

PROTECT SANDBRIDGE BEACH

A scenic view of Sandbridge Beach. In the foreground, there are sandy dunes with clumps of tall, dry beach grass. A small, dark, shadowed area, possibly a ditch or a hole in the sand, is visible on the right side of the dune. In the middle ground, the ocean waves are breaking onto the beach, creating white foam. The water is a deep blue. The sky is a clear, bright blue.

**Kitty Hawk Wind Project
Brief for our community**

20 Mar 2023 SBCL Meeting

OBJECTIVES

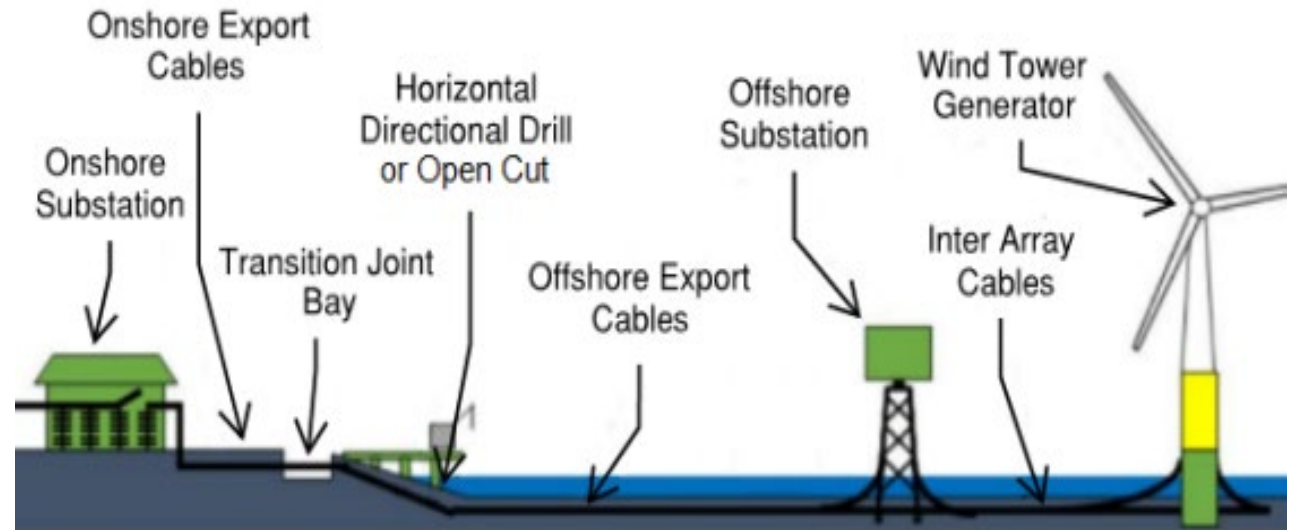
- Provide a better understanding of the impacts of offshore wind power transmission cable landfall in Sandbridge to the community
- Fill in “gaps” in public information provided by Avangrid
- Communicate concerns clearly and consistently to decision makers at local, state and federal level.



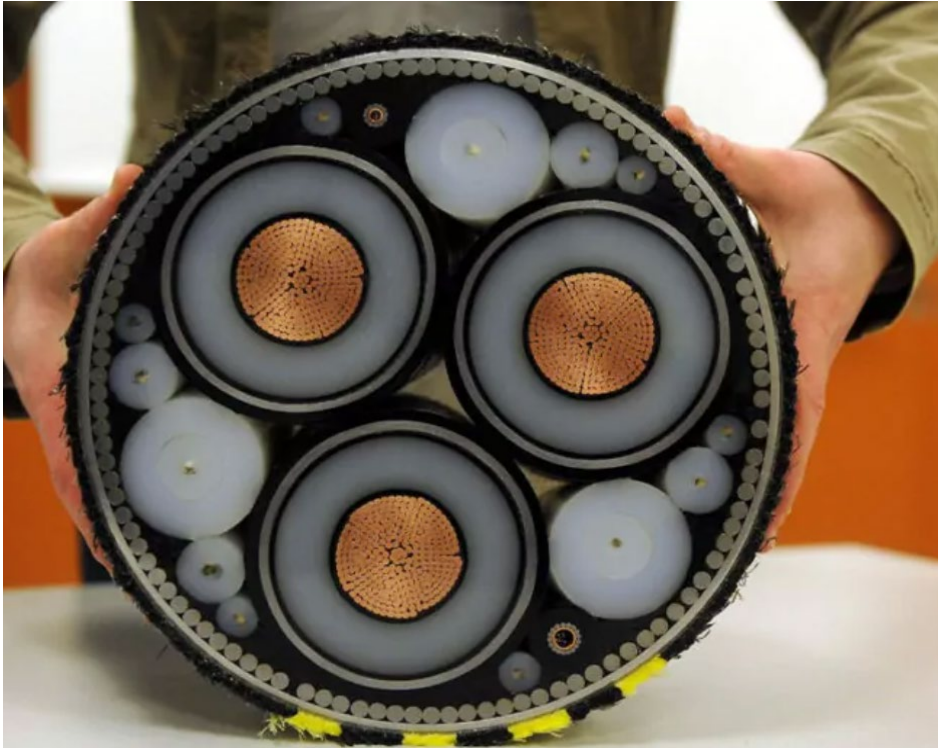
- All information contained in this presentation was sourced from public industry sources
- Avangrid Renewables information was sourced from BOEM unless otherwise noted

SANDBRIDGE LANDFALL: TECHNICAL OVERVIEW

- Offshore Export Cables
- Landfall & Transition Joint Bays
- Underground High Voltage Lines
- Onshore Cables & Duct Banks
- Transmission Line Failure and Repair
- EMF & Modeling Inconsistencies
- Sandbridge Beach Nourishment Project Risk
- Key Takeaways



OFFSHORE EXPORT CABLES



Cross section of 3-Core 275kV Sub Marine Cable

- Kitty Hawk North = 2 cables, 800MW
- Kitty Hawk South = 4 cables, 1900MW

Avangrid Proposed Cable Specs

- Three Conductors plus Fiber Optic cable
- 3 phase 275kV
- 2" (51mm) Diameter Conductors
- 11" (286mm) Diameter Cable



Worker on deck of cable deployment vessel

LANDFALL & TRANSITION JOINT BAYS *(INSTALLED UNDER PARKING LOT)*



Example of typical underground transition joint bay

- Maximum excavation depth: 25'
- Safety risks: EMF, explosion risk
- Structural integrity of parking lot

- Avangrid Transition Joint Bay: 60'L x 12'W 9'H *
- Six bays required (one per offshore cable) *
- Photos left and below are similar in size

*(source: email from Avangrid to Andrew Horne, 1 Mar 2023)



Typical transition joint bay for underground transmission lines

The scope of the parking lot construction and resulting disruption is substantial. The details of the underground infrastructure should be shared with the community.

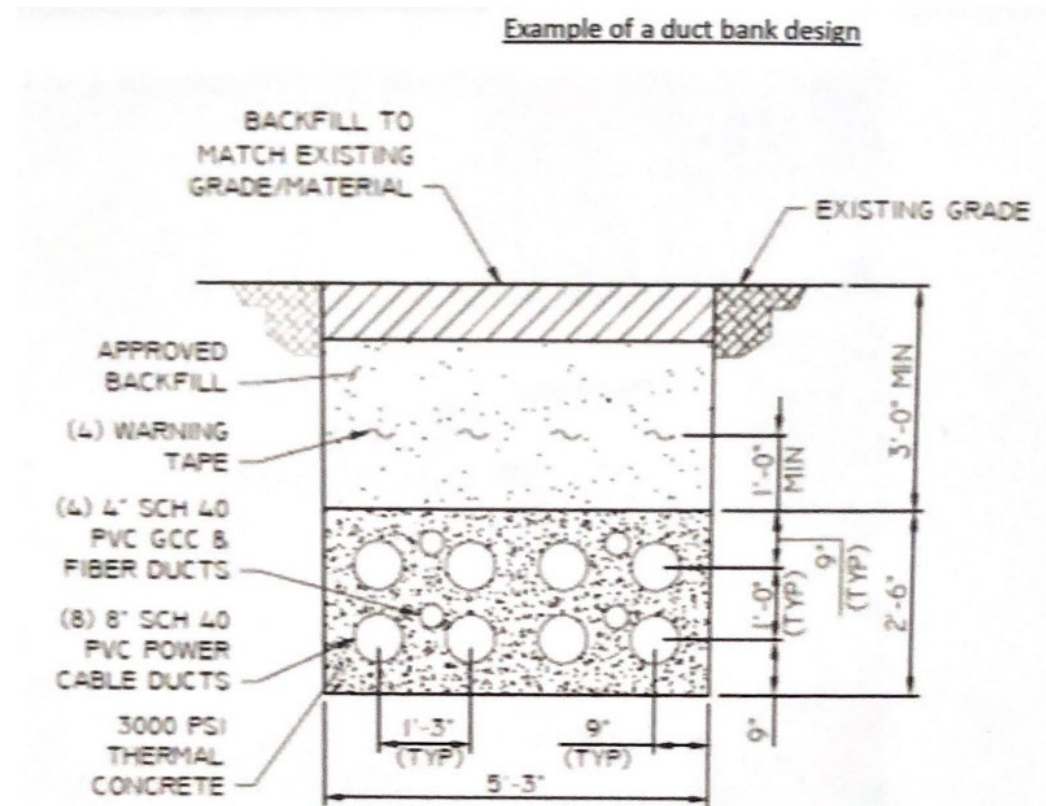
ONSHORE CABLES & DUCT BANKS



Crews work on an underground duct bank from a typical 8'x8'x24' vault

- Excavation Depth: Minimum Depth 3', Maximum 21' (6.3 meters) Source: COP 3.2.2.2
- KHN: 6 onshore export cables, 5" Diameter each
- KHN+KHS: 18 onshore export cables, additional duct banks required

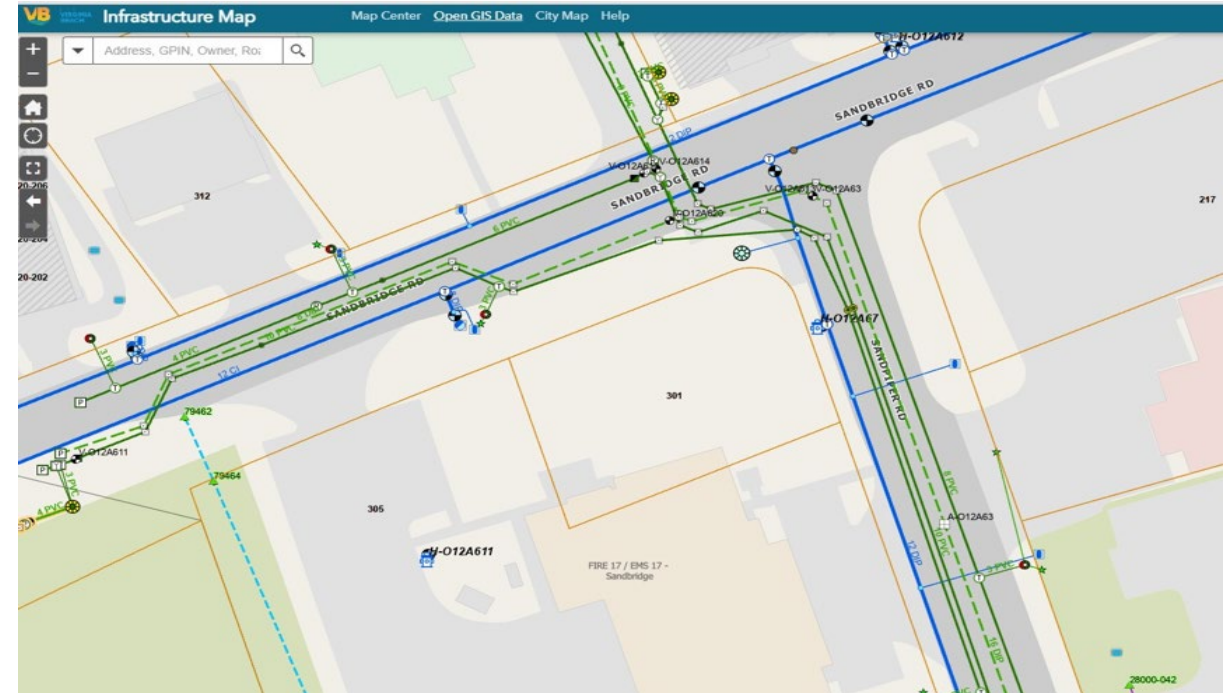
Top of duct bank may be 9' below surface to deconflict with VB utility infrastructure (16 Mar 2023 update email from Avangrid to Andrew Horne)



Source: Avangrid SBCL Presentation 20 June 2022

CABLES AND DUCT BANKS: EXISTING UTILITY INFRASTRUCTURE

- The Sandbridge public utility infrastructure is already congested
- Latest Avangrid strategy is to install cable ducts below existing utilities.
- At least two cable ducts required. Requires approx. half of road width



Intersection of Sandbridge Rd and Sandpiper Rd

How can cable ducts be constructed in very congested space without major disruption, road closures, and utility outages??

CABLES & DUCT BANKS: ROUTING



Source: Avangrid COP

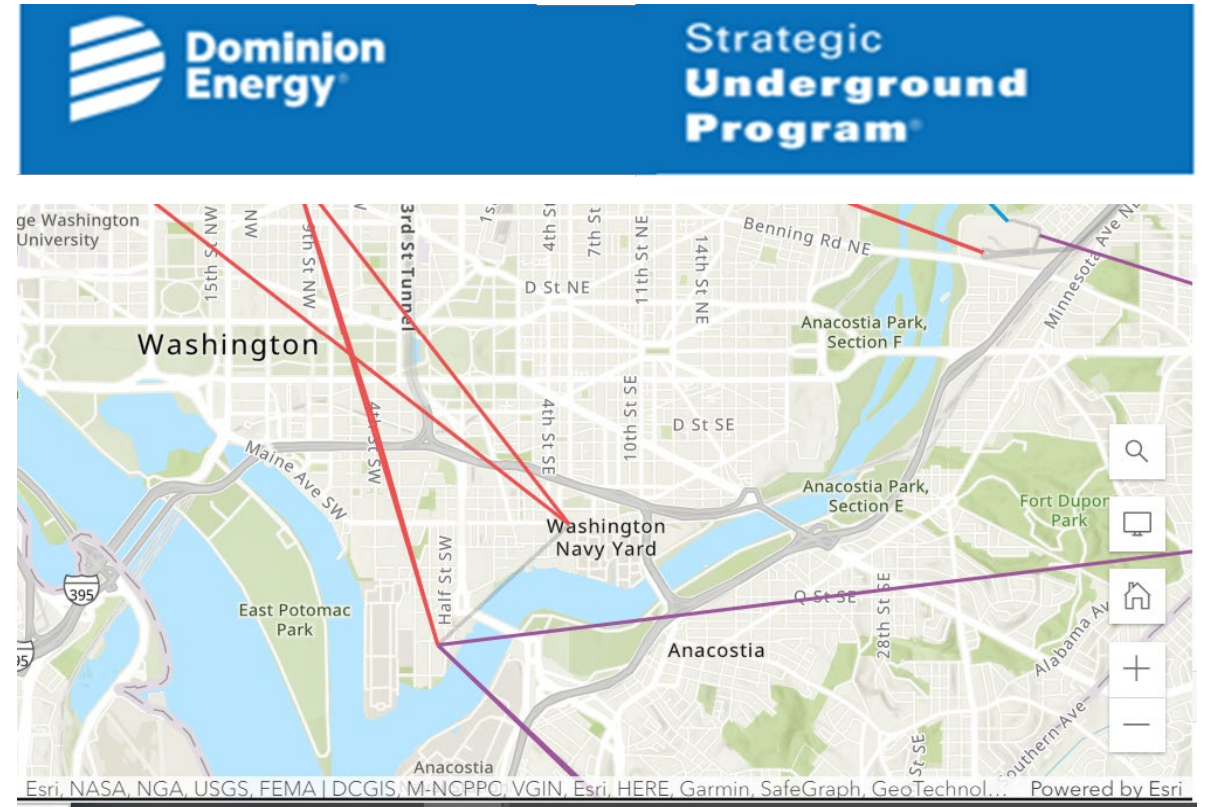


Redrawn for clarity

- COP includes option for overhead lines along Sandbridge Rd.
- Will parking lot be restored during each tourist season?
- Cable failure and repair during tourist season would be a catastrophe

UNDERGROUNDING: MATURE TECHNOLOGY

- Underground power lines make up approx. 18% of U.S. transmission lines
- Dominion SUP: Grid resilience initiative
- Actual Safety and EMF data collected
- 15-20 times the cost per mile vs. overhead lines
- 60% more time required to repair faults
- Failure rates are known and predictable.



Source: ARCGID Underground High & Extra High Voltage Lines

Avangrid has not provided much detail about the 275kV underground cable infrastructure. Comparative data is available for actual EMF levels and cable failure rates

POWER TRANSMISSION LINE FAILURE AND REPAIR

- 65% of underground line failures occur at terminations and joints like those located in transition joint bays and splice vaults.
- The probability of the transmission line failure rate between the Sandbridge landfall and Corporate Landing can be estimated using historical data
- Estimate: One failure every 2-3 years between Sandbridge & Corporate Landing. Expert independent verification recommended
- Repairs for underground transmission lines can take weeks to complete. In many cases, repair requires large machinery and excavation of the transmission line components
- Cable failures during tourist season could be extremely disruptive and have long term economic impacts to the resort area

* CIGRE TB 379 "Update of Service Experience of HV Underground and Sub Marine Cable Systems", (0.012 failures/conductor-mile/year)

EMF MODELING INCONSISTENCIES

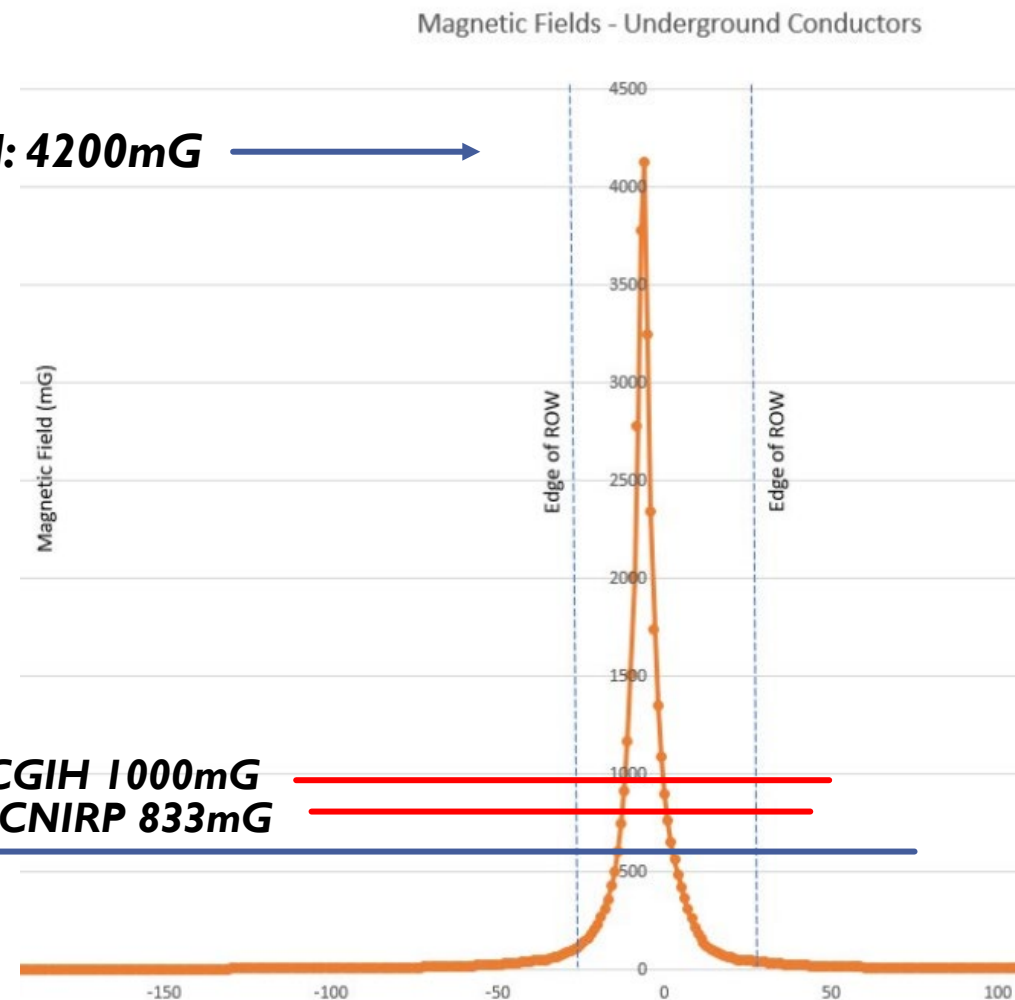
- Power level is approx. the same for the two systems at 2.7GW
- Dominion EMF model is 7X Avangrid model

Sources: Coastal Virginia OSW COP 6 May 2022 & Avangrid SBCL 20 June 2022 Presentation

Dominion CVOSW Model: 4200mG →

Avangrid Model: 600mG →

ACGIH 1000mG
ICNIRP 833mG



More information is needed from Avangrid for independent validation of safe EMF levels

SANDBRIDGE BEACH NOURISHMENT PROGRAM

- USACE engagement required to assess risk
- Additional cost/insurance to work at risk in vicinity of cables in the dredge area, and shore landfall?
- Avangrid ROW blocks prime potential future borrow areas
- No evidence of Avangrid collaboration with USACE in COP
- Avangrid proposed schedule will conflict with next replenishment cycle and include near shore construction vessels for HDD and cable landfall.
- Statement from Dominion CVOSW COP 2.1.1.2;
“Impacts to the utility of sand resources may complicate permitting considerations. Sand borrow operations in the vicinity of cables also pose an inherent risk of incident.”

SANDBRIDGE BEACH NOURISHMENT RISK

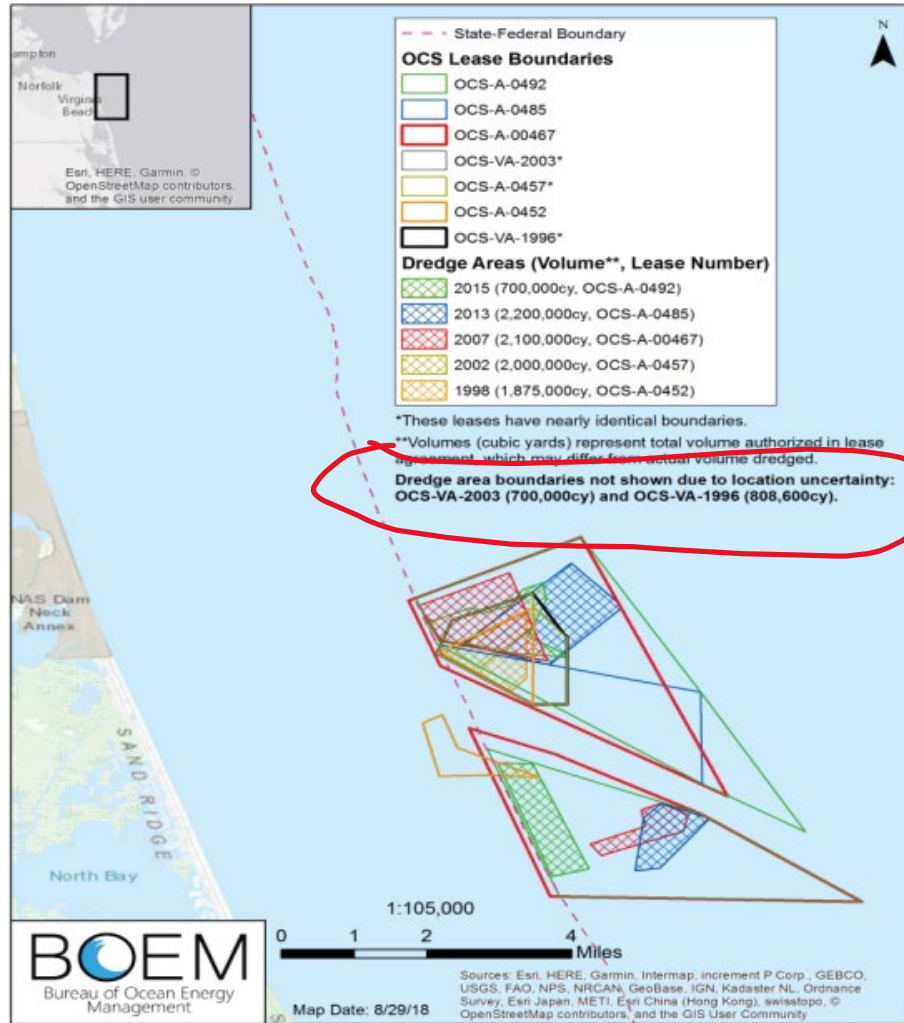


Figure 3: All dredge events at Sandbridge Shoal

https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/KTH%20Chapter%203%20Project%20Description_rev7_clean.pdf

Uncertainty in boundaries

Cable ROW close to dredge area

ROW blocks potential future borrow areas

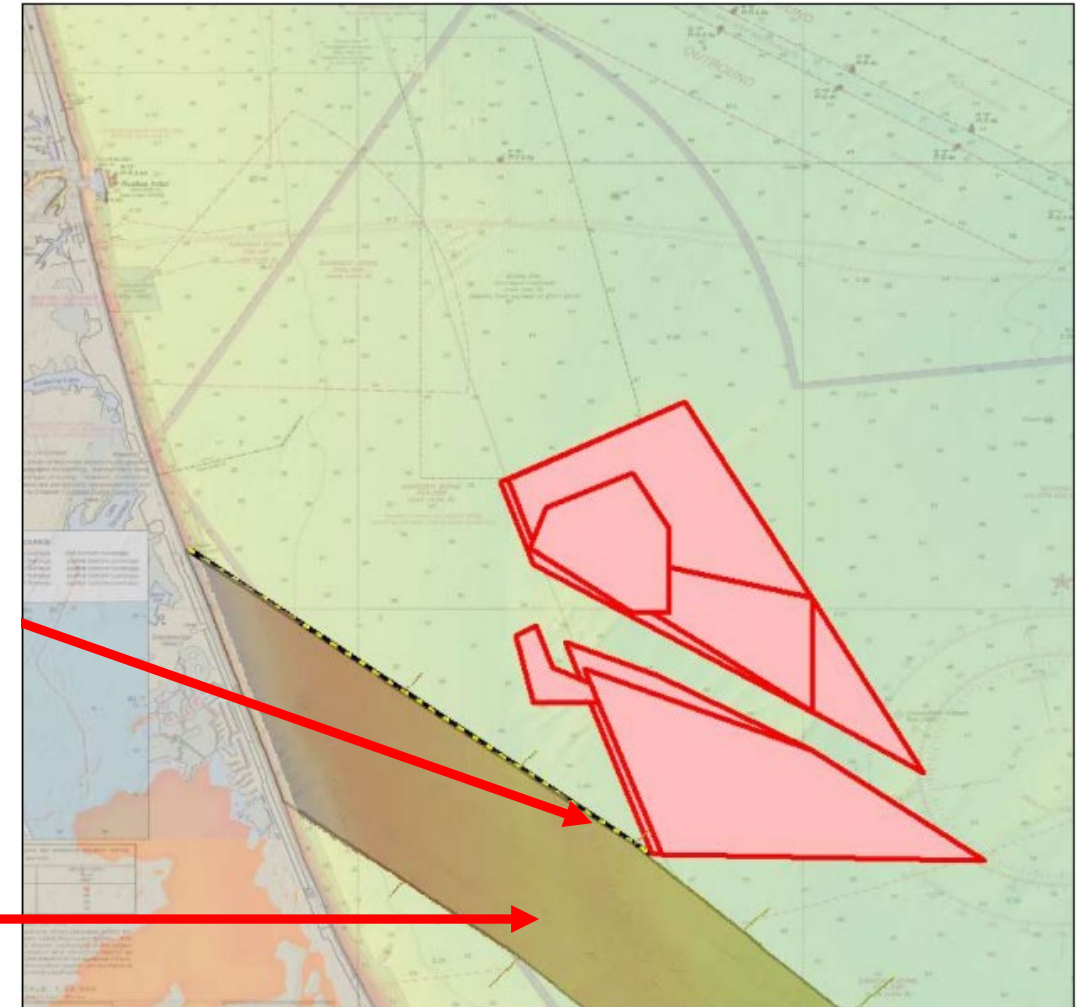
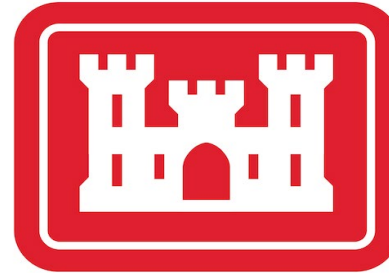


Figure J-20. Offshore Export Cable Bathymetry Survey Area (Brown) Shown Alongside DNODS (Charted) and Sand Borrow Areas (Red Polygons)

<https://www.boem.gov/sites/default/files/non-energy-minerals/Sandbridge-EA-All-Appendices.pdf>

PARTIAL LIST OF AGENCIES USACE COORDINATES WITH FOR SAND REPLENISHMENT PROGRAM

- Department of Environmental Quality
- Department of Game and Inland Fisheries
- Department of Conservation and Recreation
- Department of Mines, Minerals and Energy
- Marine Resources Commission
- Department of Health
- Department of Historic Resources
- Virginia Institute of Marine Science
- Hampton Roads Planning District Commission



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SUMMARY

- Landing at Sandbridge Rd will cause substantial disruption for years to come in a resort community that is of vital economic resource to Virginia Beach
- The underground transmission cables and equipment will make future Sandbridge public utility repairs and improvement projects more difficult. Future maintenance & repairs will be more costly to the city off Virginia Beach and ultimately increase taxes
- The Avangrid information provided on safe EMF levels is not consistent with those projected for Dominion Virginia Coastal Offshore Wind and should be subject to expert independent review
- The Sandbridge landfall adds risk to the Sandbridge Beach Nourishment Project. Any disruption/delay/cost increase would result in severe long term economic impacts to Sandbridge and Virginia Beach.
 - dredging operations pose risk of incident
 - near-shore operations pose risk of incident
 - Offshore cable ROW will block potentially viable future sand borrow areas



THANK YOU FOR LISTENING

For More Info: www.protectsandbridgebeach.org

Email: Info@protectsandbridgebeach.org

OTHER LANDFALL SITING OPTIONS CONSIDERED

