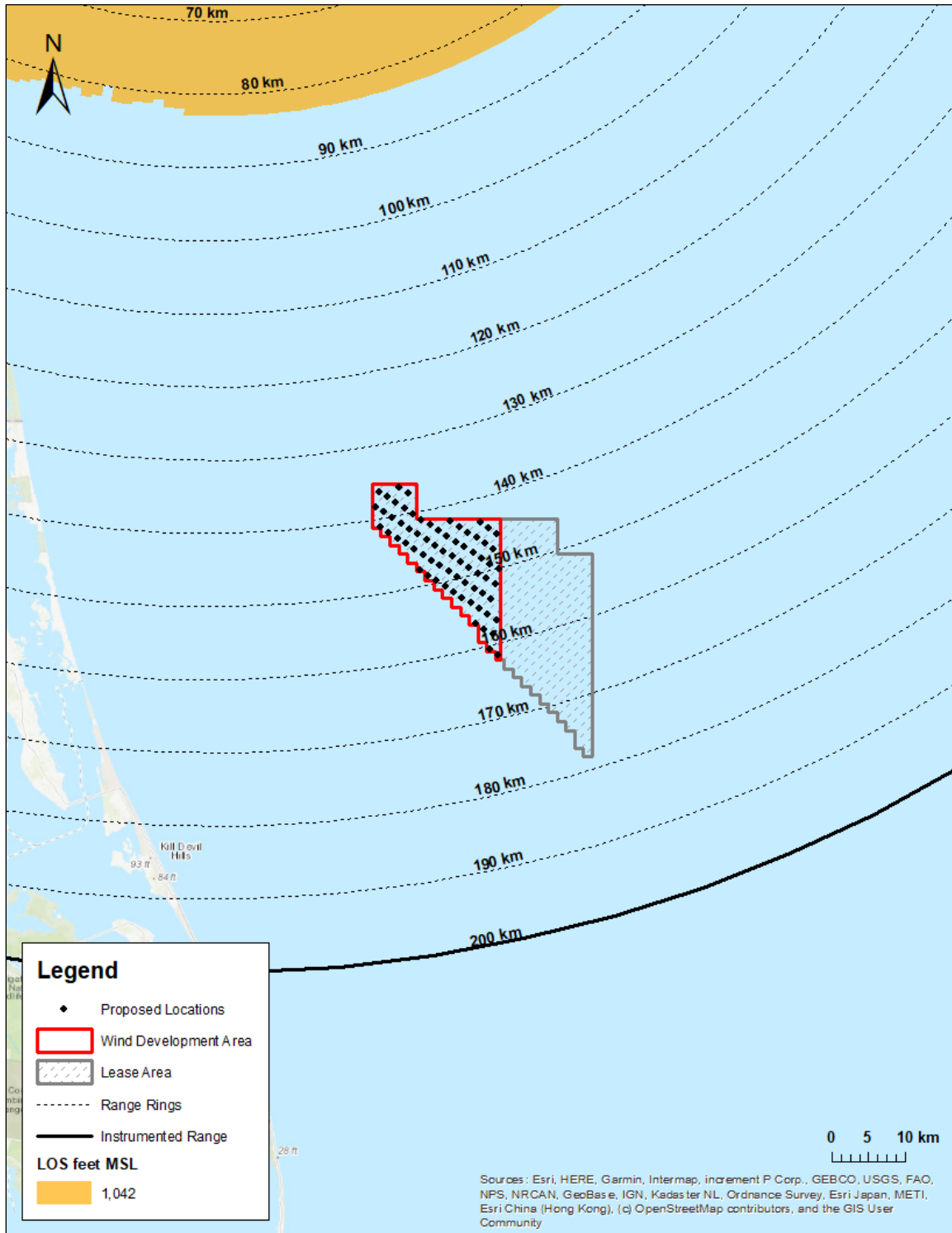


Figure 17 LOS Analysis Results for the Cedar Island HF Radar using 3DEP Data

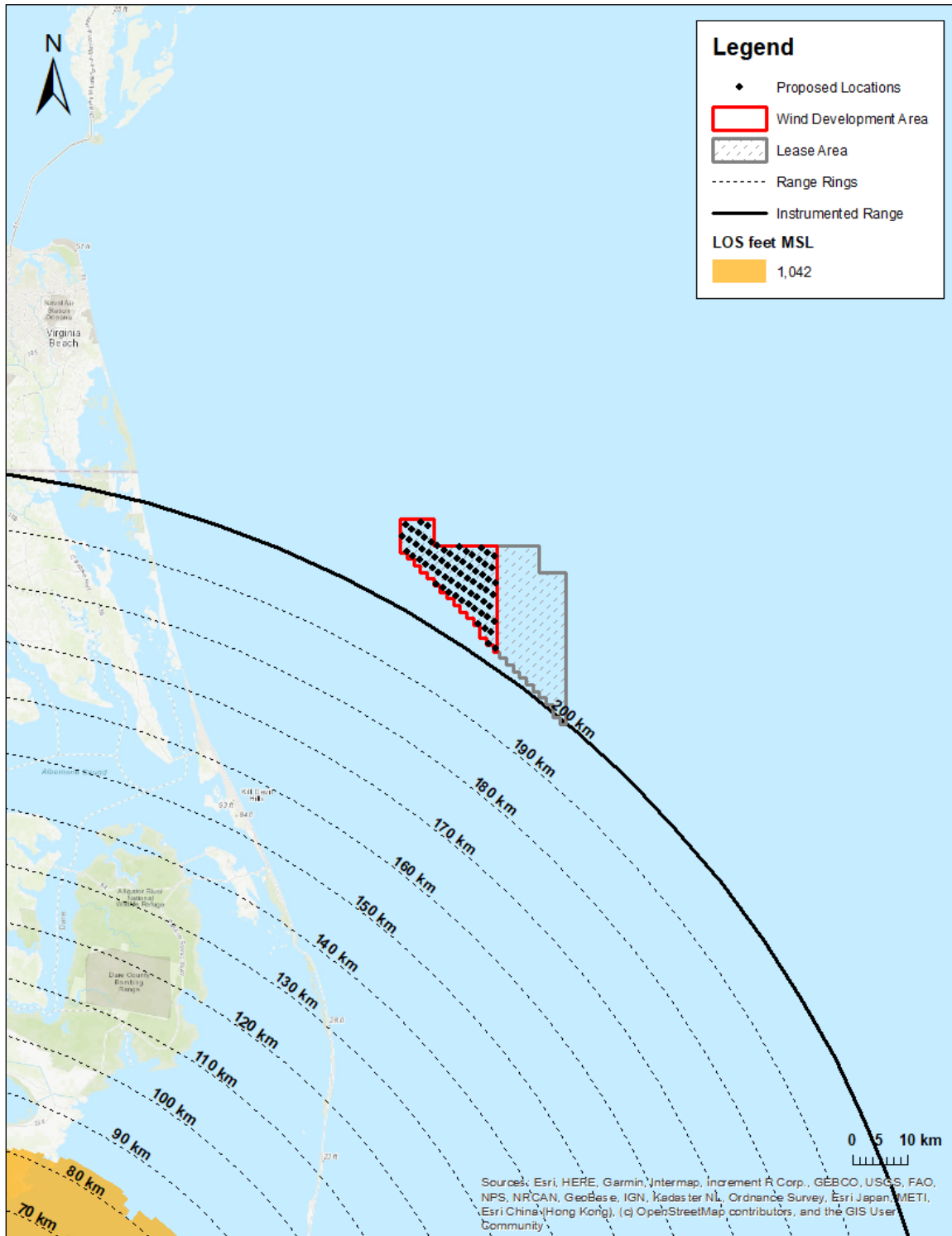


Figure 18 LOS Analysis Results for the Core Banks HF Radar using 3DEP Data

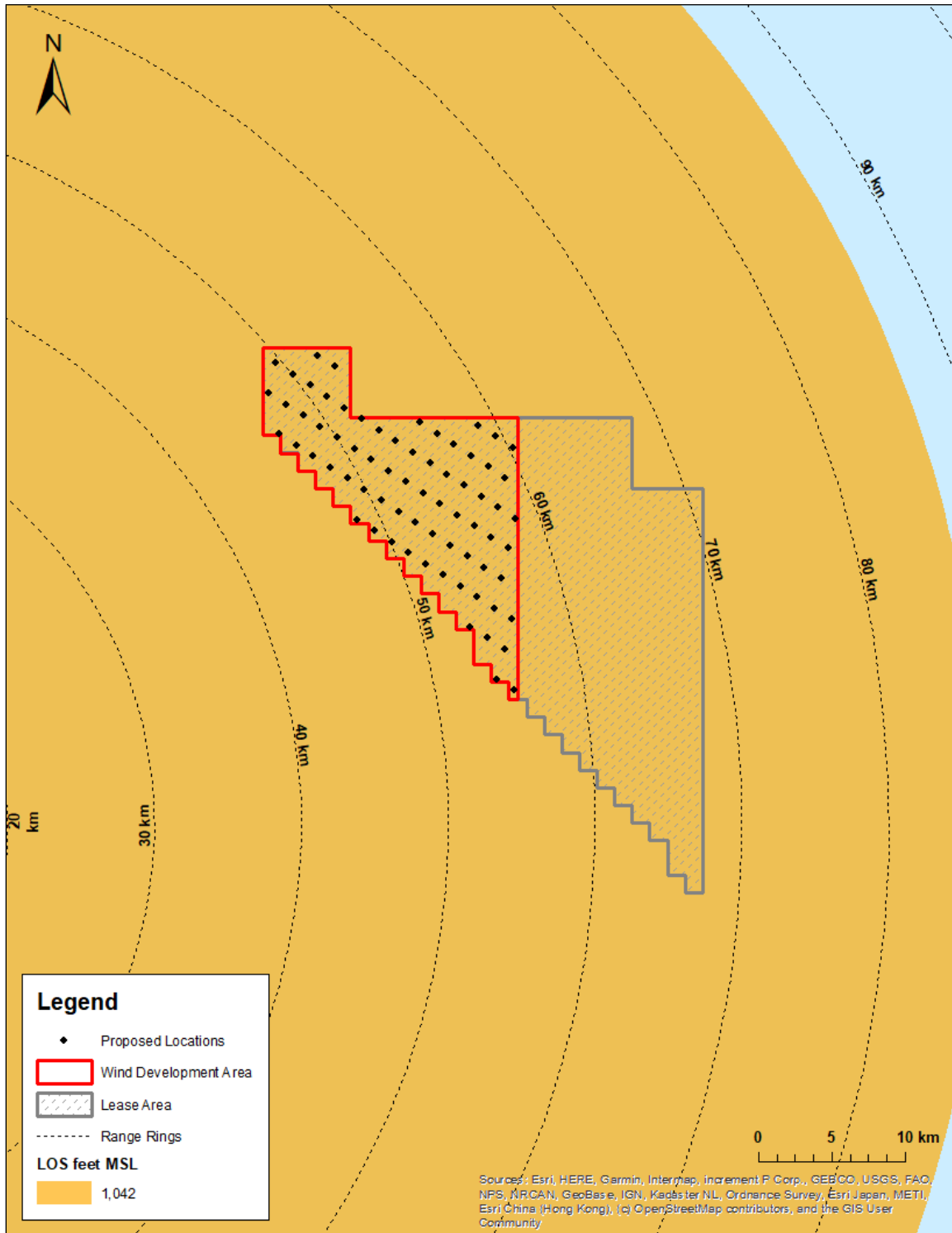


Figure 19 LOS Analysis Results for the Duck HF Radar using 3DEP Data

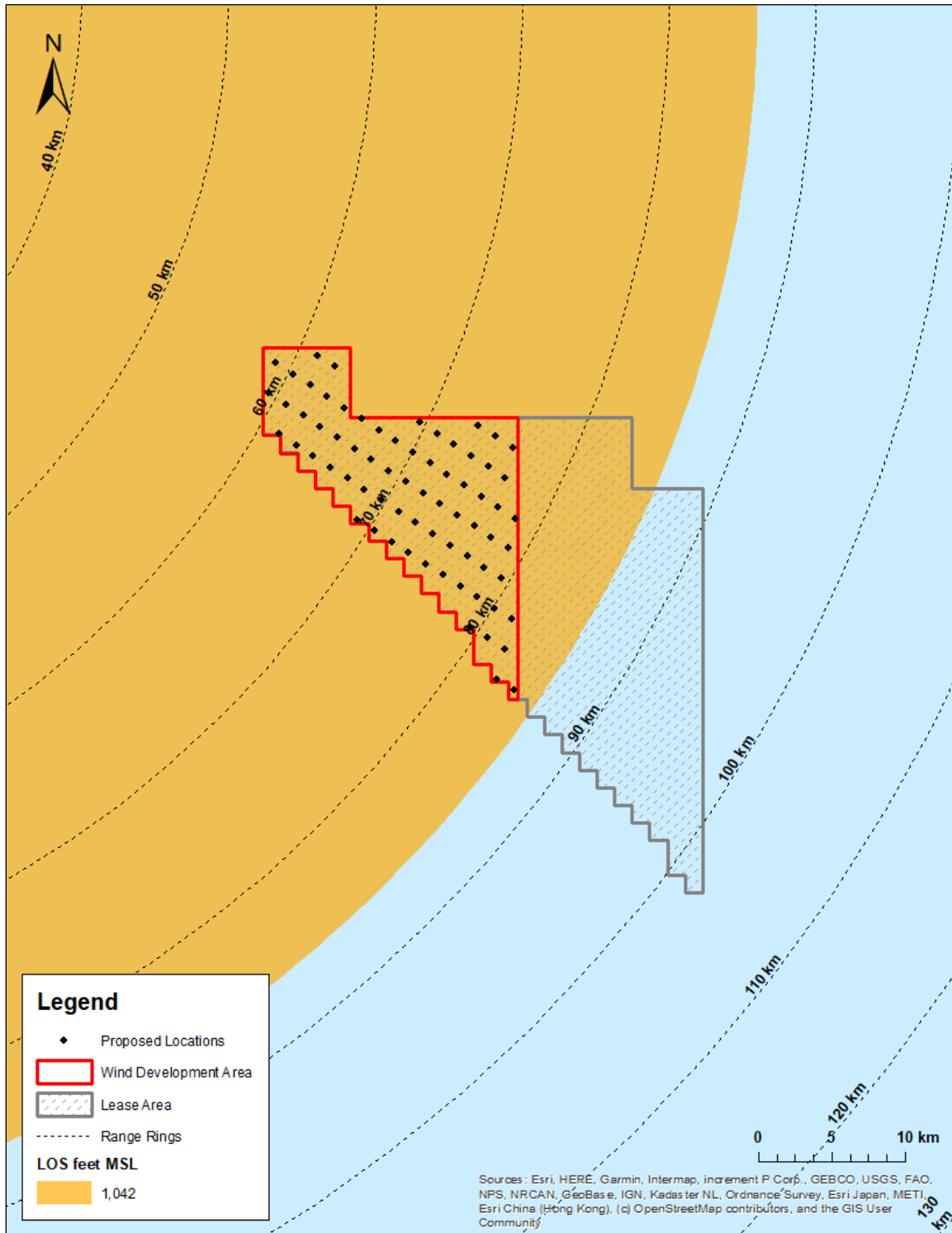


Figure 20 LOS Analysis Results for the Little Island Park HF Radar using 3DEP Data

CONCLUSIONS

Westslope conducted an ARSR and ASR LOS analysis for the following four ARSR and ASR sites:

- Binns Hall CARSR
- NAS Oceana ASR-11
- Norfolk ASR-9
- Oceana ARSR-4

The ARSR and ASR LOS analyses conducted by Westslope show the following:

- For the Oceana ARSR-4, the LOS analysis results using 3DEP data show that 69 of the 70 proposed locations will be within line-of-sight of and may interfere with this radar site at a blade-tip height of 1,042 ft (317.5 m) MSL. The LOS analysis results using 3DEP data and the DSM data show that 31 of the 70 proposed locations will be within line-of-sight of and may interfere with this radar site at a blade-tip height of 1,042 ft (317.5 m) MSL.
- For the NAS Oceana ASR-11, the LOS analysis results using 3DEP data show that 63 of the 70 proposed locations will be within line-of-sight of and may interfere with this radar site at a blade-tip height of 1,042 ft (317.5 m) MSL. The LOS analysis results using 3DEP data and the DSM show that the 70 proposed locations will not be within line-of-sight of and will not interfere with this radar site at a blade-tip height of 1,042 ft (317.5 m) MSL.
- For the Norfolk ASR-9, the LOS analysis results using 3DEP data show that eight of the 70 proposed locations will be within line-of-sight of and may interfere with this radar site at a blade-tip height of 1,042 ft (317.5 m) MSL. The LOS analysis results using 3DEP data and the DSM show that the 70 proposed locations will not be within line-of-sight of and will not interfere with this radar site at a blade-tip height of 1,042 ft (317.5 m) MSL.
- For the Binns Hall CARSR, the 70 proposed locations will not be within line-of-sight of and will not interfere with this radar site at a blade-tip height of 1,042 ft (317.5 m) MSL.

For the Oceana ARSR-4, without mitigation, the radar effects due to clutter will include a partial loss of primary target detection and a number of false primary targets over and in the immediate vicinity of the proposed locations within line-of-sight in the Project.

Because WTGs will be within line-of-sight of the Oceana ARSR-4, Westslope expects that the DoD will have concerns with the proposed locations within line-of-sight at a blade-tip height of 1,042 ft (317.5 m) MSL based on electromagnetic interference to an air navigation facility. Please note that radar effects do not always translate into operational impacts. The DoD Siting Clearinghouse process will provide an official decision as to whether impacts are acceptable to operations.

The Project is not within the 12 nautical mile (NM) territorial waters where the FAA conducts aeronautical studies.

Although possible, Westslope does not expect that the DHS will have concerns with the proposed locations within line-of-sight at a blade-tip height of 1,042 ft (317.5 m) MSL based on impacts to the Oceana ARSR-4.

Westslope does not expect that the proposed locations will affect the secondary surveillance radar system co-located with the Oceana ARSR-4.

Westslope's ROTHr screening analysis shows that the 70 proposed locations will not fall within the impacted counties for the Virginia ROTHr. The results also show that the 70 proposed locations will fall within Westslope's offshore screening areas for both the Virginia ROTHr transmit site and the Virginia ROTHr receive site. As such, it is possible that the DoD may have concerns with the proposed locations that could interfere with the ability of the Virginia ROTHr to detect targets in parts of the North Atlantic Ocean and the South Atlantic Ocean. Based on these results, the DoD may request detailed wind turbine data to conduct wind turbine interference modelling.

Westslope's ADAMS screening analysis shows that the 70 proposed locations will not be within line-of-sight of and will not interfere with the ADAMS at a blade-tip height of 1,042 ft (317.5 m) MSL under standard atmospheric conditions. The results also show that all 70 proposed locations will fall within the ducting impact region of the GAOC. The ducting impact region represents an area where radio waves can propagate further than line-of-sight under standard atmospheric conditions. Under standard atmospheric conditions, Westslope does not expect any effects to the ADAMS at or below this blade-tip height. Under ducting conditions, it is possible that the 70 proposed locations may fall within line-of-sight of the ADAMS, in which case the radar effects will include clutter that may affect the ability of the ADAMS to accurately measure the radar cross sections of targets.

Westslope conducted a NEXRAD weather radar screening analysis for the following three radar sites:

- Dover AFB WSR-88D
- Morehead City WSR-88D
- Norfolk WSR-88D

Westslope's NEXRAD weather radar screening analysis for the Dover AFB WSR-88D, Morehead City WSR-88D, and the Norfolk WSR-88D shows that the 70 proposed locations will not be within line-of-sight of and will not interfere with these radar sites at a blade-tip height of 1,042 ft (317.5 m) MSL. The results also show that the 70 proposed locations at a blade-tip height of 1,042 ft (317.5 m) MSL will fall within a NOAA green No Impact Zone for these radar sites.

Westslope conducted an HF radar LOS analysis for the following six radar sites:

- Assateague Island HF radar
- Cape Hatteras HF radar
- Cedar Island HF radar
- Core Banks HF radar
- Duck HF radar
- Little Island Park HF radar

The HF radar LOS analyses conducted by Westslope show the following:

- For the Duck HF radar and the Little Island Park HF radar, all 70 proposed locations will be within line-of-sight of these radar sites at a blade-tip height of 1,042 ft (317.5 m) MSL.
- For the Assateague Island HF radar, Cape Hatteras HF radar, and the Cedar Island HF radar, the 70 proposed locations will not be within line-of-sight of these radar sites at a blade-tip height of 1,042 ft (317.5 m) MSL. Although the proposed locations will not be within line-of-sight of these radar sites, radar effects are still possible beyond line-of-sight due to the propagation of HF electromagnetic waves over the ocean surface.
- For the Core Banks HF radar, the 70 proposed locations are beyond the instrumented range of this radar site and will not be within line-of-sight of this radar site at a blade-tip height of 1,042 ft (317.5 m) MSL. As a result, Westslope does not expect any radar effects at or below this blade-tip height.

For the Duck HF radar and the Little Island Park HF radar, without mitigation, the radar effects will include clutter in the vicinity of the proposed locations in the Project. Because WTGs will be within line-of-sight of these radar sites, Westslope expects that multiple federal agencies in partnership with NOAA's IOOS may have concerns with the proposed locations within line-of-sight at a blade-tip height of 1,042 ft (317.5 m) MSL based on potential interference to these HF radar sites.

Westslope recommends that the Project be submitted to the DoD Siting Clearinghouse for an informal review and to the National Telecommunications and Information Administration (NTIA) for a detailed review. The NTIA is essentially a clearinghouse for other federal agencies, including NOAA. Additionally, Westslope recommends consultation with NOAA's IOOS Program Office.

Avangrid, LLC submitted a request for an informal review of the Project to the DoD Siting Clearinghouse on April 23, 2020, and will continue to engage and coordinate with applicable military contacts to assess potential impacts. Avangrid, LLC submitted the Project to the NTIA for a detailed review on August 19, 2021, and received correspondence from the NTIA on October 8, 2021, stating that no reviewing agencies had concerns with the Project.

As the Project advances, Avangrid, LLC is committed to working with the appropriate stakeholders to develop monitoring and mitigation plans.

If you have any questions regarding this analysis, please contact Geoff Blackman at (405) 816-2604 or via email at gblackman@westslopeconsulting.com.

REFERENCES

[1] DoD, Office of the Secretary, *“Military Aviation and Installation Assurance Siting Clearinghouse; Notice and Request for Public Comment on Boardman, Oregon, and NAS Patuxent River, Maryland, Geographic Areas of Concern,”* August 8, 2018, [\[https://www.federalregister.gov/documents/2018/08/08/2018-16886/military-aviation-and-installation-assurance-siting-clearinghouse-notice-and-request-for-public\]](https://www.federalregister.gov/documents/2018/08/08/2018-16886/military-aviation-and-installation-assurance-siting-clearinghouse-notice-and-request-for-public).

[2] DoD, Department of the Navy, *“Geographic Area of Concern (GAOC): Naval Air Station (NAS) Patuxent River Area, including the Advanced Dynamic Aircraft Measurement System (ADAMS) and the Digital Airport Surveillance Radar (DASR),”* May 14, 2018, [Tab_D_-_INSTALLATION_MANAGEMENT_20180514,_GAOC_for_Pax_River_Final.docx].