

FRAMEWORK OUTLINES

4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

4.1 PHYSICAL RESOURCES

4.1.1 *Regional Geologic Setting*

4.1.1.1 Site-Specific Studies Analysis

4.1.1.1.1 Marine Geophysical/Hydrographic Surveys

4.1.1.1.2 Geotechnical Investigations

4.1.1.1.3 Marine Vibracore Sampling

4.1.1.1.4 Deep Sediment Marine Borings

4.1.1.1.5 Upland Geotechnical Boring and Test Pitting

4.1.1.2 Offshore Geology

4.1.1.2.1 Seafloor Geomorphology

4.1.1.2.2 Subseafloor Geology

4.1.1.2.3 Onshore Geology

4.1.1.3 Seismic Setting.

4.1.1.4 Liquefaction

4.1.1.5 Faults

4.1.2 *Noise*

4.1.2.1 General Information on Noise

4.1.2.1.1 Above Water Noise

4.1.2.1.2 Below Water Noise

4.1.2.2 Regulatory Requirements

4.1.2.3 Existing Conditions

4.1.2.3.1 Offshore Locations

4.1.2.3.2 Onshore Locations

4.1.2.3.3 Underwater Noise Levels

4.1.3 *Physical Oceanography*

4.1.3.1 Existing Conditions

4.1.3.1.1 Currents and Tides

4.1.3.1.2 Waves

4.1.3.1.3 Salinity

4.1.3.1.4 Temperature

4.1.3.1.5 Sediment Transport

4.1.3.1.6 Water Depth/Bathymetry

4.1.4 *Climate and Meteorology*

4.1.4.1 Ambient Temperature

4.1.4.2 Wind Conditions

4.1.4.3 Precipitation and Fog Events

4.1.4.4 Hurricanes

4.1.4.5 Mixing Height

4.1.5 *Air Quality*

4.1.5.1 Existing Air Quality

4.1.5.2 Regional Air Quality

4.1.6 *Water Quality*

- 4.1.6.1 Freshwater Resources
 - 4.1.6.1.1 Groundwater
 - 4.1.6.1.2 Freshwater
 - 4.1.6.1.3 Freshwater Wetlands
- 4.1.6.2 Coastal Waters
 - 4.1.6.2.1 Estuaries and Bays
- 4.1.6.3 Offshore Waters
 - 4.1.6.3.1 Continental Shelf
- 4.1.7 *Electrical and Magnetic Fields (EMF)*
 - 4.1.7.1 Introduction
 - 4.1.7.1.1 Sources of Electric and Magnetic Fields Exposure
 - 4.1.7.2 Onshore Environment Pre-Project
 - 4.1.7.2.1 Landfall to NSTAR Electric ROW
 - 4.1.7.2.2 Within the NSTAR Electric Right-of-Way
 - 4.1.7.3 Offshore Environment Pre-Project
 - 4.1.7.3.1 Conditions in Nantucket Sound

4.2 BIOLOGICAL RESOURCES

- 4.2.1 *Terrestrial Vegetation*
 - 4.2.1.1 Woodlands
 - 4.2.1.2 Fields and Open Space
 - 4.2.1.3 Freshwater Wetlands
- 4.2.2 *Coastal and Intertidal Vegetation*
 - 4.2.2.1 Flora
 - 4.2.2.2 Barrier Islands, Beaches, and Dunes
 - 4.2.2.3 Brackish and Saline Wetlands
 - 4.2.2.4 Seagrass Beds
- 4.2.3 *Terrestrial and Coastal Faunas Other than Birds*
 - 4.2.3.1 Mammals
 - 4.2.3.1.1 Bats
 - 4.2.3.1.2 Reptiles and Amphibians
 - 4.2.3.1.3 Freshwater Fish
 - 4.2.3.1.4 Invertebrates
- 4.2.4 *Avifauna*
 - 4.2.4.1 Terrestrial Birds
 - 4.2.4.1.1 Raptors (hawks, owls, eagles, falcons, etc.)
 - 4.2.4.1.2 Other Landbirds – Migration
 - 4.2.4.2 Coastal Birds
 - 4.2.4.2.1 Shorebirds (sandpipers, plovers, etc)
 - 4.2.4.2.2 Wading Birds (herons, egrets, ibis, etc.)
 - 4.2.4.3 Marine Birds
- 4.2.5 *Subtidal Offshore Resources*
 - 4.2.5.1 Hard Bottom Benthic Communities
 - 4.2.5.2 Soft-Bottom Benthic Communities
 - 4.2.5.3 Shellfish Resources
 - 4.2.5.4 Meiofauna and Plankton
- 4.2.6 *Marine Mammals*

4.2.6.1 Pinnipeds

4.2.6.2 Cetaceans

4.2.7 Fish and Fisheries

4.2.7.1 Demersal and Pelagic Fish

4.2.7.2 Commercial and Recreational Fish and Shellfish

4.2.8 Essential Fish Habitat (EFH)

4.2.8.1 Demersal Species

4.2.8.2 Demersal Groundfish Species

4.2.8.3 Coastal Pelagic Species

4.2.8.4 Coastal Migratory Pelagic Species

4.2.8.5 Sharks

4.2.8.6 Skates.

4.2.8.7 Invertebrates

4.2.9 Threatened and Endangered (T&E) Species

4.3 SOCIOECONOMIC RESOURCES AND LAND USE

4.3.1 Socioeconomic Analysis Area

4.3.1.1 Metropolitan Statistical Area

4.3.2 Urban and Suburban Infrastructure

4.3.2.1 Housing

4.3.2.2 Construction and Manufacturing Industries

4.3.2.3 Service Industries

4.3.2.4 Waste Disposal and Transit Facilities

4.3.2.5 Military Activity

4.3.2.6 Energy Industries

4.3.3 Population and Economic Background

4.3.3.1 Demographics

4.3.3.1.1 Population

4.3.3.1.2 Age

4.3.3.1.3 Race and Ethnic Composition

4.3.3.1.4 Education

4.3.3.2 Economic Factors

4.3.3.2.1 Current Economic Baseline Data

4.3.3.2.2 Business Activity by Industrial Sector

4.3.3.2.3 Employment

4.3.3.2.4 Income and Wealth

4.3.3.2.5 Property Values

4.3.3.3 Environmental Justice Considerations

4.3.3.4 Visual Resources

4.3.3.4.1 Visual Resources Associated with Historic Structures and Districts

4.3.3.4.2 Visual Resources Associated with Tribal Areas of Cultural and Religious Importance

4.3.3.4.3 Visual Resources Associated With Recreational Areas

4.3.4 On-shore Cable Route

4.3.5 Cultural Resources

4.3.5.1 Onshore Cultural Resources

- 4.3.5.1.1 Historic
- 4.3.5.1.2 Prehistoric
- 4.3.5.1.3 Tribal Areas of Traditional Cultural and Religious Importance
- 4.3.5.2 Offshore Cultural Resources
 - 4.3.5.2.1 Historic
 - 4.3.5.2.2 Prehistoric
 - 4.3.5.2.3 Tribal Areas of Traditional Cultural and Religious Importance

4.3.6 Recreation and Tourism

- 4.3.6.1 Birding
- 4.3.6.2 Federal or State Parklands and Reserves
- 4.3.6.3 Beach and Shoreline Activities
- 4.3.6.4 Recreational Boating and Water Activities
- 4.3.6.5 Recreational Fishing

4.3.7 Competing Uses in the Vicinity of the Proposed Action

- 4.3.7.1 Pipelines and Cables
- 4.3.7.2 Navigation Features
- 4.3.7.3 Sand Mining and Mineral Extraction
- 4.3.7.4 Commercial Fishing and Boating
- 4.3.7.5 Recreational Fishing
- 4.3.7.6 Military Training
- 4.3.7.7 Outer Continental Shelf (OCS) Alternative Energy
- 4.3.7.8 Onshore Competing Use Activities

4.4 NAVIGATION AND TRANSPORTATION

4.4.1 Overland Transportation Arteries

- 4.4.1.1 Roadways Located in the Vicinity of the On-land Transmission Cable

4.4.2 Airport Facilities

- 4.4.2.1 Commercial Aviation Corridors
- 4.4.2.2 General Aviation Traffic

4.4.3 Port Facilities

- 4.4.3.1 General Description of the Area
- 4.4.3.2 Ports and Marinas
- 4.4.3.3 Commercial Ship Traffic and Berthing
- 4.4.3.4 Ship, Container and Bulk Oil Handling Facilities
- 4.4.3.5 Navigation Channels
- 4.4.3.6 Cruise Ship Traffic
- 4.4.3.7 Overwater Passenger Ferry Traffic
- 4.4.3.8 Marinas and Recreational Boating
- 4.4.3.9 Commercial Fishing

4.4.4 Communications: Radar, Television, Radio, Cellular, and Satellite Signals and Beacons

- 4.4.4.1 Existing Conditions
 - 4.4.4.1.1 Communications Towers in Area
 - 4.4.4.1.2 Broadcast Service in Area

5. ENVIRONMENTAL AND SOCIOECONOMIC CONSEQUENCES

5.1 **IMPACT-PRODUCING FACTORS – NORMAL CONDITIONS**

5.1.1 Maintenance or Construction Vessels and Crew boats

5.1.1.1 Vessel Activity (in Transit, on Station, at Staging or Maintenance Base)

5.1.1.1.1 Sumps, Ballast, and Bilge Discharges

5.1.1.1.2 Deck Drainage

5.1.1.1.3 Greywater Discharges

5.1.1.1.4 Blackwater Discharges

5.1.1.1.5 Water Withdrawals

5.1.1.1.6 Solid Waste and Trash Handling

5.1.1.1.7 Floating Debris and Trash

5.1.1.1.8 Noise, Lights, and Vibration

5.1.1.1.9 Bottom Disturbances and Anchoring

5.1.1.1.10 Air Emissions

5.1.1.1.11 Visual Aesthetics

5.1.1.1.12 Channel Maintenance

5.1.1.1.13 Bottom Debris

5.1.2 Heliport Facilities

5.1.2.1 Helicopter Activities During Construction

5.1.2.2 Helicopter Activities During Operations

5.1.3 Construction and Maintenance Staging Facilities

5.1.3.1 Solid Wastes and Trash

5.1.3.2 Oily or Hazardous Wastes

5.1.3.3 Stormwater and Wastewater

5.1.3.4 Landfills

5.1.3.5 Noise, Lights, and Vibration

5.1.4 Wind Turbine Generator, ESP, and Cable Installation

5.1.4.1 Visual Aesthetics

5.1.4.2 Noise and Vibration

5.1.4.3 Cable Jetting

5.1.4.4 Solid Waste and Trash Handling

5.1.4.5 Floating Trash and Debris

5.1.4.6 Bottom Debris

5.1.4.7 Bottom Disturbance

5.1.4.8 New or Unusual Technologies Deployed

5.1.4.9 Displacement of OCS Space

5.1.4.10 Displacement of Aviation Space

5.1.4.11 Post Lease Geological and Geophysical Field Investigations

5.1.5 Proposed Action Operations

5.1.5.1 Discharges to the Sea

5.1.5.2 Bottom Disturbances and Anchoring

5.1.5.3 Floating Trash and Debris

5.1.5.4 Bottom Debris

5.1.5.5 Air Emissions

5.1.5.6 Visual Aesthetics

- 5.1.5.7 Noise and Vibration
- 5.1.5.8 Wind Turbine Generator Navigation Lights
- 5.1.5.9 Monopile Stability and Foundation Scour
- 5.1.5.10 WTG Blades in Motion
- 5.1.5.11 Monopiles as Fish Attracting Devices (FAD)
- 5.1.6 *Proposed Action Decommissioning*
 - 5.1.6.1 Discharges to the Sea
 - 5.1.6.2 Bottom Disturbances and Anchoring
 - 5.1.6.3 Sea Bed Site
 - 5.1.6.4 Floating Trash and Debris
 - 5.1.6.5 Air Emissions
 - 5.1.6.6 Visual Aesthetics
 - 5.1.6.7 Noise and Vibration
 - 5.1.6.8 Navigation Lights or Beacons
 - 5.1.6.9 Essential Fish Habitat Degradation With Monopile and Cable Removal
 - 5.1.6.10 Restoration of Outer Continental Shelf Space
 - 5.1.6.11 Restoration of Aviation Space
- 5.1.7 *On-shore Impact Producing Factors*
 - 5.1.7.1 Transmission Cable Installation
 - 5.1.7.1.1 Vegetation Removal
 - 5.1.7.1.2 Sedimentation and Erosion
 - 5.1.7.1.3 Trenching and Soil Disturbance
 - 5.1.7.1.4 Noise and Vibration
 - 5.1.7.1.5 Air Emissions
 - 5.1.7.1.6 Dewatering Discharges
 - 5.1.7.1.7 Traffic Management
 - 5.1.7.2 Transmission Cable Operation
 - 5.1.7.2.1 Vegetation Maintenance
 - 5.1.7.2.2 Electro Magnetic Fields (EMF)
 - 5.1.7.2.3 Transmission Cable Decommissioning

5.2 IMPACT-PRODUCING FACTORS – NON-ROUTINE CONDITIONS

- 5.2.1 *Maintenance or Construction Vessels and Crew Boats*
 - 5.2.1.1 Oil or Fuel Spills
 - 5.2.1.2 Vessel Collisions
 - 5.2.1.3 Cable Repair
- 5.2.2 *WTG in Operation*
 - 5.2.2.1 WTG and Electric Service Platform Fluid Spills
 - 5.2.2.2 Monopile Collapse
 - 5.2.2.3 Wind Turbine Generator and Ice Build Up and Safety
- 5.2.3 *Electrical Service Platform*
 - 5.2.3.1 Oil or Fuel Spills
- 5.2.4 *Electrical Transmission Cables*
 - 5.2.4.1 Snagging or Severance
 - 5.2.4.2 Exhumation
 - 5.2.4.3 On Land Cable Damage or Severance

5.3 IMPACTS ON PHYSICAL, BIOLOGICAL, SOCIOECONOMIC, AND HUMAN RESOURCES – PROPOSED ACTION

NOTE: Every impact category considers “Operational Impacts” AND “Construction/Decommissioning Impacts”

5.3.1 Physical Resources

5.3.1.1 Geology

5.3.1.2 Noise

5.3.1.3 Oceanographic Processes

5.3.1.4 Climate and Meteorology

5.3.1.5 Air Quality

5.3.1.6 Water Quality

5.3.1.7 Electric and Magnetic Fields (EMF)

5.3.2 Biological Resources

5.3.2.1 Terrestrial Vegetation

5.3.2.2 Coastal and Intertidal Vegetation

5.3.2.3 Terrestrial and Coastal Faunas Other Than Birds

5.3.2.4 Avifauna

5.3.2.5 Subtidal Offshore Resources

5.3.2.6 Non-ESA Marine Mammals

5.3.2.7 Fish and Fisheries

5.3.2.8 Essential Fish Habitat

5.3.2.9 Threatened and Endangered Species

5.3.3 Socioeconomic Resources and Land Use

5.3.3.1 Urban and Suburban Infrastructure

5.3.3.2 Population and Economics

5.3.3.3 Environmental Justice

5.3.3.4 Visual Resources

5.3.3.5 Cultural Resources

5.3.3.6 Recreation and Tourism

5.3.3.7 Competing Uses in the Vicinity of the Proposed Action

5.3.4 Navigation and Transportation

5.3.4.1 Overland Transportation

5.3.4.2 Airport Facilities and Aviation Traffic

5.3.4.3 Port Facilities

5.3.4.4 Communications

5.4 IMPACTS OF ALTERNATIVES

5.4.1 Location X

5.4.2 Location Y

5.4.3 Smaller Project Alternative

5.4.4 Phased Development Alternative

5.4.5 Condensed Array Alternative

5.4.6 No-Action Alternative

5.4.7 Transmission Line Siting

5.4.8 Conclusion