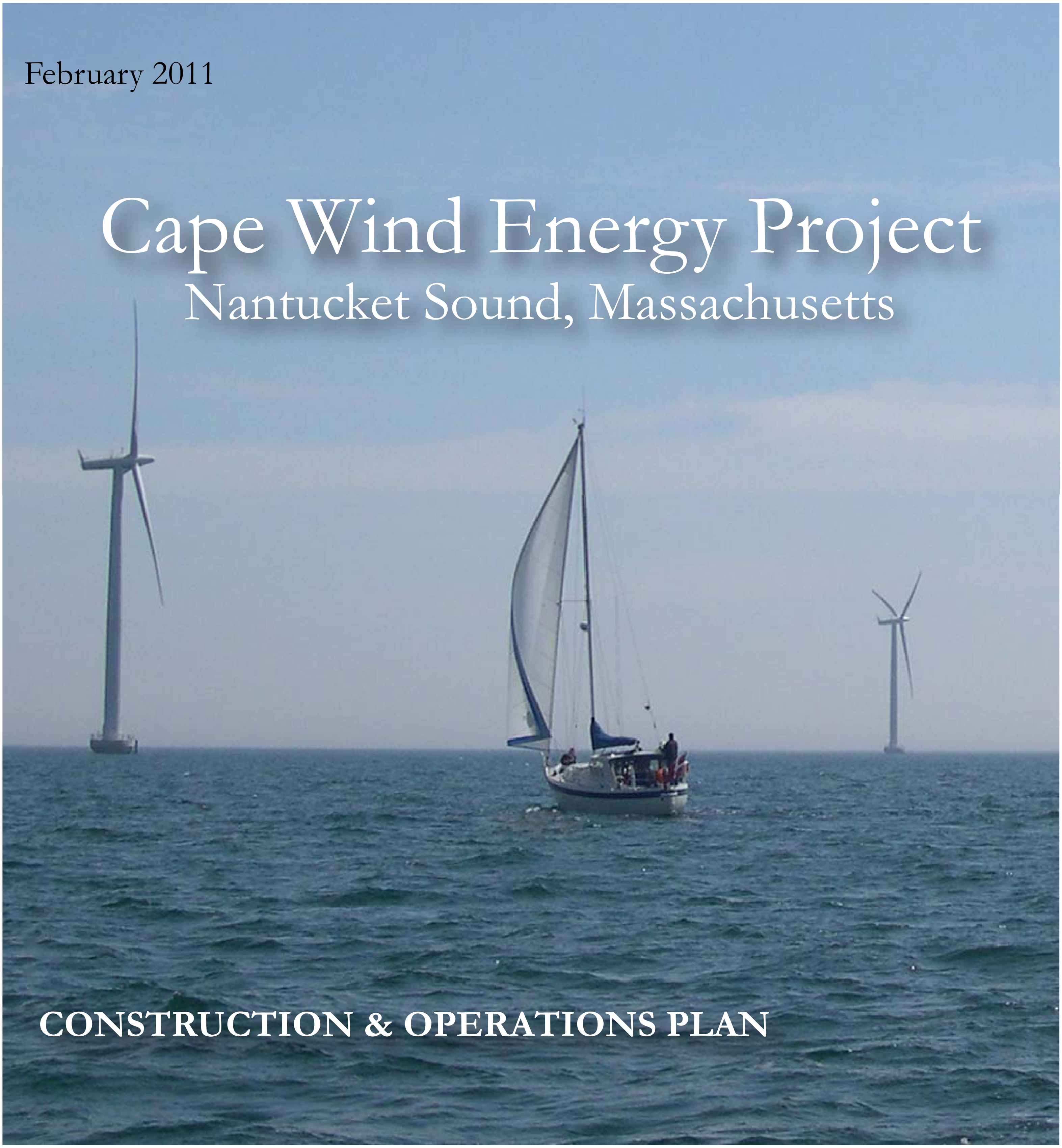
February 2011

Cape Wind Energy Project

Nantucket Sound, Massachusetts



CONSTRUCTION & OPERATIONS PLAN

Prepared for Submission to:

Bureau of Ocean Energy Management, Regulation and Enforcement
381 Elden Street
Herndon, VA 20170

On Behalf of:

Cape Wind Associates, LLC
75 Arlington Street, Suite 704
Boston, MA 02116

Prepared by:

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, MA 02482

Ocean Surveys, Inc.
91 Sheffield Street
Old Saybrook, CT 06475

SgurrEnergy
350 Commercial Street
Portland, ME 04101

Construction & Operations Plan

CAPE WIND ENERGY PROJECT
NANTUCKET SOUND, MASSACHUSETTS

PREPARED FOR SUBMISSION TO

Bureau of Ocean Energy Management,
Regulation and Enforcement
381 Elden Street
Herndon, Virginia 20170

ON BEHALF OF

Cape Wind Associates, LLC
75 Arlington Street, Suite 704
Boston, Massachusetts 02116

PREPARED BY

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482

Ocean Surveys, Inc.
91 Sheffield Street
Old Saybrook, Connecticut 06475

SgurrEnergy, Inc.
350 Commercial Street
Portland, Maine 04101

Project No. E159-504.1

February 4, 2011

www.essgroup.com

CONSTRUCTION & OPERATIONS PLAN
CAPE WIND ENERGY PROJECT
Nantucket Sound, Massachusetts

Prepared For Submission to:

Bureau of Ocean Energy Management, Regulation and Enforcement
381 Elden Street
Herndon, Virginia 20170

On Behalf of:

Cape Wind Associates, LLC
75 Arlington Street, Suite 704
Boston, Massachusetts 02116

Prepared By:

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482

Ocean Surveys, Inc.
91 Sheffield Street
Old Saybrook, Connecticut 06475

SgurrEnergy, Inc.
350 Commercial Street
Portland, Maine 04101

ESS Project No. E159-504.1

February 4, 2011

ESS Group, Inc.

TABLE OF CONTENTS

SECTION **PAGE**

TABLE OF CONTENTS (Continued)

SECTION **PAGE**

TABLE OF CONTENTS (Continued)

SECTION PAGE

ESS Group, Inc.

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

Acronyms

401 WQC	401 Water Quality Certification
ABMP	Avian and Bat Monitoring Plan
AC	Alternating Current
AHV	Anchor Handling Vessel
APE	Area of Potential Effect
API	American Petroleum Institute
APPE	Area of Potential Physical Effect
ATON	Aids to Navigation
AWOIS	Automated Wreck and Obstruction Information System
BMP	Best Management Practice
BOEMRE	Bureau of Ocean Energy Management, Regulation & Enforcement
Boomer	Boomer Subbottom Profiler
BoP	Balance of Plant
Cape Wind	The Cape Wind Project
CCC	Cape Cod Commission
CFR	Code of Federal Regulations
Chirp	Chirp Subbottom Profiler
COP	Construction and Operation Plan
CPT	Cone Penetrometer Test
Cu. ft	Cubic feet
CVA	Certified Verification Agency
CWA	Cape Wind Associates, LLC
CZM	Coastal Zone Management
DEIR	Draft Environmental Impact Report
DEIS	Draft Environmental Impact Statement
DGPS	Differential Global Positioning System
DEI&T	De-Energized Inspections and Tests
DOI	Department of Interior
DRI	Development of Regional Impact
EA	Environmental Assessment
EFSB	Energy Facilities Siting Board
EI	Energized Inspections
EIS	Environmental Impact Statement
EMF	Electrical and Magnetic Fields
EMI	Energy Management, Inc.
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESP	Electric Service Platform
ESS	ESS Group, Inc.
FAA	Federal Aviation Administration
FDR	Facilities Design Report
FEIR	Final Environmental Impact Report
FEIS	Final Environmental Impact Statement
FIR	Fabrication and Installation Report
FIS	Full Instrumentation Suite
FM	Frequency Modulated
FOIA	Freedom of Information Act
FONNSI	Finding of No New Significant Impact
fpm	flash per minute
ft	feet
G&G	Geological and Geotechnical
GPS	Global Positioning System
HAZOP	Hazard and Operability Study
HAZID	Hazard Identification

HDD	Horizontal Directional Drilling
HDPE	High Density Polyethylene
HF	High Frequency
HRG	High Resolution Geophysical
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IHA	Incidental Harassment Authorization
ISO-NE	Independent System Operator - New England
kcmil	Thousand Circular Mil (wire size)
km	kilometers
km2	Square kilometers
kV	Kilovolt
LGIA	Large Generator Interconnect Agreement
LTSA	Long Term Service Agreement
m	meters
MADEP	Massachusetts Department of Environmental Protection
MBUAR	Massachusetts Board of Underwater Archaeological Resources
MHC	Massachusetts Historical Commission
MLLW	Mean Low Lower Water
MMS	Minerals Management Service
MOC	Management of Change
mph	Miles per Hour
m/s	Meters/second
MV	Medium Voltage
MW	Megawatt
m3	Cubic meters
NDT	Non-destructive Testing
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NTL	Notice to Lessee
NMFS	National Marine Fisheries Service
NOAA	National Oceanic And Atmospheric Administration
NSR	(Nonattainment) New Source Review
NSTAR	NSTAR Electric
O&M	Operations And Maintenance
OCS	Outer Continental Shelf
OSHA	Occupational Safety And Health Administration
OSI	Ocean Surveys, Inc.
OSRP	Oil Spill Response Plan
PAL	Public Archaeology Laboratory, Inc.
PATON	Private Aids to Navigation
PPE	Personal Protective Equipment
RIS	Reduced Instrumentation Suite
ROD	Record of Decision
ROW	Right-Of-Way
SAR	Search and Rescue
SAV	Submerged aquatic vegetation
SCADA	Supervisory control and data acquisition
SMDS	Scientific Measurement Devices Station
SMS	Safety Management Systems
SPCC	Spill Prevention, Control, and Countermeasure
SPT	Standard Penetration Test
SSA	Steam Ship Authority
SWPPP	Stormwater Pollution Prevention Plan
TI	Thermal Imaging
TP	Transition Piece

TSA	Turbine Supply Agreement
TVG	Time and Variable Gain
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VHF	Very High Frequency
WAMS	Waterways Analysis and Management System
WFSS	Wind Farm SCADA System
WTG	Wind Turbine Generators
WTSS	Wind Turbine SCADA System
XLPE	Extruded Cross-Linked Polyethylene

1.0 INTRODUCTION

This Construction and Operation Plan (COP) presents, in an organized and synthesized manner, the extensive information and data that Cape Wind Associates, LLC (CWA) has developed over the past ten years to support the construction and operation of the Cape Wind Energy Project (Cape Wind or the Project). The Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) has already rigorously reviewed this information and relied upon it to prepare its extensive Final Environmental Impact Statement (FEIS) under the National Environmental Policy Act (NEPA) and its Section 106 Findings of Adverse Effects under the National Historic preservation Act for the Project. The information has also served as the basis for BOEMRE's consultations and coordination with state and federal agencies and the involved federally-recognized Tribal Nations.[1]

The only report presented in this COP that was not previously submitted is an analysis of the surface and subsurface geology data collected between 2001 and 2006 to identify potential shallow hazards (Appendix A). Please note that given the sensitive nature of the potential cultural resources identified in the report, this document should be considered and treated as confidential. This COP also attaches CWA's Avian and Bat Monitoring Plan (Appendix B), Oil Spill Response Plan (Appendix C), Materials Management and Disposal Plan (Appendix D), Safety Management System (Appendix E), Storm Water Pollution Prevention Plan (Appendix F). The Operations and Maintenance Plan (O&M Plan) is set forth in Section 5.0 of this COP.

1.1 Objective of the Construction and Operation Plan (COP):

The objective of this COP is to provide a description of all proposed activities and planned facilities for the Cape Wind Project.

The data, information, and written plans contained and described within this COP, or appended to it, are extensive and have been diligently collected, compiled and analyzed by both CWA and BOEMRE. This COP demonstrates that CWA's activities will:

- Conform to all applicable laws, implementing regulations, lease provisions, best management practices (BMPs) and environmental stipulations or conditions of its commercial lease;
- Not cause undue harm or damage to natural resources; life (including human and wildlife); property; the marine coastal or human environment; or sites, structures or objects of historical or archaeological significance;
- Be constructed and operated in a prudent and safe manner;

---

[1] On June 18, 2010 Secretary Ken Salazar issued Secretarial Order 3302 and renamed the Minerals Management Service the Bureau of Ocean Energy Management, Regulation and Enforcement. This COP is being filed subsequent to the agency's name change and, as such, this COP refers to this agency as Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE). In all instances, even when describing historical events prior to the agency name change this COP uses the current agency name, BOEMRE. In all instances, when this COP uses the term BOEMRE it means the agency now known as BOEMRE and formerly known as the Minerals Management Service (MMS). While the document has been edited for consistent use of this agency name, there may be some attachments, appendices, figures or references to this COP that include the term MMS because the compilation, preparation and/or production of those documents predate the agency name change.

- Not unreasonably interfere with other uses of the Outer Continental Shelf (OCS), including those involved with National security or defense;
- Use best available and safest technology;
- Use best management practices; and
- Use properly trained personnel.

The text that follows:

1. Describes all planned facilities that CWA will construct or use and describes all proposed construction activities and commercial operations for the Cape Wind facilities;
2. Presents an analysis of the surface and subsurface geology of the project area to provide information on potential shallow hazards; and
3. Describes the activities planned to implement the pre-construction cultural, geological, and geophysical studies set forth in Addendum C to the Lease.

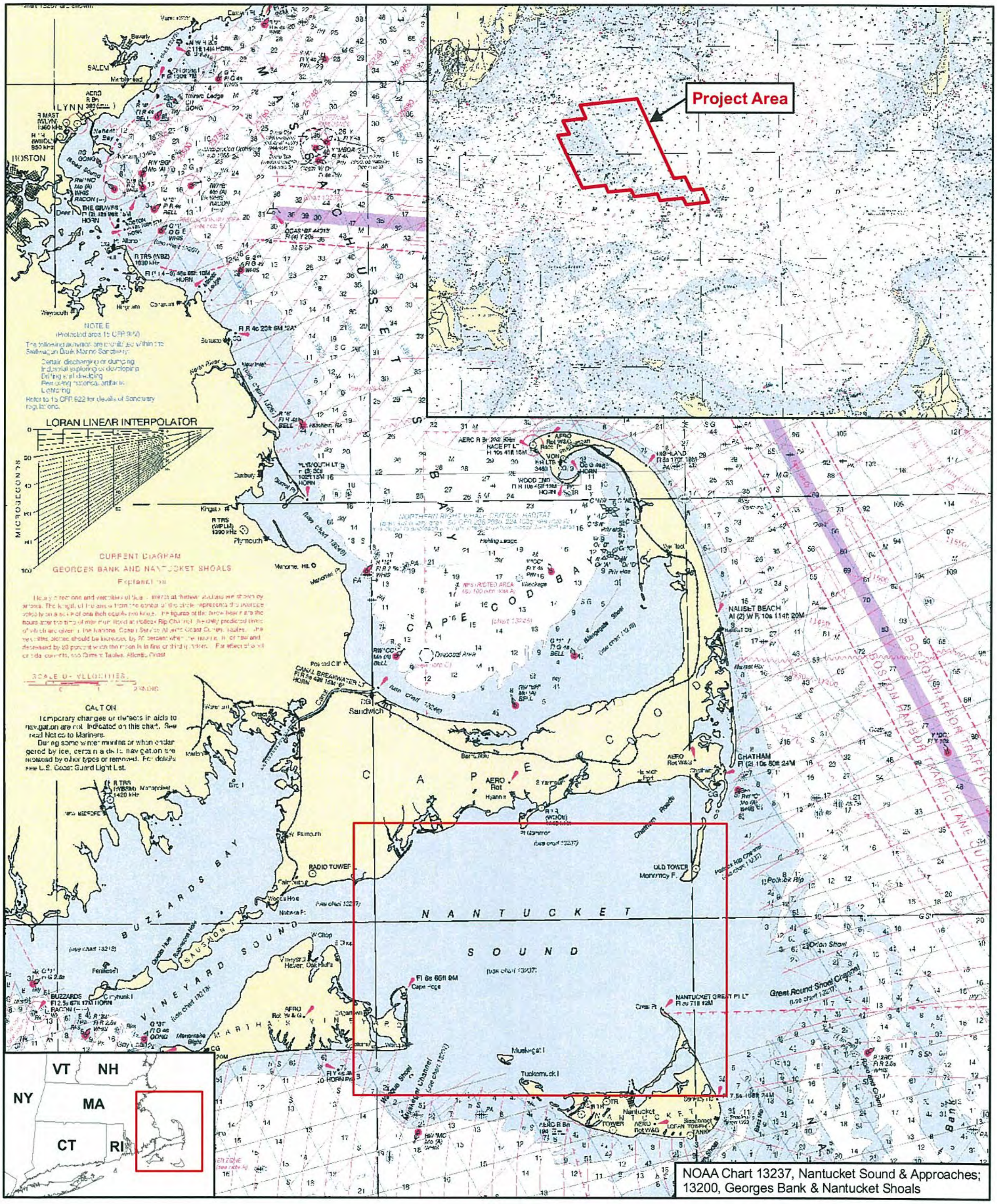
1.2 Project Overview:

The Cape Wind Project was the first offshore wind energy project to be proposed in the United States, and it will likely be the first utility-scale offshore wind energy project that will be constructed. As such it has undergone an unprecedented level of environmental and regulatory analysis over the course of its 10 year development history. The Project will be located in Nantucket Sound off the coast of Massachusetts and will consist of 130 Siemens 3.6 megawatt (MW) wind turbine generators capable of producing 468 MW of energy interconnected directly with Independent System Operator – New England (ISO-NE) at the Barnstable substation. The energy produced by the Project will be sufficient to supply approximately 75% of the annual requirements of Cape Cod and the nearby islands of Martha's Vineyard and Nantucket. In addition, Cape Wind will:

- Reduce the greenhouse gas emissions of otherwise required conventional generation, saving 733,000 tons of CO_2, 802 tons of SO_X, and 497 tons of NO_x annually;
- Create 600 – 1,000 direct, indirect and induced jobs in building and supplying the Project;
- Create 154 jobs in operation and administration;
- Provide consumers across the region a valuable hedge against increasing fossil fuel prices;
- Suppress market prices in ISO-NE, savings consumers approximately $4.6 billion over the life of the Project; and
- Catalyze the development of port facilities, offshore transmission technology, services and support capabilities and other infrastructure needed for future offshore wind and ocean energy projects.

The Project site is the nation's best location for offshore wind development. This site offers high wind energy potential, low wave heights and shallow depths. Unlike many other offshore and land-based projects, Cape Wind is close to large population centers, minimizing expensive transmission upgrades. Cape Wind is the only offshore wind project to have completed the lengthy NEPA review process at the Department of the Interior (DOI), to have received a Record of Decision from the DOI pursuant to section 388 of the Energy Policy Act of 2005, to have secured a lease on the Outer Continental Shelf for offshore energy production, and to have obtained all required state and local approvals.

The Project is fully described in Section 2 of the FEIS, but a brief overview is presented here. It entails the construction, operation and maintenance, and eventual decommissioning of an electric generating facility consisting of 130 wind turbine generators (WTGs) arranged in a grid pattern in the Horseshoe Shoal region of Nantucket Sound, Massachusetts (see Figure 1.2-1). Each of the 130 wind turbine generators would generate electricity independently of each other. For this area of Nantucket Sound, the wind power density analysis conducted by CWA determined that orientation of the array in a northwest to southeast alignment provides optimal wind energy potential for the operation of the WTGs. This alignment would position the WTGs perpendicular to prevailing winds, which are generally from the northwest in the winter and from the southwest in the summer for this geographic area in Nantucket Sound.



CAPE WIND ENERGY PROJECT
Project Locus Map

Figure 1.2-1

Solid dielectric submarine inner-array cables (33 kilovolt) from each wind turbine generator would interconnect within the WTG grid and terminate on an electrical service platform (ESP). The electric service platform would serve as the common interconnection point for all of the wind turbine generators. The proposed submarine transmission cable system (115 kilovolt) connecting the Project to Cape Cod is approximately 12.5 miles in length (7.6 miles within the Massachusetts 3 mile territorial line) from the electric service platform to the landfall location in Yarmouth. The submarine transmission cable system consists of two parallel cables that would travel north to northeast in Nantucket Sound into Lewis Bay past the westerly side of Egg Island, and then make landfall at New Hampshire Avenue.

The proposed onshore transmission cable system route from the landfall area to its intersection with the NSTAR Electric right-of-way (ROW) would be located entirely along existing paved right-of-ways where other underground utilities already exist. All of the roadways within Yarmouth and Barnstable in which the proposed transmission cable system would be placed are town owned and maintained roads with the exception of Routes 6 and 28, which are owned and maintained by the Massachusetts Highway Department. A portion of the onshore transmission cable system route would also be located underground within an existing maintained NSTAR Electric right-of-way.

Installation of the proposed action components would comprise five activities: (1) installation of the foundation monopiles and transition pieces; (2) erection of the wind turbine generators and electric service platform; (3) installation of the inner-array cables; (4) installation of the transmission cables from the electric service platform to the Barnstable Switching Station; and (5) installation of the scour protection around the monopiles and electric service platform piles. The electric service platform design is based on a piled jacket/template design with a superstructure mounting on top. The platform jacket and superstructure is expected to be fully fabricated on shore and delivered to the work site by barges, where it would be installed.

The installation of the submarine cables (both the inner array cables and the submarine transmission cables) would be accomplished by the Hydroplow embedment process, commonly referred to as jet plowing. This method involves the use of a positioned cable barge and a towed hydraulically-powered jet plow device that simultaneously lays and embeds the submarine cable in one continuous trench from wind turbine generator to wind turbine generator and then to the electric service platform, or from the electric service platform to the landfall area.

The transition of the submarine transmission cables from water to land would be accomplished through the use of Horizontal Directional Drilling (HDD). Construction of the onshore transmission cable is expected to occur in two phases. The first phase would consist of installing the ductbanks, conduits, and vaults. The second phase would consist of the installation of the onshore transmission cables, including splices and terminations. The main operation center for the project, housing the remote monitoring and command center will be located on Cape Cod. The service and maintenance vessels, supplies and personnel are expected to be stationed at two onshore locations: a New Bedford location for parts storage and larger maintenance supply vessels and Falmouth for crew transport, since it is closer to the site.

1.3 Construction and Operation Concept

The COP describes construction and operation activities for all planned Project facilities, including onshore and support facilities. Offshore construction activities, including Project components, installation methods, and safety for offshore construction workers, are described in Section 4.1, and include pre-construction offshore supplemental field surveys as specified in the Lease (Section 4.1.1), and safety management systems (SMS) (Section 4.1.2). The SMS (Appendix E) describes (a) how CWA will ensure the safety of personnel and others near the facilities, (b) remote monitoring, control, and shut down capabilities, (c) emergency response procedures, (d) fire suppression equipment, (e) testing of the SMS, and (f) personnel training. However, it is important to note that the SMS is a living document that will continue to evolve as CWA finalizes contracts for engineering, procurement, construction, and operation of the project. The SMS will also be updated as CWA contractors conduct engineering, construction and operations of the project. Detailed methods and procedures implementing the SMS will be developed in consultation with BOEMRE and the relevant health and safety regulatory agencies. Onshore construction activities, including Project components, installation methods, and safety for onshore construction workers, are described in Section 4.2.

The O&M Plan presented in Section 5 describes the approach to operations and maintenance for the Cape Wind Project and provides details regarding O&M elements of the Project that have previously been described and reviewed in the NEPA process. The purpose and objective of the O&M Plan is to maintain the plant in a safe and effective operating condition in order to maximize electricity output and plant reliability. The plan includes an explanation of specific practices and procedures that were more generally described in the FEIS and is based on practical experience from offshore wind projects in Europe, other pertinent offshore experience, and applicable regulatory requirements. [The O&M Plan specifically addresses the Lease stipulation requiring that an O&M Plan be developed to prevent potential impacts to water quality from spills and erosion/sedimentation. This requirement was established as a condition of the State FEIR Certificate and incorporated by BOEMRE as a Lease stipulation.]

1.4 Regulatory Status

The Project has undergone an unprecedented level of federal, state and local environmental review and public comment, from its initial application in November 2001 to then-lead federal agency the U.S. Army Corps of Engineers (USACE), culminating in the Record of Decision (ROD) and the signing of a Commercial Lease with BOEMRE.

The Cape Wind Project has received all state permits necessary to construct the project. All major federal reviews of the Project have also been completed. The BOEMRE issued a Record of Decision on April 28, 2010, and entered into a commercial lease with CWA on October 6, 2010. Additionally, the Federal Aviation Administration (FAA) has determined that the project is not a hazard to aviation, and other major federal permits necessary for construction (EPA and USACE) have been issued.

A comprehensive list of all required permits and the status of each is provided in Table 1.4-1, and attests to the extensive regulatory review and public comment that the Project has received over the last decade. Selected regulatory permits, approvals, and correspondence are included in Appendix H (see list in the Table of Contents). A detailed description of the Project's NEPA compliance and the permits and approvals obtained to date is provided in Section 8.0.

Table 1.4-1
Status of Permits and Approvals as of February 2011
Cape Wind Energy Project

Agency	Jurisdiction	Permit Description	ID Number	Date Applied	Date Approved
Federal					
Department of Interior - Minerals Management Service (BOEMRE)	Outer Continental Shelf	Lease, Easement or Right-of-way Under Renewable Energy and Alternate Uses of Existing Facilities on the OCS Regulatory Framework (30 CFR Part 285)	OCS-A 0478	9/14/05	ROD received; Lease Executed 10/6/10
Council on Environmental Quality, National Environmental Policy Act (NEPA)	NEPA jurisdiction is over the entire project	USACE Draft Environmental Impact Statement	(Formerly USACE NAE-2004-338-1)MMS FEIS 2-1-2-32, 2009	November 2004	
		BOEMRE Draft Environmental Impact Statement		Jan 2008	
		Final Environmental Impact Statement		Jan 2009	
		Record of Decision			4/28/2010
United States Army Corps of Engineers	Rivers and Harbors Act Section 10 jurisdiction is for work in navigable waters of the United States; Clean Water Act Section 404 jurisdiction is for work in waters of the United States and wetlands located within the 3-mile limit.	Individual Permit – Section 10/Section 404	USACE NAE-2004-338-1 (formerly 200102913)	11/22/01	Received 1/5/ 2011
United States Environmental Protection Agency (USEPA)	USEPA jurisdiction is on the upland component of the Project under the Clean Water Act and for NEPA (Section 309) review	National Pollutant Discharge Elimination System (NPDES) General Stormwater Permit		To be filed (Expected Q2 2011)	(Expected Q2 2011)
	Outer Continental Shelf	40 CFR Part 55 Air Permit for OCS Sources	OCS-R1-01	12/7/07	Received 1/7/2011
Federal Aviation Administration	Structures exceeding 200 feet into navigable airspace	Notice of Proposed Construction or Alteration Form (FAA Form 7460-1); Determination of No-Hazard	2009-WTE-332-OE through 461-OE	1/15/09	5/2010 (Petitions for discretionary review denied, determinations finalized 8/4/10)
US Coast Guard	Structures located in navigable waters of the U.S.	Permit to Establish and Operate a Private Aid-to-Navigation to a Fixed Structure		To be filed (Expected Q1 2011)	(Expected Q2 2011 or in the normal course)
National Marine Fisheries Service	Marine Mammal Protection Act (MMPA)	Incidental Harassment Authorization		To be filed (Expected Q1 2011)	(Expected Q2 2011 or in the normal course)

Agency	Jurisdiction	Permit Description	ID Number	Date Applied	Date Approved
U.S. Geological Survey (USGS)	Migratory Bird Treaty Act	Federal Bird Banding Permit		To be filed (Expected Q2 2011)	(Expected within 90 days of filing)
U.S. Fish & Wildlife Services (USFWS)	Migratory Bird Treaty Act	Federal Migratory Bird Scientific Collection Permit		To be filed (Expected Q2 2011)	(Expected within 60 days of filing)
National Park Service	National Parks & National Wildlife Refuges	Scientific Research and Collecting Permit		To be filed if necessary (Expected Q2 2011)	(Expected within 90 days of filing)
State					
Massachusetts Environmental Policy Act (MEPA)	Jurisdiction is within three-mile state territorial seas limit	Environmental Notification Form (ENF)	12643	11/15/01	4/22/02
		Draft Environmental Impact Report (DEIR)		11/15/04	3/3/05
		Notice of Project Change (NPC)		6/30/05	8/8/05
		Final Environmental Impact Report (FEIR)		2/15/07	
		Issuance of Certificate			3/29/07
Massachusetts Energy Facilities Siting Board (EFSB)	Jurisdiction is within three-mile state territorial seas limit	Petition to Construct Jurisdictional Facilities	EFSB 02-2	9/17/02	5/11/05
		Approval under G.L. c. 164, § 69J			
		Approval under G.L. c. 164 § 72	D.T.E. 02-53	11/19/07	5/2/08
		Project Change; Request for Extension	EFSB 02-2A	11/19/07	5/2/08
		Certificate of Environmental Impact and Public Interest (Approval under G.L. c. 164, §§ 69K-69O)	EFSB 07-08	5/27/09	5/27/09
Massachusetts Department of Environmental Protection (MADEP) – Wetlands and Waterways Regulation Program	Jurisdiction is within three-mile state territorial seas limit	Chapter 91 Waterways License	W08 -2480	10/6/08	12/22/08
		MADEP Water Quality Certification	W133633	11/2/07	8/15/08
Massachusetts Coastal Zone Management (MCZM)	State jurisdiction is within the three-mile limit under the Coastal Zone Management Act (CZMA). Federal Consistency Review jurisdiction is three mile limit and specific activities beyond three miles that may affect Massachusetts Coastal Zone	Concurrence with Federal Consistency Certification Statement		7/23/08	1/23/09

Agency	Jurisdiction	Permit Description	ID Number	Date Applied	Date Approved
Rhode Island Coastal Resources Management Council (CRMC)	State jurisdiction is within the three-mile limit under the Coastal Zone Management Act (CZMA). Federal Consistency Review jurisdiction is three mile limit and specific activities beyond three miles that may affect Rhode Island Coastal Zone	Concurrence with Federal Consistency Certification Statement		7/16/08	7/30/08
Massachusetts Highway Department (MHD)	Jurisdiction is within 3-mile limit	Permit to Access State Highway and Access Agreement	5-2008-0246	11/01/07	7/22/08; extension 7/21/09
Massachusetts Executive Office of Transportation (EOT)	Jurisdiction is within 3-mile limit	License/Permit Approval for Use and Occupancy of EOT property (RR bed)		11/05/07	9/17/08
Massachusetts Historical Commission (MHC): State Archaeologist	Jurisdiction is within three-mile state territorial seas limit	Permit for Upland Reconnaissance Archaeological Survey	2246	3/12/03	3/28/03
		Permit for Upland Intensive Archaeological Survey	2595	9/18/03	9/23/03
Massachusetts Division of Fisheries & Wildlife	Jurisdiction is within three-mile state territorial seas limit	Massachusetts State Scientific Collection permit		To be filed (Expected Q2 2011)	(Expected within 30 days of filing)
Massachusetts Division of Fisheries & Wildlife	Jurisdiction is within three-mile state territorial seas limit	Massachusetts Bird Banding permit		To be filed (Expected Q2 2011)	(Expected within 30 days of filing)
Regional					
Cape Cod Commission	Jurisdiction is within three-mile state territorial seas limit	Development of Regional Impact (DRI) Review	JR#20084	11/15/01	
					Procedural Denial 10/18/07;
		Issuance of DRI		EFSB Certificate of Environmental Impact and Public Interest (Approval under G.L. c. 164, §§ 69K-69O) 5/27/09	
Local					
Yarmouth Conservation Commission	Jurisdiction is within three-mile state territorial seas limit	Notice of Intent		11/15/07	EFSB Certificate of Environmental Impact and Public Interest (Approval under G.L. c. 164, §§ 69K-
		Issuance of Order of Conditions			
Barnstable Conservation Commission	Jurisdiction is within three-mile state territorial seas limit	Notice of Intent		11/15/07	
		Issuance of Order of Conditions			

Agency	Jurisdiction	Permit Description	ID Number	Date Applied	Date Approved
Yarmouth Department of Public Works (DPW)	Jurisdiction is within three-mile state territorial seas limit	Request for Transmission Line Location		11/13/07	69O) 5/27/09
Barnstable DPW	Jurisdiction is within three-mile state territorial seas limit	Request for Transmission Line Location		11/13/07	

2.0 PROJECT INFORMATION

2.1 Contact Information

Craig Olmsted
Project Director
Cape Wind Associates, LLC
75 Arlington Street, Suite 704
Boston, Massachusetts 02116
(617) 904-3100
colmsted@capewind.org

2.2 Financial Assurance

Per the terms of the lease, CWA must provide financial assurance in an amount based on the determination of BOEMRE to support payment of all accrued lease obligations.

On October 5, 2010, BOEMRE received and accepted financial assurance in the amount of $488,278 to cover (1) a $100,000 initial bond, (2) $300,000 to cover decommissioning for an existing structure, and (3) $88,278 to cover one year of advance rent. The $488,278 is an adequate amount to cover all lease obligations prior to the start of construction. CWA notes that Lease Addendum B, Section III (c) (pg B-11) notes that the Lessor reserves the right to adjust the amount of any financial assurance requirement (initial, supplemental or decommissioning) associated with the lease, and/or reassess Lessee's cumulative lease obligations, including decommissioning obligations, at any time.

Under separate cover, CWA will provide for review by BOEMRE an analysis of the amounts required to meet lease obligations during the life of the project and a proposed plan for providing financial assurance to meet the requirements under the lease.

2.3 Project Construction Schedule

2.3.1 Definitions of Terms:

The following terms are defined with respect to the construction schedule:

- **Available for Commercial Operations** means that the wind turbine generator (WTG), WTG array, or complete wind farm are ready to be operated in commercial dispatch as directed by ISO New England. This date is determined by CWA's acknowledgement of an Acceptance Certificate completed by the equipment manufacturer.

- The **Commercial Operations Date** ("COD") for this Construction and Operations Plan is the date on which the first WTG is Available for Commercial Operations.

FIGURE 2.3-1 REDACTED
Confidential business information.
Not for public disclosure.

2.3.2 Construction Activities – Offshore

Offshore construction will begin with the installation of the monopiles for the ESP foundation in the third quarter of 2011. [redacted]

2.3.3 Construction Activities – Onshore

Onshore construction work will begin with installation of the underground duct bank in the NSTAR right-of-way in the third quarter of 2011. Cable installation is expected to be completed by the fourth quarter of 2012.

2.3.4 Commissioning

Commissioning of the project includes all the activities required to make the fully-installed equipment ready for full operation. [redacted]

2.3.5 Operating Fee Payments during the Commissioning Period

[redacted]

[redacted]

On November 1 of each year, commencing on the effective date of the Lease (November 1, 2010) CWA will provide BOEMRE with an estimated commissioning schedule for the coming year. That schedule will show the estimated Commercial Operations Date for each turbine or group of turbines and will calculate the Operating Fee payment in accordance with the formula provided in Addendum B, Section III(b)(4) of the Lease. The calendar day for an individual turbine's COD will begin at 00:01 and end at 24:00 on the given day. No allowance will be made for the time if day when the final commissioning is complete.

On November 1, following actual commissioning of WTGs, CWA will provide BOEMRE with the actual commissioning schedule, and a calculation of the Operating Fee based on the actual commissioning schedule achieved during the prior year. The difference between the Operating Fee paid based on the estimated commissioning schedule and the Operating Fee calculated based on the actual commissioning schedule would be added to or subtracted from the fee calculated for the coming lease year. As described in the Lease, it is possible that not all the turbines will be commissioned in the same lease year. Further, there may be separation between the commencement of commissioning activities and full build-out of the project.

2.4 Certified Verification Agency (CVA) Nominations

The CVA requirements for an offshore renewable energy project are contained in 30 CFR Part 285 Subpart G – "Facility Design, Fabrication, and Installation," and in particular § 285.705 through § 285.712. On October 28, in a letter to BOEMRE, CWA nominated Det Norske Veritas (USA) Inc. (DNV) as its CVA for the Cape Wind Project. The following section describes in detail the qualifications of DNV and the activities they will undertake as CVA for Cape Wind.

2.4.1 CVA Qualification Statement (§ 285.706 (b))

2.4.1.1 Description of DNV (§ 285.706(b)(3))

DNV in Brief

DNV is a global provider of services for managing risk, helping customers to safely and responsibly improve their business performance. As companies today are operating in an increasingly more complex and demanding risk environment, DNV's core competence is to identify, assess, and advise on how to effectively manage risk, and to identify improvement opportunities. Our technology expertise and deep industry knowledge, combined with our risk management approach, have been used to manage the risks involved in numerous high-profile projects around the world.

Organized as an independent, autonomous foundation, DNV balances the needs of business and society, based on our independence and integrity. With the objective of safeguarding life, property and the environment, DNV serves a range of industries, with a special focus on the maritime and energy sectors. Established in 1864, the company has a global presence with a network of 300 offices in 100 countries, and is headquartered in Oslo, Norway. DNV's prime assets are the knowledge and expertise of our 9,000 employees.

DNV operates through four geographical divisions serving the maritime and energy industries: Norway, Finland and Russia; Asia, Pacific and Middle East; Europe and North Africa; and Americas and Sub-Saharan Africa. A division for Governance and Global Development supports the geographic divisions. In addition, DNV operates a global division for Sustainability and Innovation services. DNV also have three independent business units: DNV IT Global Services; DNV Software; and DNV Petroleum Services.

More information can be found at DNV's internet site: http://www.dnv.com.

DNV in the USA

DNV opened its first office in USA in New York in 1898. Today DNV has 700 employees in USA with Divisional office for Americas in Houston, and other offices in Atlanta, Chicago, Columbus, Cincinnati, Detroit, Jacksonville, Long Beach, Boston, Miami, Norfolk, New Orleans, New York, Portland, Seattle, San Francisco and La Porte.

DNV's main activities in USA are within the energy sector, both within wind energy and within oil & gas exploration, development and production. DNV is engaged in verification, classification and asset risk management offshore in the Gulf of Mexico and within risk management of onshore pipelines and refining. DNV has a Deepwater Technology Center in Houston and a leading Corrosion and Materials Technology Center in Ohio focusing on management of degradable structures.

DNV helps the maritime industry to manage risk in all phases of a ship's life through ship classification, statutory certification, fuel testing and a range of technical, business risk and competency-related services. DNV is among the top two classification societies for mobile offshore units. DNV is present in all maritime clusters in U.S. and our Global Cruise Center located in Miami supports our leading position in this sector.

DNV in the Wind Industry

DNV is the largest independent consultancy within wind energy in USA. DNV has 130+ professionals working primarily in Wind Energy, located in Seattle, Boston, Houston and San Roman offices.

A leader in providing technical services to the wind industry, DNV has conducted direct work on wind projects representing more than half of the new installed wind energy capacity in the United States. Additionally, DNV is the world's leading service provider in the field of offshore wind and has been involved in more than 60% of offshore wind projects worldwide. DNV has been leading the efforts of standardizing design practices through active participation in IEC (International Electro-technical Commission) and other international and national standards bodies.

DNV has been active in developing its own standards, specifications and guidelines for wind turbine structures and components since 2001. The standards integrate decades of experience from the offshore industry with DNV's in-depth wind turbine knowledge gained from the type certification of large megawatt turbines.

More information on DNV involvement and services within the Wind Energy industry can be found at DNV's internet site: www.dnv.com/focus/wind_energy/.

2.4.1.2 Previous Experience (§ 285.706(b)(1))

DNV's Recent Research Activities in the Wind Industry

2010 Projects

- HSE hazard management framework for the global wind industry
- Verification of complex foundation structures for the offshore wind industry
- Methods of correcting complex flow bias for remote sensing technologies
- An offshore standard for marine operations for installation of offshore wind
- Wind turbine gearbox durability analysis
- Offshore wind installation vessels advisory network
- Implementation of curtailment strategies to obtain production data for use in wake studies
- Development of new blade standard based on damage tolerant philosophy
- Probabilistic lifecycle model for strategic/management decision support for large investments in offshore wind (value chain analysis)
- Reliability database for large-scale wind turbines
- Best practices for design of floating wind turbines

2009 Projects

- Performance optimization methods for operating wind projects
- Guidelines for floating turbines
- Analysis of grouted connections for offshore wind turbines
- Development of real-time data loads analysis
- Development of offshore safety standard for transformer platforms
- WindMaster data management system – proprietary software for wind resource data analysis.
- Dynamics, load, and control system analysis of wind turbines mounted on catenary moored and TLP floating platforms

Extraordinary Innovation Projects

- Compressed air storage in pipelines and other options for energy storage for offshore wind.

Joint Industry Projects

- Updating methodology for grouted connections in offshore wind turbines.
- DNV Standards for Wind Energy

- DNV-OS-J101 Design of Offshore Wind Turbine Structures
- DNV-OS-J102 Design and Manufacture of Wind Turbine Blades
- DNV-OS-J201 Design of Offshore Substations
- Guideline Document for Offshore Floating Wind Turbine Structures

International Standards

- IEC 61400-1 "Wind Turbines – Part 1: Design Requirements", International Electrotechnical Commission, 2005
- IEC 61400-3 "Wind Turbines – Part 3: Design Requirements for Offshore Wind Turbines", International Electrotechnical Commission, 2008

Recent Industry Publications

- OMAE2010-20344 "Guideline for Offshore Floating Wind Turbine Structures" presented by DNV in ASME 29th International Conference on Ocean, Offshore and Arctic Engineering in 2010

- OTC-20674-PP "Qualification of a Semi-Submersible Floating Foundation for Multi-Megawatt Wind Turbines" jointly presented by Principal Power Inc and DNV in Offshore Technology Conference in 2010

A copy of the above mentioned publications can be provided upon request.

Other

- DNV has been actively participating in BOEM workshops and Industry discussion for CVA for Offshore Wind from the very beginning
- DNV has submitted an abstract on CVA for First Offshore Wind Turbine for US Waters for Windpower 2011

DNV's Latest (2010) CVA Experience

- CVA for BW Pioneer FPSO (the first FPSO in US waters) to ensure compliance for 30 CFR 250 Subpart I
- CVA for Macondo Riser intended for GOM oil spill containment operation

2.4.1.3 Technical Qualifications of DNV Team on Cape Wind CVA(§ 285.706(b)(2))

DNV proposes to staff this project with the following key team members. Specific assignments for some tasks may vary depending on timing of the work.

Santhosh Kumar Mony, Head of Project Certification (Project Sponsor)

Mr. Mony has 20 years of varied and extensive experience in offshore project and engineering management, as well as in EPC contract management and leadership. He is very knowledgeable in new build FPSOs and interface management (hull and topside), and also possesses knowledge in LNG value chain.

Mr. Mony is an experienced leader in people management, and is also very experienced in new service development and marketing of various services. He has been involved in the complete verification planning and execution of large and complex international offshore projects, and is well versed with the risk based verification approach and total project verification.

Mr. Mony has extensive experience in contract administration, bid management, product verification and consultancy services for offshore projects. He has been involved in SHEQ and training/competence development. Mr. Mony has a good understanding of the shipyard practices and practical knowledge of many aspects of working with the yards. He has early experience in structural/hull engineering, finite element analysis, welding technology, and knowledge in various topside, marine, control systems and safety studies.

ShashikantSarada, Senior Engineer (Project Manager)

Mr. Sarada has over eight years of experience in design, advanced analysis and construction of variety of civil/offshore steel and concrete structures. He is a Certified Project Manager Professional (PMP). He has been involved in Geotechnical / Foundation Investigation for installation of offshore wind turbines, structural approval and plan approval coordination for Class.

Mr. Sarada assisted in the development of Regulatory road map for performing plan approval and inspections on behalf of the United States Coast Guard for offshore installations in the outer continental shelf of Gulf of Mexico. He is Project Manager for CVA Project for BW Pioneer FPSO - Verification of hull, topsides, mooring, turret and piles.

Mr. Sarada has experience in detailed engineering design, analysis and installation of more than 30 fixed offshore platforms, caissons, guardians, decks and miscellaneous structures in Gulf of Mexico and in Black Sea. He has performed pile-soil-structure interaction analysis and pile design for a number of platforms, and has also prepared regulatory (MMS) permit and CVA documentation.

Morten Søgaard Andersen, Senior Engineer (Project Team Member)

Mr. Andersen has worked for seven years in DNV with wind turbine verification as project engineer for technical verification of support structures for wind turbines, and as project manager for wind project certification. He has high expertise in structural analysis of concrete and steel.

Prior to joining DNV, Mr. Andersen worked for five years as a consultant within structural design - mainly bridges and support structures for wind turbines. He has worked as research assistant, investigating concrete/reinforcement interface.

Jenny Yan Lu, Principle Engineer (Project Team Member)

Ms. Lu is a licensed PE with 15 years of experience in shipbuilding and offshore engineering, including design, analysis and verification of offshore structures including semi-submersibles, TLPs, Spars, FPSOs and jackups.

Ms. Lu is experienced in class systematics, verification and classification of offshore structures involving FEM analysis, structural dynamic analysis, hydrodynamic analysis, global and local strength evaluation (yield & buckling), fatigue analysis, blast analysis and risk based inspection analysis, etc. She is actively involved in business development, project management, and updates of DNV rules and other industry standards.

Jens Døssing, Senior Engineer (Project Team Member)

Since his graduation as a civil engineer, Mr. Doessing has been specializing in structural engineering. Mr. Doessing has been engaged in design and analysis of steel structures, including buildings, steel structures for process plants and also offshore structures, cranes, masts and towers.

Since 1990 Mr. Doessing has been responsible for larger structural projects including flue gas desulphurization plants, waste incineration plants and building design.

From 1993 to 2000 Mr. Doessing held the position as head of a steel structures design department, responsible for current planning, management and development of staff, sales and administration, project management, and maintenance of a general high professional standard, including introduction of new technology.

From 1982 to 1985 Mr. Doessing prepared his Ph.D. thesis on deck joints in offshore structures. The study comprised both theoretical and numerical analyses of circular cylindrical shells. For six months Mr. Doessing participated in an experimental research project on ultimate strength of tubular joints in offshore jacket structures in the United States.

AndrzejSerednicki, (Project Team Member)

Mr. Serednicki has 30 years of offshore industry-related experience, including:

- General structural plan approval of steel and concrete structures.
- Certification plan approval of materials and machinery components.
- Function, strength, fatigue, pressure and fire testing of structural and process equipment components.

- Assessment and qualify control of concrete materials, prestressing systems and construction methods.
- Assessment of platform installation methods and underbase grouting of gravity structures.
- Design of concrete weight coating for submarine pipelines and quality control of coating application.
- Assessment of design and construction of grouted connections for steel structures.
- Design, engineering and supervision of repairs to pipelines, steel and concrete structures.
- Design and execution of high integrity bolted joints. Bolt specifications.
- Design, engineering and supervision of elastomeric and PTFE structural bearings.

Mr. Serednicki also has eight years of experience in structural design of precast concrete industrial structures and office buildings.

Steven Kelsey, Principle Surveyor (Project Team Member)

Mr. Kelsey is responsible for performing vendor surveillance for the certification of production and drilling-related equipment, as well as marine propulsion, controls and automation and associated components. He is responsible for performing various types of third party inspections and surveillances on behalf of oil production and drilling-related clients, as well as acting as oil production company representative contractor facilities to assure contractual requirements, schedules and qualification activities are fulfilled (e.g. - Statoil).

Mr. Kelsey is involved in daily activities such as monitoring welding, hydrostatic/functional testing, dimensional inspections, performance testing, and various NDE testing (as a minimum) for production, downhole, drilling, offshore, onshore and subsea equipment as well as ships. He performs project monitoring and various activities for oil production and drilling-related clients. He has been involved in witnessing of various types of inspections related to land-based, offshore and subsea equipment. He has also been involved in the development of overview documents for monitoring of manufacturing activities, as well as development of quality procedures geared towards improvement and consistency in implementation of inspection activities and reporting methods within the assigned department.

Ed Groff, Senior Surveyor (Project Team Member)

Mr. Groff possesses extensive experience in ensuring conformance to requirements in accordance with DNV Management Policies and Procedures, customer requirements, national standards and specifications, and international standards and specifications and their application to the equipment reviewed. He is knowledgeable in the review of welding process specifications and supporting process specification records, as well as in the review of non-destructive examination (NDE) requirements for both application and qualification of NDE technicians.

LivHamre, Principal Specialist (Project Team Member)

Ms. Hamre has extensive experience in foundation design of gravity base and piled structures. She is responsible for the development of best practice for geotechnical verification of wind turbine foundations in DNV. She is knowledgeable in soil modeling for computer applications, and is involved in supervision of offshore soil investigation, together with planning and reporting of soil parameters for design. Ms. Hamre is well experienced in the interpretation of soil parameters from in situ and laboratory testing.

2.4.1.4 Software (§ 285.706(b)(4))

DNV has access to several computer programs, which are part of SESAM suite, for undertaking any complex independent analysis. The figure on the next page summarizes SESAM suite of programs that are currently available. Abstracts are not presented for these programs, however in the event they are required to be applied, abstracts will be presented with the verification reports.

REDACTED
Confidential business information.
Not for public disclosure.

Figure 2.4-1 [redacted]

2.4.1.5 Resource Availability (§ 285.706(b)(5))

The nominated resources described in this section are based on DNV's current work schedule. Should project personnel availability change at the time of contract award, DNV will discuss and agree to changes in resources with the customer. DNV will identify alternative resources with the same level of competence as the resources listed.

2.4.1.6 CVA Previous Experience with BOEMRE Procedures (§ 285.706(b)(6))

The Cape Wind Project is the first offshore wind facility to enter into a lease agreement with BOEMRE. As such, there is no existing experience with offshore wind-specific BOEMRE requirements and procedures. However, DNV has extensive experience in the offshore wind industry in Europe, including participation in development of the relevant standards used industry-wide. Further, DNV also has experience with BOEMRE requirements for offshore mineral extraction projects. This experience is described in Section 2.4.1.2.

2.4.1.7 Conflict of Interest (§ 285.706(c))

§ 285.706(b)(6) states:

Individuals or organizations acting as CVAs must not function in any capacity that will create a conflict of interest, or the appearance of a conflict of interest.

Outside of the contract to provide CVA services, DNV or any of its employees and or family members not affiliated with CWA in any capacity. CWA is not aware of any function performed by DNV that would create a conflict of interest or the appearance of a conflict of interest. DNV has successfully met this requirement on all of the past CVA projects executed under 30 CFR 250.

2.4.1.8 Professional Engineer Supervision (§ 285.706(d))

The USCG recognizes certification by DNV employee as equivalent to Certification by PE under the NVIC 10-92 dated June 19, 1998.

DNV has met this requirement on all of the past CVA projects executed under 30 CFR 250. The proposed CVA team includes DNV employees who are also registered PE’s.

DNV has own quality system with strict requirement to assign only people with required competence to oversee and/or execute the project activities.

2.4.2 CVA Level of Work (§ 285.706(b)(7))

DNV has developed a systematic approach to ensure verification with respect to 30 CFR 285 Subpart G requirements. DNV’s systematic approach to CVA for oil and gas facilities (with respect to 30 CFR 250) in the Gulf of Mexico has been appreciated and accepted by BOEMRE.

In line with BOEMRE requirements, DNV as a CVA will, through verification activities and using sound engineering judgment and practices, verify that the Cape Wind Project is designed, fabricated and installed to withstand the environmental and functional load conditions appropriate for the intended service life and site specific conditions.

DNV has developed a scope of work consistent with the BOEMRE requirements and based on DNV’s experience in working as CVA on other energy production facilities. Since there are some uncertainties regarding exactly what BOEMRE will require for wind turbine projects, the scope may have to be adjusted at a later stage. It is anticipated that there will be a CVA nomination meeting which will give DNV opportunity to explain the scheme of execution and level of involvement to BOEMRE for this first offshore wind project in US waters.

2.4.2.1 List of Activities

Table 2.4-1 shows the four project phases and the appurtenant tasks.

Table 2.4-1 – Overview of Project Phases

Phase	Task	Task Description
Phase 1: WTG Structure Design Verification	Task 1	Project Kickoff Meeting
	Task 2	Site Conditions Verification
	Task 3	Site Suitability Verification
	Task 4	WTG Load Cases
	Task 5	Statement of Compliance
	Task 6	WTG Foundation Design Verification
	Task 7	WTG Structure Design Verification Report
Phase 2: ESP Structure Design Verification	Task 1	ESP Load Cases
	Task 2	ESP Foundation Design
	Task 3	ESP Structure Design Verification Report
Phase 3: ESP and WTG Foundation Structure Fabrication Verification	Task 1	On-site inspection of monopile and transition piece fabrication
	Task 2	Fabrication Verification Report
Phase 4: Installation Verification	Task 1	WTG and ESP Pile Installation
	Task 2	Transition Piece Installation
	Task 3	Offshore Cable Installation
	Task 4	ESP Topsides Installation
	Task 5	Installation Verification Report

2.4.2.2 Execution

Phase 1: WTG Structure Design Verification

The CVA work scope and duties for the design phase, and more specifically Phase 1 of this project, are as stipulated in 30 CFR §285.707. DNV as CVA will use good engineering judgment and practices in conducting an independent assessment of the design of the facility.

[redacted]

The CVA design phase scope of work for the WTG structure is verification through independent assessment of the following elements:

1. Planning criteria
2. Operational requirements
3. Environmental loading data

4. Load determinations
5. Stress Analysis
6. Material designations
7. Soil and foundations conditions
8. Safety factors
9. Foundations

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Phase 2: ESP Structure Design Verification

The CVA work scope and duties for Phase 2 are also as stipulated in 30 CFR §285.707.

The CVA design phase scope of work for the ESP structure is verification of the following elements through independent assessment:

1. Environmental loading data

2. Load determinations
3. Stress Analysis
4. Material designations
5. Safety factors
6. Foundations

[redacted]

[redacted]

[redacted]

Phase 3: ESP and WTG Foundation Structure Fabrication Verification

The CVA work scope including responsibilities and duties for the fabrication phase (Phase 3) is stipulated in §285.708 and §285.709, and include the following:

[redacted] Use good engineering judgment and practice in conducting independent assessments of fabrication activities associated with monopile and transition piece fabrication. [redacted]

2. Verify quality control aspects of the construction program at various stages of the fabrication phase by conducting periodic onsite inspections and verifications of the following:
    a. Fabrication contractor's quality control plans
    b. Material quality and identification methods
    c. Adherence to sound fabrication procedures specified in the Fabrication and Installation Report
    d. Welder and welding procedure qualification and identification
    e. NDE requirements and results

f. Destructive testing requirements and results
g. Dimensional check, erection and alignment procedures
h. Submit interim fabrication verification report to establish status of quality-control records at various stages of fabrication

[redacted]

Phase 4: Installation Verification

The CVA work scope including responsibilities and duties for the installation phase (Phase 4) is stipulated in §285.708 and §285.710, and include the following:

1. Independently assess the adequacy of the overall installation plan and observe that installation sequences and activities per design assumptions are being followed. [redacted]
2. Independent analyses of Soil Resistance to Driving (SRD), and pile drivability.

[redacted] Observe installation activities, spot check equipment, procedures and record keeping as necessary to verify compliance with design parameters such as environmental data, design loads, platform structural aspects, and foundation design. [redacted]

4. Submit installation verification reports interim and final for all installation activities to establish status of quality-control records at various stages of installation.

[redacted]

[redacted]

[redacted]

2.4.2.4 Deliverables

Verification Activities

A Statement of Compliance for the WTG load cases and the site investigation with respect to API RP-2A WSD, IEC 61400-01 and 61400-03, will be issued upon completion of related verification activities/review.

Independent Analysis

A technical report summarizing FE models, analysis methodology and comparison of results will be prepared where independent analysis has been performed by DNV as part of verification activities.

CVA Reports

DNV deliverables shall include intermediate and final report.

The intermediate report will be provided at agreed milestones.

[redacted]

[redacted]

[redacted]

The final report shall be submitted as per the requirements in 30 CFR §285.712 and shall be submitted to the BOEMRE Regional Supervisor with a copy to Cape Wind Associates.

2.4.3 Required Documents(§ 285.706(b))

2.4.3.1 Design Verification Plan

The following documents will be provided to the CVA for the Design Verification Plan (Phases 1 and 2 of the list of activities described in Section 2.4.2.):

Document	Developed By
Wave Report (includes tides and currents)	SgurrEnergy
Wind Report (includes wake effects and temperature)	AWS Truepower
Accessibility Report (includes snow, ice and marine growth effects)	SgurrEnergy
Location Coordinates (includes water depths)	Cape Wind/ESS Group
Geophysical Studies	OSI, Inc.
Geotechnical Studies	GZA
WTG elevations and interface levels	Cape Wind
Design Basis (codes and standards to be used for design, including IEC 61400-03)	Siemens
Allowable structure frequencies	Siemens
Functional specifications, including design life, fatigue life, natural frequencies, etc.	Siemens
Project specific design load case table	Siemens
Selection of turbine position to be considered for design loads	Siemens
Wind turbine data, including masses, loads, etc.	Siemens
Input for Component Certification for rotor/nacelle assembly	Siemens
WTG tower structural design requirements	Siemens
Corrosion protection design basis	Foundation Designer
Material data and specifications for monopiles and transition pieces	Foundation Designer
Design plan for grouted connection, including all relevant back-up documentation	Foundation Designer
Design procedure for load generation, soil pile interaction, scour, design load iterations and computer programs	Foundation Designer
Monopile structural design requirements	Foundation Designer
Transition piece structural design requirements	Foundation Designer
Transition piece operational and interface design requirements	Siemens
ESP foundation design basis	ESP Contractor
ESP structural design requirements	ESP Contractor
ESP foundation design procedure (including software)	ESP Contractor

2.4.3.2 Fabrication Verification Plan

The following documents will be provided to the CVA for the Fabrication Verification Plan (Phase 3 of the list of activities described in Section 2.4.2.):

Document	Developed By
Inspection and test plan for WTG tower manufacturing	Siemens
WTG tower manufacturing locations	Siemens
WTG tower manufacturing procedures	Siemens
WTG tower inspection and NDT procedures	Siemens
Inspection and test plan for monopile and transition piece	EPC Contractor
Monopile and transition piece manufacturing locations	EPC Contractor
Monopile and transition piece manufacturing procedures	EPC Contractor
Monopile and transition piece inspection and NDT procedures	EPC Contractor
Inspection and test plan for ESP	ESP Contractor
ESP manufacturing locations	ESP Contractor
ESP manufacturing procedures	ESP Contractor
ESP inspection and NDT procedures	ESP Contractor

2.4.3.3 Installation Verification Plan

The following documents will be provided to the CVA for the Installation Verification Plan (Phase 4 of the list of activities described in Section 2.4.2.):

Document	Developed By
WTG tower and nacelle assembly procedures	Siemens
WTG tower and nacelle assembly QA/QC plan	Siemens
Monopile driveability study	Foundation Designer
Monopile installation procedures	EPC Contractor
Monopile installation QA/QC plan	EPC Contractor
Transition piece installation procedures	EPC Contractor
Transition piece installation QA/QC plan	EPC Contractor
ESP foundation installation procedures	EPC Contractor
ESP foundation installation QA/QC plan	EPC Contractor

3.0 SITE INVESTIGATIONS COMPLETED TO DATE

The following section describes in detail the geological, geophysical, geotechnical and cultural investigations performed at the project site. As per the request of BOEMRE, a sequential description of the investigations, interpretations, and mitigations for geological and cultural purposes is laid out below. Additional site investigations including meteorological, oceanographic and biological (including but not limited to fish, marine mammals, sea turtles, and sea birds) are described in the FEIS and are not repeated herein.

A shallow hazard report for the Project Area is provided in Appendix A. The intention of this shallow hazards report is to identify the presence of natural and man-made hazards in the Project Area. The report was prepared in accordance with applicable requirements and discussions with the BOEMRE.

3.1 Introduction

Over the ten year development of the Project, CWA has conducted detailed investigations of all relevant environmental conditions, to characterize and evaluate the existing physical, archaeological, oceanographic, biological conditions and shallow hazards to assist in the siting and design of the Project. Section 10 of the FEIS includes a comprehensive list of 60 technical reports that have been prepared by the CWA technical team on behalf of the Project, as part of the extensive environmental analysis. Field studies and analyses conducted to date not only CWA with a complete understanding of the proposed Project site to satisfy the required regulatory reviews. Studies and analyses include:

- Geophysical surveys in 2001, 2002, 2003 and 2005 that covered approximately 635 nautical miles of tracklines encompassing the project site on Horseshoe Shoal, as well as the proposed cable route and nearshore landfall area.
- Geological/geotechnical surveys in 2001, 2002, 2003, 2004 and 2005 that obtained 86 sediment vibracores and 22 deep borings at representative turbine locations and along proposed cabling corridors.
- Terrestrial and marine archeological surveys.
- Avian surveys covering all seasons and times of day that were conducted from 2002 through 2006 and involved several methodologies including land and barge based radar, as well as direct observations from land, boats and planes.
- Shellfish and benthic surveys conducted in 2001, 2002, 2003, and 2005 to gather benthic macroinvertebrate community information at turbine sites and along the cable routes. Samples were also gathered from the foundation piles of the met tower.
- Gathering of metocean data on wind, waves and currents from the met tower constructed in 2002.
- Survey of submerged aquatic vegetation (SAV) including dive and underwater video surveys.
- Wetland delineation and environmental survey along the upland cable route.
- Noise analyses to obtain ambient background levels both above and below water and to model anticipated impacts to humans and marine mammals.
- Visual simulations from representative cultural resources within the project viewshed.
- Recreational and Commercial Fisheries data analyses, including user surveys.

- Navigational Risk Assessment that included vessel counts, analysis of Search and Rescue (SAR) data, and analyses of oil spill and vessel collision probabilities.

- Dive survey analysis of the effectiveness of proposed Scour Control methods on the Met tower foundation.

Descriptions of the methodology and findings of these investigations have been reported in previous filings. The sections below provide the information relevant to the COP requirements, and also provide the locations of the specific reports for more detailed information. Planned pre-construction field programs, as required by the ROD and the Lease terms, are described in Section 4.0.

3.2 Geophysical and Geological/Geotechnical (G&G) Investigations Completed

Integrated marine geophysical/hydrographic surveys and geological/geotechnical investigations were conducted for the Project in 2001, 2002, 2003, 2004, and 2005 on Horseshoe Shoal and along the proposed submarine transmission cable route from the ESP to the proposed landfall location in Yarmouth. This survey coverage has provided characterization of surficial and subsurface geology in and around Horseshoe Shoal. As indicated in the table below, approximately 635 nautical miles of marine geophysical trackline data was collected and 22 borings and 86 vibracores advanced in multiple field surveys conducted for the Project since 2001.

Survey	Approx Trackline nautical miles	# of Vibracores	# of Borings
OSI 2001	180	47	
GZA 2002	--		3
GZA 2003	--		19
OSI 2003	370	23	
SI 2004	--	4	
OSI 2005	85	12	
TOTAL	**635**	**86**	**22**

The studies yielded site-specific information about water depths, surface and sub-surface sediment types, seafloor morphology, sub-seafloor stratigraphy, natural or man-made obstructions, and other conditions that may affect installation, operation, and decommissioning of the proposed facilities.

The methodologies and results of the G&G surveys were described in the following regulatory filings and technical reports. In addition, a comprehensive description of the equipment, data acquisition settings, and data analysis conducted during these investigations is provided in Appendix A of the COP. A summary of equipment Reports pertaining to oceanographic processes, including sediment scour and mitigation measures, are listed and summarized in Section 3.4 of the COP.

USACE Draft Environmental Impact Statement (DEIS) (11/2004)

- See Sections 5.1 and 5.2, and cited figures, tables and appendices.

Application for Lease (7/11/2006)

- See Section C1 (page 1-6).

Final Environmental Impact Report (FEIR) (2/2007)

- See Section 3.20 and Section 2.2.1.3.3, and cited figures, tables and appendices.

MMS DEIS (1/2008)

- See Section 4.1.1. and cited figures, tables and appendices.

MMS FEIS (1/2009)

- See Section 4.1. and Section 2.7, and cited figures, tables and appendices.

In addition, hard copies of the following confidential commercial technical data and reports (which were not included in the filings above) have previously been provided to BOEMRE (via CWA transmittal to Dr. Rodney Cluck dated August 28, 2006), as confidential commercial or financial information protected from disclosure under Exemption 4 to the Freedom of Information Act (FOIA). This data was voluntarily submitted by CWA to assist BOEMRE in its preparation of the Environmental Impact Statement (EIS), to assist in compliance with the NEPA.

Geophysical survey reports:

- Ocean Surveys, Inc. (OSI). 2002. Marine geophysical survey and sediment sampling program: Cape Wind Energy Project, Nantucket Sound, Massachusetts. Prepared for Cape Wind L.L.C., Boston, Mass., Old Saybrook, Conn.
- Ocean Surveys, Inc. (OSI). 2003. Final report: Supplemental Marine Geophysical Survey: Cape Wind Energy Project, Nantucket Sound, Massachusetts. Prepared for Cape Wind L.L.C., Boston, Mass., Old Saybrook, Conn.
- Ocean Surveys, Inc. (OSI). 2005. Final report: Marine geophysical survey investigation, Nantucket Sound, Massachusetts. Prepared for Cape Wind L.L.C., Boston, Mass., Old Saybrook, Conn.

Boring logs and geotechnical analyses were included in the following reports:

- GZA GeoEnvironmental, Inc. (GZA). 2002. Geotechnical Data Report Cape Wind Met Tower Foundations, Hyannis/Nantucket, Massachusetts. Prepared for Cape Wind Associates, Boston, Massachusetts. Old Saybrook, Conn.
- GZA GeoEnvironmental, Inc. (GZA). September 2003. 2003 Geotechnical Data Report Cape Wind Energy Project, Nantucket Sound, Massachusetts. Prepared for Cape Wind Associates, Boston, Massachusetts.
- GZA GeoEnvironmental, Inc. (GZA). October 2003. October 2003 Geotechnical Data Report Cape Wind Energy Project, Nantucket Sound, Massachusetts. Prepared for Cape Wind Associates, Boston, Massachusetts.

Responses to Individual BOEMRE Data Requests:

- See correspondence to BOEMRE dated April 20, 2006, August 28, 2006, November 27, 2006, July 13, 2007 and February 28, 2007.
- Geochemical and bulk testing data submitted 8/28/2006.
- Supplemental information to be provided prior to construction, per FEIS Section 2.7

Vibracore logs:

- ESS Group, Inc. Logs of 86 vibracores advanced for the Project in 2001, 2003, 2004 and 2005.

Analytical bulk physical testing results of marine sediments:

- GeoTesting Express Inc. laboratory reports from 2001; November 12, 2003; January 3, 2005; and January 6, 2006 (latter carried in Attachment C of ESS Geotechnical/Benthic Field Evaluations Report dated March 22, 2006)/

Analytical bulk chemical testing results of marine sediments:

- Woods Hole Group Analytical Reports dated August 31, 2001; September 19, 2001; November 7, 2003; January 14, 2005; February 2, 2005; and December 30, 2005.

Thermal resistivity and ambient temperatures of marine sediments:

- Geotherm, Inc/. dated October 14, 2003

The following sections rely on the above filings and source documents and the Shallow Hazards Survey report included in Appendix A of the COP

3.2.1 Geophysical Surveys

Three Project-specific marine geophysical/hydrographic surveys were designed and conducted to collect remote sensing data to evaluate WTG foundation installation feasibility, gather data to support the foundation design process, and to support the analysis of the surface and subsurface sediments on Horseshoe Shoal and the proposed submarine transmission and inner-array cable routes. Surveys included:

- Hydrographic measurements with a fathometer to determine water depths;
- Side-scan sonar to evaluate surface sediments, seafloor morphology and potential surface obstructions;
- Seismic profiling with high frequency (HF) (high resolution; limited penetration below the seafloor) and low frequency (low resolutions; deeper penetration beneath the seafloor) acoustic sources; and
- Magnetometer surveys to identify ferrous objects at the surface or shallow subsurface areas; combined with a differential Global Positioning System (GPS) to document the precise location of anomalies.

Figure 4.1.1-8 of the FEIS illustrates the locations of the 2001, 2003, and 2005 marine geophysical and hydrographic vessel tracklines, as they relate to the proposed action facilities. Following completion of the field survey, the digital data files were processed at the surveyor’s mainland facility, then reviewed and interpreted by staff and a marine archaeologist (for potential cultural resources). Digital hydrographic files were corrected for tidal fluctuations to report water depths at mean low lower water (MLLW). Side scan sonar and magnetic intensity data were interpreted to delineate acoustic targets and magnetic anomalies. Details of each geophysical field survey are provided below.

June to August 2001 Geophysical/Hydrographic Survey

From June to August 2001, a marine geophysical/hydrographic survey was conducted by Ocean Surveys, Inc. (OSI) within the Proposed Horseshoe Shoal Alternative site in Nantucket Sound and along alternative submarine cable routes. Survey tracklines are shown in green on Figure 5.1-1 of the DEIS. The survey included use of side-scan sonar to evaluate surface sediments, seafloor morphology and potential surface obstructions; high frequency transducer receiver ("chirp" or "shallow") and low frequency transducer receiver ("boomer" or "intermediate") sub-bottom profilers to evaluate subsurface sediment conditions; magnetometer to identify ferrous objects at the surface or shallow subsurface areas; and a precision fathometer to measure water depths. Locations of survey anomalies were precisely identified using a Differential Global Positioning System (DGPS) accurate to +/- 3.3 feet (ft) (1 meter (m)). Specifications of the instrumentation used during the survey are listed in Table 5.1-1 of the DEIS.

The turbine array and scientific measurement devices station (SMDS) areas were encompassed by a total of 14 tracklines oriented north-south and spaced 2,743 feet (836 meters) apart; five east-west oriented lines spaced 5,236 feet (1,596 meters) apart; and two additional east-west lines spaced 2,000 feet (610 meters) apart. Three tracklines, spaced 500 feet (152.4 meters) apart, provided subsurface data between the ESP and the proposed landfall location in Yarmouth. Additional tracklines were run to enable avoidance of areas where review of the data suggested hard bottom conditions existed. OSI survey coverage of the bottom during this survey is described below (Nowak, 2002):

- **Side-Scan Sonar:** Sweep range was up to 328 feet (100 meters) on either side of the underwater transducer (towfish), depending on water depth. The normal convention is to tow the side scan instrument 26 feet (8 meters) to 66 feet (20 meters) above the bottom for optimum coverage at this sweep range. In shallow water, where tow height is limited by water depth, the effective sweep coverage is approximately 12.5 times the towed transducer height above the seafloor. In shallow water, the transducer is generally towed within 5 feet (1.5 meters) of the water surface, so the towed transducer height is equal to the water depth minus 5 feet (1.5 meters). The main beam coverage of each channel of the side scan sonar is between 20 and 70 degrees below the horizontal plane.

- **Cesium Magnetometer:** This magnetometer senses the ambient magnetic field and localized anomalies. Each individual run of the magnetometer used in the survey can be considered to have coverage of approximately 50 to 75 feet (15.2 to 22.9 meters) in width. An anomaly peripherally detected by a single magnetometer run would not provide an accurate indication of size or location of that magnetic anomaly off the trackline. Additional magnetometer information was collected at anomalies as necessary, based upon field interpretation of the data.

- **Sub-Bottom Profiler:** The coverage of the instrumentation is generally narrow, and considered to be the area directly below the instrument.

August 2002 Supplemental Geophysical Survey of SMDS Area

A supplemental August 2002 marine geophysical survey of the SMDS site was conducted in a 630-foot x 810-foot (192-meter x 246.9-meter) area centered on the SMDS site, approximately 11 nautical miles (20.4 kilometers) south-southwest of Hyannis Harbor. A total of 25 transects, generally at 50-foot (15.2-meter) intervals, were surveyed to identify potentially significant submerged prehistoric archaeological resources (see Section 5.10 of the DEIS). The equipment listed on Table 5.1-1 of the DEIS was used for this survey as well, with the exception of the "boomer" intermediate sub-bottom profiler.

June to July 2003 Supplemental Geophysical Survey of Horseshoe Shoal and Proposed Submarine Cable Route

Because the planned array was reduced from 170 to 130 turbines and the layout reconfigured following the 2001 survey, a geophysical program was conducted in June-July 2003 to help evaluate seafloor and subsurface conditions directly over the new turbine and inner-array cable locations proposed. The geophysical survey was followed by a geotechnical boring program (see August and October 2003 field program descriptions in Section 5.1.2.2 of the DEIS) in order to correlate seismic data with geologic conditions. This geophysical program was also planned to support a marine archaeological reconnaissance survey within the Project area, as described in Section 5.10.2.3 of the DEIS. The subsequent October 2003 vibracore program provided both shallow sediment samples for geotechnical analysis for foundation design and information used in the archaeological survey (see Sections 5.10.3.1.1 and 5.10.3.2.1 of the DEIS).

Field operations for this supplemental geophysical program in deeper waters were conducted in June and July 2003, with shallow waters near the Lewis Bay landfall area surveyed in September 2003. Survey vessels were equipped similarly to the 2001 Geophysical Program, with remote sensing and vessel positioning equipment, as listed on Table 5.1-1 of the DEIS.

Survey tracklines were chosen prior to commencement of survey operations, and are shown in blue on Figure 5.10-1 of the DEIS. In the area of the proposed WTG array on Horseshoe Shoal, survey lines were run northwest-southeast and east-west to connect proposed WTG locations. Northwest-southeast survey lines consisted of a centerline crossing proposed WTG locations and two survey lines each offset 50 feet (15.2 meters) east and west of the centerline.

The centerline was run with a full instrument suite (FIS), including "boomer" and "chirp" subbottom profilers, side-scan sonar, magnetometer, and fathometer. The offset lines were run with a reduced instrument suite (RIS), including "chirp" subbottom profiler, side-scan sonar, magnetometer, and fathometer. East-west lines connecting WTGs and portions of proposed inner-array cable routes were surveyed as two RIS survey lines offset from the cable centerline by 25 feet (7.6 meters) on each side.

In the ESP survey area, which is approximately 8,300 feet long and 3,275 feet wide, survey lines were run with the RIS generally northwest-southeast at a 50-foot (15.2 meter) line spacing.

Hydrographic, magnetometer and "chirp" subbottom data were collected on all lines. Side-scan sonar data were collected on nearly every line. The submarine cable route between the proposed ESP and landfall was surveyed as two RIS survey lines offset from the proposed submarine cable route centerline by 25 feet (7.6 meters) on each side.

June to July 2005 Supplemental Geophysical Survey of Project Area

Between 2003 and 2004, a number of project issues came to light that resulted in modifications to the WTG array layout. The purpose of the 2005 geophysical field program was to extend the survey coverage to the new WTG locations and associated interconnect cable routes. Identical equipment, trackline orientation, and trackline spacing were used in order to maintain consistency with previous surveys as indicated in Section 4.1.1.1 of the FEIS. Results of the 2005 studies were incorporated into Section 4.1.1 of the FEIS. A technical description of the 2005 survey is provided in the Shallow Hazards Report (Appendix A).

3.2.2 Geological/Geotechnical Surveys

Three marine sediment sampling methods, surface grab sampling, vibracoring and sediment borings, were used to advance sediment sampling devices below the seafloor surface to collect representative samples for analysis from the site of the proposed action. The information gathered during these studies was used to correlate the geophysical data collected to actual sediment characteristics where WTG foundations are proposed in deep sediment (85 ft [26 m] below the seafloor) and along shallow electrical inner-array cable routes in shallow sediment depths (targeted for 6 ft [1.8 m] below the seafloor). Benthic grab samples of the seafloor were also collected at some of the vibracore locations, to collect biological information (see Section 3.5 of the COP). Figures 4.1.1-8 and 4.1.1-9 of the FEIS illustrate the offshore locations of the marine vibracores, the geotechnical/sediment sampling, and the wind turbine locations.

In addition, soil borings and test pits were completed along the onshore transmission cable route to confirm the surficial materials expected to be encountered during transmission cable installation. Figure 4.1.1-10 of the FEIS illustrates the geotechnical boring and test pit locations along the onshore cable route.

3.2.2.1 Marine Sediment Borings

A total of 22 sediment marine borings were advanced, to a maximum depth below the seafloor of 150 ft (45.7 m), to collect geotechnical information as it relates to the below seafloor depths of the proposed wind turbine foundations. Sediment borings were advanced from a ship. Sampling devices, split spoons, were driven ahead of drilling tools to collect representative sediment samples. Standard penetration test blow counts were recorded. Sediment recovered in the split spoons was characterized, and at various applicable locations, field tests included pocket penetrometer and torvane tests to estimate the un-drained shear strength of the cohesive soils encountered. Grain size and Atterberg Limits analyses were performed on sediment samples and pressure meter tests were performed at select locations to measure the in situ strength and deformation characteristics of the sediment. The pressure meter tests can be used to assess the bearing capacity and settlement of foundations.

Details of each boring program are provided below.

April 2002 Marine Borings

Three borings (GZA-SB-01 through GZA-SB-03) were advanced on Horseshoe Shoal in April 2002 at locations shown on Figure 5.1-1 of the DEIS. The borings were advanced to a maximum-drilled depth of 98.5 feet (30 meters) below the seafloor (127.5 feet (38.9 meters) below MLLW) to characterize geologic conditions to the maximum expected depths of the WTG foundations. Split-spoon sediment samples were obtained at approximately 5-foot (1.5 meter) intervals, and visually classified.

August 2003 Marine Borings

In August 2003, 10 borings were advanced across Horseshoe Shoal for geotechnical purposes. These borings were designated SB-01 to SB-07 and SB-11 to SB-13, and were advanced to depths between 98.4 and 150.3 feet (30 and 45.81 meters) below the seafloor. Locations are shown on Figure 5.1-1 of the DEIS. Sediment field tests were performed including pocket penetrometer and torvane tests to estimate the undrained shear strength of the cohesive soils. Grain size and Atterberg Limits analyses were performed on sediment samples collected via split-spoon. Pressuremeter tests were performed at select depths in Borings SB-05 and SB-13.

October 2003 Marine Borings

Also for geotechnical purposes, nine borings were advanced in October 2003 to depths between 100 and 102 feet (30.5 to 31.09 meters) below the seafloor at proposed wind turbine locations on Horseshoe Shoal. These borings were designated according to their WTG grid number: SB-A10, SB-B12, SB-C9, SB-D4, SB-D11, SB-G2, SB-G11, SB-J5, and SB-J13. Locations are shown on Figure 5.1-1 of the DEIS. In Boring SB-B12, where organic silt was encountered, an undisturbed sample was obtained by pushing a Shelby Tube mechanically into the soft sediments. Field tests included pocket penetrometer and torvane tests, to estimate the undrained shear strength of cohesive soils (GZA, 2003).

Data obtained from these field studies was integrated with published reports and information on Nantucket Sound to characterize existing conditions in the vicinity of the Project area, as described in Section 5.1.3 of the DEIS.

3.2.2.2 Marine Vibracore Sampling

A total of 86 vibracores were advanced to confirm geophysical survey interpretations, to visually characterize the sediment, and to collect representative samples for physical property and chemical constituent analysis. Three of the vibracores collected were used to support the marine archaeological investigation as a result of the geophysical review. Benthic grab samples of the seafloor were also collected adjacent to some vibracore locations as part of the benthic monitoring program and provided information about surficial sediment types.

Vibracores were advanced and collected from a marine vessel. The cores were labeled and capped on the ship and transported to shore for analysis. Cores were advanced up to 30 ft (9.1 m) below the seafloor in the wind turbine field grid and typically to 10 ft (3 m) below the seafloor along the transmission cable route. Onshore, cores were opened, photographed, and were described in accordance with the Unified Soil Classification System. Summaries of each vibracore program are presented below. The vibracore and benthic grab field programs are summarized below.

Summer 2001 Vibracore and Benthic Grab Program

The Summer 2001 sediment sampling and geotechnical program was performed after the 2001 geophysical survey results were reviewed. The program was conducted in accordance with procedures outlined in ESS, Inc.'s *Geotechnical Sampling and Analysis Protocol* (2001), which was provided to the Massachusetts Department of Environmental Protection (MADEP) and USACE for review and comment prior to the fieldwork. No modifications to the protocol were requested by MADEP (MADEP, 2001).

The program consisted of the following activities:

- Advancement of a total of 47 vibracores at selected locations in the Wind Park and along alternative submarine cable routes to confirm geophysical survey interpretations of subsurface sedimentary conditions;

- Visual characterization and photography of the cores, to identify sediment types; and

- Selection of representative sediment samples from similar and varied acoustic/geologic types for subsequent laboratory analysis of bulk physical properties and chemical parameters.

Benthic grab samples (BG series) were also collected from surface sediments at the vibracore locations, prior to coring for benthic species analysis. Locations of the vibracores (VC01 series) are shown on Figure 5.1-1 of the DEIS; a summary of vibracore information is presented on Table 5.1-2 of the DEIS.

October 2003 Vibracore Program

A total of 23 vibracores were collected along the proposed submarine cable route and in the eastern portion of Horseshoe Shoal during this field program. Vibracore locations were selected after review of the 2003 geophysical data.

During this program, nine vibracores were advanced in areas of possible archaeological sensitivity throughout the WTG array, as part of the marine cultural resources investigation (see Section 5.10 of the FEIS). These cores were located to determine the presence/absence of organic sediments intermittently encountered in previous studies in order to assess the origin (terrestrial or marine) of the organic material, if found.

An additional 14 vibracores were advanced for geotechnical and chemical analysis along the proposed submarine cable route to characterize the sediment at and above the proposed cable burial depth. Samples from Cores VC03-10 through VC03-24 were analyzed for bulk physical parameters. Samples from Cores VC03-13, VC03-16, VC03-19 and VC03-20 were analyzed for bulk physical and chemical parameters. The results of these analyses are discussed in Sections 5.1.3.2 and 5.1.3.3, and are shown on Tables 5.1-2 through 5.1-6 of the DEIS.

Because an area of fine-grained material was encountered along the proposed submarine cable route in Lewis Bay, a series of test cores were advanced to identify the horizontal and vertical extent of this fine material. This process included advancing vibracores and immediately splitting them on the deck to photograph and visually describe the sediment. The Lewis Bay cable route was delineated to avoid these fine sediments, to the extent feasible. Sediments from cores along the selected Lewis Bay route were then submitted for bulk physical analyses.

November 2005 Vibracore Program

A total of 12 vibracores were collected throughout the Project Area to ground truth results of the 2005 geophysical survey. Vibracore sampling methodology was conducted consistently with the procedures implemented in 2001 and 2003 and in accordance with the ESS Group, Inc. (ESS) *Geotechnical Sampling and Analysis Protocol* (2001), which was provided to the MADEP and USACE for review and comment prior to the initiating the 2001 studies.

Laboratory Analysis

Composite sediment samples from representative vibracores were submitted for analysis of physical properties and chemical constituents following the completion of each vibracore program. Analytical results were provided to BOEMRE for review and are addressed in the FEIS. Results from the 2001 and 2003 sampling program are presented in Sections 5.1.3.2 and 5.1.3.3, and on Tables 5.1-3 through 5.1-6 of the DEIS.

All samples submitted for chemical analysis were composited from the 0- to 5-foot (0- to 1.5-meter) depth range because shallow sediments are more likely to be affected by potential modern contamination than the deeper sediments. Sample locations were selected to assess the chemical conditions of shallow marine sediments throughout the Project area, as well as shallow sediments that were observed to contain greater than 50 percent fines during field classification. Samples were selected based upon depth and location within the Project area, using the following locational categories and parameters:

- **Cable route cores:** Sediments were composited from the 0- to 5-foot (0 to 1.5 meter) and 5- to 10-foot (1.5 to 3 meter) depth intervals, with a minimum of one physical sample submitted for bulk analysis from each depth interval in this category. If the sample from these depths contained more than 50 percent fines based on visual observations, then a sample of that interval was also collected and submitted for chemical analysis.

- **Nearshore and select cable route cores:** Sediments were composited from the 0- to 5-foot (0 to 1.5 meter) and 5- to 10-foot (1.5 to 3 meter) depth intervals. A minimum of one sample was collected and submitted for bulk physical analysis from each interval, and a minimum of one sample from the 0- to 5-foot (0 to 1.5 meter) depth range was collected and submitted for chemical analysis in this category.

- **Cable route cores within the WTG array:** Sediments were composited from the 0- to 5-, 5- to 10- and 10- to 30-foot (0- to 1.5-, 1.5- to 3-, and 3- to 9.1-meter) depth intervals, with a minimum of one sample submitted for bulk physical analysis from each interval within this category. If the composite sample for the 0- to 5- or 5- to 10-foot (0 to 1.5 or 1.5 to 3 meter) interval contained more than 50 percent fines based upon visual observations, then a sample of that interval was also submitted for chemical analysis.

- **WTG Cores**: Sediments were composited from the 0- to 10- and the 10- to 20-foot (the 0- to 3- and the 3- to 6.1 meter) depth intervals. A minimum of one sample was submitted from each interval for bulk physical analysis. If the composite of the 0- to 10-foot (0- to 3-meter) depth interval contained more than 50 percent fines based on visual observation, then a sample from that depth interval was also submitted for chemical analysis.

- **Select WTG cores**: Sediments were composited from the 0- to 10-foot (0- to 3-meter) and 10- to 20-foot (3- to 6.1-meter) depth intervals. A minimum of one sample from each interval was submitted for bulk physical analysis; a minimum of one sample from the 0- to 10-foot (0- to 3-meter) interval was submitted for chemical analysis.

The results of chemical analyses were compared to marine sediment guidelines published by Long et al., 1995, which are used to assess effects to the benthic community. Results are presented on DEIS Tables 5.1-4 though 5.1-6 and discussed in Sections 5.1.3.2 and 5.1.3.3 of the DEIS.

3.2.3 Offshore Geology

The offshore area of the proposed action is located in Nantucket Sound, a broad passage of water that separates the south shore of the Cape Cod mainland and the islands of Nantucket and Martha's Vineyard, and in Lewis Bay, a coastal embayment along the south coastline of Cape Cod. In general, the bathymetry in Nantucket Sound is irregular, with a large number of shoals present in various locations throughout this basin. The foundations for the WTGs and the ESP are proposed for installation on Horseshoe Shoal, located in the central region of Nantucket Sound, with the transmission cables extending northward into Lewis Bay and the southern shoreline of Cape Cod. As its name suggests, Horseshoe Shoal is shaped like a horseshoe opening to the east, with a northern leg and a southern leg surrounded by deeper water.

A combination of National Oceanic and Atmospheric Administration (NOAA) nautical charts and project-specific hydrographic surveys were used to assess existing bathymetric conditions. On Horseshoe Shoal where the WTGs and the ESP are proposed, hydrographic surveys indicate water depths are as shallow as 0.5 ft (0.15 m) (MLLW), with depths of up to 60 ft (18.3 m) (MLLW) occurring between the northern and southern legs of the shoal. The WTGs and ESP would be located in water with depths between 12 and 50 ft (3.7 and 15.2 m) (MLLW).

Water depths between Horseshoe Shoal and the Cape Cod shoreline have an average depth of approximately 15 to 20 ft (4.6 to 6.1 m) (MLLW). Along the proposed transmission cable system route, water depths range from 16 to 40 ft (4.9 to 12.2 m) (MLLW), with an average depth of approximately 30 ft (9.1 m) (MLLW).

In Lewis Bay, water depths range from 8 to 16 ft (2.4 to 4.9 m) (MLLW) in the center of the bay to less than 5 ft (1.5 m) (MLLW) along the perimeter. Water depths along the proposed transmission route in Lewis Bay range from 2 to 16 ft (0.61 to 2.4 m) (MLLW).

Results of marine geophysical surveys indicate a seafloor in the Project Area that ranges from flat and barren to rolling with areas of sand waves of varying heights. Localized areas of glacial erratics (pebble to boulder size rock fragments) were observed. This possible till deposit has been avoided during the selection of the final proposed transmission cable alignments. In addition, the side scan geophysical imagery was indicative of coarse glacial material (gravel, cobbles, and boulders) and intermingled with man-made debris (generally from 1 to 5 ft [0.3 to 1.5 m] in size) on the seafloor in the west central part of the proposed action area.

Sand Waves and Sediment Transport

The sand waves observed during the geophysical surveys are wave-like seabed features, with elongated, more or less parallel crests. Typically, sand waves are not static, rather they are migrating bedforms and evidence of active sediment transport along the seabed. Sand waves in this shoal environment are morphologically dynamic, with sand waves moving, appearing, disappearing, and changing shape over time as a result of tidal and storm influences. This sand wave process is not unique to Nantucket Sound, but rather occurs in coastal settings wherever the appropriate hydrodynamic conditions exist along with a predominance of sandy, non-cohesive sediments.

Sand waves of varying heights characterize the areas of active sediment transport, generally in the center of the Horseshoe Shoal. However, a large field of sand waves extends across the southern half of the shoal, and several smaller fields are located to the north within the area of the proposed action. Figure 4.1.1-11 of the FEIS presents the location and maximum observed heights of sand waves identified during geophysical surveys completed in 2003 and 2005, and includes the locations of the proposed WTGs and the electrical transmission cable routes.

The sand wave crests are oriented generally in a north-south direction, with long period wavelengths ranging from 100 to 600 ft (30.5 to 182.9 m). Short period sand waves are located between the larger crests. The average sand wave height observed was 4 to 5 ft (1.2 to 1.5 m), but waves as high as 12 ft (3.7 m) were present. Smaller wave heights from 1 to 2 ft (0.3 to 0.61 m) were often observed between the larger wave crests.

Tidal currents flow east and west across the Nantucket Sound, with the eastward-flowing flood tide more dominant than the westward-flowing ebb tide. The symmetry of the sand waves indicates migration to the east or west, depending on where they formed on the Horseshoe Shoal. Sand waves forming on the west flank of the shoal tend to migrate easterly. Sand waves forming on the east flanks of the shoal tend to migrate to the west. Sand waves across the crest of the shoal have a symmetrical profile, suggesting an equal force in both the ebb and flood tidal phases. Not all bed forms exhibit a clear migration direction, indicative of multiple processes impacting sediment transport in Nantucket Sound, including storm events.

Analytical sediment transport modeling was completed to determine the extent to which existing wave and current conditions are likely to lift and move sand at the site of the proposed action. A two-dimensional sediment transport model was developed to simulate 26 current and wave conditions across the site of the proposed action. The model inputs included a grid of wave heights and ambient currents for the site of the proposed action. The model then calculated near bottom velocities and shear stresses associated with waves and ambient currents. The model results represent whether and where sediment transport is likely to occur and potential rates of bed load and suspended load sediment transport (FEIS Report No. 4.1.1-9).

Ten tidal and wind driven current scenarios were run for Horseshoe Shoal. The conditions were selected to represent a range of tidal currents, locally-generated wind waves within Nantucket Sound, ocean waves, and wind-generated currents in the sound. Extreme conditions, such as storms, were not modeled. The results of the model runs are useful in understanding the dynamics of sediment transport in Nantucket Sound under different conditions. However, qualitative sediment transport rates and net sediment flux within Horseshoe Shoal are not possible without field measurements for model verification (FEIS Report No. 4.1.1-9).

The results of the modeling indicate that active sediment transport occurs at Horseshoe Shoal under typical wave and tidal current conditions. The highest sediment transport rates are focused locally on the shallowest portions of the shoal, and there is relatively little sediment transport in the deeper regions of the shoal (particularly the east side) under typical conditions. Bed load transport is typically an order of magnitude greater than suspended load transport. The range of sediment transport volume from the energy flux calculation for mean flood tide conditions and commonly occurring waves (height = 1.3 ft [0.4 m], period = 2.3 seconds) is 0 to 32.3 cubic feet (cu. ft)/feet-day (0 to 3.0 cubic meters (m3)/meters-day), though the authors recognize that the model cannot account for erosion and equilibration of the seafloor and likely the rates predicted are overstated (FEIS Report No. 4.1.1-9).

Spring tidal currents and typical wind-driven currents (wind speeds ranging from 15 to 20 miles per hour (mph) [6.7 -8.9 meters/second (m/s)]) initiate approximately 20 percent more transport than mean tidal currents. The greatest impact on sediment transport initiation is wave action. Larger locally generated waves within Nantucket Sound can result in a significant increase in sediment transport. Storm generated ocean swells reaching the sound can greatly increase sediment transport rates, as much as one-hundred fold (FEIS Report No. 4.1.1-9).

Subsurface Geology

The sediment below the seafloor was characterized by completing geophysical surveys at all of the WTG locations and along electrical transmission cable runs, and the collection, characterization, and analysis of samples collected from 86 vibracores (not including three archeological cores) and 22 deep borings on Horseshoe Shoal. On Horseshoe Shoal, vibracores were advanced up to 20 ft (6.1 m) below the seafloor. Geotechnical borings were advanced below the anticipated depth of the WTG foundations (85 ft [26 m]). At the proposed location of the ESP, one boring extended to 150 ft (47.5 m) below the seabed which corresponds to the anticipated ESP pile depth. Geophysical surveys characterized shallow and deep sediments, with bottom profiler gathering data to 200 ft (61 m) below the seafloor at some locations. In general, geotechnical surveys indicate that subsurface soil conditions within the WTG array on Horseshoe Shoal consist primarily of sands and glacial deposits to greater than 100 ft (30.5 m) below the seafloor, and provide an appropriate physical location and seabed structure for Project design and construction.

Shallow sediment samples collected from vibracores (extended up to 20 ft [6.1 m] below the seafloor) between the WTGs indicates the shallow surficial sediments are primarily medium sand in shallow water and fine sand in deeper water. Characterization via bulk physical analysis was completed on composite samples collected from the upper 4 to 5 ft (1.2 to 1.5 m) of sediment collected from the vibracores. The samples collected from shallow water indicated the presence of well sorted sands with less than 5 percent fines. In the deeper waters, well sorted sand to silty sand was present. Detailed cross sections across Horseshoe Shoal A″-A‴ and B″-B‴ are presented as FEIS Figures 4.1.1-12 and 4.1.1-13, respectively; the plan view for cross section locations are presented in Figure 4.1.1-5 of the FEIS.

Along the proposed transmission cable route in Nantucket Sound, sediment characterization samples were collected and analyzed and were found to be very similar to those in the WTG array area. Within Lewis Bay, a higher percentage of silt and clay were identified with the sands. In addition, thin layers of organic material, including thin (0.5 ft [0.15 m] thick) layers of peat, were observed. The geophysical sub-bottom profiles approaching Lewis Bay contain inconsistent (continuous, discontinuous) acoustic subsurface reflectors, which may be evidence of the fluvial erosion (during sea-level fall) and then wave erosion (during sea-level rise) that has occurred on the Cape Cod southern coastline (OSI, 2002 and 2003).

These shallow sediments are representative of the material to be disturbed (suspended during jet plow embedment) during the WTG inner-array cable installation, which is targeted for a depth of 6 ft (1.8 m). Figure 4.1.1-9 of the FEIS presents vibracore sample locations and a plan view of a geologic cross section location along the 115 kilovolt (kV) Cable Route from the WTG array to landfall. The cross section is presented in Figure 4.1.1-14 of the FEIS.

Deeper sediments were characterized as re-worked fine to medium sands. Locally, intermittent beds of organics are located within and below this re-worked sediment. This is presented on the cross section presented in FEIS Figure 4.1.1-12 with boring SB-01-2002. This intermittent zone of organics may be a soil horizon marking land surface exposed during the sea level low-stand prior to the marine transgression and sea-level rise that continues today. The lack of a broad soil horizon is likely related to the erosion and reworking of the sediment during this marine transgression.

In addition, limited areas of Horseshoe Shoal contained near-surface gaseous sediments derived from organic material which was identified by acoustical penetration restrictions during the geotechnical seismic profiling. This is a common occurrence in shallow near-shore sediments, yet is not considered a geologic hazard. Signs of high biogenic gas content, such as sea-bed pockmarks, were not identified during the geophysical surveys.

In addition to the organic soil horizon, a thin but distinct sedimentary facies of interbedded clay was locally observed at the same location and others, but at a greater depth. Though not widespread, this may be evidence of a former glacial lake. Analysis of the sub-bottom geophysical results and the deep boring data indicates this intermittent clay horizon has been eroded, a geologic unconformity. This is best illustrated on the cross section presented in Figure 4.1.1-13 of the FEIS comparing the silty-clay horizon of SB-03 and the fine sand and clay horizon of SB-02-2002, with the sandy sediment in SB-01.

A correlation between the geophysical and geotechnical soil boring results indicates the subsurface sediment is dominated by fine to coarse-grained sand interbedded with deposits of clay, silt, gravel and/or cobbles. An example of this geologic setting is illustrated on the geophysical trackline profile G-13, correlated to marine boring GZA-SB-02 in Figure 4.1.1-15 of the FEIS.

The potential for diapirism, a fairly common type of soft sediment deformation in continental shelf sediments, was assessed for the area of the proposed action. Diapirs can be composed of salt or mud depending on the source sediments. Sediments undergo compaction as younger sediments are deposited over them, leading to increasing pressure on fluids within the sediments. The pressurized fluids can start to flow, mobilizing the sediments to zones of lower pressure at or near the seafloor. This process may also be associated with methane-producing organic content in the sediments (Kennett and Fackler-Adams, 2000).

In the process of flowing upward, the diapirs deform the overlying sediments in a doming or piercing fashion. Diapirs are discrete features that can be identified on geophysical subbottom profiler data and can be avoided. They can be active or inactive, exhibit a range of sizes, and may or may not intersect the seafloor. They can cause pockmarked depressions in the seafloor, and slumping and landslides of fine-grained marine sediments in areas of steep unstable slopes (such as on continental slopes in deep water). As indicated in the Shallow Hazards Report (Appendix A) no evidence of diapirism is found throughout the Project Area, based upon a review of the geophysical data collected for the Project.

Bedrock was not encountered during the geophysical investigation. The depth to bedrock beneath the seafloor is estimated at greater than 300 to 900 ft (91.5 to 274.4 m) below the seafloor across the area of the proposed action, sloping to the southeast. The estimated depth to bedrock is below the deepest foundation proposed (USGS, 1983; USGS, 1990; USGS, 2006d).

Faults

A fault is a fracture plane within the Earth's lithosphere along which displacement has occurred. No active shallow or deep faults have been identified within the area of the proposed action based upon geologic literature review. Results of the Shallow Hazards Analysis (provided in Appendix A) indicate that there is no indication of disruption or internal deformation of lithologic units within overlying Quaternary sediments throughout the Project Area.

Seismic Setting

In general, Cape Cod and Nantucket Sound are considered a relatively stable tectonic setting, distantly located from a tectonic plate boundary, where frequent high energy earthquakes are typically more common. This intraplate setting is not a seismic-free location. The seismic activity here is less frequent than at plate boundaries, but low intensity earthquakes are common in New England, with an average of 30 to 40 occurring each year, but most are never felt by residents. In Massachusetts, 316 earthquakes were recorded between 1627 and 1989. In Rhode Island, only 32 earthquakes were recorded between 1766 and 1989 (NESEC, 2006).

Compared to the mainland of New England, it is recognized that Nantucket Sound is relatively less seismically active. However, on October 24, 1965, the residents of Nantucket Island felt a moderate earthquake. Very slight damage was recorded, mostly to ornaments and doors. Windows and dishes rattled, and house timbers creaked (USGS, 2006b). This recent example indicates that the area of the proposed action is not earthquake free but that seismic activity is typically low energy.

Occasionally, higher energy earthquakes could occur in Massachusetts, such as the largest earthquake recorded in Massachusetts, the Cape Ann earthquake of 1755. With an intensity value of VIII on the Modified Mercalli scale (magnitude 6+ on the Richter Scale), very strong shaking and moderate structural damage were recorded in Boston and the North Shore (USGS, 2006b).

Seismic waves travel out from an earthquake epicenter through the surrounding rock. Ground motion is higher closer to the location of the event. In general, ground motion decreases away from the epicenter, though the amount of ground motion at the surface is related to more than just distance from the epicenter. Some natural materials can amplify ground motion, for instance ground motion is generally less on solid bedrock and greater on thick deposits of clay, sand, or artificial fill.

Seismic hazards defined in building codes are typically based on peak ground acceleration. During an earthquake, a particle attached to the earth would move back and forth irregularly. The horizontal force a structure must withstand during an earthquake is related to ground acceleration. Peak ground acceleration is the maximum acceleration experienced by a particle during an earthquake.

The United States Geologic Survey (USGS) produces probabilistic Seismic Hazard Maps for the United States with peak ground acceleration values represented as a factor of "g." One g is equal to the force on an object at the surface of the earth due to gravity. Engineers utilize these probabilistic ground motion values, representing hard rock beneath site soils, when designing earthquake resistant structures.

The USGS Seismic Hazard Maps were reviewed for the area of the proposed action. The maps show a 10 percent probability of a 2-3 percent g exceedence in 50 years (see Figure 4.1.1-19 of the FEIS). In addition, there is a 2 percent probability of a 6 to 10 percent g exceedence in 50 years (see FEIS Figure 4.1.1-20) (USGS, 2002a). This information will be utilized by project engineers during final design to ensure foundation stability during times of seismic stress.

Liquefaction

Liquefaction is a process whereby the strength and stiffness of a soil and/or sediment is reduced by earthquake shaking or other rapid loading. The result is a transformation of soil and/or sediment to a liquid state. Typically, three general factors are necessary for liquefaction to occur. They are (USGS, 2006c):

- Young (Pleistocene) sands and silts with very low or no clay, naturally deposited (beach, river deposits, windblown deposits) or man-made land (hydraulic fill, backfill).
- Soils and sediments must be saturated. The space between individual particles is completely filled with water. This water exerts a pressure on the soil and sediment particles that influences how tightly the particles themselves are pressed together. This is most commonly observed at or near bodies of water such as rivers, lakes, bays, and oceans, and associated wetlands.
- Severe shaking. This is most commonly caused by a large earthquake. Prior to an earthquake, the water pressure is relatively low. However, earthquake shaking can cause the water pressure to increase to the point where the soil particles can readily move with respect to each other. This factor is limited by the distance from the large earthquake epicenter. That is, liquefaction potential decreases as distance increases from the epicenter of a large earthquake.

Based on the USGS Seismic Hazard Maps for the area of the proposed action, the risk of a large earthquake resulting in severe shaking of the young, saturated sand deposits of Horseshoe Shoal is low.

Based on results of the geotechnical sampling and analysis program, as described above, the sediment conditions across the site consist of fine to medium sand. Intervals of silty clay, organic silt, fine sand and coarse sand/gravel were encountered at most boring locations. The Standard Penetration Test (SPT) values in the sand deposits generally indicate a relative density of dense to very dense. The organic silt has a loose to medium dense relative density. The SPT N-values obtained in the silt indicate it had a relative density of very dense.

Based on these factors the bearing strata (not organic soil) of sediment in the Project Area presents no risk of liquefaction because the relative density is dense to very dense. There may have been a risk of liquefaction in the organic silt deposits caused by cyclic loading because the relative density is loose to medium dense. Since the organic silt deposits are not a bearing strata for the Project, the possibility of liquefaction in the Project Area is considered negligible.

3.3 Archaeological Investigations Completed

Offshore pre-European Contact Period (prehistoric) and post-Contact Period (historic) archaeological resources with the potential to be impacted by the construction and operation of the proposed project have been thoroughly evaluated over the course of the 9 year regulatory review process. The following section provides references to the extensive body of source documents that have been prepared as part of that review, and then provides a brief summary of the archaeological surveys and studies completed.

Project Lease Application (7/11/2006)

- See Section C10 (page 31-33).

FEIR (2/2007)

- See Section 3.11.

DEIS

- See Section 4.3.5

FEIS (1/2009)

- See Section 4.3.5. and the reports highlighted in bold below, which were contained in the FEIS.

Reports

- Public Archaeological Laboratories (PAL). 2004. Preliminary archaeological sensitivity assessment. Cape Wind Energy Project Alternatives: Horseshoe Shoal; Combination New Bedford/Buzzards Bay and Reduced Horseshoe Shoal; Monomoy and Handkerchief Shoals; Tuckernuck Shoal; and South of Tuckernuck Island, Massachusetts. PAL Project No. 1485.02. Submitted to Cape Wind Associates, L.L.C. Boston, Mass. Pawtucket, R.I.
- **FEIS Report No. 4.3.5-1.** Graves, A. K., and H. Herbster. 2004. Terrestrial Archaeological Reconnaissance Survey, Terrestrial Route Alternatives #1 and #2, Barnstable, Mashpee, and Yarmouth, Massachusetts and Intensive (Locational)

Archaeological Survey, Terrestrial Route Alternative #1, Cape Wind Energy Project, Barnstable and Yarmouth, Massachusetts. Submitted by Public Archeological Laboratory. PAL Report No. 1485.01. Submitted to Cape Wind Associates, L.L.C., Boston, Mass. Pawtucket, R.I.

- **FEIS Report No. 4.3.5-2.** Robinson, D. S., B. Ford, H. Herbster, and J. N. Waller, Jr. 2003. Marine Archaeological Sensitivity Assessment, Cape Wind Energy Project, Nantucket Sound, Massachusetts. Submitted by Public Archeological Laboratory. PAL Report No. 1485. Submitted to Cape Wind Associates, L.L.C., Boston, Mass. Pawtucket, R.I.
- **FEIS Report No. 4.3.5-3.** Robinson, D. S., B. Ford, H. Herbster, and J. N. Waller, Jr. 2004. Marine Archaeological Reconnaissance Survey Cape Wind Energy Project, Nantucket Sound, Massachusetts. Submitted by Public Archeological Laboratory. PAL Report No. 1485. Submitted to Cape Wind Associates, L.L.C., Boston, Mass. Pawtucket, R.I.
- **FEIS Report No. 4.3.5-4.** Public Archeological Laboratory (PAL), 2006. Supplement Report, Cape Wind Energy Project Nantucket Sound Massachusetts, Supplemental Marine Archaeological Reconnaissance Survey of Revised Layout Offshore Project Area. PAL Report No. 1485.06. Prepared for Cape Wind Associates, L.L.C., Boston, Mass. Pawtucket, R.I.

3.3.1 Offshore Area of Potential Effect for Archaeological Resources

The Area of Potential Effect (APE) for offshore archaeological resources includes the direct impact areas associated with the footprints of the WTG structures on the sea bottom;; the jet plowed trenches for installation of the inner-array cables connecting the WTGs to the ESP; the jet plowed trenches for the transmission cable system from the ESP to the landfall, as well as the indirect impact areas associated marine work areas around each WTG, the ESP, inner array cable, and the transmission cable system where marine sediments may be disturbed, such as spud and anchor drop zones and anchor cable sweep areas.

A marine sensitivity assessment of approximately 15,360 acres (62.15 square kilometers (km2)) of Nantucket Sound seafloor comprising the proposed action study area, as well as along the 115 kV transmission cable system route to the Yarmouth landfall, was conducted in 2003 (FEIS Report No. 4.3.5-2). Based on this assessment, a marine archaeological reconnaissance survey was conducted in the offshore study area in 2003 (FEIS Report No. 4.3.5-3). A supplemental marine archaeological reconnaissance survey was performed in 2005 after the WTG array was revised to avoid potential archaeologically sensitive areas (FEIS Report No. 4.3.5-4).

A pre-construction archaeological investigation will be conducted of the offshore APE, including anchor impact areas, prior to construction, as described in Section 4.0. Project compliance with NEPA and Section 106 of the National Historic Preservation Act of 1966, as amended (the NHPA), is addressed in Section 8.0.

3.3.2 Marine Archaeological Sensitivity Assessment

The Marine Archaeological Sensitivity Assessment conducted for the proposed action by Public Archaeology Laboratory, Inc (PAL) (FEIS Report No. 4.3.5-2) indicated that there were 45 ships reported lost within the general vicinity of the project area and that the project area had a moderate probability for containing submerged historic resources (i.e., shipwrecks). The dates of the vessels lost ranged from 1841 to 1963; however, 19 of the vessels had no date of loss given in the source databases used by PAL. The primary sources of shipwreck data used in the PAL analysis were the Massachusetts Board of Underwater Archaeological Research (MBUAR), the Northern Shipwreck Database, and the NOAA Automated Wreck and Obstruction Information

System (AWOIS) database. A listing of these reported shipwrecks is found in Appendix A of PAL's report (FEIS Report No. 4.3.5-2).

The marine archaeological sensitivity assessment conducted for the Project also indicated that except for a crescent-shaped area on the eastern flank of Horseshoe Shoal in the eastern portion of the offshore study area where former natural soil strata (paleosols) could have been present, a majority of the offshore study area had a low probability for containing submerged prehistoric archaeological resources. Some of this sensitive area was located within the proposed project area. The archaeological sensitivity of the proposed project area was further evaluated in subsequent studies, as described below.

3.3.3 Marine Archaeological Reconnaissance Survey in 2003

Based upon the results of the marine archaeological sensitivity assessment and subsequent consultation with state, federal and tribal agencies, and because the preliminary turbine array layout was revised after the original geophysical field surveys in 2001, additional marine geophysical field survey was conducted in June, July and September 2003, to assess seafloor and subsurface conditions and to determine the presence or absence of submerged cultural resources within the direct impacts portion of the Project's marine APE.

The scope of this marine archaeological reconnaissance survey was developed following consultation with Massachusetts Board of Underwater MBUAR and Massachusetts Historical Commission (MHC). The field portion of the marine geophysical survey was conducted by OSI in two separate field deployments during the summer and fall of 2003. The survey collected over 300 linear miles (483 kilometers (km)) of geophysical information within the Wind Park and along the proposed 115 kV transmission cable route into Lewis Bay. In addition to OSI personnel and other scientists, a marine archaeologist from PAL was on board the geophysical survey boat during each field day, to identify targets and note other areas of interest for potential submerged cultural resources.

The geophysical survey was performed using differential GPS, side scan sonar, sub-bottom profiler, a marine magnetometer and a recording fathometer. A survey trackline interval of 50 feet (15.2 meters) was utilized for those portions of the Project area in which sub-surface impacts during construction are anticipated, such as where installations of the WTGs, ESP, inner-array and submarine cable transmission lines are proposed. The geophysical survey program collected data to be used for geotechnical assessment and engineering design purposes, as well as for archaeological assessment purposes.

The 2003 geophysical survey recorded 154 magnetic anomalies and 109 side-scan sonar contacts. Of the 154 magnetic anomalies, and 109 side-scan sonar contacts all but 29 were determined by the marine archaeologist to have a source that was non-cultural in nature or was interpreted as isolated debris, and, therefore, were eliminated from further consideration.

Additional analysis of post-processed data collected in June, July and September 2003, focusing particularly on the 29 anomalies of interest, was completed. Analyses of the post-processed 2003 data produced three target areas consisting of one side-scan anomaly associated with a cluster of five magnetic anomalies (PAL Target 03-01), and two clusters of three magnetic anomalies associated with observed changes in the bathymetry (PAL Targets 03-02 and 03-03), all of which were assessed as having a moderate probability of representing potential submerged cultural resources (i.e., shipwrecks). All three target areas are located in the vicinity of Horseshoe Shoal. Locations for these areas were reported to MHC and the MBUAR; Project components were re-located to avoid these areas. PAL Target 03-01 is located over 4,000 feet away from the ESP structure, in an area surveyed using tight geophysical spacing referred to as the ESP area. Therefore, the area will be clearly avoided.

A map showing the delineation of the three targets, the 100-foot buffer zones around each, and the Project components, is being provided to BOEMRE by OSI on an ArcGIS shape file. The potential for impact to these targets is not problematic. In addition, the target delineations and the 100-foot radial buffer zones will be marked as No Seafloor Disturbance Zones on maps provided to the construction contractors. The contractors will also be informed in Project construction documents, which will include navigational coordinates around the targets, annotated to avoid all seafloor disturbance in these zones. Avoidance of seafloor disturbance in the zones around the three targets will also be overseen by the Environmental Inspector(s) working in the field during construction.

Please note that the target locations should not be publicly disseminated to protect the integrity of these possible archaeological sites.

In addition, based on the results of the geophysical survey, PAL recommended additional vibracores be taken to determine the source of sub-bottom profiler anomalies (i.e., reflectors) and better characterize the origin, nature and extent of organic sediments observed in three vibratory coring samples previously recovered from the eastern edge of the marine Project area. The purpose of the archaeological vibracore program was to assess whether intact shallow submerged terrestrial paleosols (formerly subaerially exposed soil surfaces) were present within the offshore Project area. Identification of such a paleosol deposit would indicate a potential for these areas to contain submerged prehistoric resources. Twenty-three vibracores (including the additional eight recommended by PAL and one by ESS) as having high probability for paleosols based upon subbottom geophysical reflectors were collected during the 2003 field program for archaeological and geotechnical assessment and engineering design purposes. The entire suite of data was reviewed by PAL.

As a result of the 2003 marine archaeological survey, organic material interpreted as paleosols (ancient land surfaces) was identified in limited areas within the easternmost portion of the WTG array. The extent of the paleosols and associated seismic signature on shallow geophysical data are discontinuous and intermittent, which is consistent with the widespread destruction of former land surfaces that geophysical and geotechnical data collected to date for the project indicates occurred during the Holocene marine transgression. Avoidance of ground disturbing activities was recommended in these limited areas where sub-bottom profiler reflectors correlating to the intermittent paleosols encountered in the vibracores were identified within the direct impact areas of the current APE. The Project APE for the inner array cables extends to a maximum depth of 8 feet (2.4 meters) below the seafloor. The APE for the WTGs and ESP pilings extends to depths well below the 12–foot (3.7 meter) depth considered the technologically/logistically viable maximum depth for performing systematic sub-surface archaeological testing (see USACE DEIS Report in Appendix 5.10-C).

Avoidance of areas along seismic reflectors with specific characteristics which appear to correlate with the paleosols required adjustment of locations for WTGs G3, G4, H9, I4, I5, and L4 and seven limited portions of the inner array cable grid (see Figure 6-1 in USACE DEIS Appendix 5.10-C). If avoidance was deemed not possible, then additional survey was recommended, in consultation with SHPO (MHC and MBUAR). However, those WTG and portions of inner array cables recommended for location adjustments were moved out of the potential paleosol area. A supplemental geophysical/geotechnical survey of the newly adjusted WTG and inner array locations was conducted in 2005. MBUAR and MHC concurred with the project archaeologist's recommendations by letters dated February 27, 2006 and March 8, 2006, respectively.

3.3.4 Supplemental Marine Archaeological Reconnaissance Survey in 2005

The direct impact areas associated with the revised locations of the WTGs and interconnect cable routes adjusted for the current layout in federal waters were subjected to a supplemental survey integrating geophysical, geotechnical and hydrographic data acquisition programs designed to meet both engineering and archaeological data needs. The supplemental survey was performed in June, July and November 2005, the results from which are detailed in FEIS Report 4.3.5-4.

Geophysical survey methods and instrumentation employed in 2005 were essentially the same as those used during the 2003 survey. The geophysical survey data were acquired along a series of parallel survey track lines spaced 50 feet (15 m) apart; data sets were monitored as they were acquired on the vessel by the marine archaeologist. These were subsequently correlated with post-processed data to provide a final inventory of anomalies and locations for review, in conjunction with the results of the 2003 marine archaeological reconnaissance survey information.

Three shallow sub-bottom profiler reflectors on the flanks of Horseshoe Shoal were vibracored at the recommendation of the marine archaeologist, to assess the presence/absence of potential paleosols. No visible evidence indicating the presence of contextually intact, stratified paleosol deposits were found in any of the three vibracores upon examination by a marine archaeologist and a marine geologist/limnologist. None of the relatively low density of small side-scan sonar and magnetometer anomalies detected in the 2005 survey possessed characteristics associated with historic archaeological deposits such as shipwrecks.

The marine archaeologist recommended no further archaeological investigation of the direct impact area associated with the revised locations of the WTGs and interconnect cable routes (see FEIS Report 4.3.5-4); MBUAR and MHC concurred with the project archaeologist's recommendations by letters dated February 27, 2006 and March 8, 2006, respectively.

Summary of Anomalies:

The sidescan sonar and magnetic anomalies detected during the Project's three geophysical surveys conducted in 2001, 2003 and 2005 and individually reported in previous reports cannot be summed to obtain an accurate total of anomalies identified to date within the final layout of the Wind Park. As reported in previous filings, the layout has been revised since 2001 for various reasons that include avoidance of certain anomalies, reduction of visual impacts to southern Cape Cod and the Kennedy Compound National Historic Landmark, siting to remain in federal waters after a state boundary line change, and to reduce potential navigational impacts along the southern Project Area. Anomaly totals in previous reports often included proposed and alternative cable routes, as well as anomalies detected on tracklines now outside the final layout. For example, Figures 2 and 3 in the Shallow Hazards Report show 2001 and 2003 survey tracklines that extend beyond the final layout.

Only those sonar and magnetic anomalies identified within the surveyed final layout of the Wind Park were included in the Shallow Hazards Report and associated figures and drawings in Appendix A of the COP. A total of 161 sidescan sonar and 225 magnetic anomalies have been identified during the three surveys run to date within the final layout of the Wind Park.

The specifications for the magnetometer and sidescan sonar instruments run during the geophysical surveys in 2001, 2003 and 2005 are reported in Tables 2 through 4 of the Shallow Hazards Report, respectively. Additional specifications were provided with the geophysical datasets sent to BOEMRE by OSI in November and December 2010. The location of all tracklines surveyed to date in the Wind Park are shown on the Navigation Post-Plot provided as Drawing 1 in the Shallow Hazards Report.

4.0 CONSTRUCTION PLAN

This section of the COP describes construction for all planned Project facilities, including onshore and support facilities. The anticipated construction schedule is presented in Figure 2.3-1.

Offshore construction activities, including Project components, installation methods, and safety for offshore construction workers, are described in Section 4.1, and include pre-construction offshore supplemental field surveys (Section 4.1.1).

Onshore construction activities, including Project components, installation methods, and safety for onshore construction workers, are described in Section 4.2.

4.1 Offshore Construction Plan

The offshore components of the Project include 130 monopile foundations, transition pieces and WTGs; the inner array 33 kV cables; the ESP; the submarine 115 kV transmission cable system to shore; and the components of the offshore cable system as it transitions to upland cable at the landfall.

The construction plan for the offshore components incorporates the construction descriptions set forth in the FEIS. The Project's construction activities will adhere to the stipulations set forth in the Lease, to the extent they are technically feasible and necessary, in consultation with BOEMRE.

Safety management systems to ensure the appropriate training and safety of offshore construction personnel are summarized in Section 4.1.3. Offshore Project facilities, including design and fabrication, and installation methods for each component and support facilities are described in Sections 4.1.4 through 4.1.9.

4.1.1 Pre-Construction Offshore Field Surveys

While an extensive amount of data has been gathered during the past 10 years providing CWA with the information necessary to ensure successful development of the Project, supplemental offshore field surveys will be conducted prior to the start of construction to comply with pre-construction requirements in the ROD and the Lease. These supplemental pre-construction field surveys will include high resolution geophysical (HRG) surveys, geological and geotechnical (G&G) surveys, and archaeological investigations. The scopes of the planned surveys are presented below.

Pre-construction field surveys within the Project's offshore lAPE for construction and operation will be conducted prior to the start of seafloor-disturbing construction activities, and will provide data supplemental to prior project-specific field investigations conducted since 2001. The field surveys will include G&G investigations as well as marine archaeological, investigations. The investigations will be planned and conducted to comply with federal and state permit requirements for supplemental investigations post-lease and prior to the start of construction.

In accordance with the Lease, CWA will meet with representatives of BOEMRE for a pre-survey planning meeting prior to the start of any offshore G&G investigation activities. CWA will be prepared to further review and finalize the specifications of data acquisition systems, field techniques, data to be acquired, processing and analysis to be performed, data and information to be submitted.

Further, before conducting offshore survey operations employing towed geophysical gear, CWA will notify commercial fishers and other OCS users through a Notice to Mariners. The notice will be provided at least two weeks before the start of operations and approximately 72 hours prior to mobilization (30 CFR 285.606(3), 285.621(c), 285.641(c)).

The scopes of the anticipated studies are described below, and have been designed to comply with the Lease and other applicable permit requirements. The results of the surveys are expected to be reported in the Facilities and Design Report, which will be submitted to BOEMRE for acceptance prior to the start of construction.

4.1.1.1 Plan for Pre-Construction High-Resolution Geophysical (HRG) Survey

A pre-construction HRG Survey will be conducted in the offshore Project area to satisfy the mitigation and monitoring requirements for Cultural Resources and Geology in the Environmental Stipulations in Addendum C of the Lease. The pre-construction survey will be conducted to collect data to supplement the three previous site-specific geophysical surveys (described in Section 3.0 above and in Section 4.1.1.1 of the FEIS). The three HRG surveys conducted to date provide information about seafloor and subsurface conditions pertinent to the design, construction, operation and removal of Project structures and foundations.

HRG Survey Area

In accordance with Addendum C1.II.a of the Lease, the pre-construction HRG survey will be conducted within an area extending 1,000 feet beyond the Area of Potential Effect for offshore archaeological resources defined Section 2.1 of the *Documentation of Section 106 Finding of Adverse Effect (Revised)*, issued by BOEMRE in 2010 and available at

http://www.boemre.gov/offshore/RenewableEnergy/PDFs/CapeWind/Tripathi/Revised_Findings_Main.pdf

As stated in that document:

> *…The APE for offshore archaeological resources includes the footprints of the WTG structures on the sea floor; the work area around each WTG where marine sediments may be disturbed; the jet plowed trenches for installation of the inner-array cables connecting the WTGs to the ESP; the jet plowed trenches for the transmission cable system from the ESP to the landfall site; and associated marine work areas such as anchor drop areas.*

The marine work areas associated with WTG and submarine cable installation will be finalized by the marine construction contractor (once selected), based upon specific vessel and anchoring requirements.

HRG Survey Design

The HRG survey will be conducted along tracklines oriented in a NNW/SSE and E/W pattern within the WTG array, and parallel to the 115kV submarine cable between the ESP and landfall in Lewis Bay. The orientation of the survey tracklines is designed to be consistent with previous geophysical data collected throughout the Project area and is generally consistent with the geomorphology and bathymetry of Horseshoe Shoals. Tracklines oriented in these directions also intersect the maximum number of WTGs, which were sited to optimize the power derived from the prevailing winds.

Tracklines will be spaced 30 meters apart to comply with the Cultural Resource stipulations in Addendum C.1.II.c.i. of the Lease. The following instrumentation will be deployed on every trackline: depth sounder for bathymetry, magnetometer, side scan sonar, and Chirp subbottom profiler (Chirp). Side scan sonar will provide the full coverage of the seafloor bottom and suitable resolution of targets required at Addendum C.1.II.c.iii of the Lease. Although multibeam equipment is also stipulated in that clause to collect bathymetry data, use of the single beam echo sounder equipment is appropriate, given the site's shallow water depths and because the necessary bottom coverage and target resolution will be provided by the side scan sonar. Single beam equipment will adequately provide all the bathymetric data needed, given the close required line spacing. The collection of medium penetration sub-bottom profiler data would be collected on tracklines at 150 meter spacing. The selection of survey equipment will be finalized during pre-survey discussions between BOEMRE and the Project's geophysical contractor. As stated in Addendum C.1.II of the Lease, the stipulations for the HRG Survey "may be modified if BOEMRE determines that the criteria are not technically feasible or necessary to implement at the Project site".

It should be noted that additional processing of the medium penetration seismic profiling (boomer) data, as discussed in the Shallow Hazards Report in Appendix A, has been conducted to further evaluate shallow subsurface hazards to maximum depths of interest to BOEMRE (150 to 300 feet below the seafloor, as site conditions allow). These depths are well below the approximately 85 foot maximum depths of the monopiles. The subbottom penetration and data resolution of the existing boomer data adequately characterizes the subsurface geology within the Project Area, which is typical for a coastal embayment in a tidal environment dominated by unconsolidated glaciated and re-worked sediments on and below the seafloor. No faulting, diapirs, gas hydrates or unexpected features have been identified from the field investigations completed to date, and neither of the two types of subsurface hazards identified (boulders and buried channels) are expected to pose any adverse impact to the Project. It is unlikely that future acquisition of boomer data will identify any additional types of geologic features or hazards.

The HRG survey will likely be conducted prior to the G&G survey (described below), so that data from the HRG survey can be used to plan the sampling locations for the G&G survey. The majority of the HRG survey program is expected to be conducted using a 40- to 45-foot-long diesel-powered vessel, outfitted with the survey equipment. In shallow waters, the survey will be conducted using a smaller vessel, likely a 25- to 30-foot gasoline-powered boat.

The survey vessels will operate approximately 10 hours per day during relatively calm sea conditions. The vessel will travel at approximately 15 knots when transiting to the survey area (approximately 1 hour each way), and at approximately 3 knots per hour during the 8 hours of actual survey time per day. The vessel will continuously transect the area, obtaining an estimated 30 linear miles of data each day, before returning to port each night before dark.

In accordance with the requirements of the Lease, a "ramp up" (depending on the technical limitations of the equipment used) will be required at the beginning of each seismic survey in order to allow marine mammals, sea turtles and fish to vacate the area prior to the commencement of activities. Seismic surveys may not commence (i.e., ramp up) at night time or when the exclusion zone cannot be effectively monitored (i.e., reduced visibility). For more detail refer to Section 9-29 of the FEIS.

Instrumentation

The following navigation, hydrographic, and geophysical equipment systems (or equivalent) are proposed for use on the HRG surveys:

Trimble Differential Global Positioning System

A Trimble differential satellite positioning system provides reliable, high-precision positioning and navigation for a wide variety of operations and environments. The system consists of a GPS receiver, a GPS volute antenna and cable, RS232 output data cables, and a Coast Guard beacon receiver. The beacon receiver consists of a small control unit, a volute antenna and cable, and RS232 interface to the Trimble GPS unit. In this system configuration a position accuracy of ± 1 meter is quoted by the manufacturer.

Fully automated, the Trimble receivers provide a means for 9 channel simultaneous satellite tracking with real time display of geodetic position, time, date, and boat track if desired. The Trimble unit is mounted on the survey vessel with the beacon receiver which continuously receives differential satellite correction factors via radio link from one of the DGPS United States Coast Guard reference beacons. The Trimble GPS accepts the correction factors and applies the differential corrections to obtain continuous, high accuracy, real time position updates. A standard NMEA string including geographic coordinates is output from the Trimble DGPS and interfaced to the navigation system running HYPACK software for trackline control.

HYPACK Navigation Software

Survey vessel trackline control and position fixing will be obtained by utilizing a computer-based data-logging package running HYPACK navigation software. The computer is interfaced with the Trimble DGPS onboard the survey vessel. Vessel position data were updated at one second intervals and input to the HYPACK navigation system which processes the geographic position data into State Plane coordinates used to guide the survey vessel accurately along preselected tracklines. The incoming data are logged on disk and processed in real time allowing the vessel position to be displayed on a video monitor and compared to each preplotted trackline as the survey progresses. Digitized shoreline, NOAA charts, and the locations of existing structures, buoys, and control points can also be displayed on the monitor in relation to the vessel position. The computer logging system, combined with the HYPACK software, thus provide an accurate visual representation of survey vessel location in real time, combined with highly efficient data logging capability and post-survey data processing and plotting routines.

The HYPACK survey software digitally records the position data for each sensor, depth sounding data, motion sensor readings (heave, pitch, roll), and magnetic intensity measurements, as well as exports sensor position data (adjusted for offset and layback values) to external devices for recording with digital imagery (side scan sonar, subbottom profiles).

Innerspace Model 448 Single Beam Depth Sounder

Precision single beam water depth measurements will be recorded by employing an Innerspace Model 448 digital depth sounder with a 200 kilohertz, 3-8° beam width transducer. The Model 448 recorder provides precise, high-resolution depth records using a solid state thermal printer as well as digital data output which allows integration with the computer-based HYPACK navigation system. Depth sounding points were collected at the maximum rate of the system, 13 samples per second. The Model 448 also incorporates both tide and draft corrections plus a calibration capability for local water mass sound speed.

Sound speed calibrations are accomplished by performing "bar checks" in shallow water sites. The bar check procedure consists of lowering an acoustic target, typically a 20 pound lead disk, on a measured sounding line, to the specified Project depth. The speed of sound control is adjusted such that the reflection from the disk is printed on the recorder precisely at this known depth. The acoustic target is then raised to successively shallower depths and calibration readings at these depths are recorded. Variations which exist in the indicated depth at these calibration points are incorporated in the sounding data processing to produce maximum accuracy in the resulting depth measurements. Bar checks were performed at the beginning of each day to check the surface water mass sound speed in comparison with the CTD profiler.

Bar checks are used for calibration when surveying in shallow water areas of generally less than 60-80 feet. For depth sounder calibration in the deeper water a Sea-Bird SBE19 CTD Profiler is utilized to measure the temperature, salinity, and density of the entire water column from which sound velocity can be calculated and input to the 448 echosounder. Both checks were performed during this field investigation for quality control and comparison.

SeaBird Electronics SBE19 SEACAT Profiler

Water column velocity measurements will be logged at multiple locations daily using SeaBird Electronics 19 SEACAT Profiler. The SBE 19 is the next generation personal CTD, bringing numerous improvements in accuracy, resolution, reliability and ease-of-use. The SBE 19 samples at 4 Hz, has a 0.005 accuracy and has 8 Mbytes of memory. Data are recorded in non-volatile FLASH memory and can be transferred and processed on a PC. The SBE 19 has a fast sampling and pump controlled TC-ducted flow configuration, significantly reducing salinity spiking caused by ship heave.

The sound velocity profiles collected using the Sea-Bird are important for adjusting the single beam depth soundings for velocity changes in the water column to attain the highest level depth accuracy possible. Sound velocity is also input to other geophysical systems that provide the option for applying sound corrections for distance plotting on imagery (side scan sonar, subbottom profilers).

TSS DMS-05 Motion Sensor

Vessel heave, pitch and roll information will be measured and logged utilizing TSS's DMS-05 Dynamic Motion Sensor. Incorporating an enhanced external velocity and heading aiding algorithm for improved accuracy during dynamic maneuvers, the solid state angular sensor offers reliability and the highest performance of any TSS produced vertical reference unit. The DMS-05 motion sensor was designed for use with single and multibeam echosounders and incorporates advanced processing techniques and high grade inertial sensing elements to attain heave, pitch, and roll measurements with high dynamic accuracy and immunity to vessel turns and speed changes. The DMS-05 allows full utilization of all echosounder beams and survey capabilities to IHO standards. The DMS-05 has a dynamic roll and pitch accuracy to 0.05° over a 30° range and dynamic heave accuracy to 5 centimeters or 5% (whichever is greater). The unit can output digital data at a rate up to 200 hertz and accepts a standard NMEA 0183 message string. Digital data are logged by the HYPACK navigation computer. The DMS-05 permits survey operations to continue through degrading weather conditions, increasing project productivity and efficiency.

Klein Model 3900 Dual Frequency Side Scan Sonar

Side scan sonar images of the bottom will be acquired using a Klein 3900 dual frequency, high-resolution sonar system operating at frequencies of 445 and 900 kilohertz. The system consists of a topside computer, monitor, keyboard, mouse, tow cable, and sonar towfish. All system components are interfaced via a local network hub and cable connections. The system contains an integrated navigational plotter which accepts standard NMEA 0183 input from a GPS system. This allows vessel position to be displayed on the monitor and speed information to be used for controlling sonar ping rate. Sonar sweep can also be plotted in the navigation window for monitoring bottom coverage in the survey area.

The hardware is interfaced to the Klein SonarPro data acquisition and playback software package which runs on the topside computer. All sonar images are stored digitally and can be enhanced real-time or post-survey by numerous mathematical filters available in the program software. Imagery is displayed in a waterfall window in either normal or ground range (water column removed) formats. Other software functions that are available during data acquisition include; changing range scale and delay, display color, automatic or manual TVG (time variable gain), speed over bottom, multiple enlargement zoom, target length, height, and area measurements, logging and saving of target images, and annotation frequency and content. The power of this system is its real-time processing capability for determining precise dimensions of targets and areas on the bottom.

As with many other marine geophysical instruments, the side scan sonar derives its information from reflected acoustic energy. A set of transducers mounted in a compact towfish generate the short duration acoustic pulses required for extremely high resolution. The pulses are emitted in a thin, fan-shaped pattern that spreads downward to either side of the fish in a plane perpendicular to its path. As the fish progresses along the trackline this acoustic beam sequentially scans the bottom from a point directly beneath the fish outward to each side of the survey trackline.

Acoustic energy reflected from any bottom discontinuities is received by the set of transducers in the towfish, amplified and transmitted to the survey vessel via the tow cable where it is further amplified, processed, and converted to a graphic record by the side scan recorder. The sequence of reflections from the series of pulses is displayed on a video monitor and/or dual-channel graphic recorder on which paper is incrementally advanced prior to printing each acoustic pulse. The resulting output is essentially analogous to a high angle oblique "photograph" providing detailed representation of bottom features and characteristics. This system allows display of positive relief (features extending above the bottom) and negative relief (such as depressions) in either light or dark opposing contrast modes on the video monitor. Examination of the images thus allows a determination of significant features and objects present on the bottom within the survey area.

Geometrics G882 Cesium Marine Magnetometer

Total magnetic field intensity measurements at a 10 hertz sampling rate will be acquired along the survey tracklines using a Geometrics G882 cesium magnetometer that has an instrument sensitivity of 0.1 gamma. The G882 magnetometer system includes the sensor head with a coil and optical component tube, a sensor electronics package which houses the AC signal generator and mini-counter that converts the Larmor signal into a magnetic anomaly value in gammas, and a RS-232 data cable for transmitting digital measurements to a data logging system. The cesium-based method of magnetic detection allows a center or nose tow configuration off the survey vessel, simultaneously with other remote sensing equipment, while maintaining high quality, quiet magnetic data with ambient fluctuations of less than 1 gamma. The Geometrics G882 features an altimeter which outputs sensor height above the seafloor. Data are recorded on the data-logging computer by the HYPACK software.

The G882 magnetometer acquires information on the ambient magnetic field strength by measuring the variation in cesium electron energy level states. The presence of only one electron in the atom's outermost electron shell (known as an alkali metal) makes cesium ideal for optical pumping and magentometry.

In operation, a beam of infrared light is passed through a cesium vapor chamber producing a Larmor frequency output in the form of a continuous sine wave. This radio frequency field is generated by an H1 coil wound around a tube containing the optical components (lamp oscillator, optical filters and lenses, split-circular polarizer, and infrared photo detector). The Larmor frequency is directly proportional to the ambient magnetic intensity, and is exactly 3.49872 times the ambient magnetic field measured in gammas or nano-Teslas. Changes in the ambient magnetic field cause different degrees of atomic excitation in the cesium vapor which in turn allows variable amounts of infrared light to pass, resulting in fluctuations in the Larmor frequency.

Although the earth's magnetic field does change with both time and distance, over short periods and distances the earth's field can be viewed as relatively constant. The presence of magnetic material and/or magnetic minerals, however, can add to or subtract from the earth's magnetic field creating a magnetic anomaly. Rapid changes in total magnetic field intensity, which are not associated with normal background fluctuations, mark the locations of these anomalies.

EdgeTech "Chirp" Shallow Subbottom Profiler

High-resolution subbottom profiling will be accomplished utilizing an EdgeTech Full Spectrum "Chirp" Subbottom Profiler system operating with frequencies of 2-16 kHz. The subbottom profiler consists of three components: the deck or topside unit (desktop computer processor, amplifier, monitor, keyboard, and trackball), an underwater cable, and a Model 216 towed vehicle housing the transducers. Data are displayed on a color monitor while saved in a DAT/JSF type proprietary digital format on the topside computer.

The EdgeTech Chirp sonar is a versatile subbottom profiler that generates cross-sectional images and collects normal incidence reflection data over many frequency ranges. The system transmits and receives a frequency modulated (FM) pulse signal generated via a streamlined towed vehicle (subsurface transducer array). The outgoing FM pulse is linearly swept over a full spectrum range of 2-16 kHz for a period of approximately 20 milliseconds. The acoustic return received at the hydrophone array is cross-correlated with the outgoing FM pulse and sent to the deck unit for display and archiving, generating a high-resolution image of the subbottom stratigraphy. Because the FM pulse is generated by a converter with a wide dynamic range and a transmitter with linear components, the energy, amplitude, and phase characteristics of the acoustic pulse can be precisely controlled and enhanced.

The "chirp" subbottom profiler is designed for acquiring high-resolution subsurface data from the upper portions of the stratigraphic column (20-50 feet depending on site conditions). The higher end frequencies allow good resolution of subbottom layering while the lower end acoustic frequencies provide significant penetration. This particular system is capable of providing excellent acoustic imagery of the nearsurface in a wide variety of marine environments.

Medium Penetration Seismic Profiler/Applied Acoustics 300J Boomer Subbottom Profiling System

Medium penetration seismic subbottom profiler data will be collected using an Applied Acoustics 300 Joule boomer subbottom seismic reflection system. The "boomer" system consists of an Applied Acoustics AA-200 sound source ("boomer" plate), a 10 element hydrophone array or receiver, and an Octopus Model 760 Shallow Seismic Processor which includes a universal amplifier and TVG (time varied gain) filter with bottom tracking, automatic gain control, and a swell compensator. This system will interface with a graphic recorder for displaying the seismic profiles.

Operationally, the "boomer" employs a sound source that utilizes electrical energy discharged from a capacitor bank to rapidly move a metal plate in the transducer housing. The motion of the metal plate creates an intense, short duration (330 ms) acoustic pulse or signal in the water column with broad band frequencies (0.5 - 8 kHz) capable of penetrating up to 250 feet or more of marine sediments with optimum layer resolution of 1-3 feet. The maximum anticipated depth of WTG foundations is approximately 95 feet below the seafloor. Based on the lease agreement, which specifies the required penetration capability for the system, the "boomer" seismic profiler will be capable of penetrating a minimum of 61 meters below the seafloor for the existing geologic conditions. The lease requires boomer data penetration of at least 50 feet below the anticipated depth of WTG foundations. Therefore the boomer meets the equipment specifications required by BOEMRE.

Data Processing & Analysis

The HRG survey data will be processed and analyzed in accordance with terms of the Lease and applicable sections of BOEMRE guidelines for the shallow hazards program (Notice to Lessee (NTL) No. 2006-P01) and archaeological resource surveys and reports (NTL No. 2005-G07). The following requirements are specified in the Lease and will be addressed:

- Magnetometer data will be contoured for the entire survey area (Addendum C.1.II.g.iv of the Lease); and
- A side scan sonar mosaic will be produced (Addendum C.1.II.H.iv of the Lease).

Results of the HRG survey will be provided in the Facility Design Report.

4.1.1.2 Plan for Pre-Construction Archaeological Review

The pre-construction archaeological review will supplement the information already obtained during the Project's previous marine archaeological investigations (see Section 3.0 above).

The APE for the pre-construction archaeological investigation will coincide with the APE for the HRG survey defined above in Section 4.1.1.1 and in Addendum C1.II.a of the Lease. The study area of the archaeological investigation will extend 1,000 feet beyond the APE for offshore archaeological resources defined Section 2.1 of the *Documentation of Section 106 Finding of Adverse Effect (Revised)*, issued by BOEMRE in 2010:

> *…The APE for offshore archaeological resources includes the footprints of the WTG structures on the sea floor; the work area around each WTG where marine sediments may be disturbed; the jet plowed trenches for installation of the inner-array cables connecting the WTGs to the ESP; the jet plowed trenches for the transmission cable system from the ESP to the landfall site; and associated marine work areas such as anchor drop areas.*

The marine work areas associated with WTG and submarine cable installation will be finalized by the marine construction contractor (once selected), based upon specific vessel and anchoring requirements.

Marine archaeologist(s) will participate in the geophysical survey described in Section 4.1.1.1, which will be designed and conducted to comply with Environmental Stipulations for Cultural Resources and Geology in Addendum C of the Lease. The marine archaeologist(s) will observe and preliminarily analyze geophysical data as it is acquired on the vessel and to identify remote sensing anomalies in the data with potential to be submerged cultural resources. The geophysical data will be collected, processed and mapped to comply, as feasible, with assessment and reporting requirements for underwater archeological resources BOEMRE's NTL No. 2005-G07 and its Appendices 1 & 2, entitled *Archaeological Resource Surveys and Reports*. Parallel trackline spacing for archaeological data acquisition purposes will be set at a 30 m (100 foot) interval. Instrumentation will consist of the equipment suite described above.

Vibracores will be advanced at every WTG location. The vibracores will likely be advanced from a small gasoline-powered vessel less than 25 feet in length. Up to 6 vibracores can be collected in a field day with favorable bottom conditions and calm seas.

In accordance with the cultural resource requirements for mitigation and monitoring in the Lease, the sediments will be visually examined by a marine archaeologist for evidence of paleosols. If evidence of paleosols is visible, the following analyses (listed in Addendum C.1.III.b of the Lease) may be conducted:

- Sediment grain size analysis
- Point count analysis
- Geochemical analysis
- Palynological analysis
- Radiometric data (C14, Pb210, and possibly Cs137) of strata or organic material

- Sediment shear strength

The analytical suite applied to specific sediment samples to assess the presence/absence of cultural resources will be determined by the marine archaeologist based upon field conditions, in consultation with BOEMRE.

Measures to protect submerged cultural resources during Project construction are described in Section 7.0. Tribal monitors will be invited to monitor bottom disturbing activities, in accordance with Addendum C.V.c. of the Lease. CWA will comply with the *Procedures for the Unanticipated Discovery ("Chance Finds") of Cultural Resources and Human Remains* in Addendum C VI. of the Lease during construction.

4.1.1.3 Plan for Pre-Construction Geological & Geotechnical (G&G) Surveys

In accordance with Addendum C of the Lease, a pre-construction G&G Survey will be conducted in the offshore APE to satisfy the mitigation and monitoring requirements for Cultural Resources and Geology. Note that the APE, as defined in Section 4.1.1.1 above and the Cultural Resources stipulations at Addendum C.1.II.a of the Lease, is considered the same as the Area of Potential Physical Effect (APPE) used in the Geology stipulations at Addendum C.2.e.ii of the Lease.

The following geotechnical sampling/testing protocols for cone penetrometer tests and soil borings are established in the Lease. These will be followed during the pre-construction G&G survey, unless field or equipment conditions warrant modification, in consultation with BOEMRE.

i. In situ cone CPTs and soil borings must be taken at all platform and turbine locations except as provided below. In some cases, CPT data may substitute for soil borings, provided that the Lessor, and the Lessee's CVA if available, determine that there is adequate continuity of soil and rock strata, evidenced by soil properties and engineering performance parameters. All CPTs and soil borings must extend at least 10m below the tip of the foundation location. If soil conditions do not allow CPTs to be pushed using a seabed frame to routinely penetrate to the prescribed total depth, the Lessor shall, in consultation with Lessee's CVA, if available, determine whether borings are needed below the refusal depth at specific locations to support the engineering design of the Project. Where full depth CPT data can be obtained with a seabed CPT frame at all structures, soil borings can be limited to (1) a portion of the structure locations depending on subsurface complexity (based on the results of the geophysical survey), and (2) the ESP site. The Lessor, in consultation with the CVA, if available, may approve departures from the above requirements if it determines that doing so will not in any way jeopardize the engineering integrity of the Project, or pose a significant adverse risk to safety or environmental and cultural resources.

In accordance with the geology requirements for mitigation and monitoring in the Lease, the following geotechnical sampling/testing activities will also be conducted, if deemed necessary by Project engineers with the agreement of the designated CVA:

- In situ and laboratory soil test data must be analyzed to estimate foundation soil response to maximum anticipated static and dynamic loads.
- Determine embedment depth and predict susceptibility of the foundation to liquefaction and scour protection.

The Lease includes the following stipulations that have already been addressed through review of existing data:

- Potential for seafloor erosion and scour in the context of empirically derived current velocity data has been evaluated (see Report No. 4.1.1-5 in the FEIS).
- The liquefaction potential of the Project Area has already been characterized as negligible in the context of regional seismicity in Section 3.2.2.

4.1.1.4 Plan for Pre-Construction Biological Investigations

Permit conditions associated with certain federal and state approvals of the Project require the following biological investigations to be conducted prior to the initiation of construction. The purpose of the pre-construction environmental study program is to further document the pre-existing conditions of certain resources in order to monitor and evaluate the impacts of the Project during construction and operation, as well as to evaluate monitoring methods and techniques to be used in post-construction monitoring.

CWA will conduct the following biological investigations post-lease and prior to construction:

Avian and Bat Monitoring Program

Pursuant to the Biological Opinion issued by the U.S. Fish and Wildlife Service (USFWS) as part of the Endangered Species Act Section 7 consultation and the ROD issued by BOEMRE, portions of an ABMP will be initiated prior to construction. The scope of the program was developed by the BOEMRE and CWA (September 19, 2008) to gather data to assess potential impacts to bird and bat populations as a result of the Project. The monitoring program will focus on bats, migratory birds and federally and state endangered birds including the Roseate Tern and Piping Plover, which are known to occur in and near Nantucket Sound. The ABMP also includes specific study objectives and research questions that will be addressed through pre-construction and post-construction monitoring techniques. The monitoring efforts described in the ABMP will apply to migratory birds.

The monitoring plan was developed in coordination with the BOEMRE and USFWS and includes several monitoring requirements as a result of previous regulatory review. As a requirement of the USFWS Biological Opinion and the BOEMRE Record of Decision (BOEMRE 4/28/10), the monitoring protocols are being peer-reviewed prior to implementation. CWA submitted draft protocols to BOEMRE in July 2010 (see Appendix B) and is currently in discussions with BOEMRE and USFWS as to the details of the monitoring plan. The pre-construction avian work is anticipated to take approximately one year before the installation of WTGs.

Seafloor Habitat and Benthic Community Video Survey and Aerial Photography

Video surveillance is proposed for 3 pre-selected cable embedment segments within the 3-mile limit and 3 segments on the OCS, each up to 0.5-mile in length with the intent being to collect all video data within a couple of days. A video camera with GPS linkage will be towed along each of the routes, tracking the centerline. (see Attachment E of the 401 WQC).

Once collected, videotapes of the selected segments of the route will be reviewed by a marine biologist.

The following observations will be made:

- Presence and general characterization of the substrate (three dimensional features and regularity).
- Presence and general characterization of epibenthic invertebrates (especially lobster and crabs).
- Presence and general characteristics of shellfish (especially scallops).
- Evidence of lobster burrows, if visible.
- Presence and general characterization of fish and habitat.
- Organisms that have been identified to the lowest practicable taxonomic level.
- Location of features.

CWA will also conduct aerial photography of the inshore cable route from the entrance to Lewis Bay during the month of July (high growth time period for eel grass) prior to the commencement of cable installation.

CWA will monitor benthic community recovery in state waters and the OCS pursuant to the Seafloor Habitat/Benthic Community Monitoring Plan contained in the MEPA FEIR and cited in MEPA Certificate. CWA will include three additional paired monitoring sites on the OCS in addition to those outlined in the Seafloor Benthic Community Monitoring Plan. The Seafloor Habitat/Benthic Community Monitoring Plan is included in the MassDEP Water Quality Certificate (Appendix H-6, Attachment E). BOEMRE will be copied on the submission on the summary reports.

Shellfish Monitoring Program

Prior to construction in Lewis Bay a shellfish monitoring program will be implemented. A plan will be submitted to the state agencies and samples will be extracted from within the footprint of anticipated project construction impact areas of Lewis Bay in order to characterize existing shellfish resources. Preconstruction shellfish monitoring will take approximately 1- 2 days. In accordance with the ROD and the MEPA FEIR, CWA will coordinate with the Town of Yarmouth shellfish constable to appropriately avoid or minimize impacts to designated shellfish areas from installation of the submarine cable. CWA will provide the Town of Yarmouth with funds to mitigate for the direct area of impact within the Town's designated shellfish bed.

Eelgrass Survey

Pursuant to the Massachusetts Department of Environmental Protection 401 Water Quality Certification (see Appendix H), in accordance with Section 401 of the Federal Clean Water Act, an eelgrass survey will be conducted within 60 days prior to initiating submarine cable installation.

A dive survey will be conducted to confirm the limits of the eelgrass bed near Egg Island no more than 60 days prior to the commencement of cable installation. Should aerial photography, conducted during the seafloor habitat/benthic community monitoring program, identify other eelgrass beds in the vicinity of the cable route, additional diver surveys may be required. The survey shall document the edge of any eelgrass beds close to the work area and mark the edge using a buoy system. Additionally, transects through the eelgrass beds will be performed in order to determine the extent and health of the bed. The eelgrass survey is expected to take about a week.

In addition to the survey within State waters, CWA will comply with the environmental Lease stipulations for Coastal and Intertidal Vegetation (pg C-18 Addendum C of the Lease) including pre-construction dive survey of the anticipated work area for WTG B4, where previous survey has indicated the presence of SAV, and avoiding any identified eelgrass beds where practicable. CWA will conduct eelgrass monitoring for two years following the commencement of commercial operations of WTG B4, and will replant eelgrass at a ratio of 3:1 if the results of surveying indicate that eelgrass was lost as a result of project activities. It is not practicable to relocate WTG B4 due to resulting wind resource wake losses and decreases in power production.

Marine Mammal Monitoring

During pre-construction HRG Survey activities, CWA will monitor the Project area for marine mammals and sea turtles. A 500 meter-radius exclusion zone will be established around any seismic-survey vessel and an on-board NMFS approved observer will monitor the zone for marine mammals and sea turtles for 60 minutes prior to commencing or restarting surveys, during surveys, and for 60 minutes after surveys end. The seismic sound source will be shut down immediately should a marine mammal or sea turtle enter the zone during surveying, and not restarted until the area has been clear for 60 minutes. Observations will be reported to NMFS within 90 days of the completion of the surveys.

4.1.2 Summary of Safety Management System

The Project's Safety Management System (SMS) is provided in Appendix E, and details specific safety practices and procedures to be adopted during offshore construction, based on good practice on offshore wind projects in Europe, and other pertinent offshore experience and regulatory requirements in the USA. The SMS describes overall safety policies and objectives, organization and responsibilities, methods to identify, assess, control and mitigate hazards, training and emergency response procedures, and compliance monitoring. For additional information, see Appendix E.

4.1.3 Monopile Foundations, Transition Pieces and Wind Turbine Generators (WTGs)

4.1.3.1 Foundation System Design Criteria

Based on the results of the site specific geophysical and geological surveys and geotechnical subsurface soil conditions at Horseshoe Shoal, the use of a driven monopile was chosen as the preferred foundation design system for the WTG.

In addition, the selected pile foundation system was analyzed for the following structural loadings, which are both steady state and dynamic in nature.

- Wind loads from WTG operation including wind shear and turbulence;
- Hydrodynamic loads from prevailing and extreme sea-state conditions;
- Impact loads from pile-driving installation;
- Earthquake loads; and
- Lateral loading from sea ice.

In order to demonstrate the structural adequacy and design lifetime of the Foundations the Contractors shall in the FDR design documentation describe the models used and the essential design parameters. The design documentation supplied by the Contractors will contain not only the list of information provided in Appendix A of the IEC 61400-3 but also the following minimum parameters:

Information Provided by Cape Wind to Contractors for Design Basis

- Units, Datums and Coordinate Systems including vertical and horizontal datums, conversion factors and units to be used
- Site layout includes coordinates of the wind turbines, substation(s) (incl. electrical layout), meteorological mast and metocean report
- Support structure levels including the interface level and hub height level

- Site conditions including bathymetry, ground conditions, wind data, wake effects (including methodology), metocean data (including wave conditions and wind wave misalignment probabilities), salinity, air and sea temperatures, marine growth, global sea level rise and ice loads
- Foundation Design Basis
- Foundation design basis including design codes and standards, design philosophy, design life, reference level, interface level, corrosion protection, secondary structures
- Geotechnical data including design methodology, sources of information, principles for establishing characteristic soil profiles, principles for assessing driveability of piles, geography and geology, determination of engineering profiles, density, strength, vertical capacity, vertical and lateral load responses, parameters for driveability
- Environmental data including water depths, wind climate, wave climate (including wind wave misalignment and windspeed-wave height correlation), tidal elevation and currents extreme sea state and extreme wave height, severe sea state and severe wave height, normal sea state, wave breaking, additional parameters, ice, seismic conditions, ship impact and wave run up
- Material data including structural steel specification for monopiles and transition pieces
- Design procedure including grouted connection, load generation, soil pile interaction, scour, design load iterations and computer programmes
- Terminology and principles of limit state design including limit states, design format, design situations and load combinations (including a load case table compatible with part B) and fatigue
- Wind turbine data including masses and operational requirements supplied by SWP
- Generic turbine positions to be considered and interpolation of loads to other turbine positions
- Overall logarithmic damping factor (incl. soil, hydrodynamic, structural contribution)
- Special requirements including installation and testing of monopiles and transition pieces.

Geophysical and geotechnical surveys indicate that subsurface sediment conditions within the WTG array on Horseshoe Shoal consist primarily of sands and glacial sedimentary deposits to greater than 100 feet (30.5 meters) below the present bottom. The pile foundation system will be installed by mechanical hammer driving, thereby minimizing seabed disturbance and turbidity associated with foundation installation.

The significant wave height and period for various water depths was calculated and utilized in the foundation design evaluation. This analysis showed that the dominating loading criterion for monopiles is the fatigue loading. For structural analysis the fatigue loading from the wind is combined with a representative fatigue wave. A design tidal current of 1 meter per second (m/sec) was applied to the design analysis based on data obtained by baseline studies performed by Woods Hole Group (see Report 4.1.1-9 in the FEIS).

Although foundation loading by drifting sea ice is not a frequent occurrence for this area of Nantucket Sound, a conservative ice loading design factor of a 6-inch (0.15 m) ice cap was applied in the analysis. In addition, a 1.18-inch (30 mm) ice cover over the tower and nacelle was included.

The Massachusetts State Building Code describes Nantucket Sound as a low seismic activity area. Therefore, while seismic loading was considered in the design, it was not a determining factor in the foundation design analysis.

The monopile and transition piece foundation will likely have a three-part system to protect it from corrosion. This will consist of the following:

- Corrosion allowance – a liberal corrosion allowance will be added to the design criteria;
- Coating - A coating system will be applied to surfaces that come in contact with both the atmosphere and the splash zone; and
- Cathodic protection utilizing sacrificial anodes (pure aluminum).

Length of monopile, insertion distance and finished elevation will vary by individual location due to water depth and structural and geotechnical parameters and will be further described in the Fabrication and Installation Report and/or the Facilities Design Report. Monopiles are anticipated to be installed to a depth of approximately 85 feet below the seafloor..

Fabrication and Installation

Monopiles and transition pieces are expected to be fabricated in the Northeast United States and possibly at an additional facility in Europe. The monopiles and transition pieces will likely be delivered to the Project Area via barge from the location in the US and via transport vessel from Europe. Ideally, the monopiles and transition pieces will be installed directly from the barge or transport vessel and not require an intermediate unload/load at the staging area.

During pile driving activities, it is estimated that approximately 4-6 vessels would be present in the general vicinity of the pile installation. Most of these vessels will be stationary or slow moving barges and tugs conducting or supporting the installation. Other project vessels will be delivering construction materials or crew to the site and will be transiting from the various points on the mainland to the Project site and back. Barges, tugs and vessels delivering construction materials will travel at 10 knots (19 kilometers per hour) or below and may range in size from 90 to 400 feet (27.4 to 122 meters). The only vessels that are anticipated to be traveling at greater speeds are crew boats that will deliver and return crew to the Project site twice per day. Crew boats are anticipated to be approximately 50 feet (15.2 meters) in length and may travel at speeds up to 21 knots (39 kilometers per hour). These crew boats are similar to typical vessel traffic occurring in Nantucket Sound already on a regular basis.

The vessel drafts for equipment currently used for installation of similar projects are approximately 10 feet (3.0 meters). Based upon site specific bathymetric survey there are no proposed turbine locations in water depths less than approximately 12 feet (3.7 meters) relative to mean lower low water. All monopile sites are constructible at the proposed locations. Construction vessel access to each of the sites is available from at least one direction.

As a contingency, CWA's normal construction sequence may be altered to accommodate water depths. For those few sites where the water depth approaches the 12 feet (3.7 meters) relative to mean lower low water it may require careful coordination with tides, construction sequencing and vessel loading. Once the vessel is in place and jacked up (which can occur at high tide), it will be unaffected by water depths.

A specialized jack-up barge with a large crane and pile driving equipment will be utilized for the actual installation of the monopiles. This specialized barge is the first of three barges that will be involved in the construction of each of the WTGs. The jack-up barge (Barge #1) is anticipated to have four legs with pads of about four meters square (approximately 172 square feet [16 square meters]). The crane will lift the monopiles from a transport barge that is held in place with an attendant tug and place them into position. The monopiles will be installed into the seabed by means of pile driving ram or vibratory hammer and to an approximate depth of 85 feet (26 meters) into the seabed. This will be repeated at all WTG locations. CWA anticipates that two monopiles may be installed simultaneously. However, hammering of the piles will occur one at a time. As a result, two specialized pile driving barges will likely be present within the Project area at any one time. The anticipated duration of installing all of the monopiles from start to finish is expected to be approximately ten months including delays due to weather.

Pile Driving and Marine Mammal Mitigation

CWA will conduct required sound measurements to verify the established exclusion zone that will be maintained during pile driving to protect marine mammals and sea turtles. A preliminary 2,461 ft (750 m) radius exclusion zone for listed whales and sea turtles will be established around each pile driving site in order to reduce the potential for serious injury or mortality of these species. Field verification of the exclusion zone will take during pile driving of the first three piles. The results of the measurements from the first three piles can then be used to establish a new exclusion zone which is greater than or less than the 2460 ft (750 m) depending on the results of the field tests. For additional detail regarding noise measurements and maintenance of the exclusion zone, refer to FEIS 9-26 through 9-27.

A "soft start" will be used at the beginning of each pile installation in order to provide additional protection to listed whales and sea turtles and for juvenile and adult fish allowing them to vacate the area at the commencement of pile driving activities. The soft start requires an initial set of 3 strikes from the impact hammer at 40 percent energy with a one minute waiting period between subsequent 3-strike sets. If listed whales or sea turtles are sighted within the exclusion zone prior to pile driving, or during the soft start, the Resident Engineer (or other authorized individual) will delay pile-driving until the animal has moved outside the exclusion zone. For additional detail refer to 9-29 of the FEIS.

Pile driving will not be started during night hours or when the safety radius can not be adequately monitored (i.e., obscured by fog, inclement weather, poor lighting conditions) unless the applicant implements an alternative monitoring method that is agreed to by MMS and NMFS. However, if a soft start has been initiated before dark or the onset of inclement weather, the pile driving of that segment may continue through these periods. Once that pile has been driven, the pile driving of the next segment will not begin until the exclusion zone can be visually or otherwise monitored.

CWA will provide the following reports to BOEMRE and NMFS during pile driving activities:

(1) Weekly status reports during pile driving activities, including a summary of the previous week's monitoring activities and an estimate of the number of marine mammals and sea turtles that may have been taken as a result of pile driving activities;

(2) Any observed injury or mortality to marine mammals or sea turtles from pile driving within 24 hours of such observation;

(3) Any observations concerning other impacts on marine mammals and sea turtles within 48 hours of such observation; and

(4) A final report within 120 days after completion of the pile driving and construction activities, which summarizes monitoring activities, observed impacts to marine mammals and sea turtles, an assessment of the effectiveness and feasibility of the mitigation measures employed.

4.1.3.2 Transition Pieces

Each WTG foundation and substructure unit will include a transition piece. Each transition piece will be a prefabricated large diameter steel structure largely standardized for each WTG. The transition pieces will include decks, ladders, corrosion protection, a turbine tower flange, I/J-tubes and supports for cable connections, a maintenance crane, a boat landing, and other hardware. The transition pieces will also include an external work platform for use during turbine installation, routine operation and maintenance activities. The work platforms will be designed to accommodate access to the WTG during installation and for ongoing equipment inspections.

The transition piece will be placed onto the monopile, leveled, set at the precise elevation of the tower, and grouted into place to the foundation monopile using a product such as Ducorit® D4 by Densit. Following the grouting of the transition piece the installation barge will move to the next available installed monopile to repeat the transition piece installation process.

CWA and its design team continue to conduct exhaustive research on the state of the art and stay abreast of the experiences of the European offshore installations, and expect to make modifications to the traditional monopile / transition piece cylindrical connections. As a result of horizontal grout failures being experienced with the cylindrical connections at some European installations, CWA will be utilizing either a conical interface in order to provide additional compression for grout adhesion, shear keys to transfer the axial load, an elastomeric bearing to take the vertical load or other solution developed during design development. Any of these solutions should effectively eliminate the problem. CWA and its consultants are investigating to determine which solution is most reliable and cost-effective. The final design solution will be reviewed and approved by the CVA and included in the FDR and/or FIR.

4.1.3.3 Scour Control

After installation of the pile foundation, some localized scour around the monopile foundation may occur depending on the location of the WTG on Horseshoe Shoal and local sediment transport conditions. Scour protection will be designed and installed using scour mats and/or rock armoring. (see Report 4.1.1-5 in the FEIS, Revised Scour Analysis and Report 4.1.1-6 in the FEIS – Rock Armoring). Scour mats are synthetic fronds designed to mimic seafloor vegetation that would afford the necessary scour protection while minimizing potential alterations to the benthic and fish communities typically associated with Horseshoe Shoal. This is because the synthetic fronds (scour control mats), when secured to the bottom as a network, trap sediments and become buried. In the event that scour mats are found to be less effective than anticipated, more traditional scour protection methods (such as rock armor) are available as an alternative and may be utilized upon written request and permission from BOEMRE as provided for in the Lease. The rock armor scour control design requires the use of filter layer material and rock armor stones. The rock armor and filter material would be placed so that the final elevations approximate pre-installation bottom contours to the extent practicable such that mounds of material would not be created. The rock armor stones would be placed on top of this filter layer material which is used to fill the majority of the scour hole that is predicted to develop after installation of each WTG and the ESP. The filter layer would also minimize the potential for the underlying natural sediment material to be removed by the wave action and would also minimize the potential for the rock armor to settle into the underlying sediment material. The armor stones will be sized so that they are large enough not to be removed by the effects of the waves and current conditions, while being small enough to prevent the stone fill material placed underneath it from being removed.

As the monopiles and transition pieces are completed, the submarine inner-array cables will be laid in order to connect the string of wind turbines (up to 10 WTGs), and then the seabed scour control system will be installed on the seabed around each monopile. The scour control system will help to prevent underwater currents from eroding the substrate adjacent to the WTG foundation. The scour control system will consist of either a set of six scour-control mats arranged to surround the monopile or rock armor.

Each scour control mat is 16.5 feet by 8.2 feet (5 meters by 2.5 meters) with eight anchors which securely tie to the seabed. Figure 2.3.2.3 of the FEIS illustrates the typical arrangement of the mats. For a complete installation procedure, see Report 4.1.1-5 in the FEIS. It is anticipated that the process of completing one string of WTGs (10 WTGs with associated inner-array cable and scour mats) will take up to approximately one month. The installation of the scour mats will overlap with monopile, transition piece, and array cabling installations. The scour mats are placed on the seabed by a crane or davit onboard the support vessel. Final positioning is performed with the assistance of divers. After the mat is placed on the bottom, divers use a hydraulic spigot gun fitted with an anchor drive spigot to drive the anchors into the seabed.

It is anticipated that at 24 WTG locations rock armor scour protection may be necessary as an alternative approach to scour control. Figure 2.3.2.4 of the FEIS shows the turbines for which it is anticipated that rock armor could be used. The rock armor and filter material will be placed on the seabed using a clamshell bucket or chute. For a complete installation procedure for the rock armor scour protection see Report 4.1.1-6 in the FEIS.

4.1.3.4 Wind Turbine Generators (WTGs)

The Project will utilize pitch-regulated upwind WTGs with active yaw and a three-blade rotor (see 2.1.1-1 of the FEIS). The WTG nacelle hub height will be approximately 264.1 feet (80.5 meters) from the MLLW datum (0.0 feet = MLLW). The total height of the wind turbine is 440 feet. The main components of the WTG are the rotor, the transmission system, the generator, the yaw system, and the control and electrical systems, which are located within the WTG's nacelle. The WTG's nacelle will be mounted on a manufactured steel tower supported by a monopile foundation system (described above). The monopile is simply a large diameter pile generally 14.75 to 19.75 feet (4.5 to 6.0 meters) driven approximately 85 feet (26 meters) into the seabed depending on the local load bearing characteristics of subsurface marine sediments. The base of the tower, a pre-fabricated access platform and service vessel landing (approximately 32 feet (9.6 meters) from MLLW) will be provided. The WTG and all its components described in this section will be designed to IEC standard 61400-1 or 61400-3 as applicable. The design will also be verified by an independent CVA. Design criteria for the turbine and foundation system will also include the hurricane criteria as indicated in the API-RP 2A WSD considering a 100-year storm occurrence and will also be designed to the loads specified in the controlling design standards. A step-up transformer for each wind turbine generator will be located in the base of the tower. It will be a liquid filled transformer with the insulating liquid being a biodegradable ester oil. Installation and maintenance will be conducted in accordance with NFPA 70E, "Standard for Electrical Safety in the Workplace." Installation will also conform to IEC 61400-1 on Wind Turbine Safety and Design. Ongoing maintenance will generally follow the International Electrical Testing Association's "Maintenance Testing Specifications for Electrical Power Distribution Equipment and Systems" and the manufacturer's recommendations. The steel tower and nacelle will be mounted on a transition piece which is attached through a grouted connection to a welded steel monopile foundation as described in more detail above.

In order to demonstrate the structural adequacy and design lifetime of the WTGs, the Contractors shall in the FDR design documentation describe the models used and the essential design parameters. The design documentation supplied by the Contractors will contain not only the list of information provided in Appendix A of the IEC 61400-3 but also the following minimum parameters:

Information Provided by Cape Wind to Contractors for Design Basis

- Units, Datums and Coordinate Systems including vertical and horizontal datums, conversion factors and units to be used
- Site layout includes coordinates of the wind turbines, substation(s) (incl. electrical layout), meteorological mast and metocean report
- Support structure levels including the interface level and hub height level
- Site conditions including bathymetry, ground conditions, wind data, wake effects (including methodology), metocean data (including wave conditions and wind wave misalignment probabilities), salinity, air and sea temperatures, marine growth, global sea level rise and ice loads

WTG Design Basis

- References including standards, rules and guidelines and project specific documents
- Units and Coordinate System including the system of units, reference sea level, definition of directions and wind turbine coordinate system (to be compatible with Part A)
- Site description including wind turbine locations and water depth variation over the park (to be compatible with Part A)
- Environmental conditions including wind climate (PCC), wave climate, wind wave joint directional probabilities, site turbulence, wake effects and soil conditions (from Foundation Designer)

- Allowable interval for first system frequency
- Description of the wind turbine including general properties, mass properties, preliminary tower structure and first eigen frequency
- Sloshing dampers contribution to overall damping
- Functional specifications and requirements including foundation type and preliminary layout, service life and fatigue life, eigen (natural) frequencies, structural misalignments and installation and O&M
- Load exchange format
- Project specific design load case table in accordance with IEC 61400-3/-1 for all cases except the extreme storm event which shall be based on a 100 year return period using API RP 2A WSD and the applicable API standard for the additional IEC 61400-1 design load case (DLC) 6.1 and DLC 6.2.
- Generic turbine position to be considered

In addition the WTG tower shall be provided with a lift (elevator). The safe working capacity shall be 250kg minimum. The lift shall be suitable for carrying at least two persons as well as tools and equipment simultaneously. The lift shall be installed inside the tower within reach of the ladder. The lift shall meet the requirements laid down in the relevant OSHA, ANSI, applicable Coast Guard regulations and international standards. The lift is to have a cage which must fully close during operation. It shall not be possible for the lift to start moving, with goods, persons or extremities protruding from the cage. The lift shall also not be able to move if the cage is not closed and locked. Provision shall be made to ensure other persons working in the tower, during movement or operation of the lift, are safe. To achieve this, sensors shall be present in the lift system to stop the lift in the event that a person or piece of equipment is blocking its movement. It shall be possible to operate the lift cage remotely from both the nacelle and also tower base, as well as from inside the lift itself. The lift shall have the capacity to descend safely the entire tower height in the event of power loss. Prior to first use the lift will be inspected and certified by a qualified sub-contractor.

WTG Installation

The WTGs will be manufactured in Denmark by Siemens and delivered to the onshore staging area on freighter vessels. Delivery vessels will likely transport 6 turbines per trip. The turbines will be offloaded and stored at the staging area until WTG installation is initiated. Prior to installation, the pitch mechanism will be installed in the turbines and they will be pre-assembled by the manufacturer.

Installation of the WTGs will likely be from specialized vessels configured or converted specifically for this purpose (see Figure 2.3.2-2 of the FEIS). Work vessels for the Project will comply with applicable mandatory ballast water management practices established by the U.S. Coast Guard in order to avoid the inadvertent transport of invasive species.

The vessels will be loaded at the onshore staging area with the necessary components to erect six to eight WTGs. Components include the towers, nacelles, hubs and blades. Two teams of installation crews will likely be established with one jack-up installation barge with a crane and two transport barges without cranes per team. The two jack-up barges will likely remain deployed at the Project Site throughout the duration of the installation program, while the transport barges will transit between the staging area and Project Site.

The vessels will transit from the onshore staging area to the work site as described above and locate adjacent to one of the previously installed monopiles. A jack-up system will then stabilize the vessel in the correct location. Depending on the actual circumstance, four or six jacking legs will raise the vessel to a suitable working elevation.

The crane located on the installation barge will then place the first tower section onto the deck of the transition piece. Once this piece is secured, the upper tower section is raised and bolted to the lower section. In order, the nacelle, hub and blades are raised to the top of the tower and secured. Several of these components may be pre-assembled prior to final installation. This process is anticipated to take approximately 24 hours to cycle through one complete WTG and would be repeated for each of the 130 WTG locations. Including the twenty or so trips from the onshore staging area to Horseshoe Shoal, this process will take approximately nine months including delays due to weather. The installation of the WTGs will overlap with the installation of the monopile foundations and transition pieces.

4.1.4 Inner-Array 33 kV Cables

Each of the 130 WTGs within the Wind Park will generate electricity independently of each other and will be connected in arrays of 8 to 10 turbines each. Within the nacelle of each turbine, a wind-driven generator will produce low voltage electricity, which will be "stepped up" by an adjacent transformer (see section 4.1.3.4) to produce the 33 kV electric transmission capacity of the WTG. Solid dielectric submarine cables from each WTG will interconnect within the grid and terminate at their spread junctions on the ESP. General testing of the submarine cables for integrity (i.e. thermal aging, tests for resistance to cracking, corona) will be conducted in compliance with:

- Association of Edison Illuminating Companies: AEIC CS7, AEIC CS8
- International Electrotechnical Commission: IEC 60811 series, IEC 60840
- Insulated Cable Engineers Association: ICEA S-93-639, ICEA S-97-682
- CIGRE Electra No. 189

The submarine cable system interconnecting the WTGs with the ESP will be of solid dielectric AC construction, using a three-conductor cable with all phases under a common jacket. The cables will be arranged in strings, each of which will connect up to approximately 10 WTGs to a 33 kV circuit breaker on the ESP (see Figure 2-6 of the FEIR). All submarine cables will receive a DC proof test prior to terminating. The 33 kV cables will also be meggered. Terminals will be metric. There will be a total of approximately 66.7 miles (107 km) of inner-array cabling throughout the Wind Park. The electrical current in the cable segments within each string will vary depending on WTGs location within the string. Cable segments closer to the ESP will provide greater transmission capacity compared to cables further away from the ESP. It is anticipated that three different cable sizes will be used to accommodate this variation in transmission capacity related to the distance of the WTG from the ESP. The conductor cross sections are 3x150 mm2, 3x400 mm2, and 3x630 mm2 and the overall diameter of the cable is 132 mm (5.19 inches), 146 mm (5.75 inches), and 164 mm (6.45 inches) respectively (see Figure 4-9 of the DEIS).

Inner Array 33 kV Cable Installation

The 33 kilovolt cable will likely be transported to the onshore staging area at Quonset Point Rhode Island (see Section 4.1.8.2) from the cable manufacturer in a special cable transport vessel. Specified lengths of inner array cable will be transferred onto a cable holding barge and transported to a location proximate to the immediate work area. A cable installation barge will offload specific lengths of cable from the holding barge. The linear cable machines on-board the installation barge will pull the cables from coils on the holding barge onto the installation barge, and into prefabricated tubs.

The method of installation of the submarine cable is by the jet plow embedment process, commonly referred to as jet plowing (see Figure 2.1.3-3 of the FEIS). This method involves the use of a positioned cable barge and a towed hydraulically-powered jet plow device that simultaneously lays and embeds the submarine cable in one continuous trench from WTG to WTG and then to the ESP. The cable will be embedded approximately 6 feet (1.8 m) below the seabed by the fluidized sediments from the jet plow and will not require supplemental anchoring. The barge will propel itself along the route with the forward winches, and the other moorings holding the alignment during the installation. For installation of the inner array cables, a four point mooring system which will also include the use of mid-line buoys, will allow the support tug to move anchors while the installation and burial proceeds uninterrupted on a 24-hour basis. Additionally, jet-plowing is expected to be suspended during extreme storm events. For additional detail on submarine cable installation please refer to Section 4.1.6 below.

When the barge nears the ESP, the barge spuds will be lowered to secure the barge in place for the final end float and pull-in operation. The cable will be pulled into the J-tube and terminated at the switchgear.

CWA will contact NMFS and BOEMRE within 24-hours of the commencement of jet plowing activities and again within 24-hours of the completion of the activity.

4.1.5 Electrical Service Platform (ESP)

The ESP will be installed and maintained within the approximate center of the WTG array. The ESP will serve as the common interconnection point for all of the WTGs within the array. Each WTG will interconnect with the ESP via a 33 kV submarine cable system. These cable systems will interconnect with circuit breakers and transformers located on the ESP in order to increase the voltage level and transmit wind-generated power through the 115 kV shore-connected submarine cable system. The two 115 kV submarine circuits will then ultimately connect to the existing land-based NSTAR Electric transmission system on Cape Cod.

The ESP will provide electrical protection and inner-array cable sectionalizing capability in the form of circuit breakers. It will also include voltage step-up transformers to step the 33 kV inner-array transmission voltage up to the 115 kV voltage level for the submarine cable connection to the land-based system. The service platform will also function as a helipad and as a maintenance area during periods of servicing the Wind Park equipment.

(The ESP is expected to be a fixed template type platform consisting of a jacket frame with six approximately 42-inch (106.7 centimeters) driven piles to anchor the platform to the ocean floor. The platform will likely consist of a steel superstructure of approximately 100 feet by 200 feet (30.5 meters by 61 meters). The platform will be placed approximately 39 feet (12 meters) above the MLLW datum plane in 28 feet (8.5 meters) of water.

In order to demonstrate the structural adequacy and design lifetime of the ESP, the Contractors shall in the FDR design documentation describe the models used and the essential design parameters. The design documentation supplied by the Contractors will contain not only the list of information provided in Appendix A of the IEC 61400-3 but also the following minimum parameters:

<u>Information Provided by Cape Wind to Contractors for Design Basis</u>

- Units, Datums and Coordinate Systems including vertical and horizontal datums, conversion factors and units to be used
- Site layout includes coordinates of the wind turbines, substation(s) (incl. electrical layout), meteorological mast and metocean report
- Support structure levels including the interface level and hub height level
- Site conditions including bathymetry, ground conditions, wind data, wake effects (including methodology), metocean data (including wave conditions and wind wave misalignment probabilities), salinity, air and sea temperatures, marine growth, global sea level rise and ice loads

<u>ESP Design Basis</u>

- Foundation design basis including design codes and standards, design philosophy, design life, reference level, interface level, corrosion protection, secondary structures

- Geotechnical data including design methodology, sources of information, principles for establishing characteristic soil profiles, principles for assessing driveability of piles, geography and geology, determination of engineering profiles, density, strength, vertical capacity, vertical and lateral load responses, parameters for driveability
- Environmental data including water depths, wind climate, wave climate (including wind wave misalignment and windspeed-wave height correlation), tidal elevation and currents extreme sea state and extreme wave height, severe sea state and severe wave height, normal sea state, wave breaking, additional parameters, ice, seismic conditions, ship impact and wave run up
- Material data including structural steel specification for monopiles and transition pieces
- Design procedure including grouted connection, load generation, soil pile interaction, scour, design load iterations and computer programs
- Terminology and principles of limit state design including limit states, design format, design situations and load combinations (including a load case table compatible with part B) and fatigue
- Special requirements including installation, fire detection and protection (separation and suppression systems, helicopter landing area, emergency survival area, oil containment, and grid interconnection parameters.

The ESP will follow the recommended practices and standards as follows:

- Electrical Equipment – Electrical equipment will be installed following recommended practices of the National Electric Code (NEC) (also known as NFPA 70). Generally ANSI and IEEE standards will be followed with UL listed equipment specified. Use of alternate IEC equipment standards may be considered on a case by case basis where ANSI/IEEE standards do not apply or when IEC codes are deemed superior. For high voltage equipment, the above US electric power industry standards, the grid operator requirements, and requirements of the project specific Large Generator Interconnection Agreement will be followed.

Interior Spaces – NEC and OSHA requirements will be the recommended standards followed internal to the ESP topsides and around electrical equipment as these standards are deemed to be more applicable to the electrical high voltage substation environment.

ESP Lightning Protection - Lightning protection shall be provided where necessary in accordance with NFPA No. 780, UL96, UL96A and Lightning Protection Institute Standards 175, 176 and 177 and per manufacturers' recommendations. Air terminals, conductors and other related accessories shall be UL listed and labeled and suitable for installation in a marine environment.

Fire Detection and Suppression Systems for the ESP will follow NFPA recommended practices, including but not limited to:

- No. 10 Portable Fire Extinguishers.
- No. 11 & 11A Foam Extinguishing System.
- No. 12 Carbon Dioxide Extinguishing Systems.
- No. 70 National Electric Code.

- No. 72 National Fire Alarm Code

It is envisioned that a fire risk evaluation will be conducted with the contractor and insurance underwriter as the ESP design is progressed and addressed in the FDR. Areas with oils, flammable liquids, storage locker and areas, electrical equipment rooms, and cable spreading rooms will be considered for fixed fire suppression systems (most probably CO2 fixed suppression system). Egress, separation, fire barriers, emergency power system, etc. will be also considered within the fire risk evaluation.

Fire detection and manual alarm pull stations will be installed throughout the ESP. The Fire System Alarm Panel will provide indication at the onshore control room. Since the ESP is normally unmanned and primarily contains electrical equipment, a conventional fire main with hose stations is not proposed. Portable Fire extinguishers will be USCG approved type. The exterior platforms, ladders, water craft provisions and life safety equipment (including PPE, PFD's and life rafts) will met USCG requirements and be approved by local USCG jurisdiction.

ESP Installation

The ESP design is based on a piled jacket/template design with a superstructure mounting on top. The platform jacket and superstructure will be fully fabricated on shore and delivered to the work site by barges. It is anticipated that the ESP will be fabricated in either Europe or the Gulf of Mexico and delivered directly to the Project Site on a floating barge.

The jacket will be transported to the site on a jack up transport barge. Once on site, the jacket is expected to be lifted from the transport barge by a crane mounted on a separate jack up barge (similar to Barge #1 described above). The jacket assembly will then likely be sunk and leveled in preparation for piling. The six piles will then be driven through the pile sleeves to the design tip elevation of approximately 150 feet (46 meters) below the surface of the sea bottom. The piles will be vibrated and hammered as required. An alternate installation method is to install the piles first without the jacket and then float the jacket over the piles on a barge. The barge decreases draft by taking on ballast thus lowering the jacket onto the piles.

The superstructure will be loaded onto a transport barge and floated over the jacket as described in the alternate method above. The superstructure will be lowered onto the jacket and then will be connected to the jacket in accordance with the detail design requirements. The installation of the ESP is anticipated to take approximately 10 days to complete plus any delays due to weather (See Figure 2.3.3-1 of the FEIS).

After the ESP is fully constructed, the inner-array cables and the high voltage transmission cables will be terminated at the ESP. These cables will be routed through J-tubes located on the outside of the support jackets. Once the inner-array cables are connected to the ESP, the scour control mats will be installed around the ESP piles utilizing a similar design as the WTG foundations.

4.1.6 Submarine 115kV Transmission Cable System to Shore

The submarine cable system consists of the two 115 kV solid dielectric AC submarine transmission circuits (two (2) three-conductor cable systems per trench equals one circuit, for a total of 4 cables), (See Figure 2.1.3-1 of the FEIS). The conductor cross section is expected to be approximately 3x800 mm2 (approximately 3x1,600 kcmil) and the overall diameter of the cable is 197 mm (7.75 inches). The following table shows the rating of the 115 kV (and the 33 kV) submarine cables under normal operations and for short circuit conditions:

Table 4.1-1 – Rating for 115 kV and 33 kV Submarine Cable

Cable type	Normal Rating (A)	Overload Rating (A) (Note 2)	Short Circuit Rating (kA)
115 kV 800 mm^2	631 A (note 1)	850 A (Note 1)	40 kA
33 kV 150 mm^2	400 A	540 A	31.7 kA
33 kV 400 mm^2	610 A	820 A	40 kA
33 kV 630 mm^2	725 A	975 A	40 kA

Notes:
1. Ratings are per cable. There are two cables per 115 kV circuit and two circuits total.
2. Emergency overload rating depends on duration of overload. Values indicated are based on 12 hour duration of overload. Values are approximate and depend also on amount of pre-load current in the cable prior to the occurrence of the overload

All submarine cables will receive a DC proof test prior to terminating. Terminals will be metric. The European RoHS does not apply to electrical equipment designed for use at AC voltages exceeding 1000 V. As such the 35 kV and 115 kV submarine cables are not governed by RoHS and their manufacturers do not participate in the UL RSCS, which is designed to demonstrate compliance with RoHS. The cable manufacturing process will be monitored by the owner or owner's engineer, the EPC contractor, and the lender's engineer.

The two circuits of interconnecting transmission lines linking the ESP to the landfall location will be embedded by jet plow approximately 6 feet (1.8 m) below the sea floor, with approximately 20 feet (6.1 meters) of horizontal separation between circuits. As discussed previously in Section 4.1.4, the burial depth of 6 feet will insure protection of the submarine cables' mechanical integrity from inadvertent anchor drop or fishing gear interaction. Cable ampacity calculations performed by Prysmian (formerly Pirelli), a potential cable supplier, were based on a native soil thermal resistivity of 0.5°K-m/W at burial depth, as determined by the marine geophysical and geotechnical survey. This thermal resistivity is adequate to permit transfer of heat away from the affected cables (including for the two 115 kV cable per trench configuration).

Jet plow equipment uses pressurized sea water from water pump systems on board the cable vessel to fluidize sediments. The jet plow device is typically fitted with hydraulic pressure nozzles that create a direct downward and backward "swept flow" force inside the trench. This provides a down and back flow of re-suspended sediments within the trench, thereby "fluidizing" the in situ sediment column as it progresses along the predetermined submarine cable route such that the submarine cable settles into the trench under its own weight to the planned depth of burial. The jet plow's hydrodynamic forces do not work to produce an upward movement of sediment into the water column since the objective of this method is to maximize gravitational replacement of re-suspended sediments within the trench to bury or "embed" the cable system as it progresses along its route. The pre-determined deployment depth of the jetting blade controls the cable burial depth. Available tidal and current data indicates that scouring is not a significant concern. Therefore, CWA is not planning to anchor the submarine cable.

Due to the relatively shallow water depths in Nantucket Sound, shallow draft vessels/barges which typically use anchors for positioning are necessary for installation. Deeper draft vessels equipped with dynamic positioning thrusters therefore cannot be used.

The cable-laying barge is specifically designed for installations of submarine cable. It is used for both transport and installation. The submarine cable is installed in continuous lengths delivered from the cable factory and loaded directly onto a revolving turntable on the vessel. The cable system location and burial depth will be recorded during installation for use in the preparation of as built location plans. The jet plow device is equipped with horizontal and vertical positioning equipment that records the laying and burial conditions, position, and burial depth. This information is monitored continually on the installation vessel; therefore the use of an ROV is not required. This information will be forwarded to appropriate agencies and organizations as required for inclusion on future navigation charts.

A skid/pontoon-mounted jet plow, towed by the cable-laying barge, is proposed for the Project's submarine installation. This jet plow has no propulsion system of its own. Instead, it depends on the cable vessel for propulsion. For burial, the cable barge tows the jet plow device at a safe distance as the laying/burial operation progresses. The cable system is deployed from the vessel to the funnel of the jet plow device. The jet plow blade is lowered onto the seabed, pump systems are initiated, and the jet plow progresses along the pre-selected submarine cable route with the simultaneous lay and burial operation. It is anticipated that, to install each transmission line circuit to the required depth providing a minimum of six feet (1.8 meters) of cover in the sediments that are generally found along the proposed submarine transmission line route into Lewis Bay, the jet plow tool will fluidize a pathway approximately four to six feet (1.2 to 1.8 meters) wide at the seabed and eight feet (2.4 meters) deep into which the cable system settles through its own weight. As mentioned above, the jet plow device is equipped with horizontal and vertical positioning equipment that records the laying and burial conditions, position, and burial depth. The pontoons can be made buoyant to serve different installation needs.

The geometry of the trench is typically described as trapezoidal with the trench width gradually narrowing with depth. Temporarily re-suspended in situ sediments are largely contained within the limits of the trench wall, with only a minor percentage of the re-suspended sediment traveling outside of the trench. Any re-suspended sediments that leave the trench tend to settle out quickly in areas immediately flanking the trench depending upon the sediment grain-size, composition, and hydraulic jetting forces imposed on the sediment column necessary to achieve desired burial depths. Jet-plowing operations would not be scheduled during or prior to any predicted extreme storm events. Additionally, jet-plowing would be suspended during any unanticipated extreme storm events.

This interconnection to the mainland will involve the installation of approximately 12.5 circuit miles (20.1 kilometers) of which 7.6 miles (12.2 kilometers) are within Massachusetts' waters of transmission cable for each of the two circuits. The installation of the submarine transmission line via jet plow embedment is anticipated to take approximately two to four weeks to complete. As the jet plow progresses along the route, the water pressure at the jet plow nozzles will be adjusted as sediment types and/or densities change to achieve the required minimum burial depth. In the unlikely event that the minimum burial depth is not met during jet plow embedment, additional passes with the jet plow device or the use of diver-assisted water jet probes will be utilized to achieve the required depth.

Prior to pulling the cable ashore and to the sea-land transition vault, the jet plow will be set up in the pre-excavation pit located at the offshore end of the drilled conduit. The cable will then be floated from the barge with assistance of small support vessels. The cable end will be securely anchored in place after being pulled through the jet plow and into the high density polyethylene conduit installed during the HDD and secured beyond the transition vault.

From the HDD exit point, the cable is embedded across the shallows by means of towing the jet plow along the cable route from the smaller barge's winch. The cable and jet hose will be supported by cable floats to maintain control of cable slack and the amount of hose out. The cables between the jet plow start point and the transition vault will be inside the high density polyethylene conduit.

When the cable embedment has proceeded into deeper water and nears the barge, the jet plow setback will be secured approximately 20-30 feet (6.1-9.1 meters) behind the stern chute, the barge will lift its spuds and begin winching along the cable route, with the six-point mooring system (which will utilize mid-line buoys) towing the jet plow and feeding cable off the barge and into the plow funnel as it moves along the route at a rate equal to the barge movement. This will be repeated for the second circuit.

The barge will propel itself along the route with the forward winches, and the other moorings holding the alignment of the route. The six-point mooring system allows the support tug to move anchors while the installation and burial proceeds uninterrupted on a 24-hour basis.

When the barge nears the ESP the transmission cable will be pulled into the J-tube and terminated at the switchgear.

CWA will contact NMFS and BOEMRE within 24-hours of the commencement of jet plowing activities and again within 24-hours of the completion of the activity.

4.1.7 Transition to Landfall

The transition of the interconnecting 115 kilovolt submarine transmission lines from water to land will be accomplished through the use of HDD methodology in order to minimize disturbance within the intertidal zone and near shore area. The HDD will be staged at the upland landfall area and involve the drilling of the boreholes from land toward the offshore exit point. Conduits will then be installed the length of the boreholes in order for the transmission lines to be pulled through the conduits from the seaward end toward the land. Two parallel transition manhole/transmission line splicing vaults will be installed using conventional excavation equipment (backhoe) at the upland transition point where the submarine and land transmission lines would be connected (see Figure 4-21 of the DEIS).

There will be four 18-inch (0.46 m) High Density Polyethylene (HDPE) conduit pipes (one for each three-conductor 115 kV cable and fiber optic cable set) installed to reach from the onshore transition vaults to beyond the mean low water level. The offshore end will terminate in a pre-excavated pit where the jet plow cable burial machine will start. The four conduits will have an approximately 10 foot (3 meters) separation within the pre-excavation area. The four boreholes will be approximately 200 feet (61 meters) long (borehole diameters will be slightly larger than the conduit diameter to allow the conduit to be inserted in the borehole) (see Figure 4-21 of the DEIS).

A drill rig will be set up onshore behind a bentonite pit where a 40-foot (12.1 meter) length of drill pipe with a pilot-hole drill bit will be set in place to begin the horizontal drilling. A bentonite and freshwater slurry will then be pumped into the hole. The HDD construction process involves the use of the bentonite and freshwater slurry in order to transport drill cuttings to the surface for recycling, aid in stabilization of the in situ sediment drilling formation, and to provide lubrication for the HDD drill string and down-hole assemblies. This drilling fluid is composed of a carrier fluid (freshwater) and solids (bentonite clay). The ratio of the drilling fluid is expected to be ninety-five percent water and five percent inorganic bentonite clay, which is a naturally occurring hydrated aluminosilicate composed of sodium, calcium, magnesium, and iron.

After each 40 feet (12.1 meters) of drill pipe installation, an additional length of drill pipe is added, until the final drill length is achieved. To minimize the release of the bentonite drilling fluid into Lewis Bay, freshwater will be used as a drilling fluid to the extent practicable for the final section of drilling just prior to the drill bit emerging in the pre-excavated pit. This will be accomplished by pumping the bentonite slurry out of the hole, and replacing it with freshwater as the drill bit nears the pre-excavated pit. When the drill bit emerges in the pre-excavated pit, the bit is replaced with a series of hole-opening tools called reamers that are designed to widen the borehole. Once the desired hole diameter is achieved, a pulling head is attached to the end of the pipe and the drill pipe is used to pull back the eighteen inch (457 millimeter) diameter conduit into the bored hole from the offshore end. As with the pilot hole drilling process, freshwater will be utilized to the maximum extent practicable as the reaming process nears the pre-excavated pit.

After the borehole has been constructed, 18-inch (45.7 centimeter) diameter HDPE pipe will be installed in each borehole to serve as protection for the submarine cable system. Smaller conduits with pulling wires will be placed inside the 18-inch (45.7 centimeter) diameter HDPE pipe to house the submarine cable system. Once the internal cable conduits have been inserted into the 18-inch (45.7 centimeter) HDPE conduit, a clay/bentonite medium will be injected into the conduit system to fill the void between the cable conduits and the 18-inch (45.7 centimeter) pipe. The conduits will be sealed at both ends until the submarine cable system is ready to be pulled through the conduit. After submarine cable system installation, the conduits will then be permanently sealed at each end to complete the installation process.

The HDD operation will include an upland based HDD drilling rig system, drilling fluid recirculation systems, residuals management systems, and associated support equipment. HDD drilling material handling equipment will be located on New Hampshire Avenue. Drilling will take place from the upland to Lewis Bay. Excavated soils will be temporarily stored near the HDD drill rig during construction, and will then be reused onsite or removed and disposed of as required.

To further facilitate the HDD operation, a temporary cofferdam will be constructed at the end of the boreholes in Lewis Bay. The cofferdam will be approximately 65 feet (19.8 meters) wide and 45 feet (13.7 meters) long and will be open at the seaward end to allow for manipulation of the HDD conduits. The area enclosed by the cofferdam will be approximately 2,925 square feet (271.7 square meters). The cofferdam will be constructed using steel sheet piles driven from a barge-mounted crane. The top of the sheet piles will be cut off approximately 2 feet (0.61 meters) above mean high water. This will serve to contain any turbidity associated with the dredging and subsequent jet plow embedment operations and to provide a visual reference to its location for mariners. While the cofferdam will be located outside of areas normally subject to vessel traffic, the location of the cofferdam will be appropriately marked to warn vessels of the temporary cofferdam's presence.

The area inside the cofferdam will be excavated to expose the seaward end of the borehole. Sediment inside the cofferdam will be excavated to expose the area where the HDD borehole will end at an elevation of approximately -10 feet (-3 meters) relative to mean lower low water, with a 1 foot (0.3 meter) allowable over dredge. A 20 foot (6.1 meters) long level area will be created at the closed end of the cofferdam at this elevation. From that point, the bottom of the excavated area will be sloped at 4 horizontal:1 vertical until it meets the existing seafloor bottom contour. Approximately 840 cubic yards (642.2 cubic meters) of sediment will be excavated from the cofferdam. At the end of the cable installation, the cofferdam excavation will be backfilled, rather than allowed to in-fill over time. The dredged material will be temporarily placed on a barge for storage, and then the dredged area of the cofferdam will be backfilled with the dredged material. If necessary, the dredged material backfill material will be supplemented with imported clean sandy backfill material to restore the seafloor to preconstruction grade. No removal of sediment outside of the cofferdam will be required.

The cofferdam will help to facilitate threading of the submarine cable system through the 18-inch (45.7 cm) diameter HDPE pipes placed in the horizontal directional drilled boreholes. This temporary cofferdam will be installed prior to the beginning of the HDD borehole construction, and will remain in place until jet plow embedment installation of the submarine cable system is complete.

The HDD operations will be conducted to minimize or avoid impacts to water quality in Lewis Bay. The upland HDD operation will be a self-contained system combined with a drilling fluid re-circulation system. This re-circulation system will recycle drilling fluids and contain and process drilling returns for offsite disposal to minimize excess fluids disposal and residual returns. None of these materials will be directly discharged or released to marine or tidal waters in Lewis Bay.

Each of the two landfall transition vaults will be approximately 8 feet (2.4 meters) wide by 35 feet (10.7 meters) long (outside dimensions) (see Figures 2.3.7-1 of the FEIS and Figure 4-21 of the DEIS). The submarine transmission lines will be spliced to the upland transmission lines within these transition vaults. Each transition vault will contain two 38-inch (96.5 centimeters) manholes for access and be installed approximately with its bottom ten feet (2.4 meters) below grade. The submarine transmission lines will enter through the four 18-inch (45.7 centimeter) HDPE conduits and the upland transmission lines will exit the landfall transition vault to the ductbank system through 6-inch (15.3 centimeter) diameter PVC conduits. There will be a total of 16 PVC conduits encased within concrete: 12 transmission line conduits, two conduits for 96-fiber fiber optic cables for telecommunications, supervisory control and data acquisition (SCADA) and protective relaying, and two spare conduits for the upland transmission line, as shown in Figures 2.1.3-4 and 2.1.3-5 of the FEIS.

It is anticipated that the installation of the borehole and conduit by HDD techniques will take approximately two to four weeks.

Upon completion of the installation of the conduit pipes and submarine cable system, the HDD equipment will be removed and New Hampshire Avenue will be restored to its pre-construction grades and conditions. Standard stormwater erosion and sedimentation controls will be installed on the site prior to the initiation of construction activities, and will be inspected and maintained throughout construction operations per the SWPPP (Appendix F)[2]. Once construction is completed, all equipment and construction materials will be removed from the site and the area will be returned to its original condition.

4.1.8 Vessels, Equipment, Staging and Transportation Routes

Overland transportation corridors are described in Section 4.4.1 of the FEIS. Airport facilities are described in Section 4.4.2 of the FEIS. Port facilities are described in Section 4.4.3 of the FEIS.

[2] While CWA is submitting its SWPPP in compliance with the Lease, CWA notes that the SWPPP is applicable to upland activities only which are outside of BOEMRE's jurisdiction. CWA further notes that the Part 285 regulations do not require that a SWPPP be submitted as part of a COP. CWA will submit its SWPPP to the EPA for substantive review, which has permitting authority for general stormwater permits under the National Pollutant Discharge Elimination System (NPDES).

Other infrastructure, such as communication infrastructure, is described in Section 4.4.4 of the FEIS.

4.1.8.1 Vessels and Equipment

This section provides a list of the primary equipment that will likely be required to complete all phases of construction. This primary equipment will be supplemented by hand tools and power tools such as impact drivers and wrenches, drills, hammers, grinders, sanders, saws, torches, welders, etc. that are typically used by construction work crews. Construction of the Project will generally consist of the following phases:

- Onshore Staging
- Monopile and Transition Piece Installation
- Wind Turbine Generator Installation
- Electric Service Platform Installation
- 33 kV Inner-array Submarine Transmission Cable System Installation
- 115 kV Submarine Transmission Cable System Installation
- Landfall Transition Installation
- Upland Transmission Line Installation

A summary of each construction phase, and detailed descriptions of each key component of the Project are provided above. For simplicity, several construction phases have been combined in the discussion that follows either because the installation methods are similar (e.g. submarine cables) or the phases are closely related in sequence (e.g. monopile and wind turbine generator installation).

Onshore Staging

- 800 HP Cranes
- Heavy-Duty Trucks
- Pick-up Trucks

Wind Turbine Generator Installation

- Monopile Installation Jack-Up/Spud Barge
    - 800 HP Crane
    - Pile Driving Hammer Equipment
    - Tool Room
    - Deck Lighting

  - Emergency Spill Response Kit
  - Porta-John
  - Office Trailer
  - Lunch Room
- Transition Piece Installation Jack-Up Barge
  - 800 HP Crane
  - Tool Room
  - Deck Lighting
  - Emergency Spill Response Kit
  - Porta-John
  - Office Trailer
  - Lunch Room
- WTG Component Installation Jack-Up Barge (towers, nacelles, hubs, and blades)
  - 800 HP Crane
  - Tool Room
  - Deck Lighting
  - Emergency Spill Response Kit
  - Porta-John
  - Office Trailer
  - Lunch Room
- Pre-Installed Component Transport Spud Barges
  - Monopiles
  - Transition Pieces
  - Hub
  - Nacelle
  - Blades

Auxiliary Support Vessels

- Scow Barges
- Tug Boats

- 3,000 HP Attendant Tugs
- 6,000 HP Tow Tugs
- Work Skiffs

Electric Service Platform Installation

- Foundation Transport Barge
- Foundation Installation Jack-Up Barge
    - 3,000 HP Crane
    - Pile Driving Hammer Equipment
    - Tool Room
    - Deck Lighting
    - Emergency Spill Response Kit
    - Porta-John
    - Office Trailer
    - Lunch Room
- Service Platform Superstructure Transport and Lift Jack-Up Barge
    - 800 HP Crane
    - Tool Room
    - Deck Lighting
    - Emergency Spill Response Kit
    - Porta-John
    - Office Trailer
    - Lunch Room
- Auxiliary Support Vessels
- Scow Barges
- Tug Boats
- 3,000 HP Attendant Tugs
- 6,000 HP Tow Tugs
- Work Skiffs

Submarine Cable Installation (including 33kV and 115kV cables)

- Purpose-built Cable Laying Vessel (deep water)
- Cable Holding Barge
- Cable Installation Barge (shallow water)
- Skid/Pontoon Mounted Jet Plow
- Jet Plow support systems (including pumps and accessories)
- Cable laying support systems (including cable machines, chute, tubs and complete diving operations center to support divers)
- 1,500 HP Tow Tug Boats (for handling anchors)
- Six-point mooring system with two 60-inch spuds. The mooring system will consist of 3 double winches, plus another double drum winch for controlling the two spuds. Each winch drum will contain approximately 2,000 feet (610 meters) of 1 1/8" (28.6 millimeter) mooring cable and have an anchor attached. Mid-line buoys will be attached to minimize anchor cable scour. Pendant wire with 58-inch (1.5 m) steel ball buoys will be attached to anchors for deployment and quick recovery
- Auxiliary trencher pulling barge - a small barge of 40 x 100 feet (12.2 x 30.5 meters) outfitted with spuds
- Auxiliary Vessels
- Crew Boat
- Inflatable Boats
- Work Skiffs.

Landfall Transition

- Marine Support Equipment:
  - Porta-John
  - Deck Barge with Spuds
  - 150-200 Ton Crane
  - Vibratory Driver / Excavator
  - Environmental Clamshell Bucket
  - Tool Room
  - Dive Spread
  - Diesel Welder

- Deck Lighting
- Emergency Spill Response Kit
- Office Trailer
- Lunch Room
- Materials Deck Barge – as required
- Scow Barge – as required
- Tug Boat – as required
- Work Skiffs
- Land Support Equipment
- Horizontal Directional Drilling Rig
- Bore/Drill Rigs
- High Density Polyethylene Fusion Machine
- Excavator
- Cement Mixer
- Front End Loader
- Graders
- Rough Terrain Crane
- Vibratory Driver / Extractor
- Dump Truck
- Heavy-Duty Trucks
- Pick-up Trucks

Upland Cable Installation

- Heavy-Duty Trucks
- Winch
- Bore/Drill Rigs
- Crane
- Backhoe
- Excavator
- Trenchers
- Compressor

- Dump Trucks

The Project is subject to the U.S. EPA's General Conformity Regulation (40 CFR 93) for the air emissions from all vessels and equipment associated with the Project during its construction, while located outside of 25 miles from the site and within state jurisdictional boundaries. The MMS (now BOEMRE) issued a Final General Conformity Determination for the Project in December 2009.

The Project is also subject to the U.S. EPA's Outer Continental Shelf (OCS) Air Regulations (40 CFR 55) for the air emissions from all vessels and equipment associated with the Project during both construction and operation, while located within 25 miles from the site. The U.S. EPA issued the Final OCS Air Permit for the Project on January 7, 2011 (see Appendix H).

Both the General Conformity Determination and the OCS Air Permit for the Project contained emission limitations, emissions offset requirements, and mitigation, monitoring, recordkeeping, and reporting requirements for the Project related to its emissions and potential impacts to air quality. Additional requirements for the Project related to the mitigation and monitoring of impacts to air quality are contained in the Lease issued by BOEMRE. These requirements include the following:

- <u>CWA will purchase Emission Reduction Credits</u>. Massachusetts and Rhode Island are both designated as non-attainment areas for ozone by the U.S. EPA. Therefore, the nitrogen oxides (NO_X) emissions from any source whose emissions exceed the minimum thresholds must offset its NO_X emissions, so as to not contribute to any further degradation of air quality in a non-attainment area. The NO_X emissions from vessels and equipment associated with the Project during its construction exceed the minimum thresholds; therefore as a condition of both the General Conformity Determination and the OCS Air Permit, CWA must offset its NO_X emissions during construction. CWA will acquire Emission Reduction Credits (ERC) in a sufficient quantity to satisfy the Project's offset requirements during its construction. In accordance with the Conformity Determination, Cape Wind will provide MMS documentation of the purchase of offsets prior to commencement of construction activities.

- CWA will provide BOEMRE with descriptions of any emission control technologies, quantification of the emission reductions that would be achieved, etc.. The Project's emissions offset requirement described above can be achieved by either the purchase of ERCs, the reduction of emissions through reduced equipment usage or additional emissions controls, or by a combination of each. If Project emissions during construction are offset by utilizing additional emissions controls, CWA will provide BOEMRE with a description of any emission control technologies used, and a quantification of the resulting emission reductions achieved by their use.

- <u>CWA will provide</u> BOEMRE <u>with data on horsepower rating of all propulsion and auxiliary engines, duration of time operating in State waters, load factor, and fuel consumption,</u>

for each vessel, including vessels delivering materials and supplies to the staging site, going to and from Quonset Point. CWA provided MMS (now BOEMRE) with estimated specifications for all of the vessels to be used during the Project's construction phase in State waters for the General Conformity Determination. This information was used to estimate the Project's potential emissions from such vessels and to estimate the quantity of emissions offsets required to satisfy General Conformity. CWA will provide the requested specifications for such vessels to BOEMRE as required by the Lease during its construction in order to determine the actual emissions from the vessels so that it can be confirmed that sufficient emissions offsets have been acquired for their use.

- In accordance with the EPA Air Permit, CWA will provide the engine information and emissions control equipment no later than 30 days before the start of Phase 1 (as defined in the EPA air permit).
- CWA will comply with any requirements specified by the BOEMRE in order to meet the general conformity requirements applicable at the time of decommissioning of any facility or structure.
- CWA will ensure that contractors operating diesel-powered equipment at the Quonset Point staging site use ultra low sulfur diesel fuel, if requested to do so by the Rhode Island Department of Environmental Management (RIDEM). 40 CFR 80.510(b) requires that, beginning June 1, 2010, all non-road diesel fuel is subject to a 15 parts per million (ppm) sulfur content limit, which is defined in practice as ultra low sulfur diesel (ULSD) fuel. CWA will ensure that the fuel used for all diesel-powered equipment associated with the Project meets its respective EPA sulfur content limit, which will include the use of ULSD fuel for all non-road diesel-powered equipment operated at the construction staging site.
- CWA will ensure that contractors operating vehicles, diesel engines, or non-road diesel engines at the Quonset Point staging site limit unnecessary idling. RIDEM Air Pollution Control Regulation No. 45 prohibits the unnecessary idling of diesel motor vehicles and non-road diesel engines. The Code of Massachusetts Regulations (310 CMR 7.11) prohibits the unnecessary idling of the engine of a motor vehicle in excess of five minutes. CWA will ensure that contractors operating vehicles, diesel engines, or non-road diesel engines at the construction staging site limit unnecessary idling.

4.1.8.2 Staging and Construction Management

CWA has been kept aware of the proposal by the Commonwealth of Massachusetts and the City of New Bedford to construct a Multi-Purpose Marine Commerce Terminal that could, among other purposes, serve as a staging area for construction of offshore wind projects, including the Project. At this time, however, it is unclear whether such Terminal would be both developed and available on a timeline that would meet the construction schedule for CWA set forth in this COP. Therefore, this COP is submitted with Quonset Point serving as the Project's staging area, and BOEMRE should review this filing on that basis. In the event, however, that the New Bedford Terminal does becomes available and CWA proposes its utilization for all or a substantial portion of the Project's staging requirements, CWA would submit a notice of project change and seek an appropriate and corresponding COP modification at that time.

The COP proposes that major construction activities will be supported by onshore facilities, located in Quonset, Rhode. The most probable scenario is that the majority of material and equipment will be staged onshore and then loaded onto various vessels for transportation to the offshore site, and ultimately installation. Construction personnel will be ferried by boat and/or helicopter depending upon weather conditions and other factors. Once loaded, vessels traveling from Quonset would pass through Narragansett Bay to Rhode Island Sound to Vineyard Sound, North of Martha's Vineyard to the Main Channel, a distance of about 55 nautical miles (102 kilometers).

Quonset, Rhode Island

CWA has identified an existing, underutilized, industrial port facility in Quonset, Rhode Island, as having the attributes required for staging an offshore construction project of the magnitude of the Project. The Quonset Business Park is located on Narragansett Bay in the town of North Kingstown, Rhode Island and is owned and controlled by the Quonset Development Corporation, a quasi-state agency that operates the 3,160-acre industrial park. This site is a portion of what once was a much larger government facility known as the U.S. Naval Reservation–Quonset Point, part of which is still actively utilized as a civilian airport and base for an Air National Guard Reserve squadron.

The Quonset Business Park is an active marine industrial site that houses several industrial businesses such as General Dynamics (shipbuilding) and Senesco (marine construction). Following the downsizing of the US Naval Reservation–Quonset Point, the park was created in order to develop prime industrial sites, create job opportunities and to improve the economic conditions throughout the region. The proposed staging of the Project from the Quonset Business Park is consistent with the park's stated purpose.

The entire park consists of approximately 3,150 acres (12.75 square kilometers), of which 817 acres (3.3 square kilometers) have been sold for such uses as industrial, offices, and transportation/utility (railroad and highways). Another 463 acres (1.9 square kilometers) have current leases, 605 acres (2.45 square kilometers) are used for a civilian airport (Quonset State Airport - OQU) operated by the State of Rhode Island, approximately 600 acres (2.43 square kilometers) are designated open space, about 200 acres are utilized for recreation including a golf course, and the remaining 465 acres (1.9 square kilometers) are vacant, open land available for industrial and commercial activities.

The site has deep-water capacity (30 feet [9 meters] depth) and two piers that are 1,200 feet (366 meters) in length and capable of servicing the largest of ships. One of the piers

(Pier 1) is currently leased by a company as an automobile unloading and transfer operation. The other pier (Pier 2) has intermittent use as a staging area for the Rhode Island Department of Transportation bridgework. Pier 2 would become available in the near future; however, based on timing, either pier may be available for lease.

CWA plans the use of Pier 2 because it has a load bearing capacity of over 1,000 pounds per square feet (4890 kilograms per square meters) and is 1,200 feet (365.9 meters) long by 650 feet (198.2 meters) wide. This pier would be used for the receiving, storing and assembly of the large turbine parts such as the monopiles, towers, nacelles, transition pieces, hubs, and blades. CWA and the Rhode Island Economic Development Corporation have discussed leasing all or part of Pier 2 and the land contiguous to it, which consists of approximately 33.5 acres (0.14 square kilometers) zoned for industrial or commercial activity. Additional land is also available within the park, approximately 3,000 feet (914.6 meters) away, which is accessible by a public road approximately 40 feet (12.2 meters) in width. These satellite parcels consist of approximately 25 plus acres (0.1 square kilometers) that could be used for other components of the wind turbines and associated infrastructure if needed. One of the parcels has two large buildings, which were utilized by the U.S. Navy Construction Battalion (Seabees) during the 1940's, 1950's, and 1960's, which may be capable of handling certain requirements of the Project for covered storage and enclosed workspace. Some modifications to the buildings and roadways may be required to accommodate the specialized equipment and wind turbine components. The deep-water piers are adequate to accommodate anticipated construction vessels and are not expected to require any additional dredging or modification.

New Bedford, Massachusetts

Regardless of the site for staging of construction, CWA expects that post-construction parts storage and larger maintenance supply vessels will be based out of New Bedford once the Project is operational. New Bedford Harbor is at the mouth of the Acushnet River. The Port of New Bedford is a deep-water port with depths of 30 feet (9 meters). The harbor features a hurricane barrier that stretches across the water from the south end of New Bedford to the Town of Fairhaven. The barrier's 150-foot (46 meter) opening is closed during hurricane conditions and coastal storms, making New Bedford one of the safest harbors on the eastern seaboard.

Across the harbor, shipyards line the Fairhaven waterfront. Marine service and vessel repair industries in Fairhaven have established reputations along the East Coast. Two major shipyards, D.N. Kelley & Son and Fairhaven Shipyard, are known internationally for quality repair on all types of boats.

Falmouth, Massachusetts

Falmouth Harbor located in the town of Falmouth, Massachusetts is the primary target to be utilized as a personnel staging area for the daily transport of crews to the construction site.

Falmouth Harbor is a relatively narrow well protected harbor located on the southwestern tip of Cape Cod. The harbor is approximately 10-12 miles from the wind farm site with less than 10 minutes of travel time from dockside to harbor entrance. This short distance to open water results in reduced time transporting to and from work site. Falmouth Harbor is mainly a recreational boating destination with several ferry vessels serving Martha's Vineyard Island. Falmouth is located within one hour of major cities Boston and Providence.

Falmouth Harbor has several marine service companies that are capable of supporting crew transport type vessel repairs. It is one of the facilities that will be utilized as a crew staging area and future operations and management (O&M) center for the Project. The facility has underutilized building and bulkhead area and is easily accessible from the main roadways leading to Falmouth. There is sufficient dockage for several crew vessels with bulkhead access for loading of vessels. There is also sufficient offsite parking that can be utilized throughout the tourist months and for the duration of construction. Converting the construction staging area into the O&M staging area and control center would result in cost savings and logistic synergies by allowing commissioning personnel and O&M personnel to work together during the transition phase.

4.1.8.3 Navigation And Transportation Routes

Information regarding Navigation and Transportation Routes is provided in the FEIS.

- Overland transportation corridors: Section 4.4.1 of the FEIS.
- Airport facilities: Section 4.4.2 of the FEIS.
- Port facilities: Section 4.4.3 of the FEIS.

4.1.9 Anchoring

Installation vessels will be stationed in the Project Area using a combination of jack-up spud emplacement and anchor deployment. The installation vessel anchors are emplaced by anchor handling vessels (AHV) that are specifically designated for anchor handling support operations. More specific details about the anchoring, including the size and anticipated scope associated with anchors, will be determined once a contractor has been selected. A more detailed description of anchoring will be provided in the Fabrication and Installation Report (FIR), which will be provided following COP approval. The following discussion is provided as an overview of the potential anchoring activities that will take place throughout the offshore construction process.

4.1.9.1 Equipment

The specification of the mooring winches, wires and anchors will be determined once a contractor is selected. A representative example of anchor tackle to be used is provided below.

Wire anchor configuration:

- Nominal pull of winch: 4 x 30 Metric tons (Mt)
- Stalling pull: 4 x 45 Mt
- Wire specification: 48 mm
- Spooling capacity winch: 4 x 900m wire
- Anchors: 4 x 4 Tons Flipper Delta

Chain anchor configuration:

- Nominal pull of chain anchor winch: 10 Mt
- Chain length: 235 meter 56 mm
- Anchor: 5 Tons Spec Anchor

Mid-line buoys will be attached to all anchors in order to minimize anchor cable scour and bottom impacts. In addition, pendant wire with steel ball buoys will be attached to anchors for deployment and quick recovery.

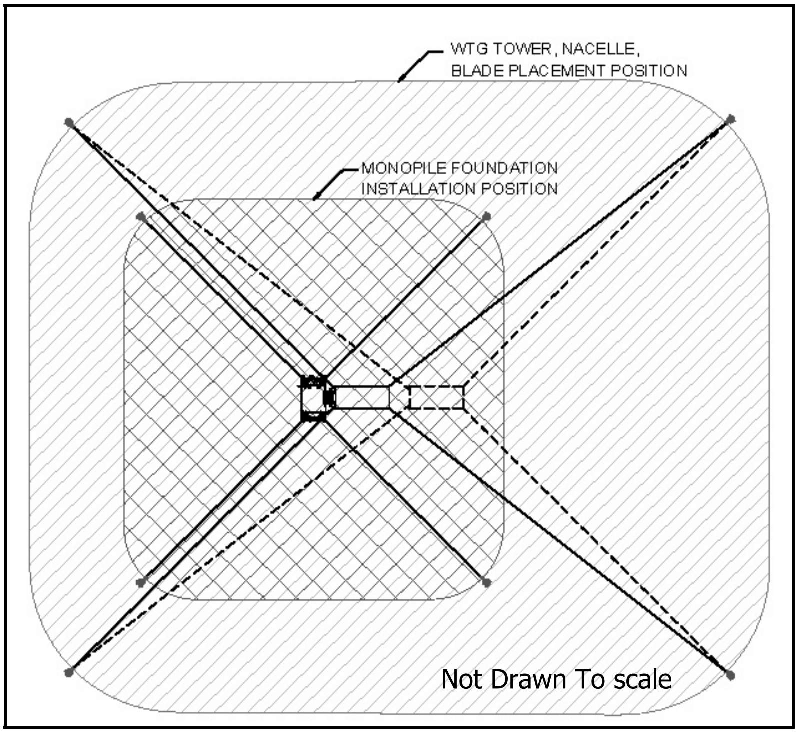
4.1.9.2 Anchor Configuration

As noted in the FEIS, anchors for installation will be configured in a four point configuration (Section 2.3.4 and 2.3.5). CWA anticipates that two additional spuds may be used to secure the vessel position during installation of the 115 kV submarine cable as described in Section 2.3.5 of the FEIS.

A representative anchor configuration for WTG and monopile installation is illustrated in figure 4.1-1. Two separate vessel deployments are shown below illustrating the monopile foundation installation and WTG installation phase and the anticipated anchor configuration. During the installation of the monopile foundation, the installation vessel is positioned adjacent to the installation location and two anchors are positioned forward and two anchors are positioned aft of the installation vessel. During the placement of the WTG tower, nacelle, and blades, the installation vessel moves away from the monopile and repositions the four anchors in the same configuration, although the length of anchor scope is greater for the second phase of this installation. The approximate overall area of temporary impact around each WTG is approximately 1500 feet in each direction. Due to overlapping coverage between WTGs, the temporary impacts related to the cabling are included in the entire anchor impact area as shown on Drawing 1 Sheet 1. The total permanent impacts related to the Project (monopiles, cables and rock armoring) as presented in FEIS Section 2.2 are 54.38 acres

Figure 4.1-1

Potential WTG Installation Anchor Configuration



The representative extent of the potential total temporary anchor impact area is provided on the Location Plat, as denoted by a red line (Drawing 1, Sheet 1).

4.1.9.3 Placement of Anchors

The anchor deployment sequence will depend on the prevailing tide, current, waves and wind direction during anchor operations. The installation vessels and AHVs will be equipped with appropriate surface positioning systems for accurate positioning of the anchors. The surface positioning systems will include survey equipment consisting of a GPS and Gyro compass systems.

Once all anchors have been deployed, the anchors will be pre-tensioned (test load) to ensure the anchors have adequate holding capacity. If an anchor does not hold it will be recovered and redeployed and the procedure will be repeated.

4.1.9.4 Operational Contingency

Vessels motions resulting from weather will restrict anchor handling work. Certain anchor handling activities are more weather sensitive than others, and the amplitude of motions depends on the heading of the installation vessels relative to wind, waves and current.

During anchor handling, the weather restriction that applies is also in relation to the motions of the AHV and its ability to handle and place anchors. The decision to proceed with anchor handling will depend on weather forecasts and the outlook for the construction activity period.

Throughout the anchor handling phase of the work, the following environmental conditions of the offshore work site will be monitored:

- Wind speed and direction
- Wave length, period and direction (visually)
- Current speed and direction (visually)
- Water-depth

4.2 Onshore Construction Plan

This section describes onshore Project facilities, including design and fabrication, and installation methods for each component and support facilities. Safety management systems to ensure the appropriate training and safety of onshore construction personnel are summarized below and detailed in Appendix E.

4.2.1 Summary of Safety Management System

The Project's SMS is provided in Appendix E, and details specific safety practices and procedures to be adopted during onshore construction The SMS describes overall safety policies and objectives, organization and responsibilities, methods to identify, assess, control and mitigate hazards, training and emergency response procedures, and compliance monitoring. For additional information, see Appendix E.

4.2.2 Upland 115 kV Transmission Cable System

Once the 115 kV submarine transmission lines make landfall at New Hampshire Avenue (as described in section 4.1.9), the submarine transmission lines will be interconnected with a 115 kV upland transmission line system within two parallel below-grade landfall transition vaults that will have interior dimensions of approximately 7'0" (2.13 m) W x 34'0" (10.36 m) L x 7'6" (2.29 m) H, containing one circuit each. (see Figure 2.3.7-1 of the FEIS) The upland transmission line system will utilize 12 single-conductor 115 kV cables each with copper conductor, Extruded Cross-linked Polyethylene (XLPE) insulation, copper wire metallic shielding, aluminum/polymer laminate moisture barrier and an outer polyethylene sheath. The metallic shields of the cables will be cross-bonded to minimize the cable losses and to limit induced voltages in the shields (see Figure 4-11 of the DEIS). The conductor cross section would be approximately 1.24 square inches (800 mm2). The 12 cables would be segregated into two circuits, each composed of two cables per phase. The balance of the upland cable route will be installed in buried concrete ductbank as described below.

Upon making landfall, the proposed transmission cable route would then follow New Hampshire Avenue north, merging with Berry Avenue. The route continues north on Berry Avenue, crossing Route 28 and continuing north on Higgins Crowell Road to Willow Street. Proceeding north on Willow Street, the route passes under Route 6 to the proposed intersection point with the existing NSTAR Electric 115 kV transmission cable ROW, approximately 500 ft (152.4 m) north of Summer Street. The route then turns westerly within the NSTAR Electric's existing ROW to the Barnstable Switching Station, crossing under Route 6. The proposed onshore transmission cable would be located within the existing public roadways for a length of approximately 4 miles (6.4 km) from landfall to NSTAR Electric transmission cable ROW located on the west side of Willow Street. The onshore transmission cable would then continue underground approximately 1.9 miles (3.1 km) along existing NSTAR Electric ROW and running from Willow Street to the Barnstable Switching Station. A new 115 kV bus at the Barnstable Switching Station will be the point of sale and change in ownership for the power being delivered to ISO New England.

Installation of the proposed onshore transmission cable includes constructing a utility easement within and along four roadways: New Hampshire Avenue, Berry Avenue, Higgins Crowell Road, and Willow Street. The easement would also include the crossing of Route 28 and Route 6. The onshore transmission cable would affect several intersections.

New Hampshire Avenue: New Hampshire Avenue is a two-lane residential road allowing vehicle access in a north-south direction. The roadway is a dead-end with a concrete retaining wall at its southern end. There are no sidewalks on either side of the roadway. In addition, there is no on-street parking. The transmission cable would be installed within the east side of the roadway.

Berry Avenue: Berry Avenue is a two-lane residential road allowing vehicle access in a north-south direction. There are sidewalks on both sides of the roadway. The transmission cable would cross to the west side of Berry Avenue off of New Hampshire Avenue.

Intersection 1 - Route 28 between Berry Avenue and Higgins Crowell Road: At the intersection with Berry Avenue and Higgins Crowell Road, Route 28 is a two-lane roadway with a painted divider. Vehicles on Route 28 travel in an east-west direction. The intersection of Route 28 with Berry Avenue and Higgins Crowell Road is signalized. There are sidewalks on both sides of Route 28. The transmission cable would be installed underneath Route 28 using trenchless technologies.

Higgins Crowell Road: Higgins Crowell Road is a two-lane road with a painted divider and vehicle travel is in a north-south direction. There are no sidewalks on either side of the roadway; however, there are unpaved shoulders along either side. The transmission cable would be placed on the east side of Higgins Crowell Road.

Intersection 2 - Buck Island Road: At the intersection with Higgins Crowell Road is a two-lane roadway with a painted divider. Vehicle on Buck Island Road travels in an east-west direction. The intersection of Buck Island Road with Higgins Crowell Road is signalized. The transmission cable would be installed beneath Buck Island Road using trenchless technologies.

Willow Street: Willow Street is a two-lane road with a painted divider. Vehicle travel is in a north-south direction. There are no sidewalks on either side of the roadway; however, there are unpaved shoulders along either side. The transmission cable would be placed on the west side of Willow Street.

Route 6 Crossings: The transmission cable would be installed using trenchless techniques as it passes underneath the Route 6 overpass. Approximately 0.5 mile (0.8 km) past the Route 6 overpass, the transmission cable would enter the NSTAR Electric ROW. The transmission cable would also cross under Route 6 from the NSTAR Electric ROW from north to south to connect with the Barnstable Switching Station. This crossing would also be accomplished using trenchless techniques.

The upland transmission line will enter the NSTAR Electric ROW and make the physical connection to the Barnstable Switching Station by continuing with two new underground transmission lines in the existing NSTAR Electric ROW approximately 1.9 miles (3.1 km) in length and running from the point where the new upland transmission line intersects the existing ROW in Yarmouth to the Barnstable Switching Station. The two transmission lines together would be comprised of 12 (2 circuits x 2 conductor/phase x 3 phases) cables of approximately 800 mm^2 (approximately 1,600 kcmil) in a cross sectional area. A third bay would be added at the Barnstable Switching Station to allow for the installation of three new circuit breakers and two banks of shunt reactors. (see Figure 2.1.3-2 of the FEIS).

4.2.3 Ancillary Structures

The duct system will consist of a single ductbank, approximately 5'8" (1.73 m) W by 2' (0.61 m) H in size with a total of sixteen (16) 6-inch (0.15 m) PVC ducts encased within a concrete envelope. The ductbank will be constructed within a trench beneath existing roadway corridors along the majority of the route. Twelve (12) of the 16 ducts will be occupied with the upland transmission lines, two ducts will contain fiber optic lines for protective relaying and communications, and two vacant ducts will be reserved for future use as spares. Figure 2.1.3-4 of the FEIS shows typical cross section of the transmission line "eight over eight" ductbank, which will also be utilized within the NSTAR Electric ROW. Figure 2.1.3-5 shows a typical cross section of the transmission line "four over four" ductbank, which will be utilized to transition from underground vaults to the "eight over eight" ductbank.

In addition to the landfall transition vault at the New Hampshire Avenue landfall site, the proposed transmission facility will include approximately 15 underground vaults along the public roadway layout portion of the proposed route and approximately nine underground vaults within NSTAR Electric's ROW. The vaults will include upland transition vaults which are required at locations utilizing trenchless techniques and typical splice vaults. All vault locations will include two parallel vaults constructed of reinforced concrete, approximately 8 inches thick. The interior dimensions of the upland transition vaults and the splice vaults will be 7'0" (2.13 m) W x 33'6" (10.21 m) L x 7'6" (2.29 m) H. The underground vaults will be located along the route as required based on cable reel capacities and to keep cable pulling tensions within manufacturer's specifications, generally at intervals between 500 to 1,700 feet (152.4 to 518 meters). The underground vaults will accommodate cable splicing and cross-bonding of cable metallic sheaths. (see Figures 2.3.7-1 of the FEIS, 4-16 and 4-17 of the DEIS).

5.0 OPERATIONS & MAINTENANCE PLAN

5.1 Introduction

This Operations and Maintenance (O&M) Plan describes the approach to operations and maintenance for the CWA project and provides details regarding O&M elements of the project that have previously been described and reviewed in the NEPA process. This plan includes an explanation of specific practices and procedures that were more generally described in the FEIS and is based on practical experience from offshore wind projects in Europe, other pertinent offshore experience, and applicable regulatory requirements in the US. Abbreviations are used liberally throughout this section as a means of streamlining the text. Please refer to the acronym list at the beginning of the document.

It is recognized that this O&M Plan will be enhanced with further project-specific details as EPC and O&M contracts are executed with CWA's selected vendors and suppliers. Further detail about O&M activities will be added as Hazard and Operability Study (HAZOP) and risk assessment reviews are completed during SMS implementation.

5.1.1 Purpose and Objectives

The purpose and objectives of this O&M Plan is to maintain the plant in a safe and effective operating condition in order to maximize electricity output and plant reliability, protect water quality and minimize potential environmental impacts by:

- Effective operational management and scheduling of maintenance tasks.
- Timely completion of scheduled and unscheduled maintenance tasks using safe systems of work as described by the SMS.
- Development and implementation of control measures to ensure the equipment is maintained in a safe and effective operating condition.
- Regular inspection of all elements of the Project according to an inspection program and applicable regulatory requirements.
- Maintenance of a safe place of work as described by the SMS.

5.1.2 Overview of Offshore Wind Farm O&M

Wind turbine operations are highly automated and wind farms are designed to operate remotely without on-site attendance at the WTGs. Monitoring sensors within the WTG gather and transmit data via the SCADA system on meteorological conditions, controls status, power generation, condition monitoring and system alarms and any other critical active safety functions. Monitoring is conducted over a SCADA system from shore base stations, which can be local to the project or centralized for monitoring of many wind farms.

The chosen WTG for the CWA project, the Siemens SWT-3.6-107, is a well-proven offshore wind turbine model. This will limit maintenance and operation risks because it reduces the likelihood of problems related to new, untried technology and serial defects, and ensures that the appropriate maintenance procedures have already been developed.

Wind farms are designed in accordance with safe life design principles for passive elements such as the structures, and fail-safe design principles for active elements such as drives and controls. This eliminates the need for continuous on-site attendance. The main reasons for intermittent on-site personnel attendance are:

- Perform as-needed maintenance to ensure high availability of power generation and transmission equipment.
- Perform scheduled inspections and maintenance to maintain good condition and operating life of the plant.
- Perform scheduled maintenance to ensure safety systems and equipment are always fully functional.
- Reviews to satisfy applicable permit conditions or regulatory requirements.

The CWA facility will be designed to be remotely operated continuously in its specific off-shore environment. The project equipment will be designed to have a useful life that meets or exceeds the life of the lease. The project will be operated and maintained in accordance with the Lease.

5.2 O&M Plan Elements

The O&M strategy for the CWA project will focus on reliable operation and continuous availability of the plant in a safe condition while fulfilling the requirements of the SMS (Appendix E). The SMS will include HAZOP/ Hazard Identification (HAZID) and risk assessment to support the safe operation and maintenance of the CWA project.

The O&M Plan elements comprise:

- Overall purpose and objectives.
- Organization, responsibilities.
- Operational management of the wind farm.
- Scheduled maintenance of the plant for safe operation.

- Scheduled maintenance of the plant for effective operation.
- Schedule inspections of the project to meet regulatory requirements.
- Unscheduled maintenance.
- Reference to the SMS to identify and assess hazards.
- Reference to the SMS to control and mitigate hazards through defined procedures and method statements.
- Reference to the SMS for monitoring and auditing of compliance of safety aspects.
- Continuous improvement interfacing with the SMS.
- Reference to the OSRP and the SMS for emergency response procedures.

The O&M Plan elements address the following key aspects of the project:

- All permanently installed offshore structures and equipment which will usually be unmanned, including the WTGs and ESP, and their foundations and substructures.
- Offshore array and export electrical cables for interconnection to the onshore electric grid.
- Operation of onshore facilities including the permanent onshore control room; permanent onshore service or staging area; permanent onshore warehouse area; shore termination of electrical cable and onshore route for grid connection.
- Grid connection at the Barnstable Switching Station operated by NSTAR.

The following is covered in the SMS:

- Operation of remote monitoring and control systems.
- Operation of all access and service vessels used during the operational phase.
- Emergency evacuation procedures.
- Onshore transportation and marshalling activities for large replacement components
- Lists of all offshore and onshore equipment and facilities, and all vessels or helicopters to be used for the project will be included in the SMS Safety File (see SMS, Appendix E).

5.2.1 O&M Plan Development

Detailed level maintenance schedules will be developed as the project progresses through the following stages:

- Selection of contractors for the engineering, procurement, construction and operation of the project, and the CVA.
- Detailed engineering design and specification.
- HAZOP and risk assessment stages.
- Lessons learned from the construction phase will be applied to the operations.
- Pre-operational planning including preparation and approval of detailed method statements and procedures for specific activities.

5.3 Cape Wind and O&M Contractor Responsibilities and Resources

5.3.1 Areas of Control

This O&M Plan covers the project equipment and activities in several geographical locations which make up the Project Site. Overall the geographical sphere of management control related to the operational phase has been defined as follows:

- "Offshore Wind Farm Site" area located on Horseshoe Shoal within Nantucket Sound off of Cape Cod, MA, USA.
- "O&M Staging Area" The facility is anticipated to be located in the town of Falmouth, MA with approximately 550 feet of quay within the harbor, and docking facilities on site for two approximately 50' service vessels. This site may also include the "O&M Warehouse Area" and "Onshore Control Center". When heavy lifting or repair activities are needed during the O&M phase, these will likely be staged out of New Bedford, MA.
- "O&M Warehouse Area" is the location where the operational spare parts and supplies will be stored. The facility is anticipated to be located in Falmouth, MA.
- "Onshore Control Center" means the CWA onshore control center which is anticipated to be located in Cape Cod, MA.
- "Cable Installation Zone" meaning the zone in which the interconnecting export cable has been installed stretching from the "Offshore Wind Farm Site" to the termination at the Barnstable Switching Station.

5.3.2 Cape Wind Organization

The CWA management team has a long track record of successful construction and operation of ambitious energy projects. The team's significant technical, financial and project management expertise is critical to the operating success of the Project.

The Project team is organized to ensure that there is a clear chain of command and responsibility between CWA, its contractors and their subcontractors. This chain of command is essential to ensuring the safe construction and operation of the wind farm. The main contractors for the project during the operational phase are planned to be:

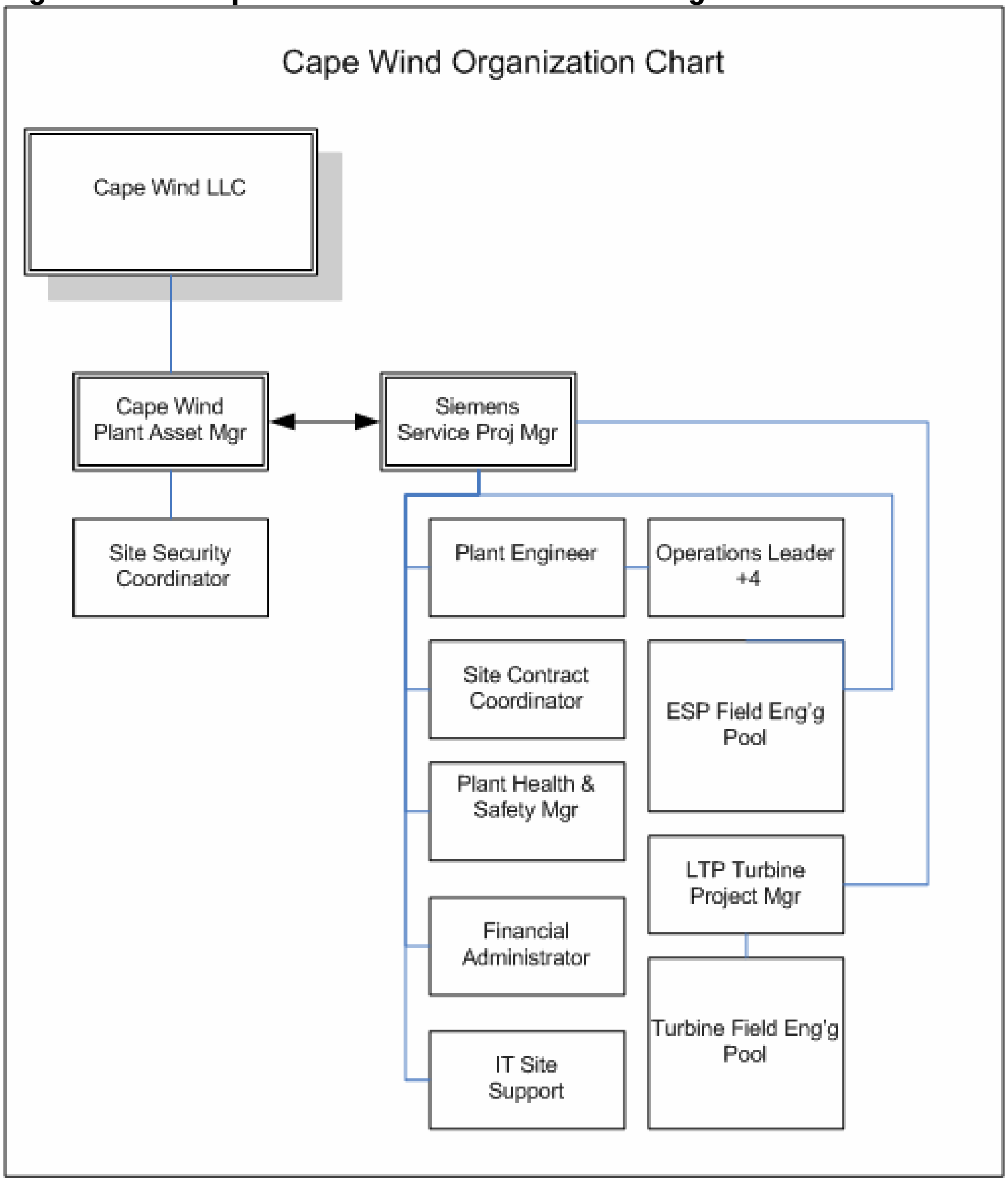
- O&M Contractor will undertake operation and maintenance of the WTGs and the ESP during the operational phase, including provision of access vessels, replacement parts and spares.

Further contractors, subcontractors or other third parties may include:

- Service or maintenance vessels providers either contracted to the Owner or the O&M Contractor.
- Subcontractors to the O&M Contractor for specialized maintenance procedures.
- The Owner's technical advisors.
- The Owner's environmental advisors.
- The Owner's safety advisors.

The CWA and O&M Contractor organizational chart is provided in Figure 5.3-1.

Figure 5.3-1: Cape Wind and O&M Contractor Organizational Chart



5.3.3 Responsibilities

5.3.3.1 Cape Wind Management Responsibilities

CWA is responsible for asset management and overall supervision of operational management of the Project.

The asset management team will handle the commercial aspects of the wind farm over the lifetime of the Project, and ensure that all safety and regulatory requirements are met in the operational management of the Project. CWA management team will:

- Oversee the activities of the O&M Contractor.
- Make decisions regarding Project dispatch and the scheduling of maintenance activities.
- Make decisions with respect to those items not within the scope of the O&M Contract.
- Monitor and inspect operations and maintenance activities.
- Conduct periodic reviews of operations and maintenance.
- Review health and safety, security and environmental programs.
- Review the spare parts and major maintenance strategy.
- Coordinate with regulatory agencies.

In particular, CWA will ensure that necessary preventive and corrective actions are performed. This includes remedial work and repairs and replacements, including provision of necessary access, maintenance, and safety vessels.

5.3.3.2 Safety Critical Roles

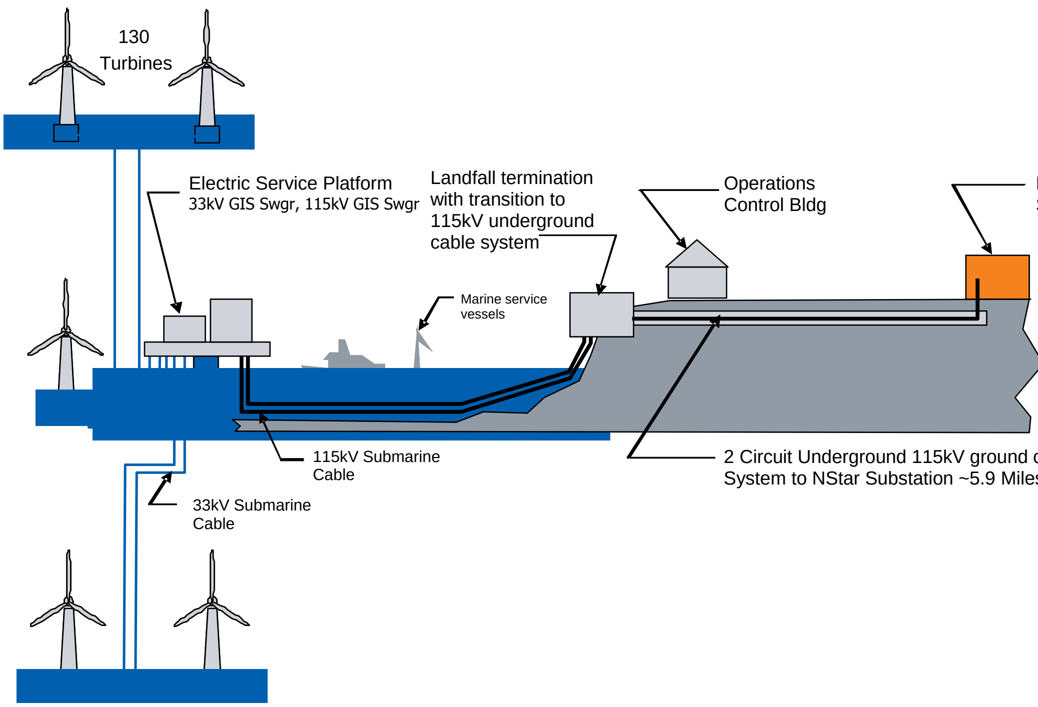
CWA's commitment to safety and safety critical roles on this project is described in the SMS. The SMS (Appendix E) describes (a) how CWA will ensure the safety of personnel and others near the facilities, (b) remote monitoring, control, and shut down capabilities, (c) emergency response procedures, (d) fire suppression equipment, (e) testing of the SMS, and (f) personnel training. However, it is important to note that the SMS is a living document that will continue to evolve as CWA finalizes contracts for engineering, procurement, construction, and operation of the project. The SMS will also be updated as CWA contractors conduct engineering, construction and operations of the project. Detailed methods and procedures implementing the SMS will be developed in consultation with BOEMRE and the relevant health and safety regulatory agencies.

5.3.3.3 O&M Contractor Responsibilities

Under the O&M with CWA it is planned that the O&M Contractor will provide all planned maintenance, unplanned maintenance and spare parts for the Project. Vessels and equipment needed for service or maintenance will also be provided by The O&M Contractor.

Figure 5.3-2: Scope of Equipment for O&M Activities

The figure below illustrates the equipment and plant systems that will be subject to O&M activities:



5.3.4 Resources

5.3.4.1 Cape Wind Capabilities

The CWA management team has direct experience managing the development, construction and operations of innovative power projects. The team is employed by the project manager, Energy Management Inc (EMI). While at EMI, the same individuals developed, financed and managed the construction of a number of new and noteworthy electric generating facilities, including cogeneration projects, the first merchant power project in the United States, early air cooled power projects in New England, the first inlet chilled power project in New England and the largest biomass power project in the United States.

CWA has assembled an interdisciplinary team to manage the construction and operations of the Project. The team draws upon the more than 100 years of experience of the core personnel as well as the more than 35 years of experience of EMI as a business entity in the field of energy development.

5.3.4.2 O&M Contractor Capabilities

The selected O&M Contractor will be highly qualified and experienced in the operation and maintenance of offshore WTGs including transmission and distribution systems. It is anticipated that CWA's selected O&M Contractor will be capable of augmenting traditional O&M services through direct support during the installation and commissioning phases. These value-added services with combined with traditional O&M contracted services will support further O&M planning.

5.3.4.3 Plant Spares and Special Tools

A list of typical spare parts and special tools that are anticipated to be supplied by the O&M Contractor and stored at the O&M staging area will be included upon submittal of the FIR. Special tools will be engineered and provided by the WTG manufacturer.

5.3.4.4 Site Resources

All operation and maintenance activities will be staged from the shore on a daily basis for all scheduled activities. The site resources for the operational phase of the project will comprise:

- Operational control center.
- Operational service base or onshore staging area.
- Onshore warehouse area.

Operations of the CWA Project will be conducted from an onshore operations control center located on Cape Cod. The operations control center will be staffed by the O&M Contractor. The CWA asset management team will likely also be based at the operations control center in order to have direct oversight of O&M activities. All commands, instructions or requests from ISO-NE, transmission owner-NSTAR, and regulatory and safety agencies, will be handled by the operations control center.

It is anticipated that Falmouth Harbor will be utilized as a personnel staging area for the daily transport of crews to the project site. Falmouth Harbor is a relatively narrow, well protected harbor located on the southwestern tip of Cape Cod. The harbor is approximately 10-12 miles from the wind farm site with less than 10 minutes of travel time from dockside to harbor entrance. The short distance to open water results in reduced time for transportation to and from the work site.

Falmouth Harbor has several marine service companies that are capable of supporting crew transport type vessel repairs. The facility has underutilized building and bulkhead area and is easily accessible from the main roadways leading to Falmouth. There is sufficient dockage for several crew vessels with bulkhead access for loading of vessels.

5.3.4.5 Access and Service Vessels

Access vessels will be provided to deploy work crews to perform scheduled maintenance or unscheduled maintenance.

From the anticipated onshore staging area in Falmouth Harbor work crews will be deployed to the WTGs and/or the ESP in approximately 50 ft (15 m) long crew boats manned by professional mariners. The O&M Contractor will supply, maintain and captain the crew boats.

5.3.4.6 Supporting Resources

Technical Advisory Support

In addition to the in-house technical expertise of CWA in power generation asset management, and Siemens expertise in WTGs, ESPs and electrical power plants, CWA will retain independent technical advisors on the following aspects when necessary:

- Offshore wind farm asset management including for example performance assessment, condition monitoring, inspection.
- Offshore structures including foundations, subsea and topsides structures, and subsea cables.
- Marine and offshore logistics including accessibility studies and evaluation of provision and use of vessels.
- Safety and environmental advisors as described in the SMS.

Helicopters

The ESP will be equipped with a helipad to allow the use of helicopters should emergency deployment or recovery of personnel become necessary.

To meet the conditions of the lease, the helipad on the ESP shall be maintained so that it can be used by USCG HH-60 Jayhawk and HH-65 Dolphin helicopters if requested to do so by the USCG. Helicopter navigational lights will be remotely activated on the helipad as needed.

Maintenance Vessels

In addition to the access and service vessels (crew boats) described above, occasionally it may be necessary to access and utilize the following vessels:

- Transfer vessels for replacement of equipment.
- Jack-up barges or heavy lift vessels for replacement of major items of equipment or refurbishment.
- Safety vessels.

These vessels, their crews and management will be provided by qualified vessel operators, whether contracted direct to the Owner or to the O&M Contractor.

Emergency Services

Emergency response services may be called upon to perform essential functions in the event of incidents, and in undertaking safety and emergency response drills and exercises. The primary first responder is the USCG. Consultation, pre-planning and coordination with emergency services is essential and is described in the SMS.

Potential emergency services which may be called upon are identified in the HAZOP and the SMS. These will include but not be limited to:

- Paramedics operating onshore, offshore, and/or in the air.
- USCG

The OSRP (Appendix C) identifies responders and response procedures in the event of an oil spill.

5.3.5 Planning and Risk Management

In order to manage risk, maximize reliable operations and minimize accidents and injuries, CWA and its contractors will be applying a systematic approach to implementing the O&M plan which includes:

- Operational management systems.
- Plant design for reliability, safe-life and fail-safe operation.
- Provision of adequate O&M resources, both personnel and equipment.
- Monitoring and recording of equipment condition, performance and trends.
- Preventive maintenance through maintenance schedules.
- Control of corrective maintenance activities.
- Management of Change control through design, build, and operational phases.

HAZOP/ HAZID, risk management and planning of how specific activities are performed safely in order to minimize risk of accident or injury, are described in the SMS.

It is planned that the O&M resources shall be fully trained and mobilized in place at least 3 months before completion of construction to allow for transition from the construction phase. Progress of the wind farm array construction will enable a progressive transition to O&M activities.

5.3.6 Documentation

O&M Plan supporting documents include, but are not limited to:

- Wind farm operating procedures.
- Operational reports.
- Self Inspection procedures.
- Maintenance schedules.
- O&M manuals.
- Service vessels specifications.
- Mobilization and logistics management.
- Training documents.
- Maintenance procedures and method statements.
- Registers of safety equipment and equipment testing procedures.
- Service and maintenance records.
- Inspection and test records.
- Management of Change control procedures.
- Safety documentation including risk assessments, risk registers, method statements, and work procedures included in SMS.

5.3.7 Communications

The Communications for the operation of the project will be compliant with the requirements of the applicable regulatory agencies, primarily the USCG and FAA. CWA's lease requires that its control center have full capability to communicate with the USCG and mariners within and in the vicinity of the Project. Communications capability will at a minimum include VHF marine radio and landline and wireless for voice and data and must include the ability to communicate with private vessels, USCG vessels and aircraft while underway, and Coast Guard Sector Southeastern New England. CWA will continue its ongoing coordination with the USGC prior to the start of construction. The coordination discussions will include but not be limited to:

- Routine operation communications as outlined below in Section 5.8.3.
- Communications with ISO–NE and NSTAR.
- Communication with the public.
- Liaison with regulatory authorities and safety notifications as described in the SMS.

- Planning and coordination of emergency response as described in the SMS.
- Procedures will be implemented for vessel and personnel tracking as described in the SMS.
- Incident reporting and emergency procedures as described in the SMS.

CWA is responsible for normal communications with Regulatory Authorities, but its communications procedures will allow and encourage immediate contacts from field construction and operations staff with authorities to report emergency conditions.

Lease conditions that will be met include the following:

- To ensure sufficient opportunity for the public to receive information directly from the owners/operators of the Project, CWA will attend quarterly meetings of the South-Eastern Massachusetts Port Safety Forum and brief the forum on the status of construction and operations, and on any problems or issues encountered with respect to navigation safety.
- The Project construction and operation, including the control center and its operators, and all plans and policies related thereto, will be subject to regular review and examination by the USCG on at least an annual basis, or more frequently if circumstances dictate.

5.3.8 Inspections and Tests

Inspections and tests will be undertaken over the operational phase of the project including during pre-operation planning and through refurbishment or decommissioning. During routine operation the entire CWA facility will typically be inspected annually, with more frequent inspections following commencement of operation, during and following major repairs or refurbishments, and after extreme storm events.

5.3.9 Management Review and Continuous Improvement

Management review will follow from inspections and will address failures to follow defined operating procedures or other matters of concern. Periodic reviews will be undertaken of both this O&M Plan and the SMS to ensure that both project performance and safety aspects are properly addressed.

CWA will employ principles of continuous improvement.

5.3.10 Management of Change

CWA has established that its contractors and subcontractors shall follow a procedure for managing the implementation of change to the facility and documentation. The procedure requires all contractors involved in any aspect of the project to have implemented a robust Management of Change (MOC) policy. This policy establishes minimum procedures for tracking, evaluating, implementing and documenting all changes from original design documents. Further detail regarding MOC can be found in the SMS (Appendix E).

5.4 Contractor Responsibilities

Area of responsibilities for contractors will be defined by an interface matrix.

The interface matrix is being developed during contract negotiations and will be included in the FIR.

5.4.1 General Contractor Responsibilities

All contractors are responsible for planning and execution of the work they undertake including:

- Appointment of person to act as point of contact with the Owner.
- Timely provision of risk assessments and method statements.
- Hours of work within regulatory requirements.
- Provision of suitably qualified and experienced personnel for the work they or their subcontractors undertake, following procedures for selection and control of subcontractors.
- Contractors' supervision and coordination of their work.
- Implementation and control of temporary works.
- Responsibility for safety and the environment.

5.5 Vessel Operations and Management

Two access vessels for operations and maintenance will be provided by the O&M Contractor. The FEIS describes the current state of knowledge related to vessel types and anticipated vessel trips. Based on the above analysis the normal activity would include two vessel trips per working day (252 days/year), which would include one crew boat from Falmouth and possibly the maintenance support vessel from New Bedford. Maintenance vessel(s), which may include a jack-up barge, will be available on an as-needed basis. In addition, an occasional second round trip from Falmouth could take place in times of fair weather or for emergency service. Vessel contractors are to be responsible for operation and maintenance of vessels in a safe condition, and to prevent damage to the environment.

All vessels for the proposed action would comply with applicable mandatory ballast water management practices established by the USCG in order to minimize the inadvertent transport of invasive species as well as the potential for adversely impacting water quality. Discharge of blackwater would not occur into the harbor while vessels are berthed. Instead, wastewater would either be held until offshore disposal can occur or would be pumped onshore for proper disposal. All vessel waste would be offloaded, stored and disposed of in accordance with all applicable local, state and federal regulations.

5.6 Competence and Training

CWA and all contractors are responsible for provision of suitably qualified and experienced personnel for the work they undertake, including assessment of qualifications, skills, experience, competence, and training requirements; and following procedures for selection and control of subcontractors as described in the SMS.

In addition to the specific requirements of the SMS, all personnel will be technically competent and possess the required regulatory license for the work they are expected to undertake.

5.7 Control Center

5.7.1 Standard Operating Procedures

Standard operating procedures for the control center shall define the methods for establishing and testing WTG rotor shutdown; method(s) for notifying the USCG of mariners in distress or potential/actual SAR incidents; method(s) for notifying the USCG of any events or incidents that may impact maritime safety or security.

5.7.2 Staffing

The control center will be staffed at all times. The number of personnel to staff the control center will be sufficient to ensure continuous monitoring of WTG operations, communications and surveillance systems; hours of operation; levels of supervision, job qualification requirements; initial, on-the-job, and refresher training requirements to ensure all plant operators maintain satisfactory levels of proficiency at all times.

5.7.3 Communications

Capabilities will be maintained by the control center to communicate with the USCG and mariners within and in the vicinity of the Project. Communications capability will at a minimum include VHF marine radio and landline and wireless for voice and data and will include the ability to communicate with private vessels, USCG vessels and aircraft while underway, and Coast Guard Sector Southeastern New England.

5.7.4 Monitoring:

Capabilities will be maintained by the control center to monitor, in real time, marine traffic within and in the vicinity of the Project and to monitor the status of all private aids to navigation.

5.8 Operational Management Tasks

Operations management includes plant monitoring, maintenance planning, and monthly reporting. The plant will be monitored consistent with the information available through both the wind turbine supplier and wind farm SCADA systems.

In addition to regular reporting and progress meetings, monitoring of the execution of maintenance work on site will be the subject of direct surveillance by CWA and/or its nominated agent.

5.8.1 Operation Management Services by O&M Contractor

The O&M Contractor will support the Owner in the operational management of the Project through provision of the following services:

- Management of interfaces.
- Reporting.
- 24 hour monitoring and site work instruction.
- Downtime / alarm analysis and performance recommendations.
- Planning and management of planned and unplanned O&M.
- Spares management including ordering, storage and managing of spares and consumables required for delivery of the O&M services.

5.8.1.1 Scheduling and Managing Planned Maintenance and Unplanned Maintenance

The O&M Contractor shall be responsible for planning all maintenance activities. This includes coordinating with other 3rd parties that deliver services to the wind farm. Where possible activities will be planned to be undertaken in parallel with other works or operational occurrences at the wind farm (e.g. grid outages) allowing the output of the wind farm to be optimized. This may require planning and coordination with 3rd parties and a collaborative approach must be adopted.

5.8.1.2 24 Hr Monitoring and Site Work Instruction

The O&M Contractor will:

- Monitor the Site via the remote facility continuously on a daily basis.
- Undertake any reset or other work relating to the operation of the wind farm where such work has been identified as necessary by the Contractor or by the Owner via remote monitoring.
- Provide a regular report summarizing both scheduled and unscheduled O&M activities, including environmental, health and safety matters that may have arisen during the report period.

5.8.2 Wind Farm Operational Procedures

The wind farm operating procedures will include the following:

- Remote monitoring and control.
- Start Up.

- Normal Operation.
- Shut Down.
- Emergency Operation.

Remote Monitoring and Control

The control room operator will have monitoring capability of critical operational parameters of the individual turbines and ESP. Critical mechanical, electrical and fault status including meteorological data can be archived for future analysis.

The control room operator will have the ability to remotely control and monitor the wind farm at all times with the exception of when start-up is disabled for personnel working on site.

SCADA systems will monitor the project WTGs and all other wind farm infrastructure. The WTG SCADA will be capable of fully interfacing with the wind farm SCADA system. The systems will be capable of providing real-time information on all WTG and wind farm data and communications. This shall include monitoring of:

- Meteorological conditions.
- Plant controls status.
- Power generation.
- Plant condition.
- System alarms.
- Any other critical active safety functions.

The SCADA systems will also be capable of remotely controlling and shutting down the WTGs and the wind farm, as and when required, including for health, safety and environmental purposes. The SCADA operations will incorporate emergency shutdown procedures, and all relevant personnel will be fully trained in this practice. Radio and telephone coverage will be available on the project site, and all site personnel fully trained in emergency procedures and communication.

A detailed description of a SCADA system is provided in Appendix G-1.

Start Up

Start-up of WTGs will generally be automated unless this is disabled by remote supervisory control, or for personnel attendance on site. This is in accordance with established wind farm operating practice.

Normal Operation

Under normal operation the individual wind turbines operate automatically. It is self-starting when the wind speed reaches an average of about 3 to 5 *m/s* (about 10 mph). The output increases approximately linearly with the wind speed until the wind speed reaches 13 to 14 *m/s* (about 30 mph). At this point, the power is regulated at rated output. If the average wind speed exceeds the maximum operational limit of 25 *m/s* (about 56 mph), the wind turbine is shut down by feathering the blades. When the average wind speed drops back below the restart average wind speed, the systems reset automatically

Hence frequent start up and shut down is part of the automated function of the wind farm.

Shut Down

The turbine is able to shut down safely from any operating situation, even in case of total breakdown of either the pitch system or the mechanical brake.

In accordance with the Lease:

- The WTGs have the capability to shut down automatically when icing conditions are present or the operator can initiate a manual shutdown of the WTG(s) should the WTGs be experiencing icing conditions.
- The Lessee will immediately shut down all or a portion of the WTGs upon notification from the USCG that search and rescue aircraft have been ordered to respond to an incident within or immediately adjacent to the Wind Park.

Emergency Operation

The operations center will have the capability to shutdown all wind turbines within a 2-minute period as required by the USCG. Emergency stops will be provided locally at each WTG and ESP and via the control center.

In the event of an emergency involving mechanical damage to the submarine cables (such as an unlikely anchor snag) ground fault protective relaying will be provided for 33 kV cables. High speed sensitive differential protection, capable of detecting ground faults, will be provided for the 115 kV cables.

Ground faults on the 33 kV array cables will be detected by digital protection relays with directional ground overcurrent elements supervising the 33 kV feeder circuit breakers on the ESP. Detected faults will result in rapid tripping of the ESP feeder breaker connected to the faulted cable. Ground faults on 33 kV array cables will also be detected by the ground overcurrent element in the Woodward WIP1 protective relay located at the 33 kV switchgear in the base of each WTG. The Woodward relay will trip its associated 33 kV circuit breaker. Ground faults in the 115 kV export submarine cables will be detected by redundant high speed differential protection relays located on the ESP and at Barnstable Substation. Those relays will result in rapid tripping of the 115 kV circuit breakers at both ends of the faulted cable.

No field splices of the submarine cable are planned, however repair slices, if necessary, will be conducted using the following process. After the cable has been brought up to the deck of the repair vessel, the damaged section is cut out and cut back sufficiently to assure an undamaged end. This end and one end of the spare cable are moved into a clean working area (tent or other enclosure) on deck. Then the various cable layers are removed and the remaining surfaces are carefully cleaned. The copper conductors of each phase are mechanically jointed by compression in a power core conductor ferrule. Each joint is then wrapped in semi-conducting tape and the insulation layers are built up. The metallic screen is reconstituted – in the case of the 33 kV cable by tinned copper mesh tape — and then protected with water barrier mastic. Each of the three power core joints is housed in a split brass joint sleeve, sealed with foam tape at each end. The joint sleeve is filled with polyurethane resin.

Each fiber of the fiber optic bundle is spliced using a fusion splicer. All of the fiber splices are contained within a dedicated fiber optic jointing box.

The three power core joints and the fiber optic jointing box are then housed in a dual set of armor bodies with appropriate sealing arrangements. The armor bodies are filled with a water repellent gel compound. Bend strain relievers are mounted on the rear of the armor bodies to provide a smooth transition from the metal work to the steel wire cable armor.

The entire splicing procedure is then repeated to join the other end of the spare cable with the other end of the damaged cable.

Emergency response procedures and drills are addressed in the SMS.

5.8.3 Communications

Vessels will have GPS tracking from control center in addition to VHF marine radio and private radio frequency communication. Due to the wind farms proximity to land wireless telephone communication will also be utilized.

The control center will have the capabilities at all times to communicate with the USCG and mariners within the vicinity of the project. Communications capability will at a minimum include VHF marine radio, landline and wireless for voice and data and must include the ability to communicate with private vessels, USCG vessels and aircraft while underway, and Coast Guard Sector South-Eastern New England.

During the operation phase capabilities will also be maintained by the control center to monitor in real time on a 24/7 basis the marine traffic within the vicinity of the Wind Farm and to monitor the status of all private aids to navigation (PATONs). The project will report any issues pertaining to PATONs to the USCG. Also the project will provide monthly reports to the USCG describing any navigational safety issues, complaints from mariners and correspondence from any other regulatory agencies regarding navigational safety issues. CWA will also communicate to the public by reporting at the quarterly South-Eastern Massachusetts Port Safety Forums.

The Control Room will on a 24/7 basis have communication capabilities with local first responders, and all required regulatory agencies. Per the LGIA the control center will also have a dedicated Ring Down line with ISO-NE in order to respond to all transmission system directives and emergencies.

5.8.4 Emergency Response

Emergency response plans, including evacuation and rescue, shall be as detailed in the OSRP and the SMS and are to be drilled on a regular basis.

A schedule of emergency response exercises will be prepared and implemented which will cover key hazard events identified from the HAZOP/HAZID as far as is practicable without entailing disproportionate risks in the exercises themselves. Risk assessments, method statements and procedures for such exercises are to be prepared and recorded in accordance with the SMS.

5.9 Maintenance Tasks

Unplanned maintenance on any part of the WTG is carried out in response to a breakdown or failure. This activity may be simple and require only hand tools, in which case the normal crew vessels would suffice. If there is a requirement to exchange larger items, the use of the larger maintenance vessel may be required to transport and lift the particular items. Such items of equipment could be an electrical control cabinet, and 33 kV voltage transformer, generator, gearbox parts, etc. The ability to conduct such operations would depend heavily on the prevailing weather conditions. Accurate weather forecasting is an essential ingredient in the planning of such offshore operations where a weather window of one to two days is required to complete the task.

5.9.1 General Requirements for Effective Operation

Maintenance shall be undertaken to ensure the following over the operating life of the project:

- Good condition of the plant and its facilities in accordance with good practice as established in the wind and offshore sectors.
- Power generation performance of the wind farms consistent with the WTGs power curve.
- Function of electrical power systems complying with ISO-NE and the Large Generator Interconnect Agreement (LGIA) and local transmission operator (NSTAR) requirements.
- Good reliability of all monitoring, control, and communication systems in accordance with good practice as established in the wind and offshore sectors.
- Good reliability of all ancillary systems in accordance with good practice as established in the wind and offshore sectors.

Maintenance activities shall be undertaken as follows:

- In accordance with suppliers' maintenance schedules and operation and maintenance manuals, including all tasks specified therein unless agreed otherwise.
- Additional maintenance tasks shall be defined and performed if required to comply with good practice as established in the wind and offshore sectors.
- Additional maintenance tasks shall be defined and performed if required to meet risk management or mitigation requirements arising from HAZOP/HAZID or risk assessment.
- Additional maintenance tasks shall be defined and performed to comply with all applicable regulatory requirements.
- Additional maintenance tasks shall be defined and performed if indicated by experience during construction or operation.
- Additional remedial or refurbishment activities shall be undertaken if necessary to meet the requirements for continued good condition, functionality, performance, reliability and availability as stated above.
- In accordance with the SMS and supporting documentation.

5.9.2 General Requirements for Safe Operation and Structural Integrity

To assure the safe operation and the structural integrity of the wind farm, the O&M Contractor will monitor and maintain the condition and/or test the function of the following:

- Structural integrity of primary structures including but not limited to foundations, substructures, and topside structures (monopiles, TPs, WTG towers, ESP topsides).
- Condition and security of secondary structures (including access walkways, safety barriers, netting, etc.).
- Foundations scour protection and electrical cables scour.
- Corrosion protection (surface finishes and cathodic protection systems).
- Condition of electrical insulation and security of electrical connections.
- Electrical isolation, protection and safety systems functional checks.
- Lighting protection systems (resistance checks).
- Automated WTG load, speed, power limiting and shut down systems (blade pitch actuation and control; hub braking and locks; yaw drive, control, braking and locks).
- Back-up power systems.

- Icing mitigation measures.
- Aids to Navigation (ATON) and aviation hazard warning.
- Ventilation, dehumidification, and temperature control (including air monitoring equipment).
- Fire protection systems (fire barriers, fire doors, fire shutters, grilles, and fire suppression systems).
- Personnel day rest facilities and refuge areas.
- Emergency lighting.
- Access and egress routes (kept clear).
- Material handling and lifting equipment.
- Elevators for personnel.
- Ladders, safety harness attachment points and fall arrest systems including security and load capacity of all anchorages.
- Emergency escape apparatus.
- Emergency stops and interlocks,
- Remote monitoring and fail-safe control of safety-critical functions.
- Any other safety systems included in the approved design or equipment registers.
- Life-saving and survival equipment registered and held on site.
- All Personal Protective Equipment (PPE) registered and held on site.

5.9.3 Self Inspection Program

Regular inspections of all elements of the Project will be conducted according to an inspection program.

A comprehensive annual self-inspection program will cover all facilities. Annual inspection will tie-in with scheduled annual service and maintenance of the equipment, particularly the service and maintenance schedules provided by the equipment suppliers, and any further service and maintenance which is specific to the project, for example that identified by HAZOP.

The inspection program, accompanying service and maintenance schedules, and records of all inspections, tests, service and maintenance carried out will be included in the Project Safety File as specified in the SMS.

The Self Inspection Program will specify:

- The type, extent, and frequency of in-place inspections that will be conducted for both the above-water and the below-water structures of all facilities.
- How corrosion protection for both the above-water and below-water structures will be monitored.
- How and when scour protection systems will be monitored. (see Section 5.9.4.4 below).
- When a structural assessment is required under API RP 2A WSD.

Details of reports that will be prepared, presenting:

- A list of facilities inspected.
- The type of inspection employed, (i.e., visual, magnetic particle, ultrasonic testing).
- A summary of the inspection indicating what repairs, if any, were needed and the overall structural condition of the facility.

Requirements for inspections of equipment will include but not be limited to:

- Ensure the procedure for all inspections and tests is in accordance with the Conditions of Contract and Owner's Requirements including the Technical Specifications where applicable.
- Include for the inspection and testing necessary confirmation that the services are in accordance with the specification and any relevant National or International Standards, Electricity Supply Industry Technical Specifications, relevant wind energy association standards or guidance.
- Provide all measuring equipment or special apparatus required for Site tests. All instruments shall be calibrated before and after tests.
- Comply with the requirements of ISO 9001/2/3 (as appropriate) in full.
- Where non-destructive testing (NDT) is required this shall be carried out to recognized standards referenced in the design codes.

The Self Inspection program will include scheduled inspections derived from the HAZOP/HAZID and specific equipment maintenance schedules. Further details of foundation structure inspections can be found in Section 5.9.4.3 below.

5.9.4 Scheduled or Preventive Maintenance Arrangements

As previously presented in the FEIS scheduled maintenance activities will be required to ensure continued reliable operations. Based on both offshore and onshore WTG operational experience, five days per year per turbine has been established as the anticipated maintenance requirement.

These visits cover two days of planned or preventative maintenance, and three days of unplanned or forced outage emergency maintenance. The WTG design is based on a twenty year operating life and all components have been analyzed to meet this design criterion. Based on 5 maintenance days per year for each of the 130 WTGs, the total is equivalent to 650 maintenance days. Based on 252 workdays per year (which adjusts for weather days and holidays) this results in 2.5 work teams or conservatively three teams being deployed. During these deployments, maintenance on the ESP would be included. Experience has shown that wind speeds must be less than 17.9 mph (8 m/s) to gain safe access to the WTGs, although safe access with winds up to 26.8 mph (12 m/s) is possible depending on direction and sea state. Based on these weather related concerns, the number of trips per day could be altered to take advantage of good weather.

The submarine cables will be inspected periodically to ensure adequate coverage is maintained. If problem areas are discovered, the submarine cables will be re-buried. Depending upon the extent of reburial required, either hand jetting or re-deployment of a jet plow would be used.

Based on the above analysis the normal activity would include two vessel trips per working day (252 days/year), which would include one crew boat from Falmouth and the, if needed, the maintenance support vessel from New Bedford. In addition, an occasional second round trip from Falmouth could take place in times of fair weather or for emergency service.

5.9.4.1 WTG Maintenance Schedules

The scheduled service and maintenance of each WTG will generally be undertaken annually and will include, but not be limited to, the items indicated in the following representative maintenance summary (Table 5.9-1).

Table 5.9-1: WTG Service and Maintenance Summary

Maintenance Task	Annual Service	Other
Visual inspection of equipment condition	*	
Inspection of blades for signs of damage or cracking	*	
Torque of bolts at tower, hub, nacelle bedplate, transmission, and check of generator alignment	*	
Recharge grease in main bearing, yaw bearing, blade bearings, generator bearings	*	
Check hydraulic pressure and pumping systems operation and sensors for brake, pitch, and yaw	*	
Blade pitch hydraulic accumulators: check charge pressure	*	
Hydraulic pumping systems for brake, pitch, and yaw: change oil filter	*	
Hydraulic pumping systems for brake, pitch, and yaw: sample oil	*	

Maintenance Task	Annual Service	Other
Hydraulic pumping systems for brake, pitch, and yaw: change oil		2-5 years
Replace flexible hoses		7-10 years
Main gearbox check oil level, pressure switch, vibration sensor	*	
Main gearbox change oil filter	*	
Main gearbox sample oil	*	
Main gearbox change oil		2-5 years
Check heating elements in main gearbox and generator	*	
Generator brushes: clean and check resistance		
Check frequency converter coolant	*	
Change frequency converter coolant		7 years
Lightning protection system inspection including grounding brushes	*	
Replace slip rings		10 years
Replace UPS batteries		3 years
Check dehumidifiers	*	
Check emergency lighting	*	
Check fire detection equipment and extinguishers	*	
Check emergency evacuation equipment	*	
Check first-aid equipment	*	
Check survival equipment	*	
Check condition and operation of lifting equipment	*	
Check condition and operation of personnel lifts	*	

Table 5.9-1 summarizes the service and maintenance tasks as specified in the standard Siemens service and maintenance manual for the SWT-3.6-107 off-shore WTG, the maintenance schedule from this manual being included in Appendix G-2.

In compliance with the lease conditions, for each existing WTG, and not later than 30 days prior to January 1, April 1, July 1, and October 1 each year, the Lessee will provide BOEMRE and the USCG with its planned WTG maintenance schedule for each respective quarter. Appropriate Notice to Mariners submissions will accompany each maintenance schedule.

5.9.4.2 ESP Topsides Maintenance Schedules

Electrical equipment will be inspected, tested and maintained in accordance with applicable standards and practices of the following organizations:

- American National Standards Institute (ANSI)
- Institute of Electrical and Electronics Engineers (IEEE)
- International Electrotechnical Commission (IEC)
- National Electrical Manufacturers Association (NEMA)
- National Fire Protection Association (NFPA)
- Underwriters Laboratories (UL)

Components that are UL listed and labeled will be provided where available. Acceptance testing of electrical equipment on the ESP will be performed in accordance with equipment manufacturer's recommendations and generally with the International Electrical Testing Association's "Acceptance Testing Specification for Electrical Power Distribution Equipment and Systems." Ongoing maintenance will generally follow the International Electrical Testing Association's "Maintenance Testing Specifications for Electrical Power Distribution Equipment and Systems" and the manufacturer's recommendation.

ESP Topside maintenance schedules include:

- Scheduled maintenance activities as usually included by the ESP supplier, as required for the design of the ESP, component manufacturers' recommendations, and as established by previous experience and good practice.
- Scheduled maintenance activities to meet project-specific requirements pertaining to the ESP Topsides scope of supply.

It is anticipated that scheduled service and maintenance of the ESP will generally be undertaken annually, with the addition of:

- 3-5 year major ESP plant and equipment service.
- 5 year inspection of 33kV and 115kV switchgear and associated protection.

Descriptions of some of the maintenance approaches and techniques which it is anticipated to use for the ESP (and other electrical or energized equipment) are given in the following paragraphs.

Preventive Maintenance Energized Inspections (EI)

The objective of preventive maintenance inspections is to ascertain the condition of the equipment with respect to the ingress of environmental contamination, visible wear and tear due to operation, vibration or other external factors that may impact the mechanical integrity of the equipment or may be a precursor to poor electrical performance. These inspections involve the physical inspection of all accessible areas of the equipment during energized operation as permitted by applicable safety standards in effect. Where possible the field engineer or technician will be looking for deterioration of painted surfaces, excessive dust and debris accumulation, evidence of extreme condensation or moisture accumulation, which may impact operational behavior or length of uninterrupted service of the equipment. Inspections would also cover outdoor insulators and lightning arresters for evidence of flash over or corona discharge. During inspections the service personnel will further listen for unnecessary or excessive vibration of housings, assemblies, components mounted on equipment. Finally the inspection will look for leaking of lubricant or insulation oil. Additionally and depending upon the asset type being visually inspected and functionality of SCADA system, inspection would also include the capturing of equipment operational data such as temperatures, pressures of dielectric mediums etc., if this data is not being captured through remote monitoring. All of these typical findings will be noted by the technician or field engineer in the field report with comments on potential corrective maintenance activity to be performed or additional inspections to be performed during the next de-energized testing and inspection interval depending upon severity.

Thermal Imaging Inspections and Tests (TI)

The intent of thermal imaging inspection and tests is to provide additional information regarding relative condition of equipment without the need for de-energized inspection and tests. Thermal imaging has proven to be a relatively inexpensive method to measure temperature gradients relative to ambient that can indicate loss of cooling of efficiency, deteriorating connectivity or other forms of excessive thermal conditions prevalent in components of the electrical substation. Thermal imaging would be done during energized inspections or at some interval between energized and de-energized inspections. The field engineer performing the thermal imaging will perform comparative analysis to previous images to gauge relativistic changes in condition and performance of the substation components.

Preventative Maintenance De-Energized Inspections and Tests (DEI&T)

All de-energized inspections and tests will be carried out pursuant to OSHA and NFPA guidelines and requirements, as appropriate. Prior to initiating de-energized inspections or testing, Lockout/Tagout safety practices will be undertaken. All personnel prior to performing tasks will be involved in a safety review meeting outlining site safety practices to be adhered to and be observed prior to and during tasks to be performed.

The objective of de-energized inspections and tests is to review both mechanical integrity and verify electrical characteristics and functionality of the equipment involved. De-energized inspections are performed similar to that outlined for energized inspections except in areas normally prohibited during equipment operation. In addition to the general mechanical integrity issues already outlined de-energized inspections also look for discoloration of terminations wires, power connections and the like. Such change in color are often leading indicators of loose or deteriorating connectivity that could result in eventual failure. Cleaning activities such as vacuuming of debris and dirt accumulated in inspected compartments will also be included in the work performed as needed by visual inspection or as recommended during energized visual inspection reports. In general continuity, grounding and insulation power factor testing will also be performed during this service. Additionally testing with respect to protection and control devices will take place during this stage of preventative maintenance using signal generation test equipment to verify set points, calibration and functional integrity of control and protective devices. Additional tests pursuant to O&M Service program will also be administered as required which are either asset specific or are deemed required due to criticality of the asset to substation availability. All testing performed will have either test data explicitly measured or test pass/fail/investigate classification in reports provided from the work performed. It should be noted that de-energized tests performed on assets become more pervasive with time as the equipment ages or accumulates more operations. Additionally, depending upon the classification of the protection and control assets within the substation by FERC/NERC regulatory agencies, the frequency at which protective relays are tested to verify functional performance and calibration may become less or more frequent. In general most protective relays will require functional testing and calibration after three to five years in service and repeated every three to five years thereafter.

A representative ESP maintenance schedule is provided in Appendix G-3.

5.9.4.3 Foundations and Substructures Maintenance

The O&M Contractor, together with the foundations designer, is to prepare a maintenance schedule that will include but not be limited to:

- An in-service inspection procedure.
- Methods to monitor, inspect, and/or test structural integrity.
- Methods to monitor or inspect scour protection.
- Methods to monitor, inspect, test, and/or maintain corrosion protection.
- Other requirements as necessary.

Further guidance and regulations may include the following:

- Likely structural inspection requirements will correspond to at least API RP2 A.
- BOEMRE requirements may be met with USCG review of an in-service inspection program.
- Applicable regulations include 33 CFR Subchapter N.
- Diving operations and equipment should comply with 46 CFR 197 Subpart B.

Routine Inspection of Foundations and Substructures

It is anticipated that routine inspections from above water will be required including:

- Inspection of corrosion protection paintwork applied to transition pieces and secondary steel (including ladders, j-tubes, platforms, boat landings, etc.).
- Inspection and testing of Cathodic Protection systems applied to monopiles/ transition pieces.
- Inspection, maintenance (and testing where appropriate) of boat landings, ladders, fall-arrest and other access systems.
- Inspection, maintenance, testing and certification of davit cranes, hoists and other lifting devices.
- Maintenance of navigation lights, fog horns and other external lighting and marking.

In addition it is anticipated the following will be required:

- Regular surveys of scour protection around the foundations.

Detailed Inspection of Foundations and Substructures

It is anticipated that detailed inspections, for example by divers, of the foundation and substructures will be required on a suitable sampling basis including:

- Internal and external inspection of the transition pieces for the WTGs.
- Inspection of the grout seals between the monopiles and the transition pieces, and the transition pieces and the WTG towers.
- Inspection of the scour protection and monopile foundation at the seabed.

Marine Growth

Contractors shall undertake cleaning of marine growth as appropriate from access ladders and the monopiles.

Cathode Replacement

Specialist contractors shall, based upon the findings of scheduled inspections of the cathodic protection, advise the Owner of any maintenance or replacement of cathodic protection necessary. Where the replacement of the cathodic protection is necessary the contractor will undertake the maintenance or replacement in a timely manner to allow replacement of the cathodes in advance of their corrosion protection being made redundant or less effective.

As stated above specialist technical advice is to be sought from the Balance of Plant (BoP) Contractor and Foundations Designer, in parallel with the design of the foundations, subsea, and topsides structures, to determine the inspection and maintenance schedule, including scour and corrosion protection.

A representative maintenance schedule is provided as part of Appendix G-2.

5.9.4.4 Electrical Cables and Scour Protection Maintenance

Other than the 115 kV splice to upland cable at landfall, there will be no submarine cable splices performed in the field. After each fiber optic cable -- including the interstitial fiber optic units in the submarine power cables -- has been completely installed, the attenuation in each fiber will be measured using an OTDR in accordance with ANSI/EIA/TIA-445-61.

The following discussion summarizes presents steps that CWA and its contractors will take to ensure that the inner-array and 115 kV submarine transmission cables are adequately covered, will not negatively affect water quality and will not interfere with fishing gear/activity or with the safe operation of the cables. CWA will ensure that the submarine transmission cables are initially buried to or below the approved and required depth of six feet below the seafloor. To ensure this initial burial depth, CWA will require that the selected cable vendor utilize real-time monitoring of the cable installation, to ensure optimal performance of the cable embedment technology and to maximize cable burial depth. Additionally, the cable installer will be required to conduct an as-built survey of the cable system shortly after installation, providing detailed latitudes, longitudes and depths of the emplaced cables.

CWA will use scour mats to provide protection at the base of the installed monopiles and the ESP. Rock armor will be used if it is believed that scour protection mats will not be adequate in a given area.

After the first year of installation, CWA will visually inspect the seabed footing of each monopile and ESP, and will visually inspect the seafloor along the reaches of all buried cables. If no initial deterioration is observed at the first year inspection, CWA will visually inspect the seabed footing of each monopile and ESP, and representative reaches of buried cables in areas of migrating sand waves and other selected reaches on a biennial (every two years) basis. This inspection will include the monitoring of scour mats and any approved rock armor. CWA will immediately inform BOEMRE if scour mats or approved rock armor become dislodged and/or significant scouring is occurring.

CWA will conduct biennial visual inspections, which may be aided or unaided by optical devices, of the inner array cable routes in areas of migrating sand waves. Should the visual inspection indicate that cable burial depth is compromised, CWA may utilize technical survey methodologies such as using Pulse Induction Technology (such as, but not limited, to a TSS

350) to determine the vertical range of the buried cable. CWA shall also conduct sample surveys of cables after any significant storm activity.

The O&M Contractor's maintenance for the WTG array and export cables shall include but not be limited to:

- In-service inspection procedures.
- Methods to monitor or inspect scour protection.
- Regular surveys of scour protection around the foundations.
- Regular surveys to check cable burial is maintained.

A representative electric cable maintenance schedule is provided in Appendix G-2.

5.9.4.5 Aids to Navigation and Aviation Hazard

The Project, including the ATON and aviation hazard warning equipment function and operation shall be maintained to meet regulatory requirements and the lease conditions:

- Each individual WTG will be marked with private aids to navigation in accordance with guidelines established by the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), subject to the approval of the Commander, First Coast Guard District.
- Each individual WTG will be clearly marked with a unique alphanumeric designation on the tower, and the USCG, other local, states, and Federal agencies will be provided with a plan showing designations for each WTG.
- WTGs will be painted an off-white (5 percent grey) color.
- There will be no daytime FAA white lighting.
- The Project will abide by the terms and conditions of the FAA's Determination of No Hazard to Air Navigation, issued on May 17, 2010.
- 50 perimeter WTG nacelles and the 8 WTGs located adjacent to the ESP will be lighted at night:
  - Each perimeter WTG nacelle will be lighted with one red flashing FAA light fixture equipped with automatic lamp changers.
  - Every other perimeter WTG will be lit by a single, medium intensity red light at night, with each alternating perimeter WTG lit by a single, low intensity red light.

- o Medium intensity lanterns (FAA L-864) will be used at corners/points of direction change with intervals of no more than 1.5 miles (2.4 km) between similar intensity fixtures.
- o The balance of perimeter WTGs will be marked with low intensity lanterns (similar in intensity to the FAA L-810 with visibility to approximately 1.15 miles).
- o The eight turbines adjacent to the ESP will each have one L-810 flashing red fixture.
- o The red lights on the perimeter WTGs and other FAA lighting [on WTGs adjacent to ESP] will be synchronized to flash in unison. The red lighting will flash on for one second, followed by no flashes for two seconds to give a rate of 20 flashes per minute (fpm).

- The balance of the interior turbines will not have FAA lighting.

5.9.4.6 Access and Egress Arrangements

Access and egress arrangements, including those for emergency evacuation and rescue, will be installed and maintained to meet the requirements of the SMS.

The Owner and all contractors will cooperate to ensure that the following requirements are fully incorporated in the design, build, and operation and maintenance of the wind farm equipment (primarily the WTGs with their transition piece (TP), and the ESP). Particularly, this will require incorporation in the maintenance schedules, and checks that this maintenance is performed, including checks on the following:

- Condition and security of access walkways, safety barriers, netting, etc.
- Access and egress routes kept clear of obstructions, hazardous materials or wastes.
- Fire protection systems do not unduly hinder egress, and any fire suppression systems do not present undue hazard to personnel (zoning, selection of fire suppression type, disabled when personnel might require access).
- Emergency lighting.
- Elevators for personnel.
- Ladders, safety harness attachment points and fall arrest systems including security and load capacity of all anchorages.
- Emergency escape apparatus.
- Emergency stops and interlocks.

Inspection and tests will generally be undertaken annually or as required by regulatory authority.

5.9.4.7 SCADA Systems Maintenance

SCADA functions will be monitored remotely on a continuous basis. Should any faults occur, a decision will be made as to whether immediate repair is necessary or whether attendance at the offshore site can await the next scheduled service or maintenance visit, in accordance with established protocols for wind farm management.

Inspection, testing, and preventive maintenance will generally be undertaken annually as indicated in the maintenance schedules for the WTGs / WTG SCADA, ESP or BoP / Wind Farm SCADA.

5.9.4.8 Communications Systems Maintenance

Communications systems will be monitored remotely on a continuous basis. Should any faults occur with critical primary or secondary / back-up communication systems, immediate repair will be scheduled in order that the status of the plant can be continuously monitored, or emergency remote supervisor controls implemented whenever required.

Inspection, testing, and preventive maintenance will generally be undertaken annually as indicated in the maintenance schedules for the BoP.

5.9.5 Unscheduled or Corrective Maintenance Arrangements

The O&M Contractor will provide Corrective Maintenance, either directly or through the application of subcontracting services, on equipment where the vendor has Preventative and Corrective Maintenance responsibility. The O&M Contractor has full responsibility for all corrective maintenance on the WTGs. Whenever possible Corrective Maintenance will be planned through a scheduled outage, in the event Corrective Maintenance is required due to a forced outage, The O&M Contractor will dispatch personnel to site to perform Corrective Maintenance tests and repairs. Services provided associated with the delivery of Corrective Maintenance incorporates the following:

1) Timely dispatch of manpower with appropriate skill levels consistent with the tasks anticipated.
2) Timely dispatch of testing equipment and other resources to site to perform diagnostic testing and perform repairs and/or replacement based upon tasks anticipated.
3) Delivery of a Corrective Maintenance field report to Owner regarding dispatch performance, test results and service activities performed. This field report will typically include:
    a. Test results for both diagnostic and verification of successful repair.
    b. List of Spare Parts consumed in the performance of Corrective Maintenance.

c. Recommendation with respect to equipment, follow up maintenance activity, testing or inspections to be scheduled in the future.

d. If appropriate, recommendation on equipment replacement or refurbishment, or reduced utilization as consequence of condition or residual damage sustained.

4) Provide listing of Spare Parts consumed in the performance of Corrective Maintenance Services.

5.9.6 Special Maintenance Arrangements

Special maintenance arrangements will be implemented for the following:

- Additional preventive maintenance (e.g. maintenance thought to be beneficial in improving reliability or operating life additional to that already scheduled.
- Complex repairs.
- Refurbishment.

Technical support, provision of spares or replacement parts, and undertaking of such maintenance works on the WTGs or ESP shall be provided by the O&M Contractor.

Maintenance of the sub-sea array and export cables, onshore termination, onshore cables and grid connection interface shall be arranged by the Owner unless the O&M Contract is extended to cover special maintenance of these aspects.

5.9.6.1 WTG Complex Repairs

Complex repairs 'will include all ancillary spare parts, lubricants, consumables and labor (including a works supervisor and any labor associated with managing the lifting of major components). The Owner shall provide the necessary specialist lifting vessels unless otherwise stated in the contracts.

Complex Repairs are categorized as follows:

Complex Repair (typically requiring a specialist vessel)

- Gearbox replacement.
- Generator replacement.
- Blade replacement.
- Blade pitch bearing or replacement.
- Yaw ring replacement.
- Main shaft (including temporary hub removal and bearing replacement).

- 33kV transformer replacement.

Complex Repair (typically not requiring a specialist vessel)

- Generator drive end bearing replacement.
- Generator non-drive end bearing replacement.
- Generator slip ring replacement.
- Yaw motor replacement.
- Yaw gearbox replacement.
- Pitch cylinder replacement.
- Pitch accumulator replacement.
- Gearbox high speed bearing replacement.
- Gearbox intermediate shaft replacement.
- Control system.
- Brake caliper replacement.
- Main hydraulic pump unit replacement.
- Rotating union replacement.
- UPS replacement.
- Local blade inspection and repairs (including exposed fiberglass components including nacelle, nose cone).
- 33kV switchgear replacement.
- WTG SCADA system WTG remote station.
- WTG SCADA system base station.
- Lifting equipment repair.

5.9.6.2 ESP Complex Repairs

Complex repairs ‘will include all ancillary spare parts, lubricants, consumables and labor (including a works supervisor and any labor associated with managing the lifting of major components). The Owner shall provide the necessary specialist lifting vessels unless otherwise stated in the contracts.

Complex Repairs are anticipated to be categorized as follows:

Complex Repair (typically requiring a specialist vessel)

- 115kV transformer replacement.

Complex Repair (typically not requiring a specialist vessel)

- 33kV switchgear and associated protection replacement.
- 115kV switchgear and associated protection replacement.
- 115kV transformers repair.
- Fire protection system repair.
- UPS replacement.
- WTG SCADA system WTG remote station repair.
- WTG SCADA system base station repair.
- Lifting equipment repair.
- ESP standby diesel engine generators replacement (if installed).

5.9.6.3 Cable Complex Repairs

The potential for a fault occurring during the operational lifetime of a buried cable system is minimal, based on industry experience (see Section 5.8.2 above). However, a cable repair procedure would be formulated by the O&M Contractor to cover the remote possibility of a fault occurring in the offshore submarine cable system. The focus would be to repair the cable quickly, while minimizing or eliminating environmental and community impacts. Should a cable failure occur, a cable repair procedure would be implemented. Once the location of the fault is identified, should the cable fault occur in the onshore sections of the project, then typical trench, repair and backfill methods would be used and no formal fault plan required. Communication with the appropriate people would take place at least 48 hours prior to repair and would specify the location, method, and date of work. Along the submarine cable, the procedures listed below are one way of repairing a cable fault.

- Mobilize the splice boat and fine tune the location of the fault.
- The splice boat would likely be a barge, equipped with water pumps, jetting devices, hoisting equipment and other tools typically used in repairs of cables.
- Expose the cable with hand-operated jet tools and cut the cable in the middle of the damaged area.

- Position the repair vessel above the cut cable, and raise one end.
- Cut off the damaged portion of the cable
- Perform a cable splice between the retrieved cable and one end of the spare cable onboard.
- Pay out cable and move to the other end of the spare cable, keeping a portion of the spare cable onboard.
- Retrieve the other damaged cable end.
- Cut off the damaged portion of the cable.
- Perform a cable splice between the retrieved cable and the remaining end of the spare cable onboard.
- Lower the second joint and position it on the sea bottom.
- Hand jet the repaired and exposed sections into the sea bottom.
- Demobilize the repair vessel.

6.0 CONCEPTUAL DECOMMISSIONING PLAN

This section discusses the general concepts and methodologies involved in the decommissioning of the Project.

6.1 Decommissioning Plan Requirements

As stated in the BOEMRE lease (Section 13: Removal of Property and Restoration of the Leased Area on Termination of Lease), CWA is required to "remove or decommission all facilities, projects, cables, pipelines, and obstructions and clear the seafloor of all obstructions created by activities on the leased area, including any project easements(s) within two years following lease termination, whether by expiration, cancellation, contraction, or relinquishment, in accordance with the Addenda and applicable regulations."

Prior to commencing decommissioning activities, CWA will submit a Decommissioning Application to BOEMRE for their approval.

As required in the BOEMRE Lease (Addendum B. III (b) Additional Financial Assurance) CWA is required to provide "a decommissioning bond or other approved means of meeting the Lessee's decommissioning obligations." (See Section 2.0 for further information on financial assurance)

In the event that the Project permanently ceases operation, a decommissioning plan will be implemented to remove and recycle, to the greatest degree possible, equipment and associated materials, thereby returning the area essentially to pre-existing conditions.

It bears noting that due to the relative newness of the offshore wind industry, none of the facilities in operation around the world have been decommissioned. The discussion below presents procedures and methods that would be most appropriate given today's technology, however it is probable that technological advancements will take place over the next two decades that would be more appropriate at the time of the Project's decommissioning.

6.2 Decommissioning Plan

Any decision by CWA to cease operation of individual WTGs or the entire Project and to decommission and remove the Project components will require consultation with BOEMRE. CWA is required to submit a decommissioning plan to BOEMRE for approval which must comply with BOEMRE's structural removal standards. Upon decommissioning of the facility, CWA must implement the decommissioning plan to remove and recycle equipment and associated materials, thereby returning the area to pre-existing conditions.

Decommissioning the Project is largely the reverse of the installation process. Decommissioning of the wind farm is broken down into several steps, closely related to the major components of the Project:

- Submarine transmission cables.
- Turbine generators and towers.
- Monopile foundations and scour system.
- Electric Service Platform.
- Upland transmission cables.

It is anticipated that equipment and vessels similar to those used during installation will be utilized during decommissioning. For offshore work this would likely include a jet plow, crane barges, jack-up barges, tugs, crew boats and specialty vessels such as cable laying vessels or possibly a vessel specifically built for erecting WTG structures. For upland work, general construction equipment such as backhoes and cable trucks would be utilized. The environmental impacts from the use of this equipment during decommissioning activities would be similar to impacts experienced during construction. However it is reasonable to expect that by the end of the Lease term, technological advances in methods and equipment servicing the offshore industry will result in some increased level of efficiencies as well as a reduced level of environmental impacts.

6.3 Decommissioning Process

The decommissioning of the offshore facilities would necessitate the involvement of an onshore disposal and recycling facility with the capacity and capabilities of handling the large quantities of steel, fiberglass and other materials from the Project. Acknowledging the fact that other potential onshore disposal and recycling facilities may exist at the end of the Lease term that may prove to be more desirable, facilities do currently exist that are capable of handling the materials. Prolerized New

England Inc. operates several facilities, two of which are located in Everett Massachusetts, and Johnston Rhode Island. Prolerized staff has indicated that they have the capabilities and capacity to handle the disposal and recycling of the materials from the proposed action, if it were to take place today. The Everett facility has deep water access, allowing for the steel towers and monopiles to be directly offloaded from the barges, cut into manageable sections, sheared into smaller pieces and then shipped to end-users as scrap metal.

For this reason, the Everett facility would be the proposed location for the onshore disposal and recycling of project materials. Currently there is no commercial scrap value for the fiberglass in the rotor blades. The fiberglass from the blades would be cut into manageable pieces and then disposed of as solid waste at an approved onshore facility. The initial step in the decommissioning process would involve the disconnection of the inner- array 33kV cables from the WTGs. The cables would then be pulled out of the J-tubes, and removed from their embedded position in the seabed. Where necessary the cable trench will be jet plowed to fluidize the sandy sediments covering the cables, and the cables will then be reeled up onto barges. The cable reels will then be transported to the port area for further handling and recycling.

The WTGs would be prepared for dismantling by properly draining all lubricating fluids according to the established operations and maintenance procedures and Materials Management and Disposal Plan (Appendix D), and removing the fluids to the port area for proper disposal and / or recycling. This would be followed by the WTGs being deconstructed (down to the transition piece at the base of the tower) in much the same way as they were installed. Utilizing the same or similar types of cranes and vessels as during their construction, the blades, rotor, nacelle and tower would be sequentially disassembled and removed to port for recycling. It is anticipated that (with the possible exception of the fiberglass) virtually the entire WTG will be recyclable.

Once the wind turbines and towers have been removed, the foundation components (transition piece, monopile and, scour mats / rock armor) would be decommissioned. Sediments inside the monopile will be suctioned out and stored on a barge to allow access for cutting and, in accordance with the BOEMRE's removal standards (30 CFR 250.913) , the monopile and transition piece assembly will be cut approximately 15 feet (5 meters) below the seabed, with the portion of the pile below the cut remaining in place. Depending upon the capacity of the available crane, the assembly above the cut may be further cut into more manageable sections in order to facilitate handling, and then placed on a barge for transport to the port area for recycling. Cutting of the pile would likely be done using one or a combination of: underwater acetylene cutting torches, mechanical cutting, or high pressure water jet. The sediments previously removed from the inner space of the monopile would be returned to the depression left when the monopile is removed, using the vacuum pump and diver assisted hoses in order to minimize sediment disturbance and turbidity. All scour mats will be recovered, brought to the surface by crane, placed on a barge and brought to port for recycling or disposal. In those locations where rock armoring has been used for scour protection, it would be excavated with a clamshell dredge, placed on a barge, and disposed of at an upland location.

The ESP will be dismantled in a similar manner as the WTGs, using similar vessels. The ESP would be prepared for dismantling by properly draining all oils, lubricating fluids, and transformer oil according to the established operations and maintenance procedures and OSRP, and removing the fluids to the port area for proper disposal and / or recycling. The inner-array 33kV cables from the WTGs and the 115 kV transmission cables to shore would be disconnected from the ESP and removed as discussed above. The heliport, ladders and boat platform will be removed from the ESP by cutting, and placed on a barge for removal to the mainland and recycling. The balance of the jacketed superstructure will be cut from the piles and lifted out of the water, placed onto barges, and removed to port for recycling. The ESP foundation piles and scour protection will be removed according to the same procedures used in the removal of the WTG foundations described above.

Decommissioning of the landfall transition and upland transmission line components will consist of pulling the cables out of the underground concrete ductbank, loading it onto truck mounted reels and transporting them offsite for reuse or salvage. The underground vaults, conduits and ductbanks will be left in place, available for reuse if the need should arise, in order to avoid disruption to the streets.

The FEIS discusses the potential impacts associated with these decommissioning activities.

7.0 ENVIRONMENTAL SAFEGUARDS

CWA has committed to implementing extensive resource safeguards to avoid, minimize or mitigate potential impacts due to construction, operation and decommissioning of the Project. These safeguards are categorized as 1) BMPs; 2) mitigation measures; 3) monitoring programs and compliance plans; and 4) reporting requirements.

All Project activities undertaken pursuant to the Lease will comply to the maximum extent practicable with the extensive BMPs identified in Section 5 of the ROD. These BMPs will not be repeated herein.

Mitigation, monitoring and reporting requirements will be the responsibility of an Environmental Coordinator, as described in section 4.0 of this COP. The Environmental Coordinator will report to the Project Director and will ensure that all local, state and federal permitting requirements and laws relating to environmental protection and reporting are adhered to. The Project's Environmental Coordinator will be responsible for verifying compliance with environmental protection programs and protocols for environmental incident response, and ensuring that any and all reporting requirements that are part of the mitigation and monitoring stipulations are completed and filed in a timely manner.

This section incorporates by reference all the environmental safeguards that have been agreed upon with BOEMRE in the executed Lease, as well as with state and local agencies. How CWA will comply with the terms, conditions, and environmental stipulations of the lease is presented and discussed throughout this COP, and its appendices. Table 7.0-1 references the relevant sections of the COP where the implementation of the mitigation, monitoring, and reporting requirements can be found.

Table 7.0-1

Mitigation and Monitoring			
Environmental Resource	**Source Document(s) Initiating**	**Details**	**Implementation Discussed in COP Section**
Cultural Resources	Lease; ROD and FEIS	Per Section 106 review process and source documents' stipulations, the Environmental Coordinator will ensure that CWA will: ▪ Conduct a pre-survey meeting with BOEMRE to finalize survey details. ▪ Conduct High Resolution Geophysical (HRG) and Geotechnical (G&G) Surveys according to the Lease ▪ Protect Cultural Resources utilizing pre-determined buffer zones in consultation with BOEMRE and Marine Archaeologist ▪ Follow procedures for Unanticipated Discovery ("Chance Finds") of Cultural Resources and/or Human Remains. ▪ Bottom disturbing activities to be monitored by qualified archaeologist and tribal members.	▪ Section 4.1.1 ▪ Section 4.1.1.2
Geology	Lease; ROD and FEIS	Per the source documents' stipulations, the Environmental Coordinator will ensure that CWA will: ▪ Conduct a pre-survey meeting with BOEMRE to finalize survey details. ▪ Conduct High Resolution Geophysical (HRG) and Geotechnical (G&G) Surveys according to the Lease ▪ Follow geotechnical sampling / testing protocols for CPTs, vibracores and soil borings ▪ Install and monitor scour protection mats and/or rock armor at the base of all monopiles and ESP ▪ Install and monitor submarine cables to ensure proper burial depth.	▪ Section 4.1.1 ▪ Section 4.1.1.3 and Appendix A ▪ Section 4.1.3.3 ▪ Sections 4.1.4 and 4.1.6 ▪ Section 5.9.4.4

Mitigation and Monitoring			
Environmental Resource	**Source Document(s) Initiating**	**Details**	**Implementation Discussed in COP Section**
Air Quality	Lease; ROD; FEIS and BOEMRE Conformity Analysis	Per the source documents' stipulations, the Environmental Coordinator will ensure that CWA will: ▪ Purchase appropriate Emission Reduction Credits ▪ Comply with all emission control and equipment requirements ▪ Comply with all reporting requirements ▪ Contractors operating diesel-powered equipment at the Quonset Point staging site use ultra low sulfur diesel fuel	▪ Section 4.1.8.1 and Appendix H (EPA Air Permit)
Water Quality	Lease; ROD; FEIS and 401 Water Quality Certificate	Per the source documents' stipulations, the Environmental Coordinator will ensure that CWA will: ▪ Comply with Operations and Maintenance Plan ▪ Comply with the OSRP ▪ Comply with the SWPPP	▪ Section 5.9.4.4 ▪ Appendix C ▪ Appendix F
Electrical and Magnetic Fields	Lease; ROD; FEIS	Per the source documents' stipulations, the Environmental Coordinator will ensure that CWA will: ▪ Install shielded three conductor cables as configured, in one trench to the specified depth of at least 6 feet in order to minimize any Electrical and Magnetic Fields (EMF)	▪ Sections 4.1.4 and 4.1.6

Mitigation and Monitoring			
Environmental Resource	**Source Document(s) Initiating**	**Details**	**Implementation Discussed in COP Section**
Coastal and Intertidal Vegetation	Lease; ROD; FEIS and 401 Water Quality Certificate	Per the source documents' stipulations, the Environmental Coordinator will ensure that CWA will: ▪ Conduct pre and post construction eel grass surveys until two years following commencement of commercial operations ▪ Aerial photography ▪ Monitor cable installation activities near Egg Island (including diver assisted anchor placements to avoid eel grass) ▪ Replant eel grass if the results of post construction surveys indicate that eelgrass was lost as the result of the project ▪ Comply with all reporting requirements	▪ Section 4.1.1.4 ▪ Appendix H-6, MassDEP Water Quality Certificate, Attachment E
Subtidal Offshore Resources	Lease; ROD; FEIS; FEIR and 401 Water Quality Certificate	Per the source documents' stipulations, the Environmental Coordinator will ensure that CWA will: ▪ Monitor benthic community recovery along the transmission line route (both on the OCS, including three additional paired monitoring sites, and within state waters) according to the Seafloor Habitat/Benthic Community Monitoring Plan ▪ Utilize proper scour control methods ▪ Comply with all monitoring and reporting requirements	▪ Section 4.1.1.4 ▪ Appendix H-6, MassDEP Water Quality Certificate, Attachment E ▪ Section 4.1.3.3

Mitigation and Monitoring			
Environmental Resource	**Source Document(s) Initiating**	**Details**	**Implementation Discussed in COP Section**
Fisheries and Essential Fish Habitat	Lease; ROD; FEIS; FEIR and 401 Water Quality Certificate	Per the source documents' stipulations, the Environmental Coordinator will ensure that CWA will: ▪ Abide by time of year in-water work restrictions to protect winter flounder spawning ▪ Install and monitor scour control to ensure proper function ▪ Install and monitor submarine cables to ensure proper burial depth ▪ Properly notice all construction activities ▪ Monitor benthic community recovery along the transmission line route (both on the OCS, including three additional paired monitoring sites and within state waters) according to the Seafloor Habitat/Benthic Community Monitoring Plan	▪ Section 2 and Appendix H (401 WQC) ▪ Section 4.1.1 ▪ Section 4.1.3.3 ▪ Sections 4.1.4 and 4.1.6 ▪ Section 4.1.1.4 ▪ Section 5.9.4.4

Mitigation and Monitoring			
Environmental Resource	**Source Document(s) Initiating**	**Details**	**Implementation Discussed in COP Section**
Marine Mammals and Sea Turtles	Lease; ROD; FEIS	Per the source documents' stipulations, the Environmental Coordinator will ensure that CWA will: ▪ Obtain Incidental Harassment Authorization (IHA) prior to construction ▪ Comply with all NMFS mitigation measures resulting from the Endangered Species Section 7 consultation ▪ Abide by NOAA Fisheries Northeast Regional Viewing Guidelines and MMS Gulf of Mexico Region's Notice to Lessee (NTL) No. 2007-G04, ▪ Limit start of pile-driving to daylight hours ▪ Seismic surveying equipment will comply as much as possible with applicable equipment noise standards of the U.S. ▪ Ensure a "soft start" at the beginning of each pile installation in order to allow marine mammals and sea turtles to vacate the project area ▪ Employ NMFS approved Marine mammal observers on survey and pile driving vessels ▪ Establish and maintain appropriate exclusion zones ▪ Conduct required sound measurements ▪ Comply with all reporting requirements	▪ Section 4.1.1.4 ▪ FEIS pg 9-24 ▪ FEIS Appendix G ▪ Biological Opinion Appendix J of the FEIS ▪ Section 4.1.3.1

Mitigation and Monitoring			
Environmental Resource	**Source Document(s) Initiating**	**Details**	**Implementation Discussed in COP Section**
Avifauna and Terrestrial and Coastal Fauna	Lease; ROD; FEIS	Per the source documents' stipulations, the Environmental Coordinator will ensure that CWA will: ▪ Comply with all United States Fish and Wildlife Service (USFWS) mitigation measures resulting from the Endangered Species Section 7 consultation ▪ Comply with all requirements of the ABMP once it has been finalized. The current draft version of the ABMP has been submitted to BOEMRE and USFWS and is currently under review and discussion. CWA will continue to consult with BOEMRE and USFWS to finalize the ABMP. ▪ Comply with all reporting requirements	▪ Biological Opinion Appendix J of the FEIS ▪ Section 4.1.1.4 ▪ Appendix B
Visual Resources	Lease; ROD; FEIS; FAA Determination of No Hazard	Per the source documents' stipulations, the Environmental Coordinator will ensure that CWA will: ▪ Mark and light the facilities according to approved FAA plan (off-white 5% grey tone paint and no day-time lighting).	▪ Section 5.9.4.5 and Appendix H (FAA Determination of No Hazard)
Airport Facilities and Air Traffic	Lease; ROD; FEIS; FAA Determination of No Hazard; FAA Affirmation of Determination	Per the source documents' stipulations, the Environmental Coordinator will ensure that CWA will: ▪ Implement the marking, flash sequence and lighting provisions per the Lease ▪ Implement the terms and conditions related to radar mitigation in the FAA Determination of No Hazard	▪ Section 5.9.4.5 and Appendix H (FAA Determination of No Hazard)

Mitigation and Monitoring			
Environmental Resource	**Source Document(s) Initiating**	**Details**	**Implementation Discussed in COP Section**
Marine Activities and Port Facilities	Lease; ROD; FEIS	Per the source documents' stipulations, the Environmental Coordinator will ensure that CWA will: ▪ Implement all terms and conditions identified by the USCG in Appendix B of the FEIS to insure maritime safety ▪ Continue to consult and coordinate closely with USCG ▪ Ensure that all WTGs and ESP are properly marked with Private Aids to Navigation (PATONS) ▪ Ensure that communication protocols are in place with USCG to enable remote shutdown and assist with SAR if requested ▪ Mark each individual WTG with clearly visible, unique, alpha-numeric identification characters ▪ Comply with all reporting requirements	▪ Section 4.1 ▪ Section 5.7.4 ▪ Section 5.8.3 ▪ Section 5.9.4.5 ▪ Appendix E ▪ FEIS Page 5-258
Communications	Lease; ROD; FEIS	Per the source documents' stipulations, the Environmental Coordinator will ensure that CWA will: ▪ Avoid use of specified radio frequencies as necessary and ensure that VHF radios utilized by the project do not interfere with other mariners and maritime safety	▪ Appendix E, Section 6

Through compliance with the extensive stipulations in the Lease, the ROD, the FEIS, FEIR and other regulatory documents as outlined above, the oversight of the Environmental Coordinator will ensure that CWA minimizes, through avoidance, monitoring and mitigation of impacts from the Project.

8.0 NEPA AND REGULATORY COMPLIANCE

8.1 NEPA Compliance

The information contained in a COP is intended to provide BOEMRE with information necessary to allow BOEMRE to comply with NEPA and other relevant laws. However, CWA has already submitted – and BOEMRE has extensively reviewed – the information that would otherwise be submitted in a COP. Therefore, CWA incorporates by reference into this COP, the Final Environmental Impact Statement issued by BOEMRE in January 2009, as well as the Environmental Assessment and Finding of No New Significant Information (FONNSI) issued by BOEMRE on April 28, 2010. Specific environmental resources that could be affected by construction and operation of the Project have been fully assessed in prior filings; locations of the resource assessments are reported in the FEIS. The information contained in this COP further details the procedures that will be followed to construct, operate, and maintain the project in accordance with the project description contained in Section 2.0 of the FEIS.

The status of all permits and approvals is summarized in Table 1.4-1.

New information relevant for NEPA purposes since BOEMRE's April 28, 2010 FONNSI is limited to:

1. The Shallow Hazards Report (Appendix A) that shows that existing site conditions are typical for site area and that no unexpected features exist that would alter the construction and operation of the project as detailed in the FEIS.

2. The FAA's Finding of No Hazard On May 17, 2010, (Appendix H) approving construction of the turbines and stating that the aeronautical studies "revealed that the structure would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities." Following the May 17, 2010 Determinations of No Hazard, the FAA received several petitions for discretionary review, in effect appealing its decision based on impacts to visual flight rules and radar. The FAA conducted a review of the aeronautical study and Determination process and upheld its decision, issuing its affirmation of Determination of No Hazard on August 5, 2010 (Appendix H).

3. BOEMRE's reinitiation of formal ESA consultation with National Marine Fisheries Service (NMFS) on July 13, 2010 in response to the sighting of a number of Right whales outside of Nantucket Sound in April 2010. NMFS issued it's revised Biological Opinion (12/30/10) which concluded that consistent with the previous Opinion would not jeopardize the existence of the Right whale.

4. EPA Region I issued an OCS Air Permit for the project on January 7, 2011, requiring the project to comply with the applicable provisions of the Massachusetts air pollution control regulations, including New Source Review (NSR) and the applicable provisions of 40 CFR 60, Standards of Performance for New Stationary Sources. (Appendix H)

5. USACE issued an Individual Permit – Section 10 Rivers and Harbors Act / Section 404 Clean Waters Act on January 5, 2011 authorizing the placement of the WTG structures in navigable waters, and the discharge of dredge or fill material related to the landfall transition cofferdam. .

8.2 Permits and Approvals

CWA has received all state permits necessary to construct the project. All major federal reviews of the Project have also been completed. The BOEMRE has issued a Record of Decision, and has entered into a commercial lease with CWA on October 6, 2010. Additionally, the Federal Aviation Administration has determined that the project is not a hazard to aviation, and other major federal permits necessary for construction (EPA and USACE) have been issued. The federal and state permits and approvals are summarized in Table 1.4-1.

Coastal Zone Management (clarification):

On January 23, 2009, the Massachusetts Office of Coastal Zone Management (MCZM) issued its concurrence with the consistency certification submitted by CWA on July 23, 2008, finding that all aspects of the CWA Project, including Project components located in federal waters, were consistent with the MCZM enforceable program policies. MCZM's concurrence letter is attached (see Appendix H-4). There have been no changes made to the project that would trigger a need for any further federal consistency review by the MCZM. Indeed, even if changes were made to the project, the only requirement is for CWA to notify MCZM and to submit an explanation of the nature of the change, as required by 15 CFR Part 930. Resubmission of the consistency certification and supporting data is not required.[3]

Since concurrence has already been received, it makes little sense for CWA to submit to BOEMRE a consistency certification and data supporting. Both BOEMRE and MCZM have conducted a comprehensive review of all the necessary data.

For your convenience, the review process engaged in by MCZM, is further described below.

MCZM Consistency Review

On January 23, 2009, the Massachusetts Office of Coastal Management (MCZM), implementing its federally-approved coastal zone management program in accordance with the requirements of 15 CFR Part 930, Subpart D (Consistency for Activities Requiring a Federal License or Permit) and the requirements of 15 CFR Part 930, Subpart E (Consistency for Outer Continental Shelf (OCS) Exploration, Development and Production Activities), notified CWA, BOEMRE, and the United States Army Corps of Engineers (USACE) of its concurrence with the CWA certification that the Project would be consistent with the CZM enforceable program policies.

The MCZM consistency review encompassed all of the information prescribed to be submitted by CWA in order to satisfy the federal consistency requirements set forth at 15 CFR § 930.58(a)(2)[4] and 15 CFR § 930.58(a)(3)[5] as well as the MCZM program requirements set forth at BOTH 301 CMR

---

[3] As with approvals issued by BOEMRE, MCZM provided that, should the Project be modified from that which was reviewed by MCZM, CWA would be required to notify MCZM and to submit an explanation of the nature of the change, as required by 15 CFR Part 930. The Project has not undergone modification as contemplated by MCZM and, in the event that the Project is so modified in the future, CWA will provide the requisite notification and explanation to MCZM and MCZM will determine the need for any further federal consistency review

[4] 15 CFR § 930.58(a)(2) provides, in relevant part:

Information specifically identified in the management program as required necessary data and information for an applicant's consistency certification. The management program as originally approved or amended may describe data and information necessary to assess the consistency of federal license or permit activities. Necessary data and information may include completed State or local government permit applications which are required for the proposed activity, but shall not include the issued State or local permits. NEPA documents shall not be considered necessary data and information when a Federal statute requires a Federal agency to initiate the CZMA federal consistency review prior to its completion of NEPA compliance.

[5] 15 CFR § 930.58(a)(3) provides, in relevant part:

21.07(3) (Review Procedures – Federal License or Permit In or Affecting the Coastal Zone; Federal Consistency Review)[6] and 301 CMR 21.08(3) (Review Procedures – Outer Continental Shelf (OCS) Exploration, Development and Production Activities; Federal Consistency Review)[7].

Scope and Extent of MCZM Federal Consistency Review

The MCZM federal consistency review process, which commenced in July 2008, included submission by CWA and review and consideration of information and documentation NOT required to be reviewed and considered under the federal regulations and in excess of the requirements of both 301 CMR 21.07 and 301 CMR 21.08. Because of the scope and extent of the CWA NEPA review; initial application triggering federal action to the USACE (which commenced the first NEPA review process prior to the enactment of the Energy Policy Act of 2005); and the development and promulgation of 30 CFR Part 285 (which commenced the second NEPA review process); MCZM determined that its federal consistency review would include all aspects of the CWA Project as would be submitted to and considered by MMS (subsequently BOEMRE) in its review of the CWA Construction and Operations Plan (COP)[8].

While not required under the federal program, MCZM did, in fact, participate in the NEPA public comment process and reviewed and considered federal NEPA documents as well as Massachusetts Environmental Policy Act documents:

To inform our federal consistency review, CZM reviewed the [State] Environmental Notification Form (ENF), Notice of Project Change (NPC), Draft Environmental Impact Report (DEIR), and Final Environmental Impact Report (FEIR) developed pursuant to the Massachusetts Environmental Policy Act, two [Federal] Draft Environmental Impact Statements (DEIS) and a Final Environmental Impact Statement developed pursuant to the National Environmental Policy Act; and, pursuant to the Coastal Zone Management Act, your federal consistency certification, applicable to state permits/licenses, and lease/easement/right-of-way application to the Minerals Management Service under the Outer Continental Shelf Lands Act. Over the course of the state and federal review process, CZM has received all of the data and information necessary to make a consistency determination [emphasis added].

An evaluation that includes a set of findings relating the coastal effects of the proposal and its associated facilities to the relevant enforceable policies of the management program. Applicants shall demonstrate adequate consideration of policies which are in the nature of recommendations. Applicants need not make findings with respect to coastal effects for which the management program does not contain enforceable or recommended policies.

[6] This section of the Massachusetts regulations corresponds to 15 CFR Part 930 Subpart D (Consistency for Activities Requiring a federal license or Permit).

[7] This section of the Massachusetts regulations corresponds to 15 CFR Part 930 Subpart E (Consistency for Outer Continental Shelf (OCS) Exploration, Development and Production Activities).

[8] The approach taken by MCZM, analogous to the approach taken by BOEMRE, acknowledged the need to review and consider all of the information necessary to support BOEMRE approval of both a Site Assessment Plan and a Construction and Operations Plan, even though BOEMRE ultimately determined that CWA would not be required to submit a Site Assessment Plan.

Based on our review, all aspects of the project, including those project elements located in federal waters and the project's effects on resources and uses in the Massachusetts coastal zone [emphasis added], we concur with your certification that the activity as proposed is consistent with the CZM enforceable program policies.

January 23, 2009 CZM Federal Consistency Review of Cape Wind Energy Project – Minerals Management Service Action; Nantucket.

9.0 REFERENCES AND AGENCY CONTACTS

Over the past decade of environmental studies and preparation of multiple permitting documents for the Project, hundreds of reference documents have been studied, dozens of regulatory agencies and technical experts have been contacted by the CWA team, and numerous opportunities for public comment have been provided. The individual references have been cited in the previous permit applications listed below that are in the public domain, and will not be repeated herein. The agencies contacted are identified below, in addition permitting documents available in the public domain which are relevant to this COP are provided in Appendix H. Details about the issues addressed with the agencies are available in the relevant permitting documents.

9.1 References

The following previously submitted documents contain bibliographies of references used in preparation of this COP:

- BOEMRE FEIS
- EFSB Final Decision
- BOEMRE DEIS
- MEPA FEIR
- USACE DEIS/MEPA DEIR/CCC DRI
- MEPA ENF

9.2 Agencies Contacted and Consultations

The following documents, with the most recent first, contain lists of agencies contacted and consultations conducted:

- BOEMRE Record of Decision: Sections 7.0 and 8.0 lists public involvement, agency consultations and coordination. Agencies and Tribal Governments consulted include:
    - Wampanoag Tribe of Gay Head (Aquinnah)
    - Mashpee Wampanoag Tribe

- NOAA Fisheries Service, also known as National Marine Fisheries Service
- US Army Corps of Engineers
- US Coast Guard
- US Department of Energy
- Us Environmental Protection Agency
- US Federal Aviation Administration
- US Air Force
- US Fish and Wildlife Service
- Cape Cod Commission
- Massachusetts Department of Environmental Protection
- Massachusetts Energy Facilities Siting board
- Massachusetts Executive Office of Environmental Affairs
- Massachusetts Historical Commission
- Town and County of Nantucket
- Town of Barnstable
- Barnstable Municipal Airport

The following Federal agencies accepted a BOEMRE invitation dated March 16, 2006 to become a cooperating agency with BOEMRE:

- US Coast Guard
- US Army Corps of Engineers, New England District
- US Environmental Protection Agency

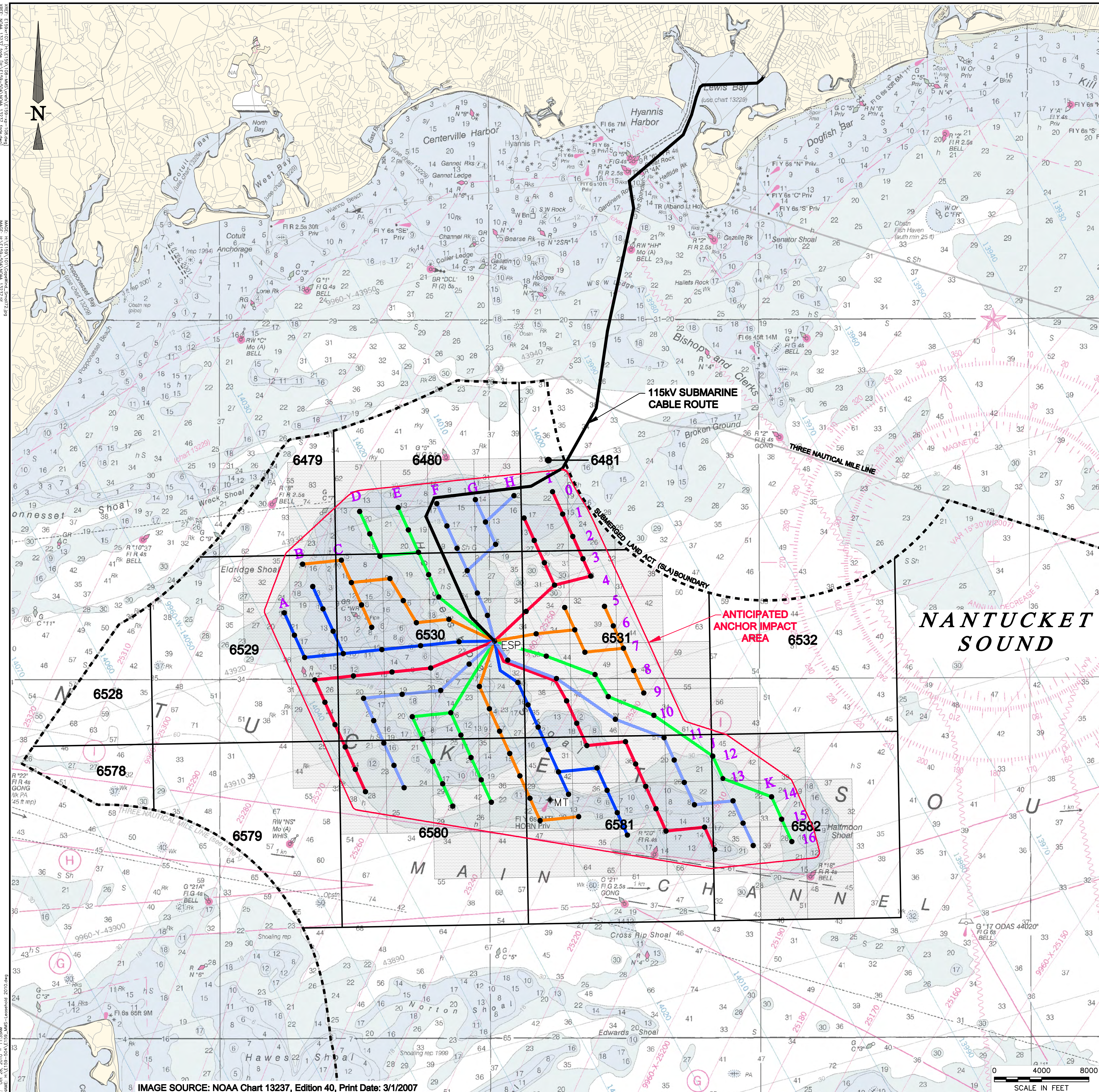
Some or all of the agencies listed above have been contacted, consulted and otherwise involved in the review of the Project at various stages throughout the regulatory process as noted in the additional permitting documents listed below.

- BOEMRE EA

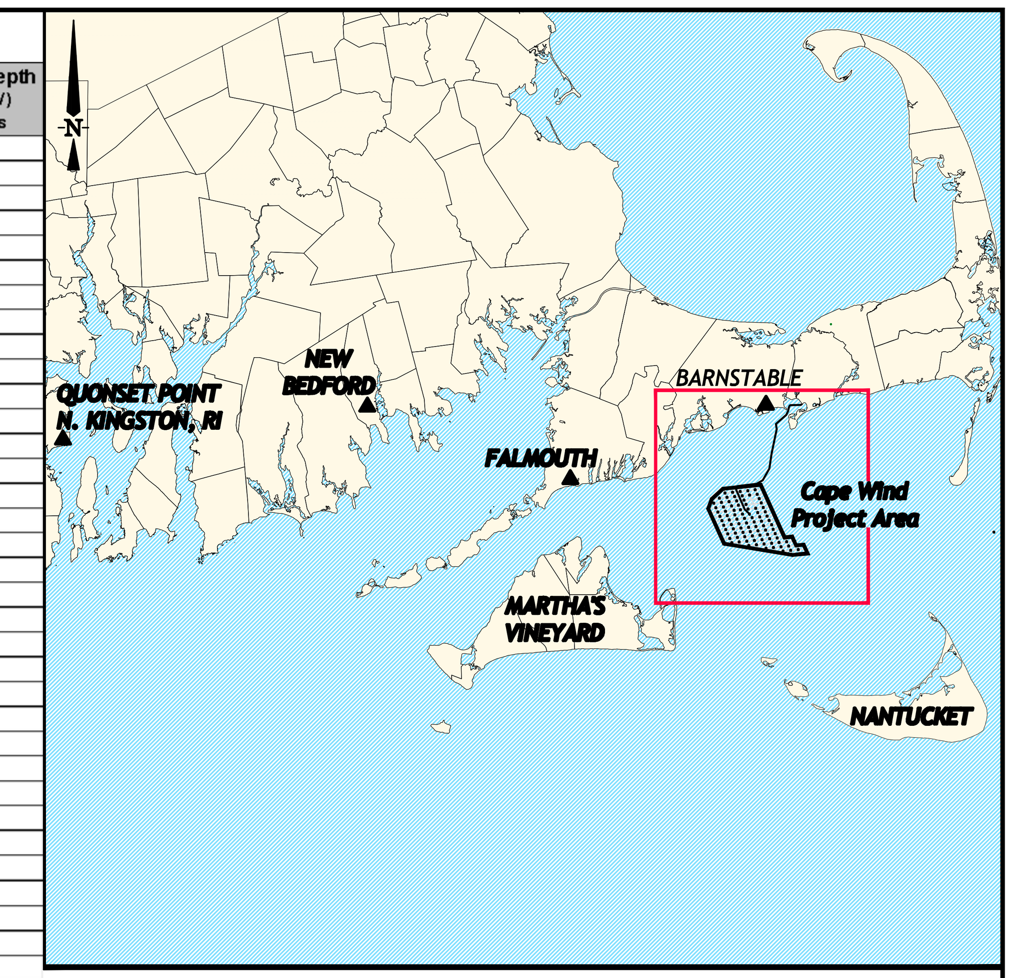
- BOEMRE FEIS Appendix B: contains 357 pages detailing Project correspondence since 2002 with federal, state and local agencies, consultations, public notices and cooperating agency acceptance letters.
- EFSB Final Decision
- BOEMRE DEIS
- MEPA FEIR
- USACE DEIS/MEPA DEIR/CCC DRI
- MEPA ENF

Drawings

Location Plat



#	WTG LOC	LATITUDE (decimal seconds)	LONGITUDE (decimal seconds)	Water Depth (MLLW) Meters
1	A4	41 30 55.77389	70 23 48.35701	7.0
2	A5	41 30 37.08711	70 23 37.11240	7.7
3	A6	41 30 18.40254	70 23 25.83975	6.6
4	A7	41 29 59.71501	70 23 14.59952	7.9
5	A8	41 29 41.02910	70 23 03.33086	9.8
6	A9	41 29 22.34190	70 22 52.09290	7.4
7	A10	41 29 03.65340	70 22 40.85804	7.6
8	A11	41 28 44.96457	70 22 29.62366	8.3
9	A12	41 28 26.27541	70 22 18.39108	9.2
10	B2	41 31 36.41158	70 23 27.96360	8.8
11	B3	41 31 17.72429	70 23 16.71881	6.0
12	B4	41 30 59.04369	70 23 05.37957	4.3
13	B5	41 30 40.36346	70 22 54.04306	4.2
14	B6	41 30 21.66924	70 22 42.87661	4.9
15	B7	41 30 02.98152	70 22 31.63176	5.5
16	B8	41 29 44.29349	70 22 20.38870	7.1
17	B9	41 29 25.60414	70 22 09.15401	6.8
18	B10	41 29 06.91448	70 21 57.92242	6.8
19	B11	41 28 48.22449	70 21 46.69130	7.6
20	B12	41 28 29.53517	70 21 35.46329	8.5
21	C2	41 31 39.68764	70 22 44.86759	4.1
22	C3	41 31 20.99325	70 22 33.71482	4.7
23	C4	41 31 02.30340	70 22 22.48232	4.7
24	C5	41 30 43.62200	70 22 11.14907	3.6
25	C6	41 30 24.92663	70 21 59.98588	4.3
26	C7	41 30 06.23776	70 21 48.74430	5.5
27	C8	41 29 47.54856	70 21 37.50450	6.6
28	C9	41 29 28.85611	70 21 26.29541	7.0
29	C10	41 29 10.16530	70 21 15.07364	6.1
30	C11	41 28 51.47318	70 21 03.85367	8.3
31	C12	41 28 32.78172	70 20 52.63548	8.8
32	C13	41 28 14.08896	70 20 41.42697	12.7
33	D0	41 32 20.32366	70 22 24.44582	6.7
34	D1	41 32 01.63460	70 22 13.20332	6.7
35	D2	41 31 42.94522	70 22 01.96262	3.9
36	D3	41 31 24.24969	70 21 50.81312	4.4
37	D4	41 31 05.82707	70 21 36.04193	4.4
38	D5	41 30 47.38255	70 21 21.57281	5.6
39	D6	41 30 28.18056	70 21 17.07951	5.4
40	D7	41 30 09.49538	70 21 05.77414	2.7
41	D8	41 29 50.79921	70 20 54.61910	7.1
42	D9	41 29 32.10172	70 20 43.46453	6.4
43	D10	41 29 13.40975	70 20 32.24602	6.5
44	D11	41 28 54.71647	70 20 21.02931	9.2
45	D12	41 28 36.02386	70 20 09.81438	7.5
46	D13	41 28 17.33383	70 19 58.55788	10.8
47	E0	41 32 23.57913	70 21 41.53312	5.7
48	E1	41 32 04.88891	70 21 30.29389	6.8
49	E2	41 31 46.19837	70 21 19.05646	6.9
50	E3	41 31 27.50750	70 21 07.82212	6.7
51	E4	41 31 08.81631	70 20 56.58827	6.8
52	E5	41 30 50.12578	70 20 45.35752	6.9
53	E6	41 30 31.42908	70 20 34.18640	6.9
54	E7	41 30 12.73692	70 20 22.95791	7.3
55	E8	41 29 54.05025	70 20 11.65892	4.0
56	E9	41 29 35.35260	70 20 00.50761	8.6
57	E10	41 29 16.65947	70 19 49.28580	7.6
58	E11	41 28 57.96601	70 19 38.06447	6.1
59	E12	41 28 39.27223	70 19 26.84624	14.5
60	E13	41 28 20.57067	70 19 15.73175	6.3
61	E14	41 28 01.87983	70 19 04.47163	9.1
62	F0	41 32 26.83015	70 20 58.61924	5.2
63	F1	41 32 08.13878	70 20 47.38328	6.3
64	F2	41 31 49.44708	70 20 36.14910	7.5
65	F3	41 31 30.75506	70 20 24.91804	7.4
66	F4	41 31 12.06271	70 20 13.68744	7.8
67	F5	41 30 53.36616	70 20 02.51123	8.4
68	F7	41 30 15.97986	70 19 40.07476	9.5
69	F8	41 29 57.28621	70 19 28.84476	10.4
70	F9	41 29 38.59323	70 19 17.62310	8.3
71	F10	41 29 19.89894	70 19 06.40456	6.1
72	F11	41 29 01.20141	70 18 55.22328	10.3
73	F12	41 28 42.50938	70 18 43.97152	11.1
74	F13	41 28 23.81027	70 18 32.81614	6.9
75	F14	41 28 05.11468	70 18 21.60343	7.5
76	G0	41 32 30.07480	70 20 15.72521	4.8
77	G1	41 32 11.38227	70 20 04.49383	4.9
78	G2	41 31 52.68943	70 19 53.27081	5.3
79	G5	41 30 56.61084	70 19 19.56121	10.8
80	G6	41 30 37.91283	70 19 08.39662	11.6
81	G7	41 30 19.21835	70 18 57.17466	12.7
82	G8	41 30 00.52355	70 18 45.95580	12.9
83	G9	41 29 41.82843	70 18 34.73742	12.6
84	G10	41 29 23.13397	70 18 23.52213	6.0
85	G11	41 29 04.43530	70 18 12.34412	9.1
86	G12	41 28 45.74210	70 18 01.09561	10.1
87	G13	41 28 27.04085	70 17 49.94351	10.7
88	G14	41 28 08.34510	70 17 38.73405	6.7
89	G15	41 27 49.64707	70 17 27.53427	14.5
90	H0	41 32 33.31792	70 19 32.78791	6.6
91	H1	41 32 14.62522	70 19 21.55847	5.0
92	H2	41 31 55.92829	70 19 10.36108	5.4
93	H3	41 31 37.23687	70 18 59.10630	9.9
94	H4	41 31 18.54220	70 18 47.88224	9.6
95	H5	41 30 59.84722	70 18 36.66128	10.5
96	H6	41 30 41.14805	70 18 25.49996	11.1
97	H7	41 30 22.45242	70 18 14.28126	13.7
98	H8	41 30 03.75647	70 18 03.06567	17.0
99	H9	41 29 45.31893	70 17 48.41865	15.4
100	H10	41 29 26.36358	70 17 40.63852	13.3
101	H11	41 29 07.66764	70 17 29.42698	13.5
102	H12	41 28 48.97040	70 17 18.21853	12.3
103	H13	41 28 30.42276	70 17 07.41467	4.0
104	H14	41 28 11.56987	70 16 55.74002	4.3
105	H15	41 27 52.87190	70 16 44.66697	6.7
106	I0	41 32 36.55564	70 18 49.87046	7.0
107	I1	41 32 17.86079	70 18 38.64429	5.9
108	I2	41 31 59.16370	70 18 27.45017	7.9
109	I3	41 31 40.47112	70 18 16.19865	9.8
110	I4	41 31 26.00431	70 18 07.56009	10.0
111	I5	41 31 00.69969	70 17 52.38729	11.6
112	I6	41 30 44.37885	70 17 42.60211	12.8
113	I7	41 30 25.68206	70 17 31.38668	14.0
114	I8	41 30 06.98495	70 17 20.17435	14.7
115	I9	41 29 48.28751	70 17 08.96249	14.9
116	I10	41 29 29.58975	70 16 57.75374	15.1
117	I11	41 29 10.89167	70 16 46.54545	16.2
118	I12	41 28 52.19039	70 16 35.38364	8.8
119	I13	41 28 33.49070	70 16 24.19469	7.6
120	I14	41 28 14.79195	70 16 12.99215	5.9
121	I15	41 27 56.09230	70 16 01.79850	5.3
122	I16	41 27 37.39263	70 15 50.60702	5.6
123	J12	41 28 55.41269	70 15 52.46083	14.4
124	J13	41 28 36.70898	70 15 41.31851	7.3
125	J14	41 28 18.00878	70 15 30.11885	7.7
126	J15	41 27 59.30443	70 15 18.98140	9.7
127	J16	41 27 40.60359	70 15 07.78530	11.9
128	K14	41 28 21.22147	70 14 47.24476	8.3
129	K15	41 28 02.51598	70 14 36.11058	9.4
130	K16	41 27 43.81398	70 14 24.91774	9.7
	ESP	41 30 31.91088	70 19 54.73761	



LOCUS MAP
Scale: 1"= 12 Miles

LEGEND:

- 6580 — OCS Blocks Official Protraction Diagram (OPD) Providence NK19-07
- Cape Wind Associates LLC Lease Area
- Submerged Land Act (SLA) Boundary
- Inner Array - 33kV Submarine Cable (Multi-colors)
- 115kV Submarine Cable
- Wind Turbine

ESS Group, Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

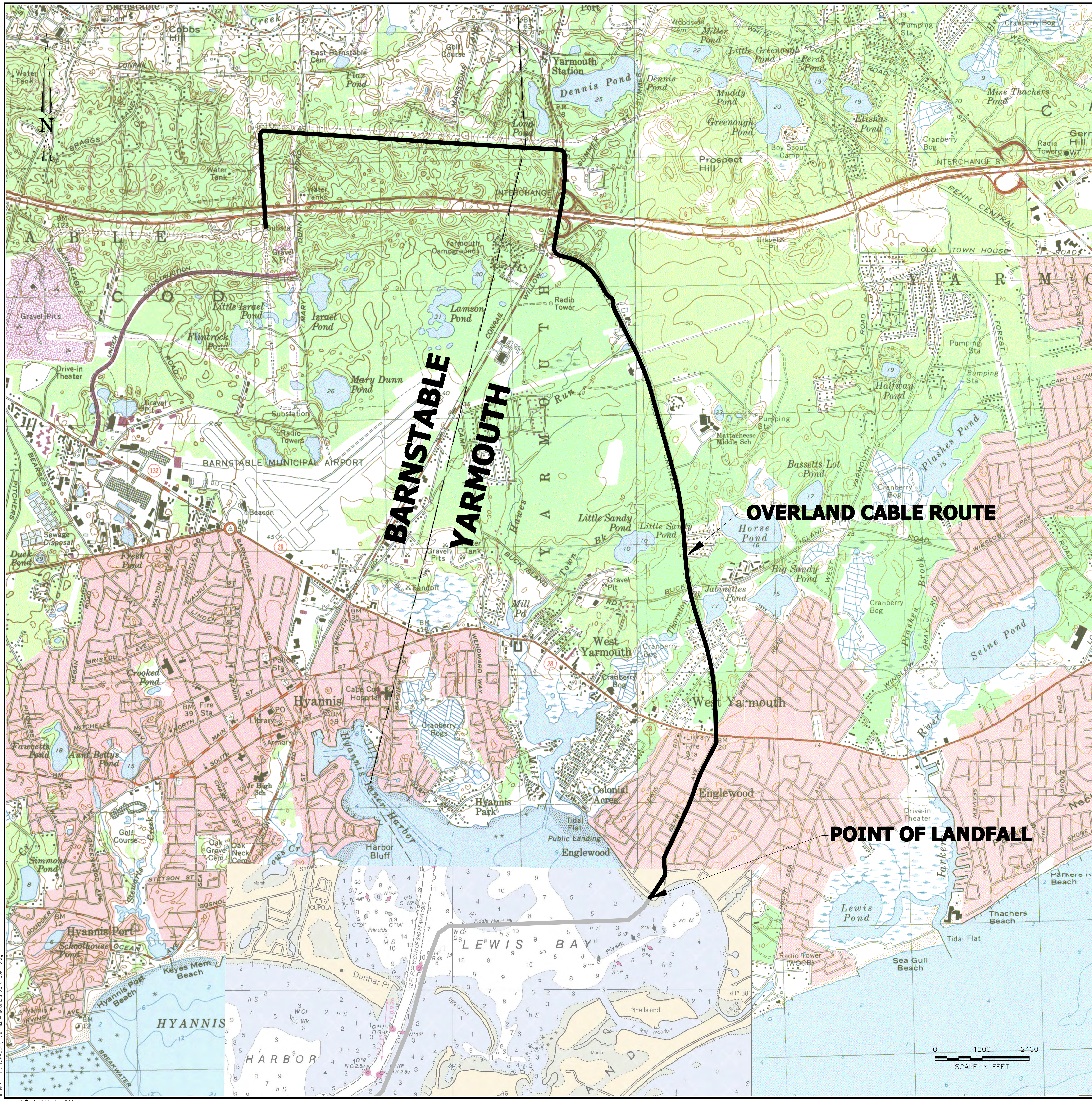
DRAWN BY: KCW | CHECKED BY: PRW
DESIGNED BY: | APPROVED BY: PRW

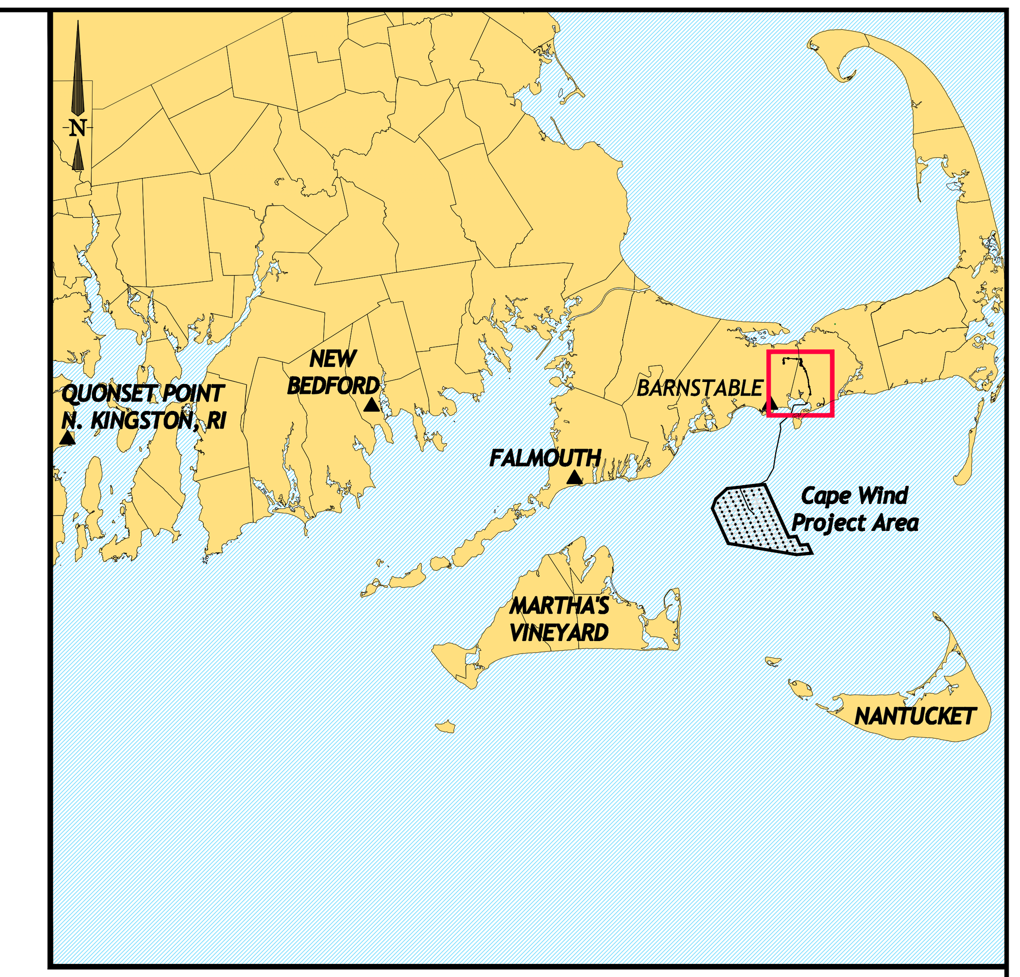
Cape Wind Associates, LLC

Cape Wind Project

Location Plat

PROJECT No.: E159–504.1
DATE OF ISSUE: October 2010
SHEET No.: 1 of 2
SCALE: As Shown
DRAWING No. 1





LOCUS MAP
Scale: 1"= 12 Miles

LEGEND:

Upland Cable

ESS Group, Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

DRAWN BY: KCW | CHECKED BY: PRW
DESIGNED BY: | APPROVED BY: PRW

Cape Wind Associates, LLC

Cape Wind Project

Location
Plat
(Upland)

PROJECT No.: E159-504.1
DATE OF ISSUE: October 2010
SHEET No.: 2 of 2
SCALE: As Shown

DRAWING No.
1

Appendix A

Shallow Hazards Report

CONFIDENTIAL

SHALLOW HAZARDS REPORT

CAPE WIND ENERGY PROJECT

HORSESHOE SHOAL, NANTUCKET SOUND

OSI REPORT # 10ES052

Prepared For:

Cape Wind Associates, LLC
75 Arlington Street, Suite 704
Boston, MA 02116

Prepared By:

Ocean Surveys, Inc.
129 Mill Rock Road East
Old Saybrook, CT 06475

4 February 2011

CONFIDENTIAL

TABLE OF CONTENTS

APPENDICES

These drawings accompany this report in a separate binder.

FIGURES

TABLES

ACRONYMS

Abbreviation	Definition
OSI	Ocean Surveys, Inc.
CWA	Cape Wind Associates, LLC
ESS	ESS Group, Inc.
PAL	Public Archaeology Laboratory, Inc.
GZA	GZA GeoEnvironmental, Inc.
BOEMRE	Bureau of Ocean Energy Management, Regulation and Enforcement
USACE	United States Army Corps of Engineers
NOAA	National Oceanic and Atmospheric Administration
USCG	United States Coast Guard
WHOI	Woods Hole Oceanographic Institution
WHG	Woods Hole Group, Inc.
MHC	Massachusetts Historical Commission
MBUAR	Massachusetts Board of Underwater Archaeological Resources
WTG	wind turbine generator
ESP	electrical service platform
COP	Construction and Operating Plan
DEIR	Draft Environmental Impact Report
FEIR	Final Environmental Impact Report
GPS	global positioning system
NAD	North American Datum (of 1983)
MLLW	mean lower low water
R/V	research vessel
VHF	very high frequency
TOC	total organic carbon
PCB	polychlorinated biphenyl
PAH	polynuclear aromatic hydrocarbon
USCS	Unified Soils Classification System
SPT	standard penetration test
CTD	conductivity, temperature, density
NMEA	National Marine Electronics Association
TVG	time variable gain
HVDC	high voltage direct current
HVAC	high voltage alternating current
FM	frequency modulated
APE	Area of Potential Effect

Units	Definition
miles	statute miles
nm	nautical miles
ft	feet / foot
m	meters
ft/s	feet per second
Hz	hertz
kHz	kilohertz
ms	milliseconds

SHALLOW HAZARDS REPORT
CAPE WIND ENERGY PROJECT
HORSESHOE SHOAL, NANTUCKET SOUND

1.0 INTRODUCTION

From 2001 to 2006, several multi-disciplinary marine site investigations were conducted by Ocean Surveys, Inc. (OSI) in Nantucket Sound to study the surficial and subsurface conditions in support of the Cape Wind Energy Project (the Project). Cape Wind Associates (CWA) proposes to construct 130 wind turbine generators (WTGs) on and adjacent to Horseshoe Shoal (the Project Area, shown in red on Figure 1) to harness the wind as a source of power for the regional electric grid. The intention of this shallow hazards review is to identify natural and man-made hazards present within the Project Area. The report was prepared under contract with CWA, and based on discussions with the Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE).

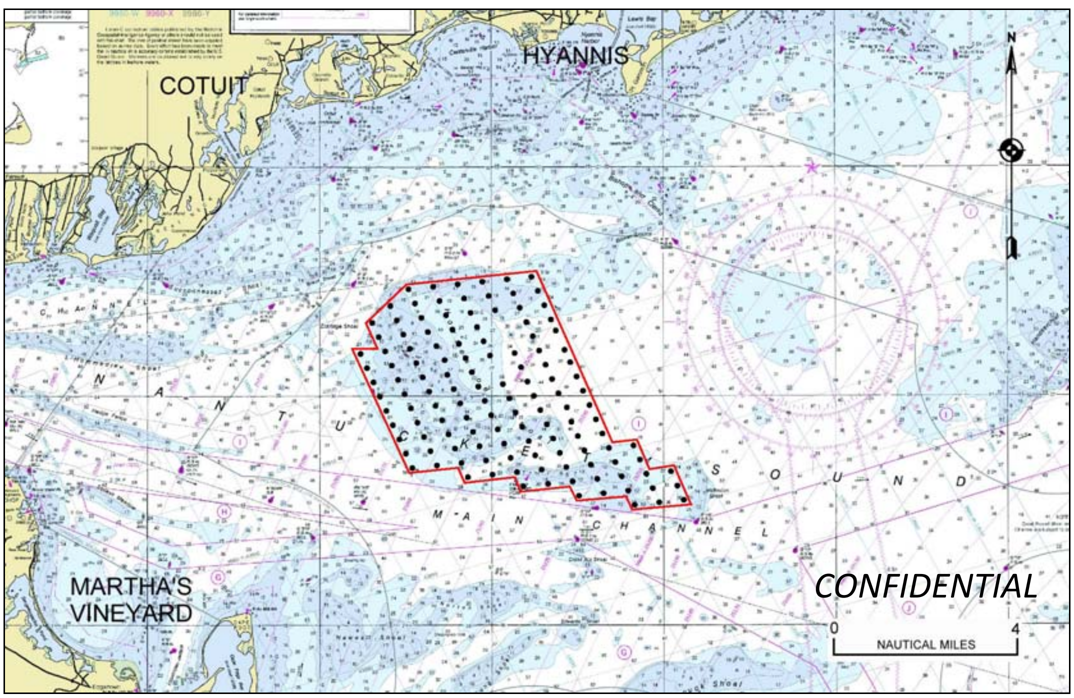


Figure 1. Project Area (in red) encompassing the final WTG design for the Cape Wind Energy Project in Nantucket Sound (NOAA Chart 13237 in background).

For the purposes of this report, the Project Area is defined as the current WTG layout. Although prior investigations (2001-2006) cover broader geographic areas due to changes in the project design since its initial conception, the data and results included in this submittal encompass the final WTG design. Upcoming pre-construction surveys will be conducted within the area of potential effect (APE) plus 1,000 feet beyond, as defined by BOEMRE and stipulated in the lease agreement.

1.1 Shallow Hazards Review Objectives and Tasks

The purpose of this study is to identify natural and man-made shallow hazards in the Project Area by re-examining existing geophysical and geological datasets. This data review addresses BOEMRE concerns regarding shallow hazards and compiles all existing information into a single document. Many hazards have been addressed previously, but these discussions were interspersed amongst numerous project documents. Members of the Project team supplying information for this shallow hazards review include:

- Ocean Surveys, Inc.
- Public Archaeology Laboratories, Inc. (PAL)
- GZA GeoEnvironmental, Inc. (GZA)
- ESS Group, Inc. (ESS)

Primary project documents for reference include prior OSI geophysical reports (2001, 2003, 2005), PAL cultural resource reports (2003, 2004, 2006), GZA geotechnical reports (2002, 2003a, 2003b), and the Draft (DEIR) and Final (FEIR) Environmental Impact Reports (CWA, 2004 and CWA, 2007).

OSI surveys focused on conditions in the immediate vicinity of each WTG location and inner array cable routes. Data products were developed to provide detailed information at each WTG site and focused on the upper 100 feet of the stratigraphic column, which is greater than the maximum depth of WTG monopile foundations. For the Construction and Operation Plan (COP), additional processing of the medium penetration seismic profiling data has been conducted to further evaluate shallow subsurface hazards to depths penetrated by the system (150-300 feet).

Data processing, analysis, interpretation, and documentation have been accomplished to adequately define the surficial and subsurface geology of the Project Area. Additional field surveys are planned in accordance with lease stipulations.

Specific tasks completed for this review include:

- Compilation of a navigation post-plot for all geophysical surveys
- Compilation of previous shallow hazards information from all CWA studies
- Re-analysis of datasets to identify surface and subsurface hazards
- Qualitative analysis of the surficial sand sheet
- Development and compilation of a surface hazards map
- Development and compilation of a subsurface hazards map
- Development of deeper, interpreted geologic cross sections

2.0 MARINE SCIENTIFIC PROGRAM HISTORY

This section provides a brief history of the OSI field program, which was conducted between 2001 and 2006 and included the investigations listed below in Table 1. These investigations were designed to document surface and subsurface conditions in the vicinity of the Project Area. Table 1 below summarizes the marine scientific field investigations completed to date.

Table 1. Program Chronology

OSI Project #	Survey Dates	Program
01ES047	25 June-15 July, 2001	Reconnaissance geophysical investigation of the proposed site
	29 July-19 August, 2001	Geotechnical investigation for seismic correlation and subsurface sampling for sediment analyses
	6-9 November 2001	Geophysical investigation of cable route approaches to landfalls
02ES055	16-17 August 2002	Geophysical investigation of meteorological tower site
03ES039	15 June-7 July, 2003	Geophysical investigation of proposed WTG array

OSI Project #	Survey Dates	Program
03ES039	9-12 September, 2003	Geophysical investigation of cable routes to shore
	10-20 October 2003	Geotechnical investigation for seismic correlation and subsurface sampling for sediment analyses
	December 2004	Geotechnical investigation near Lewis Bay landfall
05ES024	20 June-1 July and 15-17 July, 2005	Geophysical investigation of modified WTG locations
05ES043	12-19 November 2005	Geotechnical investigation in Project Area
06ES048	24-25 July 2006	Benthic study of sensitive habitats

2.1 Program Tasks and Overview

The OSI geophysical surveys provided information for a wide range of project tasks, including preliminary engineering and preparation of permit applications. To provide the necessary marine scientific information, the primary geophysical tools and ground truthing equipment utilized in support of the Project include: single beam depth sounder, side scan sonar, marine magnetometer, shallow penetration subbottom profiler (chirp), medium penetration seismic profiler (boomer), underwater video camera, grab sampler, and vibracorer.

The reconnaissance phase in 2001 was the initial exploratory field program which provided an overview of Horseshoe Shoal geologic conditions for subsequent positioning of the WTG array. To some extent, that dataset was superseded by the 2003 and 2005 programs, since the proposed WTG grid was modified and offset from the 2001 geophysical tracklines to avoid sensitive resources. Nonetheless, the 2001 dataset serves as excellent reference information for comparison and correlation with subsequent investigations that surveyed the final WTG locations and inner array cable routes.

The 2003 field program was the primary investigation of the WTG array, designed to provide detailed survey information at and between WTG locations. The interpretation of subbottom data focused on the upper 100 feet of the stratigraphic column, as a result of the design depth of WTG foundations (70-90 feet below the seafloor). Following the modification of some WTG locations after the 2003 survey, additional tracklines were surveyed in 2005 to provide data coverage of the extended Project Area.

2.2 Survey Designs

Surveys were designed, under consultation with the United States Army Corps of Engineers (USACE) New England District, the Massachusetts Historical Commission (MHC), and the Massachusetts Board of Underwater Archaeological Resources (MBUAR) to acquire scientific data focused on the WTG locations for engineering and archaeological assessment purposes. The surveys were also designed to provide information on the surface and subsurface geological conditions throughout the Project Area. To accomplish these objectives, tracklines were configured in a parallel, rhomboid pattern to bisect each proposed WTG location and follow the routes of WTG inner array cables and transmission cable system. In addition, trackline orientation was designed to provide transects perpendicular to bathymetric contours to the greatest possible extent.

All field data were positioned using a Differential GPS providing a manufacturer's stated accuracy of +/-1 meter (3.28 feet), however, navigation checks routinely performed throughout each survey showed repeatability typically within 2 feet. Geographic coordinates from the DGPS were converted in the HYPACK navigation software to reference all data to the Massachusetts State Plane Coordinate system, Island Zone 2002, NAD83 in feet. During data acquisition, events (i.e. position fixes) were exported out of HYPACK every 200 feet along line to all geophysical systems to correlate vessel and sensor positions with time. Vertical referencing of depth and subbottom data was accomplished by adjusting acoustic data to a predicted tide curve relative to the mean lower low water (MLLW) datum for the nearest National Oceanic and Atmospheric Administration (NOAA) station. The same Coast Guard reference station (Acushnet, Massachusetts) and NOAA tide stations (Succonnesset Point and Hyannis Port) were used for all field programs.

The following paragraphs summarize the survey approach employed during the geophysical field investigations in 2001, 2003, and 2005. For more detailed information on each geophysical survey refer to previously submitted OSI reports.

2001

This initial field program for CWA was designed to provide reconnaissance level information of Horseshoe Shoal for WTG siting and project constructability. Originally a total of 170 WTGs were envisioned by CWA in the Project Area. One trackline was surveyed along each of the original WTG array alignments (Figure 2) utilizing a longer sonar sweep range (100 meters) to provide increased coverage of the seafloor. Table 2 outlines the major geophysical systems and survey parameters used in 2001 along every survey trackline. [Seismic time sections (in milliseconds) are referenced to two-way travel. Sweep range values represent distances out to both sides of the side scan sonar towfish/trackline.]

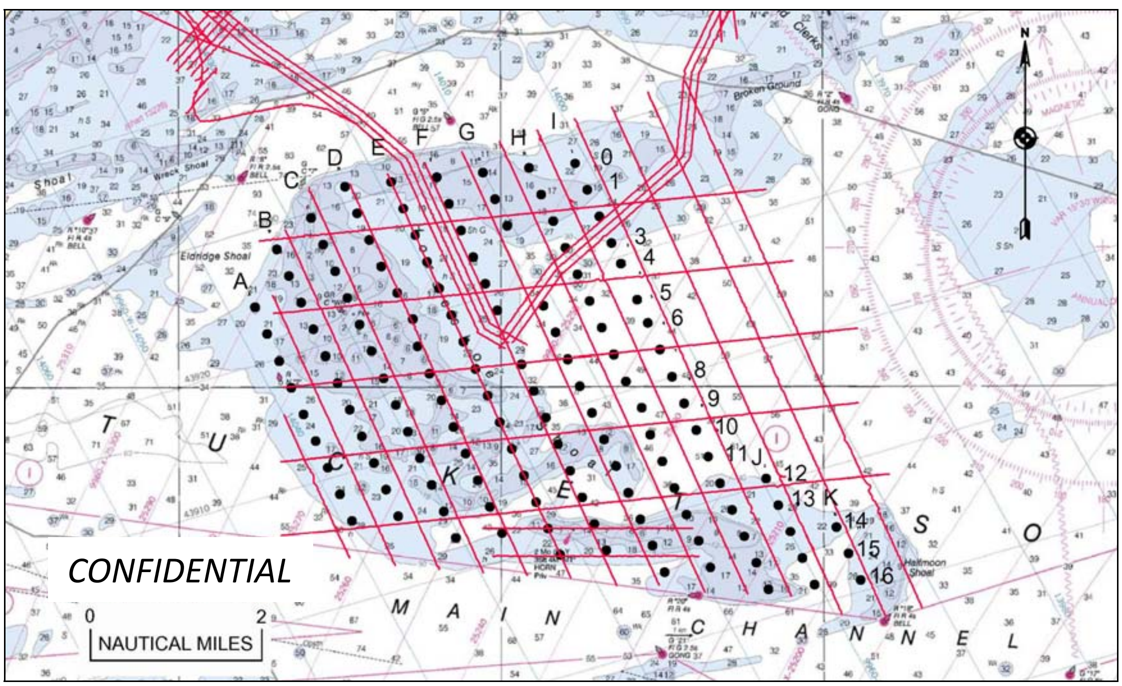


Figure 2. 2001 geophysical survey tracklines shown with the final WTG array.

Table 2. 2001 Geophysical Survey Parameters

System	Acquisition Setup
Depth (200 kHz)	13 samples per second Hull mounted transducer Recorded in HYPACK files
Side Scan Sonar (200 kHz swept frequency)	100 meter sweep range 7.7 pings per second Sensor altitude 10-15% of sweep (except where shallow water does not allow) Recorded in GeoDas as .OIC file
Magnetometer	10 samples per second Sensor altitude +/- 20 feet (except where shallow water does not allow) Recorded in HYPACK file
Shallow Penetration Subbottom Profiler "chirp" (2-16 kHz)	4 pings per second 15-20 meters recorded (below bottom) Towed 2-5 feet below water surface Recorded in EdgeTech .DAT format
Medium Penetration Seismic Profiler "boomer" (0.5-8 kHz)	3.3 pings/shots per second 125 ms time section recorded 62.5 & 125 ms sections printed Surface tow astern and outside vessel wake Recorded on EPC ADS640 as .DAT format

2003

Following review of the initial reconnaissance data and results, the array was reconfigured to include a total of 130 WTGs. A new survey was designed to provide data coverage of the modified WTG locations and inner array cable routes. Three tracklines, spaced 50 feet apart utilizing a 50 meter sweep range on the side scan sonar for enhanced resolution, were surveyed along each north-south oriented WTG array alignment and cable route (Figure 3). The medium penetration seismic profiler (boomer) was utilized on the centerline to acquire subbottom data (100-foot depth of interest) for foundation assessment. Along the west-east oriented cable routes, two 50-foot spaced tracklines were centered on the alignment connecting the WTGs. Medium penetration seismic profile data were not collected along west-east oriented tracklines.

A rectangular area, centered on the proposed electrical service platform (ESP) location, was surveyed along tracklines spaced 50-feet apart and oriented parallel to the north-south WTG array tracklines (Figure 4). The purpose of this phase of the survey was to provide sufficient data for siting the inner array cable routes into the ESP. Since inner array cables connecting to the platform will be buried less than 10 feet below the seafloor, medium penetration seismic data were not needed along these tracklines.

Table 3 outlines the major geophysical systems and parameters for the 2003 survey.

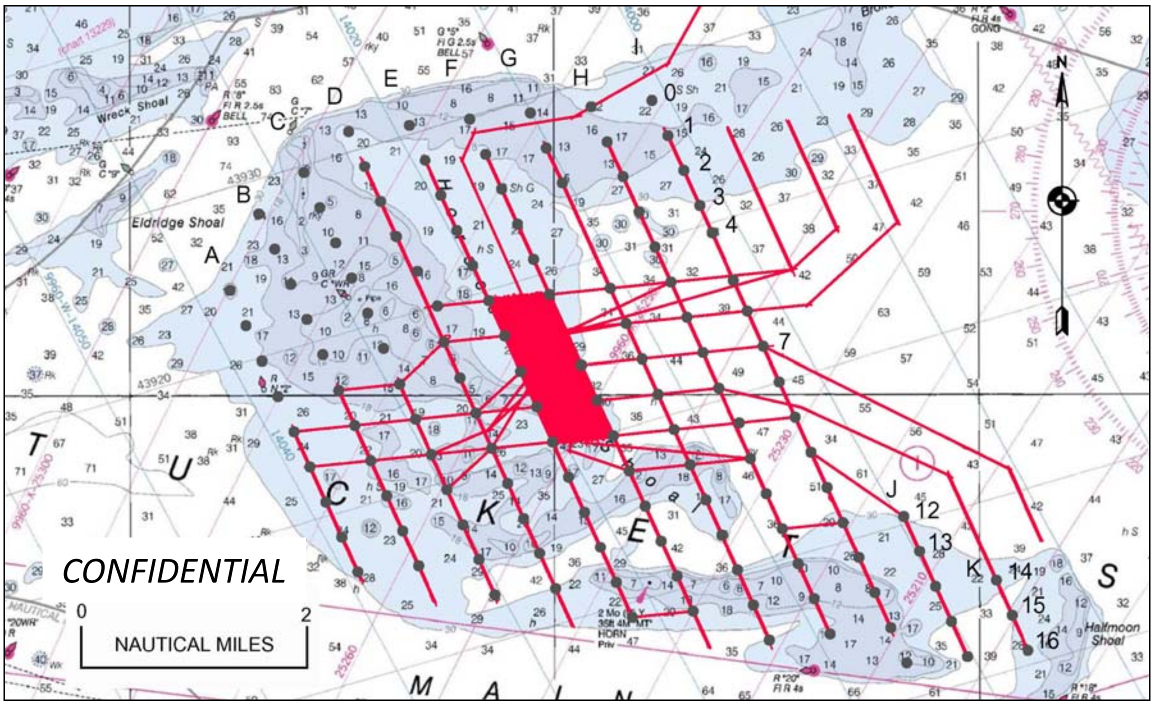


Figure 3. 2003 geophysical survey tracklines shown with the final WTG array.

Table 3. 2003 Geophysical Survey Parameters

System	Acquisition Setup
Depth (200 kHz)	13 samples per second Hull mounted transducer Recorded in HYPACK files
Side Scan Sonar (200 kHz swept frequency)	50 meter sweep range 14.3 pings per second Sensor altitude 10-15% of sweep (except where shallow water does not allow) Recorded in GeoDas as .OIC file
Magnetometer	10 samples per second Sensor altitude +/- 20 feet (except where shallow water does not allow) Recorded in HYPACK files

System	Acquisition Setup
Shallow Penetration Subbottom Profiler "chirp" (2-16 kHz)	4 pings per second 15-20 meters recorded (below bottom) Towed 2-5 feet below water surface Recorded in EdgeTech .DAT format
Medium Penetration Seismic Profiler "boomer" (0.5-8 kHz)	3.3 pings/shots per second 125 ms time section recorded 125 ms section printed Surface tow astern and outside vessel wake Recorded on TSS 360 as SEGY format

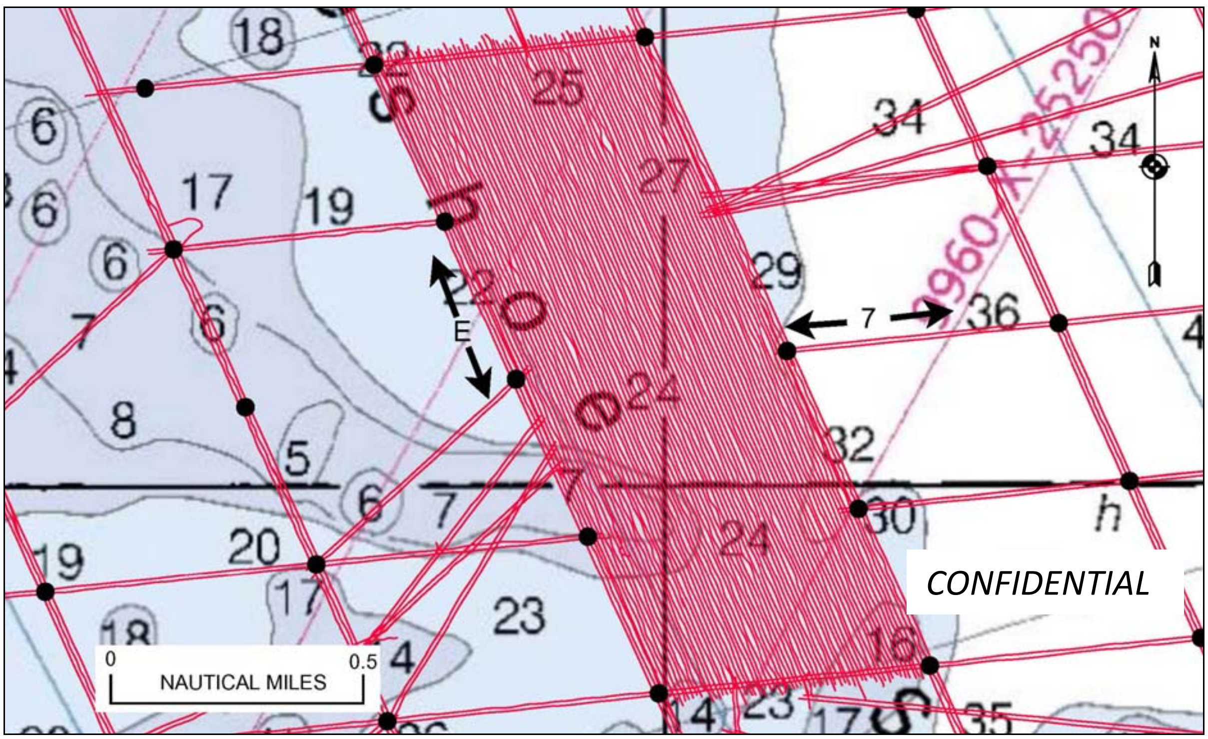


Figure 4. Electrical service platform survey area tracklines, 50-foot spacing.

2005

Between 2003 and 2004, a number of project issues came to light that resulted in modifications to the WTG array layout. These concerns included state-federal jurisdiction, proximity to ship traffic and fishing grounds, and avoidance of potential cultural resources (PAL 2003, 2004, 2006). The final WTG array layout based on the progression of survey investigations and ensuing results is shown in Figure 5. The north-south oriented array alignments are designated by letters (A to K from west to east) whereas the west-east array lines are numbered (0 to 16 from north to south). The overall WTG grid spacing averages approximately 2,075 feet in the north-south direction and 3,275 feet from west to east. As discussed previously, some individual WTGs deviate away from the grid nodes to avoid adverse impacts on or below the seafloor identified from the site investigations.

The purpose of the 2005 geophysical field investigation was to extend the survey coverage to the new WTG locations and associated inner array cable routes, following the same line orientations and spacing adhered to for the 2003 survey (see Figure 5). This resulted in WTG array lines being extended toward the north-northwest. Also, additional inner array cable routes were surveyed in other portions of the Project Area to provide options for the submarine transmission network. Table 4 outlines the major geophysical systems and survey parameters used in 2005.

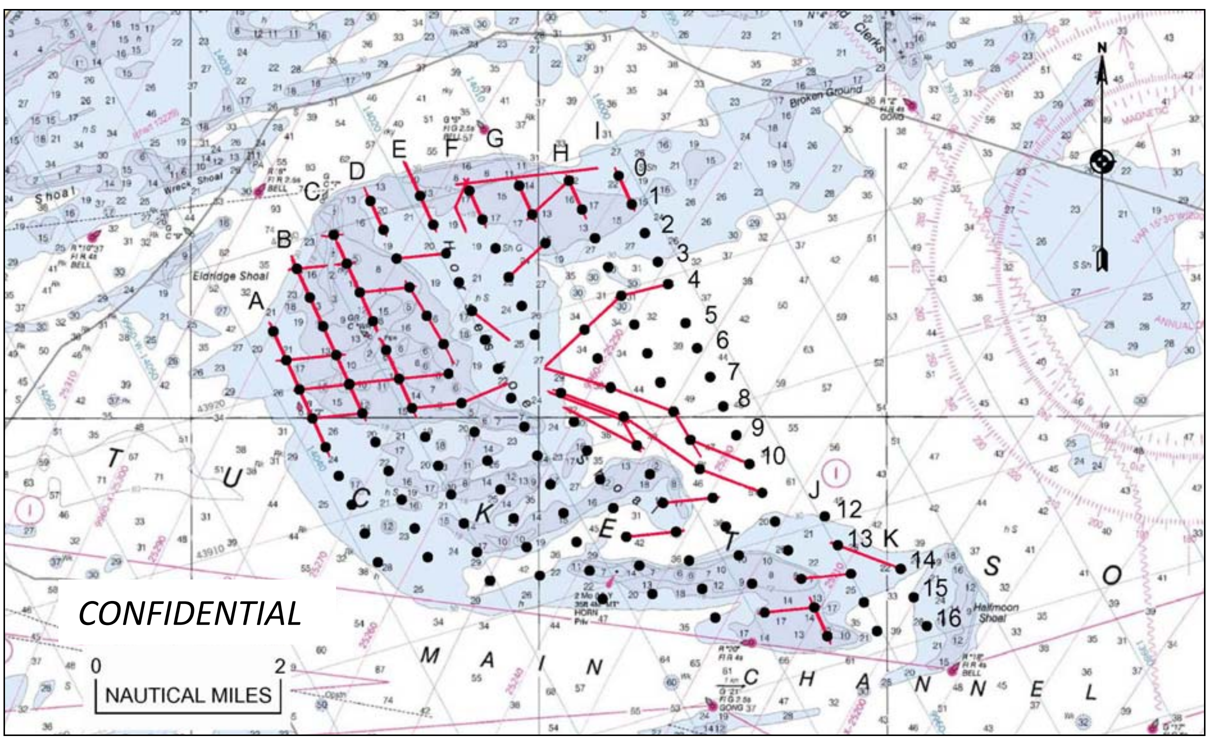


Figure 5. 2005 geophysical survey tracklines shown with the final WTG array.

Table 4. 2005 Geophysical Survey Parameters

System	Acquisition Setup
Depth (200 kHz)	13 samples per second Hull mounted transducer Recorded in HYPACK files
Side Scan Sonar (200 kHz swept frequency)	50 meter sweep range 14.3 pings per second Sensor altitude 10-15% of sweep (except where shallow water does not allow) Recorded in GeoDas as .OIC file
Magnetometer	10 samples per second Sensor altitude +/- 20 feet (except where shallow water does not allow) Recorded in HYPACK files
Shallow Penetration Subbottom Profiler “chirp” (2-16 kHz)	4 pings per second 15-20 meters recorded (below bottom) Towed 2-5 feet below water surface Recorded in EdgeTech .DAT format
Medium Penetration Seismic Profiler “boomer” (0.5-8 kHz)	3.3 pings/shots per second 330 ms time section recorded 125 ms section printed Surface tow astern and outside vessel wake Recorded on Octopus 760 as SEGY format

2.3 Scientific Survey Teams

Each survey was staffed by an experienced team of scientists and technicians, capable of conducting coastal surveys in a safe and efficient manner to the high standards set by OSI. During each geophysical survey, a senior geophysicist/geologist, who also served as the project manager, was accompanied by an electronics technician and the project archaeologist. This three-person team performed operations aboard small vessels with the technician also serving as the helmsman. During larger vessel operations, a licensed captain was responsible for boat maneuvers, in order for the technician to focus completely on the hydraulic winches for deep towing of geophysical sensors.

Similarly highly qualified individuals were assembled to conduct the geotechnical and benthic sample acquisition from other vessels, configured specifically for those tasks. Scientists involved in the field program were capable of performing onsite data interpretations for decision making, which is often a critical path for the modification of data acquisition plans in real time.

2.4 Geophysical Instruments and Survey Methods

The geophysical equipment suite utilized during these investigations was selected based on years of successful data acquisition experience in similar geologic settings throughout New England. A combination of the following instrumentation was used during all phases of the program. A complete description of this equipment, along with the operational procedures employed for data acquisition is provided in Appendix 2.

Navigation and Positioning:

- Trimble Differential Global Positioning System
- HYPACK Navigation Software

Seafloor Mapping and Inspection:

- Benthos DataSonics SIS1500 Digital Side Scan Sonar
- Geometrics G881/882 Cesium Marine Magnetometer
- Innerspace Model 448 Single Beam Depth Sounder
- TSS DMS-05 Motion Sensor
- Sea-Bird Electronics SBE19 SEACAT Profiler
- Simrad “Osprey” 9030 High-Res Color Underwater Video

Subbottom Profiling:

- Applied Acoustics 300J “Boomer” Subbottom Profiler
- TSS 360/Octopus 760 digital seismic control unit
- EPC ADS640 Digital Seismic Recorder
- EdgeTech GeoStar “Chirp” Subbottom Profiler
- EPC 1086 / 9800 thermal graphic printer

Due to shallow water in portions of the Project Area as well as the nearshore sections of the landfall approaches, a variety of survey platforms were necessary to access all areas of interest and provide the optimum work space for the marine scientific studies. Geophysical surveys were conducted aboard 27-28 foot Privateer/Parker style vessels as well as a 42 foot

Duffy featuring hydraulic winches for deep towed sensors. Figure 6 shows some of the vessels used for the CWA project. Ultimately, vessel usage was determined based upon equipment system and space requirements, water depths, and season (expected sea conditions).

All geophysical systems were run simultaneously to maximize survey efficiency, and in such a manner as to reduce interference between systems. Acoustic interference between systems was minimized during the investigations by the lateral separation of sound sources on the vessel, as well as the application of minimal signal transmit and/or receiver gain while still acquiring high-quality data. Survey speeds of 3-5 knots were realized, depending on weather conditions. Typically, as sea conditions worsened survey speed was decreased to maintain high quality data.

Figure 6. OSI survey vessels used for the marine scientific programs.

2.5 Geotechnical Equipment and Operations

The geophysical datasets were supported by a variety of geotechnical sampling methods to ground truth the interpretations and provide direct physical samples of surface materials and subsurface strata. Geotechnical methods used in support of the Project include grab sampling, vibracoring, and deep boring. Following each of the geophysical field programs, vibracore samples were collected by OSI from the upper 10-20 feet of the stratigraphic column. Between 2002 and 2003, GZA acquired borings to explore deeper stratigraphic units at strategic locations throughout the Project Area. Grab samples were also acquired by OSI in 2001 to ground truth side scan sonar imagery and in 2006 to support benthic habitat assessment. Table 5 below summarizes the geotechnical phases of work completed for the Project to date and Figure 7 is a cumulative illustration of all samples collected during the Program.

Table 5. Geotechnical Studies

Company	Dates	Description of Investigation
OSI	29 July-19 August, 2001	23 vibracore stations occupied; grab samples also collected at some locations (47 total stations; 24 along cable routes)
GZA	24-27 April 2002	3 deep borings completed
GZA	18-25 August 2003	10 deep borings completed
OSI	10-20 October 2003	12 vibracore stations occupied (23 total stations; 11 along cable routes)
GZA	13-18 October 2003	9 deep borings completed
OSI	December 2004	4 vibracore stations in Lewis Bay
OSI	12-19 November 2005	12 vibracore stations occupied
OSI	24-25 July 2006	13 grab samples recovered

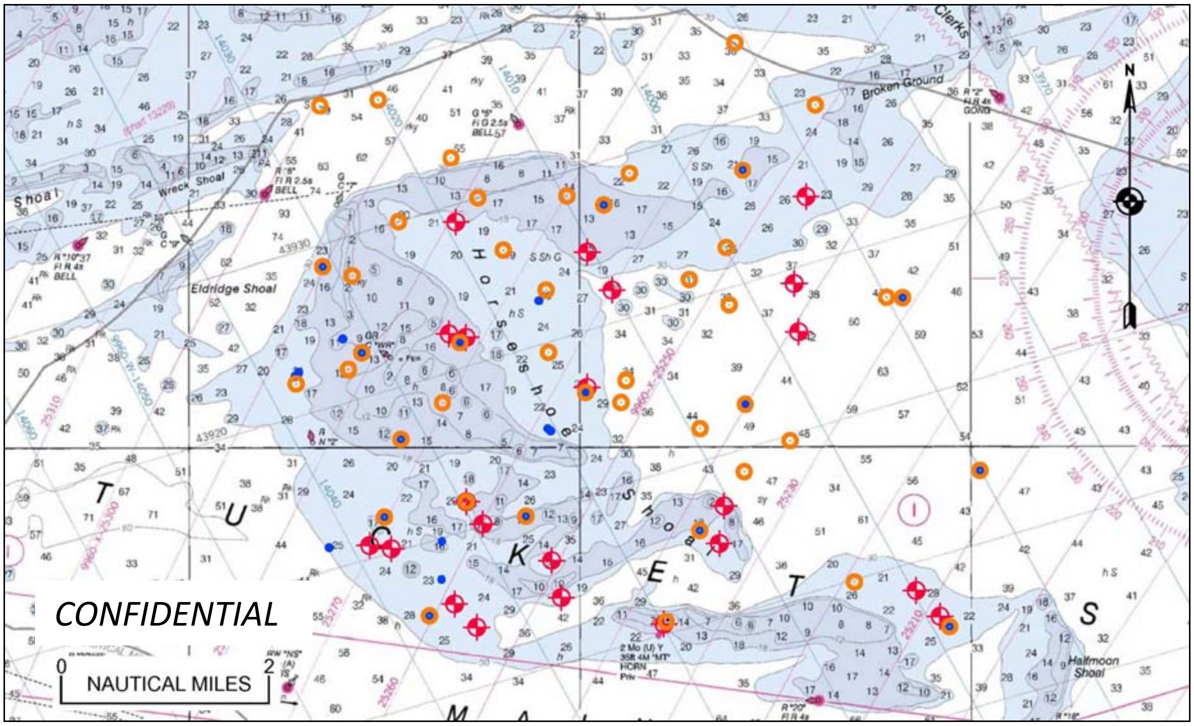


Figure 7. Cumulative plot of geotechnical samples collected in the Project Area; includes grab sample (blue), vibracore (orange), and boring (red) locations.

The equipment systems employed to obtain geotechnical samples and data for the Project are listed below. A complete discussion of this equipment and operational procedures can be found in Appendix 2.

- OSI Model BH1500 Vibratory Corer
- Van Veen Sediment Grab Sampler
- Diedrich D120 and Failing 1500 Rotary Drilling Rigs

All geotechnical operations require a stable platform for sampling. For vibracore investigations, OSI vessels were equipped with 3 to 4-point hydraulic anchoring capabilities as well as a winch and davit/A-frame/derrick for handling the heavy sampler. Vibracore work was performed off more than one platform; short cores (less than 15 feet) were collected using the 42-foot Duffy (vessel utilized during the geophysical surveys), while longer samples needed more deck space. For the longer core samples (15-20 feet) a 17x36-foot pontoon boat, specifically designed for geotechnical work was utilized (see Figure 6). For the deep boring investigations, GZA mobilized a 30x63-foot or 54x67-foot work barge with hydraulically actuated legs that allow the barge to be lifted above the water surface. This provides the stable, stationary platform necessary for drilling using standard rotary equipment.

Three different types of geotechnical sample/data acquisition systems were used for the Project based on variations in the depth of interest below the seafloor for sedimentological data (grabs = upper 1 foot, vibracores = upper 10-20 feet, borings = 100-150 feet). These samples were also used to address and collect other environmental data (ie. benthic habitats, chemical analysis, engineering parameters). Vibracores collected by OSI were delivered to ESS onsite who was responsible for the core analyses. Sediment samples were handled, stored and transported for specific analyses in accordance with laboratory protocols (ESS, 2006a). The cores were split, logged, subsampled, photographed, and archived. Samples were analyzed for physical parameters including grain size, moisture content, ash and organic content, and Atterburg limits (liquid and plasticity measures of finer grained sediments) Samples were also analyzed for chemical constituents including metals, total organic carbon (TOC), petroleum hydrocarbons, polychlorinated biphenyls (PCBs), pesticides, and polynuclear aromatic hydrocarbons (PAHs). Refer to the DEIR (2004) and FEIR (2007) for detailed laboratory results.

During boring operations conducted by GZA, field sampling and testing included: standard penetration test (SPT) sampling at 5-foot intervals, pocket penetrometer, torvane tests, with occasional pressuremeter tests and sampling of cohesive soils via Shelby tube. Select split spoon sediment samples obtained were run through a variety of laboratory tests, including grain size analysis, Atterburg limit tests on cohesive soils, and occasional pocket penetrometer and torvane measurements.

Refer to GZA project documents (2002, 2003a, 2003b) for a detailed summary of these results and boring logs (previously provided to BOEMRE under confidentiality agreement by CWA).

2.6 Sensitive Habitat Inspections

In 2006, underwater video inspections were conducted independently on a separate vessel due to differences in scope of work and required support equipment. The video survey of the seafloor was conducted at speeds necessary to obtain high quality video imagery of the benthos and of individual targets and organisms (generally less than 1 knot). Under suitable visibility, the video camera sled was “flown” above the seafloor and imaged a wider area. Under low light conditions, due to high concentrations of suspended material, the video camera sled was lowered onto the bottom in places to record potentially usable video.

Underwater video imagery of the seafloor was recorded and supplemented with grab samples to document benthic habitats present in the Project Area. Video imagery was targeted for areas where sensitive habitats were suspected based upon analysis of side scan sonar imagery. Review of the sonar records revealed areas of the bottom where patches of stronger acoustic reflections were evident relative to the surrounding seafloor. These reflections appeared generally chaotic and discontinuous over large areas with a similar but slightly different character than coarse material returns (acoustic shadows not always present). The areal extent of these surficial reflectivity patterns were mapped and verified by numerous underwater video transects along with sediment grab samples in select areas (Figure 8). These data supplement benthic studies carried out prior to 2006 in some regions of the Project Area by ESS and other project team members through dive inspections. Detailed macroinvertebrate laboratory analyses were completed on the sediment samples to document specific organisms present in the benthic communities (see the DEIR and FEIR).

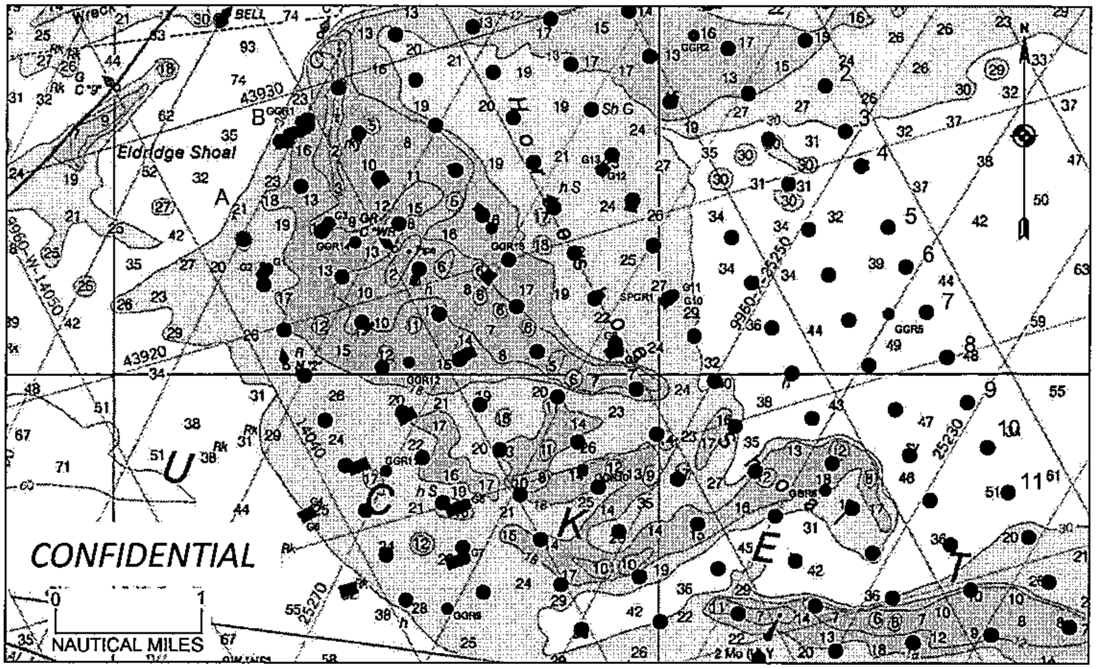


Figure 8. Underwater video transects (red areas) and grab samples (blue circles) acquired in 2006 in support of benthic habitat inspections.

3.0 SUMMARY OF DATA REVIEW

For this shallow hazards review, existing datasets have been re-processed as needed, compiled, examined, and plotted. The following paragraphs provide a brief summary of the steps performed on the datasets to develop the surface and subsurface hazards drawings and interpretations in this report. A detailed summary of data processing and analysis completed on all the existing datasets is presented in Appendix 3, including data processing performed after each geophysical survey as well as the analysis completed for this study.

3.1 Processing

Most of the geophysical datasets required limited additional processing (hydrographic, side scan sonar, magnetometer, shallow penetration subbottom profiler) and were reviewed for surface and subsurface hazards, using both raw and previously processed data files. [redacted]

[redacted] For the sand wave mapping, results from 2003 and 2005 were similarly integrated into a unified, color shaded product delineating the areal extent and height of the bedforms. The medium penetration seismic profiler (boomer) data needed to be completely re-processed in order to resolve deeper stratigraphy not presented in previous reports. A discussion of these products follows in Section 3.3.

REDACTED
Confidential business information.
Not for public disclosure

Figure 9. [redacted]

[redacted]

[redacted]

For six of the WTG array transects (A, B, E, G, H, and J), multiple seismic profiles were combined (2003 and 2005) to produce a representative cross section of the entire transect. Prominent acoustic reflectors present on each section were then interpreted and highlighted. For presentation purposes, a final processed digital file for each representative profile was exported out of ReflexW for input to AutoCAD, and adjusted to match the horizontal scale of the other drawings (1:12,000 or 1,000 feet per inch, as requested by BOEMRE).

3.2 Interpretation and Correlation

All surficial and subsurface data products were first assembled for review and comparison using a variety of graphics software packages (ie. Global Mapper, HYPACK, QuickSurf, AutoCAD). Many of these data components had been submitted previously (DEIR, FEIR) but not assembled together as hazard maps. Features identified from each system could then be correlated geographically for discussion and presentation.

[redacted]

[redacted]

3.3 Shallow Hazards Review Products

Datasets have been compiled in plan and profile view presentation formats (AutoCAD 2004) to map surface and subsurface features throughout the Project Area. Table 6 lists the presentation size and scale as well as information contained in each data product. Drawings were constructed at a scale of 1:12,000 as requested by the BOEMRE, resulting in 4 sheets to cover the Project Area (Figure 10). Different colors and symbols were used to designate various datasets to clarify the presentations as much as possible. Hard copies of the full size drawings accompany this report in a separate binder and are also available upon request. Full size 24x36" and reduced version 11x17" digital PDF files have been created for each drawing sheet and are provided on a data disk accompanying this report (Appendix 4). In addition, numerous figures are included in the text for illustrating survey results or data examples.

Table 6. Shallow Hazards Review Products

Product	Format / Scale *	Description
Report Figures	Figures (8.5 x 11")	Photos, diagrams, digital images
Drawing #1	24x36" (1:12,000)	Navigation post-plot (tracklines) with site bathymetry
Drawing #2	24x36" (1:12,000)	Seafloor Characterization; surficial sediment types with geologic features and sample locations
Drawing #3	24x36" (1:12,000)	Surface Hazards Map
Drawing #4	24x36" (1:12,000)	Subsurface Hazards Map
Drawing #5	24x36" Horiz. 1:12,000 Vert. 1"=50'	Interpreted Geologic Cross Sections of WTG Array Transects A, B, E, G, H, J

Note:
* Reduced versions (11x17") of the drawings are included in Appendix 5.
Full size hard copies of the drawings are available upon request.

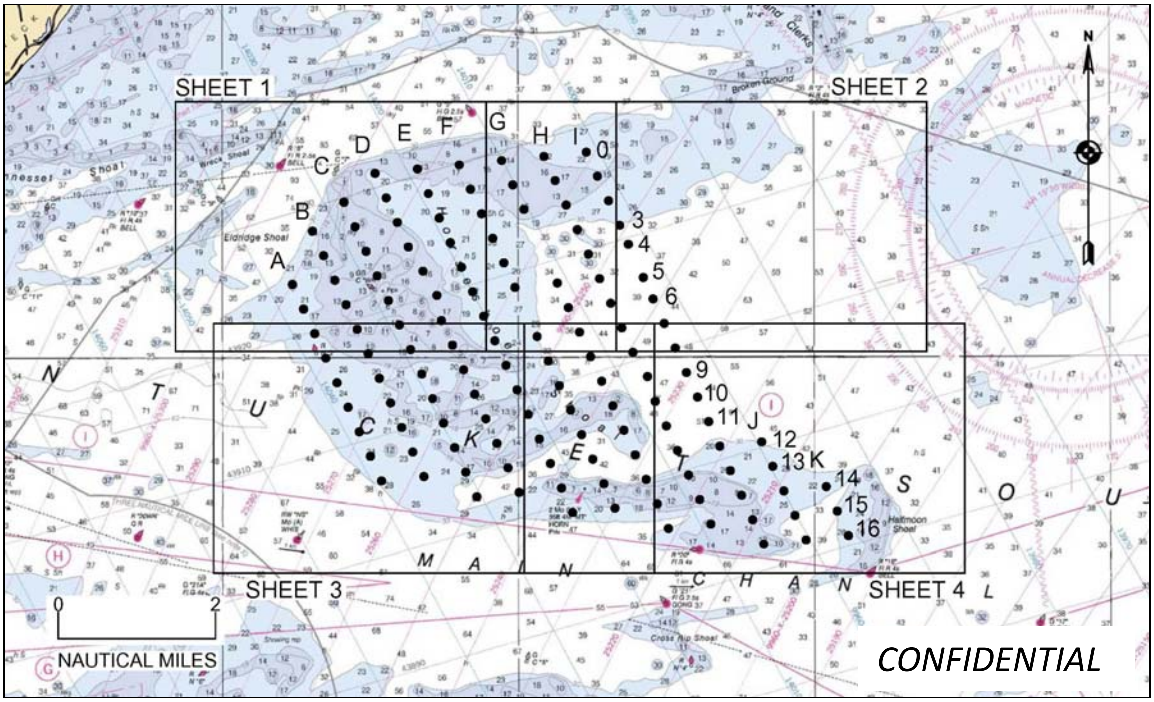


Figure 10. Sheet layout for the shallow hazards drawings/maps.

Navigation Post-Plot (Drawing #1)

The navigation post-plot/survey vessel trackline map includes all lines surveyed between 2001 and 2006 (color coded, see the legend). For presentation purposes, the trackline event numbers have been turned off but the circles designate the event positions (200-foot spacing). Bathymetry contours at a 5-foot interval were generated from a cumulative water depth x,y,z file including data from all three of the primary geophysical programs (2001, 2003, and 2005), referenced to MLLW.

Seafloor Characterization (Drawing #2)

This map represents the conditions that exist in the Project Area at the time of the surveys. It is a compilation of data from all previous geophysical and geotechnical investigations. Distribution of surficial sediment types is presented with geotechnical sample locations (grab samples, vibracores, borings). The mapping of surficial sediment types was based on side scan sonar reflectivity and geotechnical ground truthing (grab and vibracore samples). While type boundaries are interpreted from the datasets, these transitions are typically gradational in nature.

Surface Hazards Map (Drawing #3)

Hazards of concern to BOEMRE identified on the seafloor (see Tables 7 and 9) have been compiled from the three geophysical datasets and displayed together on a single map. For some data types, the process of incorporating the results of multiple surveys required a remapping of the cumulative dataset. For example, sand waves identified and mapped during the 2003 and 2005 geophysical surveys were combined into a unified, color shaded graphic presentation. Sonar targets and magnetic anomalies representing potential man-made debris have been overlain on this display, along with areas where submerged aquatic vegetation (SAV) was identified.

Subsurface Hazards Map (Drawing #4)

Subsurface hazards of concern (see Table 8) have been mapped from the medium and shallow subbottom profile data collected during the three field investigations. [redacted]

Interpreted Geologic Cross Sections (Drawing #5)

Representative geologic cross sections have been produced to illustrate the subbottom data interpretation and mapping. All the medium penetration seismic profiles were re-processed and examined as part of this supplemental review. Select transect lines are presented on the drawing to illustrate the general subsurface conditions encountered. Prominent seismic reflectors have been mapped with an interpretation of stratigraphic units across the Project Area. Geotechnical information (borings, vibracores) has been overlain on the cross sections to provide an indication of the acoustic signatures generated by different sediment types.

4.0 OVERVIEW OF SITE CONDITIONS

4.1 Geologic Setting

Similar to the rest of coastal New England and Long Island, Nantucket Sound was formed by processes associated with the Laurentide Ice Sheet that started some 50,000-70,000 years before present, during the final or Wisconsin stage of the Pleistocene Epoch (Oldale, 1992; Schlee et al., 1976). Before the Cape Cod region was glaciated, there was an extensive coastal plain consisting of Tertiary and Cretaceous rocks that extended seaward to the approximate location of present day Nantucket, Martha's Vineyard, and Block Island. The continental ice sheet advanced across Cape Cod to the islands about 23,000 years ago (Oldale, 1992), scouring bedrock and coastal plain deposits along its path. Its maximum southern advance is marked by gravel deposits on the continental shelf and by the outwash plains and moraines on the Islands (Oldale, 1982).

Most of the outwash plains were formed as deltas in glacial lakes and depressions during lower sea level stands, when ocean water was a constituent of over one-mile thick sheets of ice. The outwash plain deposits on the lower Cape were formed in the low-lying areas that occupied Nantucket Sound and Vineyard Sound (Oldale, 1992; Mulligan and Uchupi, 2004). These lower topographic regions within the Sound were formed by subaerial erosion during extreme sea level low stands as well as glacial meltwater scouring as the ice sheet retreated. The relatively higher elevation of the terminal and recessional moraines, with outwash plains sloping away from them, helped meltwater to erode the outwash plains and to generate channels that were later flooded by rising sea level to create many of the elongate embayments seen today on the southern shore of Cape Cod.

As sea level rose, flooding of the low-lying areas occurred with simultaneous erosion and transport of shoreline sediments by the transgressive sea. Areas of higher ground became islands (Martha's Vineyard, Nantucket Island) and promontories (Horseshoe Shoal, Handkerchief Shoal/Monomoy Spit) along the changing coastline. Sand was constantly redistributed in response to the lateral and vertical migration of the shoreline, forming new inlets, offshore bars, sand spits, and barrier islands as Nantucket Sound evolved.

The results of this coastal transformation that continues to this day, are evident by the geomorphology of the Sound and its surrounding relict landforms, dominated by accumulations of Quaternary age glacially-derived material. Piles of stratified glacial drift and end moraines comprise the Islands (Oldale, 1982; Uchupi and Mulligan, 2006) with deposits of outwash plain sediments accumulated in the Sound. Sediment sizes range from clay to boulders. Bedrock outcrops on the northwest shore of Buzzards Bay and slopes down to the southeast to approximately 1,600 feet below Nantucket (Oldale, 1969). A conservative projection of the bedrock surface suggests its depth exceeds 500 feet below Horseshoe Shoal (Oldale, 2001; Hallet et al., 2004).

Tidal and wind-driven currents are the primary forces behind the sediment transport and sorting within Nantucket Sound, as finer material (silt-clay) has been winnowed off many shoals and accumulated in deeper portions of the Sound. Coarser sediments (sand, gravel, cobbles, boulders) thus tend to occupy the surficial layer of many shallower features, with an abundance of bedforms indicative of active bottom transport throughout the area.

A summary of the Cape Cod regional geology is provided by the United States Geological Survey (USGS) on its website at http://pubs.usgs.gov/gip/capecod/index.html. Please refer to OSI Report No. 01ES047 for a more detailed description of Nantucket Sound geology and history.

4.2 Existing Conditions

A review of historical maps and charts indicates that Horseshoe Shoal (the Shoal) is a stable coastal feature that has existed in Nantucket Sound for decades. Furthermore, projections of paleo-land surfaces through the past using a predictive sea level model (Uchupi et al., 1996 and PAL, 2004) suggest the Shoal was once a subaerially exposed promontory surrounded by a variety of water bodies (kettle lakes, meltwater streams, and coastal embayments) prior to the flooding of Nantucket Sound. Today the Project Area resides in a semi-enclosed coastal embayment with a hydrographic setting that exerts erosional forces on the shallow portions of the Shoal via diurnal tidal currents. More intense physical reworking occurs during storm events that redistribute surficial sediments, winnowing finer material off the Shoal into deeper water and leaving a coarser lag deposit behind. As a result, primarily sand comprises the seafloor on the Shoal with patches of coarse material including scattered boulders. Silt and clay are more prominent in deeper areas, transported to the west and east by tidal forces. Reworking of the seafloor occurs on a daily basis as the water column interacts with the mobile surficial sands.

The physical conditions at the site have produced a variable seafloor topography with water depths less than 10 feet on the Shoal in numerous places, sloping down to over 50-60 feet and deeper in nearly all directions surrounding Horseshoe Shoal. A deep natural channel exists to the north of the Shoal and the Main Channel to the south serves as the primary thoroughfare for marine traffic. [redacted]

A number of man-made objects, many with a ferrous component, were identified on or just beneath the seafloor throughout the site. The majority of these objects appear as small targets on the side scan sonar images (less than 5 feet in size). Fishing gear may be the source for some of these targets as well as the numerous small amplitude magnetic anomalies (less than 20 gammas). Some of the sonar targets may also represent natural boulders on the seabed, particularly on the Shoal in the coarse material areas mapped. No large sonar targets clearly suggestive of shipwrecks or other large obstructions were recorded. Surficial features such as drag marks from fishing trawlers, as well as man-made objects may become buried below the bottom due to the continuously changing sandy substrate.

[redacted]

Coastal plain deposits underlie the region, incised by pre-glacial drainage patterns, glacial scouring and large glaciofluvial valleys and streams during sea level low stands. Common constituents of the coastal plain deposits are silt and sand, often more compact or semi-lithified than the overlying younger glacial sediments (OSI, 2006). Another deeper erosional unconformity marks the top surface of the coastal plain section. The similarity of sediments within all these unconsolidated units hinders the differentiation of the unconformities and correlation of regional strata. Thus, despite the relatively complicated geologic history of the region, the data reveals the similar nature of the unconsolidated sediments throughout the Project Area.

5.0 HAZARDS SUMMARY

Based on the re-examination of existing geophysical datasets, an assessment of surface and subsurface hazards has been completed for this study. Surface hazards have been evaluated using all pertinent datasets including hydrography, side scan sonar imagery, magnetic intensity measurements, grab and vibracore samples, underwater video, as well as a review of existing man-made features from the literature and other relevant sources, and consultation with the project archaeologist. Identification and evaluation of subsurface hazards were hazards were performed using the shallow penetration subbottom profiler, the medium penetration seismic profiler, and geotechnical datasets (vibracores and borings).

5.1 Descriptions

A list of hazards has been assembled and described (Appendix 1) to clarify those that are relevant to the Project Area, and those that are not applicable, as they are found in different geologic environments in other parts of the world. Hazard descriptions were compiled from reference material and standard industry documents to relate and describe the hazards in the context of this Project.

Potential shallow hazards of concern to BOEMRE have been included in this review and are summarized in the tables in the following sections. The discussion addresses shallow hazards that have been identified in the Project Area based upon the review and interpretation of the existing geophysical datasets. Wherever possible, relevant information from the scientific literature is included in the discussion of shallow hazards to provide additional detail.

5.2 Natural Surface Hazards

Of the 13 natural surface hazards listed in Table 7 and Appendix 1, three have been identified in the Project Area: sand waves, water scour, and biologically sensitive habitats. Table 7 below summarizes the results of the natural surface hazards review.

Table 7. Summary of Natural Surface Hazards

Hazard	Identified	Description
Fault/fault escarpment	No	Not Present
Steep/unstable slopes	No	Not Present
Diapiric structures	No	Not Present
Gas/fluid expulsion features/vents	No	Not Present *****
Collapse features (sink holes)	No	Not Present

Hazard	Identified	Description
Mass movement structures (mud flows, creep, slumps)	No	Not Present
Sand Waves	Yes	Sand wave migration; [redacted]
Water Scour	Yes	Erosion of the seabed via tidal currents, waves, and storms
Hardgrounds (rock outcrops, reefs, pinnacles)	No	Not Present; only patches or scattered boulders
Biologically sensitive habitats (hardgrounds /chemosynthetic communities, SAV)	Yes	Submerged aquatic vegetation on top and on slopes of Horseshoe Shoal
Ice scour--relict	No	Not present
Seabed subsidence	No	Undetermined; no research/data available; rates of subsidence and sea level change believed insignificant over the life span of the project
Gas hydrates	No	Not Present *

* Data were reviewed for these hazards but the features are not applicable to this site. See Appendix 1 for detailed descriptions of shallow hazards.

Sand Waves

Sand waves cover a portion of the seafloor within the Project Area and indicate active reworking of surficial sediments ([redacted]). Sediment transport via sand wave migration occurs daily along the flanks of these bedforms. These features are typical of coastal marine environments where sand is a dominant seafloor constituent with active tidal currents in the water column. Daily movement of sediment particles due to the ebb and flood tidal cycle involves relatively small displacements, although sand waves formations may occupy extensive areas of the seafloor. In general, more erosion and transport of sediment is likely to occur during storm events when increased wave action impacts the bottom.

[redacted] In general, bedform geometry is a function of tidal flow dynamics, wave action (storms), water depth and sediment grain size, among other factors.

Redacted
Confidential Business Information
Not for Public Disclosure

Figure 11. [redacted]

Isolated patches of sand waves are evident to the north and west, but the majority of the sand wave field is a nearly continuous mobile sheet of sand in the southern half of the site (see Figure 11). Analysis of subbottom profiles indicates that a basal reflector underlying the sand sheet was resolved in a number of places (Figure 12). This underlying reflector is believed to represent the erosional unconformity at the base of the mobile sand sheet, which is comprised of post-glacial Holocene sediments. Review of the data suggests a correlation may exist between the thickness of the sand sheet and bedform height. Depths to the basal reflector below the wave troughs are generally 2-5 feet where sand wave heights of less than 6 feet are present. In areas where the sand wave height was 6-12 feet, the depth to the basal reflector was measured to be 6-10 feet below the troughs of the bedform.

Redacted
Confidential Business Information
Not for Public Disclosure

Figure 12. [redacted]

[redacted]

While sand wave migration indicates active reworking of the seafloor, the dynamic equilibrium that exists in this surficial layer during normal flow conditions largely transports sediment back and forth with minimal net movement over the short term. This phenomenon is well understood and has been addressed in the engineering and design of the Project. For withstand surficial elevation changes and stress associated with the migration of sand waves past the base of each structure (see FEIR; CWA, 2007).

Water Scour

The erosion, transport, and reworking of surficial sediments is the result of water flowing over unconsolidated materials at the sediment-water interface. In places where the turbulence at this interface exceeds the force necessary to move sediments, scour of the seabed occurs. There are many factors that contribute to this phenomenon, the most persistent on Horseshoe Shoal being tidal currents. Some scour and reworking of the seabed takes place during these average flow conditions, in synch with the diurnal (two times daily) nature of the tides, mostly around maximum ebb and flood tide flows. While more intense scour and redistribution of sediments occur during storm events when above average flow and wave action take place. Natural scour in the Project Area is primarily associated with sand waves, isolated boulders, and other localized topographic highs that affect flow dynamics. Erosion/scour of the bottom may also occur around man-made debris identified from these investigations and scour mitigation is planned for the WTG monopoles as discussed below.

The placement of any man-made structure in a flowing body of water with an unconsolidated substrate will induce scour. To compensate for these physical forces of nature and protect coastal structures from scour that could impact their structural integrity, scour protection mats and armor will be used around the base of each WTG (ASA, 2006; ESS, 2006b; ESS, 2006c; WHG, 2004). This protection is engineered to safe guard the structure well beyond its anticipated life span, and has been in use for decades in dynamic marine environments. For more information concerning water flow characteristics (velocity, direction, modeling) and the scour protection proposed for use on the CWA project, refer to the DEIR (CWA, 2004), FEIR (CWA, 2007) and supporting documents.

Biologically Sensitive Habitats

Within the Project Area, submerged aquatic vegetation (SAV) was the only biologically sensitive habitat identified. For the purpose of this discussion, SAV is defined as any plant or "plant like" organisms that are found attached to the seafloor within the photosynthetically active zone of the ocean. [redacted] Strong amplitude reflections on sonar imagery with no acoustic shadows are generally associated with SAV, with the intensity of the acoustic signature dependent upon the concentration and percent coverage of the SAV which may vary seasonally. One of the most highly sensitive types of SAV is eel grass (*Zostera marina*), which is an important habitat type in coastal New England waters, providing shelter, foraging opportunities, and spawning and nursery grounds for a variety of dependent species (Green and Short, 2003).

While some eel grass beds were identified near the landfall approaches of the transmission cable route, eel grass was only observed at 1 of 20 underwater video and grab sample stations collected around Horseshoe Shoal in 2006. It was determined that the offshore SAV communities observed during previous field efforts consisted of different varieties of macroalgae, primarily seasonal species who are members of the Rhodyphytes (red algae) and Chlorpophytes (green algae) (FEIR; CWA, 2007). The single observation of eel grass during the 2006 survey consisted of several patches along a single transect. These patches ranged from one to several meters in diameter, and were irregularly spaced (FEIR).

SAV is known to inhabit a variety of habitat types and varying environmental conditions. While macroalgae in particular are known to utilize virtually any surface for attachment and subsequent anchorage (Lobban and Harrison,1994; Graham and Wilcox 2000) harder substrates such as boulders and rocky shorelines offer more stability and longevity than softer surfaces such as sand and mud. Eel grass however is known to inhabit "a range of sediment conditions from soft, highly organic muds to coarse sand and partial cobble" (Green and Short, 2003). This correlation is generally consistent with observations throughout the

Project Area where macroalgae is mapped in the same general area as coarse materials (gravel, cobble, and scattered boulders in a sand matrix).

[redacted]

[redacted]

[redacted]

[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]		
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]		
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
		[redacted]
[redacted]	[redacted]	[redacted]
[redacted]		
[redacted]	[redacted]	[redacted]
		[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Redacted
Confidential Business Information
Not for Public Disclosure

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Redacted
Confidential Business Information
Not for Public Disclosure

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

5.4 Man-Made Hazards

Of the seven man-made hazards listed in Table 9 and Appendix 1, only one was detected in the geophysical datasets; debris. Man-made hazards may be located on the surface or in the shallow subsurface. No shipwreck sites have been positively identified, although target areas comprised of clusters of magnetic anomalies were interpreted from review of the geophysical data by the project archaeologist to have moderate probability of representing submerged Euro-American cultural resources (possibly shipwrecks), as discussed below. Table 9 summarizes the results of geophysical data review and a search of existing maritime information for man-made hazards.

Table 9. Summary of Man-Made Hazards

Hazard	Identified	Description
Pipelines	No	Not Present
Power cables	No	Not Present
Well heads/abandoned wells	No	Not Present *
Communications cables	No	Not Present
Debris	Yes	Sparse distribution of sonar targets and magnetic anomalies indicative of man-made objects
Shipwrecks	No	Not Present
Ordnance	No	Not Present

* Data were reviewed for these hazards but the features are not applicable to this site. See Appendix 1 for detailed descriptions of shallow hazards.

Debris

A sparse distribution of apparently man-made objects has been identified, based primarily on the analysis of side scan sonar and magnetometer data ([redacted]). [redacted]

A total of 161 sonar targets were identified during the three geophysical surveys in the vicinity of the Project Area. No large sonar targets characteristic of a shipwreck or wreck debris field were apparent based on thorough reviews of the datasets by OSI and the project archaeologist. The apparent low concentration of man-made debris is consistent with the site location, outside of primary shipping lanes and far from more intense commercial activities associated with industrial harbors.

Redacted
Confidential Business Information
Not for Public Disclosure

Figure 15. [redacted]

Many of the side scan sonar targets identified may in fact be natural boulders, as a conservative approach to data interpretation identifies all isolated sonar contacts exhibiting any size for further archaeological review. Groupings of such targets, correlated to subbottom profiles and other datasets, may allow patches of coarse material to be positively mapped as boulders and eliminated as man-made objects. For isolated targets, sonar characteristics of a man-made object often exhibit angular-shaped reflections. But the sonar image alone may not be adequate to distinguish between natural or man-made objects in all cases.

The magnetometer data assists with this determination as a ferrous man-made object will generate an anomaly in the earth's total magnetic field intensity being measured. Locations where a sonar target and magnetic anomaly exist represent ferrous man-made objects resting on the seafloor. Locations where only a magnetic anomaly was measured with no corresponding sonar target are suggestive of buried ferrous objects. The vast majority of the 225 magnetic anomalies identified in the vicinity of the Project Area from the three surveys exhibited small amplitudes possibly associated with fishing gear or other debris. [redacted]

[redacted]

Shipwrecks

There has been no conclusive identification of a shipwreck in the site, either modern or historical, although three locations have been given a designation of moderate archaeological sensitivity for Euro-American cultural resources (PAL, 2004 and CWA, 2007). [redacted]

[redacted]

No other sonar targets or magnetic anomalies were identified as concerns from the archaeological assessments performed by PAL (2003, 2004, 2006).

6.0 CONCLUSIONS

This shallow hazards review provides an examination of available scientific data for the Project, using geophysical and geotechnical data collected from 2001-2006 as well as additional research studies and public information sources.

Existing site conditions are typical for a coastal embayment located in a tidal environment and dominated by unconsolidated sediments on and below the seafloor. No unexpected features have been identified from the field investigations completed to date. Furthermore, surface hazards detected and interpreted from the data [redacted] are considered to be manageable through well established engineering practices and pose no major problems for the construction and operation of the Project.

The subbottom penetration and data recovery to depths greater than 200 feet, where site conditions allow, adequately characterizes the subsurface geology within the Project Area. Neither of the subsurface hazards identified ([redacted]) are expected to evidence of hazards detrimental to construction of the Project. While future data acquisition along closer spaced tracklines may provide greater detail on some existing surface and subsurface features, it is unlikely that any additional types of geologic features or hazards would be identified.

7.0 REFERENCES

ASA, 2006. Hydrodynamic Analyses of Scour Effects Around Wind Turbine Generator Piles, Use of Rock Armoring and Scour Mats, and Coastal Erosion and Deposition. Applied Science Associates, Inc., Narragansett, RI, 2 pp.

CWA, 2004. Cape Wind Energy Project, Draft Environmental Impact Statement (USACE NAE-2004-338-1)/Draft Environmental Impact Report (EOEA #12643)/Development of Regional Impact (CCC#JR#20084). Cape Wind Associates, Boston, MA.

CWA, 2007. Cape Wind Energy Project, Final Environmental Impact Report (EOEA #12643)/Development of Regional Impact (CCC#JR#20084). Cape Wind Associates, Boston, MA, 774 pp.

ESS, 2006a. Geotechnical/Benthic Field Evaluations Report, Cape Wind Project, Nantucket Sound, Project No. E159.502.7, 19 pp.

ESS, 2006b. Revised Scour Report, Cape Wind Project, Nantucket Sound, Report No. 4.1.1-5, 19 pp.

ESS, 2006c. Conceptual Rock Armor Scour Protection Design, Cape Wind Project, Nantucket Sound, Report No. 4.1.1-6, 12 pp.

Green , E.P. and Short, F.T., 2003. World Atlas of Seagrasses. University of California Press, Berkeley and Los Angeles, CA.

Graham, L. E. and Wilcox, L.W., 2000. Algae. Prentice Hall, Inc., Upper Saddle River, NJ.

GZA, 2002. Geotechnical Data Report. Cape Wind Met Tower Foundations, Hyannis/Nantucket, Massachusetts, GZA GeoEnvironmental, Inc., Providence, RI, 14 pp.

GZA, 2003a. 2003 Geotechnical Data Report. Cape Wind Energy Project, Nantucket Sound, Massachusetts, GZA GeoEnvironmental, Inc., Providence, RI, 50 pp.

GZA, 2003b. October 2003 Geotechnical Data Report. Cape Wind Energy Project, Nantucket Sound, Massachusetts, GZA GeoEnvironmental, Inc., Providence, RI, 35 pp.

Hallett, B.W., Poppe, L.J., and Brand, S.G., 2004. Petrography and Character of the Bedrock Surface Beneath Western Cape Cod, Massachusetts: Northeastern Geology and Environmental Sciences, v. 27, no. 3, p. 230-241.

Lobban, C.S. and Harrison, P.J., 1994. Seaweed Ecology and Physiology. Cambridge University Press. New York. New York.

Mulligan, A.E., Uchupi, E., 2004. Wisconsinan Glacial Lake Sediments in the Subsurface of Cape Cod, Massachusetts. Northeastern Geology and Environmental Sciences, v26, p. 188-201.

O'Hara, C.J., Oldale, R.N., 1987. Maps Showing Geology, Shallow Structure, and Bedform Morphology of Nantucket Sound, Massachusetts. U.S. Geological Survey, Misc. Field Studies Map MF-1911, 4 sheets, scale 1:125,000.

Oldale, R. N. 1969. Seismic investigations on Cape Cod, Martha's Vineyard and Nantucket, Massachusetts, and a topographic map of the basement surface from Cape Cod Bay to the Islands. U.S. Geological Survey, 650B:B122-B127.

Oldale, R.N., 1982. Pleistocene Stratigraphy of Nantucket, Martha's Vineyard, the Elizabeth Islands, and Cape Cod, Massachusetts. *In:* Late Wisconsin Glaciation of New England (eds. G. J. Larson and B. D. Stone). Kendall/Hunt, Dubuque, Iowa, pp. 1-34.

Oldale, R.N. 1992. Cape Cod and the Islands: The Geologic Story. Parnassus Imprints, Orleans, Massachusetts, 208 pp.

OSI, 2001. Draft Final Report; Marine Geophysical and Sediment Sampling Program, Nantucket Wind Generation Project, Nantucket Sound. Ocean Surveys, Inc., Old Saybrook, CT, OSI Report No. 01ES047, 36 pp.

OSI, 2003. Final Report; Supplemental Marine Geophysical Survey, Cape Wind Energy Project, Nantucket Sound, MA. Ocean Surveys, Inc., Old Saybrook, CT, OSI Report No. 03ES039, 16 pp.

OSI, 2005. Final Report; Marine Geophysical Investigation, Nantucket Sound, Massachsuetts. Ocean Surveys, Inc., Old Saybrook, CT, OSI Report No. 05ES024, 6 pp.

OSI, 2006. Final Report; Marine Site Investigation for a Proposed Offshore LNG Facility, Safe Harbor Energy Project, Lease Block 6655, South of Long Island, New York, New York Bight, Atlantic Ocean. Ocean Surveys, Inc., Old Saybrook, CT, OSI Report No. 06ES022, 47 pp.

PAL, 2003. Marine Archaeological Sensitivity Assessment, Cape Wind Energy Project, Nantucket Sound, Massachusetts. Public Archaeology Laboratory, Inc., Pawtucket, RI, Report No. 1485, 45 pp.

PAL, 2004. Technical Report, Marine Archaeological Reconnaissance Survey, Cape Wind Energy Project, Nantucket Sound, Massachusetts. Public Archaeology Laboratory, Inc., Pawtucket, RI, Report No. 1485, 71 pp.

PAL, 2006. Summary Report, Supplemental Marine Archaeological Reconnaissance Survey of Revised Layout Offshore Project Area, Cape Wind Energy Project, Nantucket Sound, Massachsuetts. Public Archaeology Laboratory, Inc., Pawtucket, RI, Report No. 1485.06, 6 pp.

Poppe, L.J., Ackerman, S.D., Foster, D.S., Blackwood, D.S., Williams, S.J., Moser, M.S., Stewart, H.F., Glomb, K.A., 2007. Sea-Floor Character and Sedimentary Processes of Great Round Shoal Channel, Offshore Massachusetts. U.S. Geological Survey, Open File Report No. 2007-1138,

Schlee, J.S., Behrendt, J.C., Grow, J.A., Robb, J.M., Mattick, R.E., Taylor, P.T., and Lawson, B.J., 1976. Regional geological framework off the northeastern United States: American Association of Petroleum Geologists Bulletin, v. 60, p. 926-951.

Schwab, W.C., Allison, M.A., Corso, W., Lotto, L.L., Butman, B., Buchholtz ten Brink, M., Denny, J.F., Danforth, W.W., and Foster, D.S., 1997a, Initial results of high-resolution sea-floor mapping offshore of the New York-New Jersey metropolitan area using sidescan sonar: Northeastern Geology & Environmental Sciences, v. 19, no. 4, p. 243-262.

Uchupi, E., Giese, G.S., Aubrey, D.G., Kim, D.J., 1996. The Late Quaternary Construction of Cape Cod, Massachusetts; a Reconsideration of the W. M. Davis Model, Geological Society of America Special Paper, Boulder, CO, v309, 69 pp.

Uchupi, E., Mulligan, A.E., 2006. Late Pleistocene Stratigraphy of Upper Cape Cod and Nantucket Sound, Massachusetts, Marine Geology, v. 227, Issues 1-2, p. 93-118.

United States Geological Survey website (R.N. Oldale), 2001. Geologic History of Cape Cod, Massachusetts, http://pubs.usgs.gov/gip/capecod/index.html.

United States Geological Survey website, Studies in the New York Bight, http://woodshole.er.usgs.gov/project-pages/newyork.

WHG, 2004. Coastal Engineering Design Parameter Analysis, Phase I—Preliminary. Woods Hole Group, Inc., East Falmouth, MA. 24pp.

APPENDIX 1

SHALLOW HAZARDS DESCRIPTIONS

Natural and Man-Made Hazards of Interest to the BOEMRE

Hazard	Geologic Description	Typical Environment
Natural—Seafloor		
Fault/fault escarpment	A fracture or fracture zone along which there has been displacement of the sides relative to one another, parallel to the fracture; an escarpment is the physiographic feature formed as the result of faulting activity; *def.* a steep face formed by the abrupt termination of stratified soils/rock.	Possible in all
Steep/unstable slopes	A stretch of ground forming a natural or artificial incline, with a slope that approaches the angle of repose (maximum angle at which the material remains stable)	Possible in all
Diapiric structures	A type of intrusion in which a more mobile and ductily-deformable material is forced into brittle overlying strata.; typically associated with massive mud or salt deposits at greater depth.	Most common in sedimentary environments.
Gas/fluid expulsion features/vents	Upward movement of gas/fluid via low resistance pathways through sediments onto the seafloor; may be related to other hazards listed (diapirs, faults, shallow water flows)	Most common in deeper water, sedimentary environments.
Collapse features (sink holes)	A sinkhole, also known as a sink, shake hole, swallow hole, swallet, doline or cenote, is a natural depression or hole in the Earth's surface caused by karst processes — the chemical dissolution of carbonate rock or suffosion processes in sandstone.	Most common in karst topography regions
Mass movement structures (mud flows, creep, slumps)	Mass movement structures result from the downslope movement of sediments due to gravity. In the submarine environment these structures are often found in slope environments along coastal margins. The velocity of the flow, angle of the slope and shape of the resultant structure are all factors in distinguishing the various types.	Possible in all; requires unconsolidated materials
Sand Waves	Bedforms (sand waves) are the result of the movement of sediment by the interaction of flowing water; critical angle and forces required for mass movement are dependent upon many factors	Possible in all; requires unconsolidated materials
Water scour	Erosion of material due to water flow.	Possible in all
Hardgrounds (rock outcrops, reefs, pinnacles)	Any semi-lithified to solid rock strata exposed on the seafloor; may include carbonate reefs, cemented carbonate layers, and all types of bedrock; sometimes refers to hard bottom areas comprised of nearly continuous fragmented rock or boulders.	Possible in all

Hazard	Geologic Description	Typical Environment
Biologically sensitive habitats (hardgrounds /chemosynthetic communities, SAV)	Benthic habitats of environmental or economical significance specific to locations around the world.	Possible in all; chemosynthetic habitats only in deep water areas
Ice scour	Narrow ditch or linear depression on the seafloor caused by the impact of drifting pack ice above.	Only in high latitudes (present) or glaciated regions (relict)
Seabed subsidence	Lowering of the Earth's surface via natural geologic processes or human activity; can be caused by dewatering, compaction, crustal warping, etc.; relative subsidence may occur via sea level rise	Possible in all
Gas hydrates	A crystalline solid consisting of gas molecules, usually methane, surrounded by a cage of water molecules (similar to ice). Location of gas hydrate is dependent upon pressure and temperature. Hydrates may form a cement in the pore spaces of shallow sediment layers.	Most common in ocean-floor sediments at water depths greater than 300-500 meters
Natural—Subsurface		
Shallow faults	A fracture or fracture zone along which there has been displacement of the sides relative to one another, parallel to the fracture; shallow denotes upper portions of the stratigraphic column and is a relative term dependent upon the depths of interest for each project	Possible in all
Faulting attenuation; extent and geometry	The translation of movement along a fault into surrounding mediums; the areal extent and pattern (geometry) of attenuation is dependent upon such factors as medium composition, density, degree of saturation, and more.	Possible in all
Shallow gas	Subsurface concentration of material in gaseous form that has accumulated by the process of decomposition of carbon-based materials (former living organisms, typically plants).	Possible in all
Gassy sediments	Unconsolidated materials exhibiting a moderate to high concentration of subsurface gas throughout a study area.	Possible in all
Slump blocks or slump sediments	A single coherent mass of material torn away from its original location, in which the slide mass remains virtually intact and moves outward and downward.	Possible in all
Diapiric structures	A type of intrusion in which a more mobile and ductily-deformable material is forced into brittle overlying strata.; typically associated with massive mud or salt deposits at depth.	Most common in regions of thick depositional sequences where extensive deposits of fine grained sediments are present

Hazard	Geologic Description	Typical Environment
Boulders	Large, rounded blocks of stone often mixed with other unconsolidated materials and believed transported to current location via natural forces (glaciers, rivers); technical term for grain size greater than or equal to 12 inches in diameter (USCS).	Common in many; typical of glacial and fluvial environments
Cavernous porosity (thief zones)	Geologic formation that exhibits large subsurface voids such as crevices and caverns; *Petroleum industry:* formation encountered during drilling into which circulating fluids can be lost; thief zone can be defined as a horizontal permeability conduit, common to carbonate geologic environments	Most common in carbonate environments
Buried channels	Formerly the deepest portion of a waterway filled in with sediment over time and preserved to some extent by depositional processes	Possible in all; requires relict or existing fluvial environment nearby
Shallow water flows	The movement of water in over-pressured sediment layers (often sand aquifers) at shallow depths (300-3,500 ft) below the bottom, but deep water areas of the world.	Possible in all; requires water depths >1,500 ft; most common in Gulf of Mexico and other locals
Gas hydrates	A crystalline solid consisting of gas molecules, usually methane, surrounded by a cage of water molecules (similar to ice). Location of gas hydrate is dependent upon pressure and temperature. Hydrates may form a cement in the pore spaces of shallow sediment layers.	Most common in ocean-floor sediments at water depths greater than 300-500 meters
Man-Made—Seafloor & Subsurface		
Pipelines	Usually steel, concrete or both forming a linear conduit (pipe) used for the transport of water, natural gas, sewage, fuel oil, or other commodity.	Possible in all
Power cables	Refers to HVDC or HVAC submarine transmission cables; commonly greater than 4-5 inches in diameter, often with multiple power cables bundled together, and frequently with fiber optic as well	Possible in all
Well heads/abandoned wells	Remnants of human activity in oil and gas fields; vertical pipes and associated debris	Possible in all; most common in Gulf of Mexico and other oil and gas frontier regions
Communications cables	Refers to submarine fiber optic cables; commonly less than 3 inches in diameter and may be bundled with power cables	Possible in all
Debris	Miscellaneous man-made objects that have been discarded in the ocean and are found on and below the seafloor	Possible in all

Hazard	Geologic Description	Typical Environment
Shipwrecks	Wreckage of ships ranging from intact to debris fields, from recent times or having historical significance	Possible in all
Ordnance	Exploded or unexploded ammunitions; from wartime activities or near test facilities	Possible in all
Cultural Resources	Any man-made object or feature having historical significance	Possible in all

Notes:

	Blue shading indicates hazards that are not naturally occurring in the New England region encompassing the CWA Project Area.

Hazard descriptions were compiled from pertinent reference material and standard industry documents to relate and describe the hazards in the context of this Project.

APPENDIX 2

EQUIPMENT OPERATIONS AND PROCEDURES

Trimble Differential Global Positioning System
HYPACK Navigation Software
Benthos DataSonics SIS 1500 Side Scan Sonar
Geometrics G881/882 Cesium Marine Magnetometer
Innerspace Model 448 Single beam Depth Sounder
Sea-Bird Electronics SBE19 SEACAT Profiler
TSS DMS-05 Motion Sensor
Simrad “Osprey” 9030 High-Res Color Underwater Video
Applied Acoustics 300J “Boomer” Subbottom Profiler
TSS 360/Octopus 760 Digital Seismic Control Unit
EPC ADS 640 Digital Seismic Recorder
EdgeTech GeoStar “Chirp” Subbottom Profiler
EPC 1086/9800 Thermal Graphic Printers
OSI Model BH1500 Vibratory Corer
Van Veen Sediment Grab Sampler
Failing 1500 / Diedrich D-120 Rotary Drill

EQUIPMENT OPERATIONS AND PROCEDURES

Trimble Differential Global Positioning System

The Trimble 4000 differential satellite positioning system provides reliable, high-precision positioning and navigation for a wide variety of operations and environments. The system consists of a GPS receiver, a GPS volute antenna and cable, RS232 output data cables, and a Coast Guard beacon receiver. The beacon receiver consists of a small control unit, a volute antenna and cable, and RS232 interface to the Trimble 4000 GPS unit. In this system configuration a position accuracy of ± 1 meter is quoted by the manufacturer.

Fully automated, the Trimble 4000 provides means for 9 channel simultaneous satellite tracking with real time display of geodetic position, time, date, and boat track if desired. The Trimble unit is mounted on the survey vessel with the beacon receiver which continuously receives differential satellite correction factors via radio link from one of the DGPS United States Coast Guard reference beacons. The Trimble 4000 accepts the correction factors and applies the differential corrections to obtain continuous, high accuracy, real time position updates. A standard NMEA string including geographic coordinates is output from the Trimble 4000 system and interfaced to the OSI navigation system running HYPACK software for trackline control.

HYPACK Navigation Software

Survey vessel trackline control and position fixing were obtained by utilizing an OSI computer-based data-logging package running HYPACK navigation software. The computer is interfaced with the Trimble DGPS onboard the survey vessel. Vessel position data were updated at one second intervals and input to the HYPACK navigation system which processes the geographic position data into State Plane coordinates used to guide the survey vessel accurately along preselected tracklines. The incoming data are logged on disk and processed in real time allowing the vessel position to be displayed on a video monitor and compared to each preplotted trackline as the survey progresses. Digitized shoreline, NOAA charts, and the locations of existing structures, buoys, and control points can also be displayed on the monitor in relation to the vessel position. The OSI computer logging system, combined with the HYPACK software, thus provide an accurate visual representation of survey vessel location in real time, combined with highly efficient data logging capability and post-survey data processing and plotting routines.

The HYPACK survey software digitally records the position data for each sensor, depth sounding data, motion sensor readings (heave, pitch, roll), and magnetic intensity measurements, as well as exports sensor position data (adjusted for offset and layback values) to external devices for recording with digital imagery (side scan sonar, subbottom profiles).

Benthos DataSonics SIS 1500 Side Scan Sonar

Side scan sonar images of the bottom were collected using a DataSonics SIS1500 high resolution sonar system operating at a swept frequency of 200 kHz, utilizing “chirp” signal processing technology. The system consists of a Pentium computer, monitor, keyboard, mouse, a thermal graphic recorder, an armored towcable and hydraulic winch, and sonar towfish. The system contains an integrated navigational plotter which accepts standard NMEA 0183 input from a GPS system. This allows vessel position to be displayed on the monitor and speed information to be used for controlling sonar ping rate.

Sonar control and data acquisition is controlled by the GeoDas software. All sonar images are stored digitally (OIC format) and can be enhanced real-time or post-survey by numerous mathematical filters available in the GeoDas program. Other software functions that are available during data acquisition include; changing range scale and delay, display color, automatic or manual gain, speed over bottom, multiple enlargement zoom, target length, height, and area measurements, logging and saving of target images, and annotation frequency and content. The power of this system is its real-time processing capability for determining precise dimensions of targets and areas on the bottom, and the combination of range and resolution achieved with the “chirp” sonar technology.

As with many other marine geophysical instruments, the side scan sonar derives its information from reflected acoustic energy. A set of transducers mounted in a compact towfish generate the short duration acoustic pulses required for extremely high resolution. The pulses are emitted in a thin, fan-shaped pattern that spreads downward to either side of the fish in a plane perpendicular to its path. As the fish progresses along the trackline this acoustic beam sequentially scans the bottom from a point directly beneath the fish outward to each side of the survey trackline.

Acoustic energy reflected from any bottom discontinuities is received by the set of transducers in the towfish, amplified and transmitted to the survey vessel via the tow cable where it is further amplified, processed, and converted to a graphic record by the side scan recorder. The sequence of reflections from the series of pulses is displayed on a video monitor and/or dual-channel graphic recorder on which paper is incrementally advanced prior to printing each acoustic pulse. The resulting output is essentially analogous to a high angle oblique "photograph" providing detailed representation of bottom features and characteristics. This system allows display of positive relief (features extending above the bottom) and negative relief (such as depressions) in either light or dark opposing contrast modes on the video monitor. Examination of the images thus allows a determination of significant features and objects present on the bottom within the survey area.

Geometrics G881/882 Cesium Marine Magnetometer

Total magnetic field intensity measurements at a 10 hertz sampling rate were acquired along the survey tracklines using a Geometrics G881 or G882 cesium magnetometer that has an instrument sensitivity of 0.1 gamma. The G881/882 magnetometer system includes the sensor head with a coil and optical component tube, a sensor electronics package which houses the AC signal generator and mini-counter that converts the Larmor signal into a magnetic anomaly value in gammas, and a RS-232 data cable for transmitting digital measurements to a data logging system. The cesium-based method of magnetic detection allows a center or nose tow configuration off the survey vessel, simultaneously with other remote sensing equipment, while maintaining high quality, quiet magnetic data with ambient fluctuations of less than 1 gamma. The G881 includes a pressure sensor to provide sensor depth (subtracted from water depth to obtain sensor height) while the G882 features an altimeter which outputs sensor height above the seafloor. Data were recorded on the OSI data-logging computer by the HYPACK software.

The G881/882 magnetometer acquires information on the ambient magnetic field strength by measuring the variation in cesium electron energy level states. The presence of only one electron in the atom’s outermost electron shell (known as an alkali metal) makes cesium ideal for optical pumping and magentometry.

In operation, a beam of infrared light is passed through a cesium vapor chamber producing a Larmor frequency output in the form of a continuous sine wave. This radio frequency field is generated by an H1 coil wound around a tube containing the optical components (lamp oscillator, optical filters and lenses, split-circular polarizer, and infrared photo detector). The Larmor frequency is directly proportional to the ambient magnetic intensity, and is exactly 3.49872 times the ambient magnetic field measured in gammas or nano-Teslas. Changes in the ambient magnetic field cause different degrees of atomic excitation in the cesium vapor which in turn allows variable amounts of infrared light to pass, resulting in fluctuations in the Larmor frequency.

Although the earth's magnetic field does change with both time and distance, over short periods and distances the earth's field can be viewed as relatively constant. The presence of magnetic material and/or magnetic minerals, however, can add to or subtract from the earth's magnetic field creating a magnetic anomaly. Rapid changes in total magnetic field intensity, which are not associated with normal background fluctuations, mark the locations of these anomalies.

Innerspace Model 448 Single Beam Depth Sounder

Precision single beam water depth measurements were obtained by employing an Innerspace Model 448 digital depth sounder with a 200 kilohertz, 3-8° beam width transducer. The Model 448 recorder provides precise, high-resolution depth records using a solid state thermal printer as well as digital data output which allows integration with the OSI computer-based HYPACK navigation system. Depth sounding points were collected at the maximum rate of the system, 13 samples per second. The Model 448 also incorporates both tide and draft corrections plus a calibration capability for local water mass sound speed.

Sound speed calibrations are accomplished by performing "bar checks" in shallow water sites. The bar check procedure consists of lowering an acoustic target, typically a 20 pound lead disk, on a measured sounding line, to the specified project depth. The speed of sound control is adjusted such that the reflection from the disk is printed on the recorder precisely at this known depth. The acoustic target is then raised to successively shallower depths and calibration readings at these depths are recorded. Variations which exist in the indicated depth at these calibration points are incorporated in the sounding data processing to produce maximum accuracy in the resulting depth measurements. Bar checks were performed at the beginning of each day to check the surface water mass sound speed in comparison with the CTD profiler.

Bar checks are used for calibration when surveying in shallow water areas of generally less than 60-80 feet. For depth sounder calibration in the deeper water a Sea-Bird SBE19 CTD Profiler is utilized to measure the temperature, salinity, and density of the entire water column from which sound velocity can be calculated and input to the 448 echosounder. Both checks were performed during this field investigation for quality control and comparison.

Sea-Bird Electronics SBE19 SEACAT Profiler

Water column velocity measurements were logged a minimum of three times daily using Sea-Bird Electronics 19 SEACAT Profiler. The SBE 19 is the next generation personal CTD, bringing numerous improvements in accuracy, resolution, reliability and ease-of-use. The SBE 19 samples at 4 Hz, has a 0.005 accuracy and has 8 Mbytes of memory. Data are recorded in non-volatile FLASH memory and can be transferred and processed on a PC. The SBE 19 has a fast sampling and pump controlled TC-ducted flow configuration, significantly reducing salinity spiking caused by ship heave.

The sound velocity profiles collected using the Sea-Bird are important for adjusting the single beam depth soundings for velocity changes in the water column to attain the highest level depth accuracy possible. Sound velocity is also input to other geophysical systems that provide the option for applying sound corrections for distance plotting on imagery (side scan sonar, subbottom profilers).

TSS DMS-05 Motion Sensor

Vessel heave, pitch and roll information was measured and logged utilizing TSS's DMS-05 Dynamic Motion Sensor. Incorporating an enhanced external velocity and heading aiding algorithm for improved accuracy during dynamic maneuvers, the solid state angular sensor offers reliability and the highest performance of any TSS produced vertical reference unit. The DMS-05 motion sensor was designed for use with single and multibeam echosounders and incorporates advanced processing techniques and high grade inertial sensing elements to attain heave, pitch, and roll measurements with high dynamic accuracy and immunity to vessel turns and speed changes. The DMS-05 allows full utilization of all echosounder beams and survey capabilities to IHO standards. The DMS-05 has a dynamic roll and pitch accuracy to 0.05° over a 30° range and dynamic heave accuracy to 5 centimeters or 5% (whichever is greater). The unit can output digital data at a rate up to 200 hertz and accepts a standard NMEA 0183 message string. Digital data are logged by the HYPACK navigation computer. The DMS-05 permits survey operations to continue through degrading weather conditions, increasing project productivity and efficiency.

Simrad "Osprey" 9030 High-Res Color Underwater Video

A Simrad "Osprey" underwater color video system was utilized for inspection of surficial features on the seafloor. The system consists of a high resolution color video camera with 3.7 millimeter wide angle lense, 250 watt light with adjustable light intensity, a 250 foot cable, and power supply unit which includes the light and manual override focus controls. The "Osprey" camera features a corrosion and thermal shock resistant pressure housing made of stainless steel. The camera is designed to be extremely low light sensitive, has automatic focus, and its video output is DVD compatible. The system includes a VCR and DVD recorder with color monitor which were used to record all the video information and a microphone with amplifier to allow real time narration of the underwater scenes, if desired.

The power supply unit was mounted on the survey vessel for remote focus and light control while the camera and light were attached to a stainless steel sled frame designed for stable towing off the side of the vessel. Operationally, the camera and sled were towed at minimal vessel speeds, typically less than 2 knots, to maintain high quality video of the seafloor as the boat navigated around the site. The sled was usually towed at a height of 2-4 feet above the bottom except in areas where reduced visibility forced the sled to be even closer to the bottom. If necessary, the camera can be disconnected from the sled and used in diver hand held mode. The video data is annotated in real time on the imagery with date, UTC time (4 hours ahead of local), navigation light number, and survey line number.

Applied Acoustics 300J "Boomer" Subbottom Profiler

Subsurface exploration was accomplished utilizing an Applied Acoustics 300 joule "boomer" seismic reflection system comprised of a catamaran with boomer plate (sound source), 4,000 volt power supply, 10 element hydrophone array (eel; receiver), digital seismic control unit with filter and time-varied-gain functions, and a thermal graphic printer for real time hard copies.

The “boomer” employs a sound source that utilizes electrical energy discharged from a capacitor bank to rapidly move a metal plate in the transducer bed. The short-duration motion of the metal plate creates a broadband (500–8,000 Hz) pressure wave capable of penetrating hundreds of feet of marine sediments under suitable site conditions. In New England, these low frequency systems are used for any depth range to penetrate coarse glacial till commonly overlying bedrock. Higher frequency seismic systems have greater difficulty resolving the top of rock with a coarse till overburden.

Operationally, a seismic source (boomer) is used to create an intense, short duration acoustic pulse or signal in the water column. This signal propagates downward to the bottom where it is partially reflected at the sediment-water interface, while the rest of the signal continues into the subbottom. As the downward propagating signal encounters successive interfaces between layers of different material, similar partial reflections occur. The characteristics of the materials which cause acoustic signals to behave in such a manner are defined primarily by the cross-product of the bulk density and the compressional wave velocity of each material, a quantity known as the acoustic impedance. As a first approximation, the percentage of an acoustic signal which is reflected from an interface is directly proportional to the change in acoustic impedance across that interface.

The return signal consists of a continuous sequence of reflected energy that has a series of "peaks" correlative in intensity with the magnitude of change in acoustic impedance of the materials on either side of the interface. These return signals received by the transducer array are subsequently converted to electrical voltages which indicate the intensity of the return and hence how strongly the return is printed on the graphic recorder. Ambient noise is filtered out and the signal is then amplified with overall gain and/or TVG and displayed trace-by-trace iteratively on the recorder to yield a continuous display somewhat analogous to a geologic cross section.

The subbottom profiling system is installed aboard the survey vessel along with other scientific instrumentation, all of which is operated simultaneously along the desired survey lines. Both the energy source and the hydrophone array are deployed in an appropriate configuration to minimize the recording of background noise generated by the survey vessel.

For this investigation, the seismic source and hydrophone array were deployed astern of the vessel and electronic filter settings were adjusted to an approximate bandwidth of 800-4,000 Hz in the field. This towing configuration and filter setting provided a quiet environment even in moderately rough sea conditions.

TSS 360/Octopus 760 Digital Seismic Control Unit

The TSS 360 and Octopus 760 digital seismic control units are universal amplifiers and filters which include TVG (time varied gain) with bottom tracking, automatic gain control, real time signal stacking, and a swell filter. Digital seismic files were saved on these units using a standard seismic data format (SEG Y) and printed in real time on the EPC 1086 or model 9800 dual channel recorder. The 360/760 serves as the trigger source for the entire boomer system at a ~330 ms rate.

EPC ADS640 Digital Seismic Recorder

In addition to saving a hard copy of the remote sensing data on the graphic recorder, the subbottom profiles / side scan sonar images were also recorded digitally on the EPC Model ADS 640 seismic system. The ADS 640 system is a versatile digital seismic display and recording unit which is capable of many functions that are independent of the EPC thermal graphic recorders. Incoming analog data is digitized by two high speed A/D converters. Acoustic data are displayed at up to 256 levels of gray on an 8 inch square active matrix LCD video display. A large hard drive is contained within the unit for data storage and a 1.0 gigabyte Jaz™ drive is included for data download and transfer to other devices. Multiple RS-232 interface ports allow annotation input from the navigation system as well as output to a thermal graphic recorder.

Post-survey processing capabilities include powerful search tools that allow quick, systematic location of specific data scans via the random access disk storage. Data can be played back on the LCD display and even printed on a graphic recorder simultaneously.

EdgeTech GeoStar "Chirp" Subbottom Profiler

High-resolution subbottom profiling was accomplished utilizing an EdgeTech GeoStar Full Spectrum "Chirp" Subbottom Profiler system operating with frequencies of 2-16 kHz. The subbottom profiler consists of three components: the deck or topside unit (desktop computer processor, amplifier, monitor, keyboard, and trackball), an underwater cable, and a Model 216 towed vehicle housing the transducers. Data are displayed on a color monitor and EPC 1086 thermal printer while saved in a DAT type proprietary digital format on the topside computer.

The GeoStar Chirp sonar is a versatile subbottom profiler that generates cross-sectional images and collects normal incidence reflection data over many frequency ranges. The system transmits and receives an FM pulse signal generated via a streamlined towed vehicle (subsurface transducer array). The outgoing FM pulse is linearly swept over a full spectrum range of 2-16 kHz for a period of approximately 20 milliseconds. The acoustic return received at the hydrophone array is cross-correlated with the outgoing FM pulse and sent to the deck unit for display and archiving, generating a high-resolution image of the subbottom stratigraphy. Because the FM pulse is generated by a converter with a wide dynamic range and a transmitter with linear components, the energy, amplitude, and phase characteristics of the acoustic pulse can be precisely controlled and enhanced.

The “chirp” subbottom profiler is designed for acquiring high-resolution subsurface data from the upper portions of the stratigraphic column (20-50 feet depending on site conditions). The higher end frequencies allow good resolution of subbottom layering while the lower end acoustic frequencies provide significant penetration. This particular system is capable of providing excellent acoustic imagery of the nearsurface in a wide variety of marine environments.

During data acquisition, all records were annotated with relevant supporting information, field observations, line number, run number, navigation event marks and numbers for later interpretation and correlation with vessel position data.

EPC 1086/9800 Thermal Graphic Printers

Two models of EPC thermal printers have been used to produce real time hard copies of geophysical data for this project, the single channel 1086 (10 inches wide) and dual channel 9800 model (20 inches wide). Multiple RS-232 serial inputs allow navigation information to be input and displayed. The dual channel Model 9800, although it requires significant space, allows geophysical data to be printed at two different scales simultaneously.

OSI Model BH1500 Vibratory Corer

An OSI Model BH1500 vibratory corer was used to obtain continuous core samples of unconsolidated sediments within the survey area. The vibracore rig used for this study utilized a standard 3.5 to 4-inch diameter steel core barrel, a clear plastic lexan liner, a cutter head or shoe, a core catcher, and a pneumatically driven vibratory head attached to the upper end of the core barrel. The vibracore unit requires an air compressor to power the piston inside the head of the corer, which is the driving force of the system. A large stable platform is necessary to lay down the vibracore rig when not in use and provide support for the handling gear and hydraulic winches required to operate the rig.

Once securely on station, the entire coring rig is lowered over the side or stern of the coring vessel via the crane, winch, and connecting cable. The rig is lowered down through the water column to the bottom. Once in contact with the bottom the vibratory head is activated and the winch cable is slackened. The pneumatically powered vibratory head drives the core barrel into the underlying sediments while inducing only minor deformation in the sedimentary structures. The pneumatic head achieves its vibratory motion by means of a reciprocating air driven piston, powered by means of a flexible hose connected to a large-capacity air compressor located onboard the coring vessel.

Following penetration of the core barrel to the desired depth, the entire rig is lifted back onboard the vessel. Once on deck, the liner containing the core is removed, cut into manageable sections, the ends capped and sealed, and the core sections are marked for orientation, identification, and post-survey analysis. Only the accessible part of the core (top and bottom open ends) is examined to provide a brief sediment description onsite. The cores are stored vertically to prevent mixing of the stratigraphic layers in the sample and offloaded at the dock to a secure storage facility. Specific handling procedures for cores destined for chemical and/or biological analyses are followed carefully.

Van Veen Sediment Grab Sampler

A VanVeen grab sampler was used to obtain sediment samples of the upper 8 inches of the seabed for characterizing the surficial materials present in the survey area. The VanVeen grab sampler is used primarily to sample unconsolidated materials from soft mud to coarse sand, and is capable of retrieving a relatively undisturbed, unwashed sample from any water depth.

The sampler is constructed of steel designed for all types of benthic sediments and has a unique trigger mechanism upon striking the bottom which is capable of grabbing even some coarse sand and fine gravel sized materials. The unit is comprised of a half cylinder bucket divided in two, with each half welded to a lever arm and connected to wire cables with which the sampler is lowered. The sampler is lowered through the water column in the open position with the each half of the bucket and lever arms spread out to the side. Upon contact with the bottom, the upward motion of the down line pulls the lever arms and bucket halves together enclosing the sediment trapped within. The top of the unit is covered with mesh screen to prevent sediment and organisms from spilling out of the bucket during its ascent. Lead weights can be added to the sampler for increased penetration into the bottom, if necessary. The effective sampling area of the VanVeen grab sampler is 32 x 32 cm.

Once on deck, the sediment is subsampled according to project specifications. First the samples are photographed and visually described onboard the survey vessel. If the samples were collected as part of a benthic habitat survey, standard procedure is to seive the samples through a 1 mm (0.0394 inch) mesh screen with the living and non-living material remaining on the screen preserved in a 10% formalin solution. These processed samples can then be delivered to a benthic ecology laboratory for microscopic analysis. For geochemical analyses, subsamples of the sediment retained in the bucket are stored in appropriate glass or plastic containers, refrigerated, and delivered to the laboratory within the holding times specified for the chemical components being measured.

Failing 1500 / Diedrich D-120 Rotary Drill

Test borings for all three phases of geotechnical exploration program completed for the project were advanced using Rotary Drilling Equipment and methods. All equipment was mounted on a lift barge and work was completed while the barge was supported above the water surface. The hydraulic rotary drill rigs employed consisted of either a skid mounted Failing 1500 or a truck mounted Diedrich D-120. The borings were advanced by rotary drilling equipment using either standard "drive-and-wash" or "open hole" techniques. Drive and wash technique used 3” to 6” flush joint casing. The casing was advanced using either a 300 or 500 pound drive hammer and soils were removed by flushing to a mud tube on the barge deck. If the driller determined that the open hole technique may be used, the boring was advanced using a rotary drilling bit to cut the soils and drilling fluid circulation to remove cuttings and maintain boring opening.

Standard Penetration Test

Split-spoon soil samples were obtained at approximately five-foot intervals in general conformance with ASTM D-1586, the Standard Penetration Test (SPT), to obtain an indication of the relative density and consistency of the underlying soils. The SPT consists of driving a 1-3/8-inch inside diameter standard split-spoon sampler, at least 18 inches, with a 140-pound hammer dropping from a height of 30 inches. At some sampling intervals where extremely dense soils were encountered a 300 pound hammer was used to advance the sampler. The SPT N-value is the number of blows required to drive the sampler from the six to 18 inch penetration interval.

The sampler was opened on the deck of the lift barge, captured soil was logged and classified, and samples were taken and stored. Field soil classification was in accordance with the Burmister Classification System. Standard penetration test results and soil classification are indicated on the boring logs.

Shelby Tube Sampler

In some borings where cohesive soils or soft soils were encountered, undisturbed samples were obtained by pushing a Shelby Tube mechanically into the soft soil. The sampling was completed in general conformance with “Standard Practice for Thin-Walled Tube Sampling of Soils For Geotechnical Purposes” ASTM 1587. After retrieval the tube was sealed, capped and stored in an upright position. Prior to transport to the land based Geotechnical Lab the samples were installed in a protective container.

Pressuremeter Testing

Pressuremeter testing was completed in general conformance with “Standard Test Method for Pressuremeter Testing in Soils” ASTM Method D4719. The equipment used during the test included the following components: Roctest RRI-MOD pressuremeter probe, a P3500 Vishay Strain Indicator digital readout, Roctest Pneumatic Control Unit, and a compressed nitrogen source to facilitate the probe inflation. Prior to testing each day, the pressuremeter probe was calibrated in test cylinders.

At each test location the borehole was prepared by advancing an open hole using a 2-7/8 inch roller bit to approximately 1.5 feet beyond the test location and the hole was flushed with drilling fluid to remove cuttings. The probe was attached to drill rods and the probe was installed at the test elevation within the borehole. The test procedure was then implemented by incrementally inflating the probe to predetermined pressures. Once the test was completed the probe was deflated and removed.

APPENDIX 3

DATA PROCESSING AND ANALYSIS SUMMARY

Navigation and Hydrographic Data

Side Scan Sonar Imagery

Magnetometer Data

Subbottom Profile Data

Geotechnical Information

Underwater Video Imagery

DATA PROCESSING AND ANALYSIS SUMMARY

Navigation and Hydrographic Data

During the field investigation, vessel navigation files were continuously processed and entered into AutoCAD drawings to verify survey coverage and assist with the onsite review of geophysical data.

Upon completion of the field work, single beam hydrographic data were processed using HYPACK. Digital depth data were first checked against the graphic sounding records for verification of depth quality. Erroneous digital depths caused by floating and drifting debris, air bubbles from passing ship's wake, or fish in the water column were filtered out of the data. The editing process is performed with care to eliminate points attributed to objects in the water column (fish, floating line, etc.) while preserving small features important to the project (boulders and other potential obstructions). Depth processing procedures also incorporate the heave, pitch, and roll measurements to correct for beam position on the seafloor. The digital files containing vessel position and hydrographic data were then corrected for field calibrations (barchecks, CTD profiles) and adjusted to the required vertical datum.

The processed x, y, z data were then exported out of HYPACK and input to DTM (digital terrain modeling) software for mapping. QuickSurf Version 5.1 DTM software was used to generate the contoured surfaces of the seafloor. QuickSurf imports processed survey data points into an AutoCAD format drawing and generates surface models from these data. A number of contouring methods are available for different data applications and site specific conditions. A suite of sophisticated tools allows the user to manipulate modeled surfaces into high quality finished maps and perform a variety of engineering computations.

Side Scan Sonar Imagery

During interpretation of the side scan sonar records, areas on the seabed exhibiting different acoustical properties were identified. The variation in acoustical reflectivity of the bottom represents changes in surficial sediments and/or the presence of benthic communities and foreign material. In general, stronger reflectivity represents coarser materials (coarse sand, gravel, cobbles, boulders, bedrock) while weaker amplitude sonar returns are indicative of finer materials (silt, clay). Since acoustic signal reflection is a not a direct measure of sediment types, surficial reflectivity is best ground truthed via bottom sampling to verify specific sediment types corresponding to reflective strength for each project site. In this manner, sonar data combined with grab sample and vibracore information were used to develop a surficial sediment type map for the survey area.

Imagery were also reviewed for individual targets with the intent of identifying any object 1-foot in size or larger. Each target is interpreted and measured individually. A detailed spreadsheet summarizes specific information for each target such as position, number, size, relief, associated magnetic anomalies, and a description. The targets represent possible obstructions to the installation of wind farm structures and cables during future phases of work. In addition, the target spreadsheet with plan view map are provided to the project archaeologist for cultural resource assessment.

Magnetometer Data

The objective of the magnetometer survey was to locate any ferrous objects lying on or below the seafloor which (1) could represent potential archaeological sites of historic significance and/or (2) may impede WTG or transmission cable construction activities. Digital records of the magnetic data were reviewed and interpreted to determine the presence of ferrous material in the designated project areas. Anomalous readings above the regional geologic background gradient were identified. A coordinate and descriptive list of the anomalies as well as a map with associated to sonar contacts were provided to the project archaeologist in support of the archaeological assessment.

For discrete anomalies, determination of the location of an object producing a magnetic anomaly depends on whether or not the magnetometer sensor passed directly over the object and if the anomaly is an apparent monopole or dipole. A magnetic dipole can be thought of simply as a common bar magnet having a positive and negative end or pole. A monopole arises when the magnetometer senses only one end of a dipole as it passes over the object. This situation occurs mainly when the distance between opposite poles of a dipole is much greater than the distance between the magnetometer and the sensed pole, or when a dipole is oriented nearly perpendicular to the ambient field thus shielding one pole from detection. For dipolar anomalies, the location of the object is at the point of maximum gradient between the two poles. In the case of a monopole, the object associated with the anomaly is located below the maximum or minimum magnetic value.

Subbottom Profile Data

Once back in the office, digital seismic profiles were corrected for sound velocity, filtered, and enhanced to obtain maximum resolution for interpretation. For the shallow subbottom profiler (chirp) files, EdgeTech Discover Subbottom Processing software was used to review and interpret these data for acoustic reflectors in the upper portion of the stratigraphic column. Reflectors of interest were reviewed alongside the medium subbottom profiler (boomer) data with interpretations and products developed as requested for each phase of the project.

For the medium subbottom profiler (boomer) data, these lower frequency digital files were processed using the seismic analysis software ReflexW (Sandmeier Software Version 5.1). The program is a powerful 32 bit software package which runs in the Windows XP environment and allows the user full control over signal processing functions such as filtering, stacking, multiple suppression, a variety of gain adjustments, and many file manipulation options. Once all static corrections, filtering, and gain adjustments have been completed, acoustic reflectors of interest to the project can be picked manually by the user or automatically by the program in a cross-sectional format on the monitor. Adjustable threshold, amplitude scale, and gate window allow the automatic assignment of reflector picks to a selected phase. Separate pick codes, colors, and layer names allow the user to organize and export multiple reflector picks in a variety of file formats.

Since the vertical axis of the seismic records is signal travel time and not material thickness, a conversion from time to thickness or reflector depth was performed. A constant propagation velocity of 5,000 feet per second was used during depth and thickness computations as an average representative velocity of the saturated marine sediments in the site. Multiple layer modeling of the seismic traces allows different velocities to be assumed for each layer, if necessary. The program performs the time to distance/depth conversions using the input velocities and produces a corrected geologic cross section. Digital files can be exported containing the bottom and subbottom reflector depths in a number of formats for use with other modeling and mapping programs.

In general, the digital seismic processing steps performed using the ReflexW program are as follows:

1) File conversion and geometry/navigation checks
   SEGY formatted reflection shot point files were imported into ReflexW. All survey geometry parameters contained in the file headers, as well as coordinates and event marks were checked.
2) Band Pass Filtering
   A 1-D bandpass filter (~800-4,000 Hz) was applied to all traces to increase the signal/noise ratio improving the interpretability of reflected arrivals. This helped minimize interference recorded from the second subbottom system.
3) Deconvolution
   A spiking-deconvolution using the recursion-algorithm of Levinson (Wiener-Filter method) was applied to concentrate the signal wavelet in the time domain creating a highly broadband and smooth spectrum.
4) Envelope Calculation
   A complex trace-analysis was carried out using the Hilbert-Transformation to calculate the envelope or instantaneous amplitude. This instantaneous attribute gave an overview of the energy distribution of the traces and facilitated the determination of signal arrivals.
5) Signal Integration
   A spectral analysis filter that operates in the frequency domain; integrates the seismic signals in time for each trace. This emphasizes the lower frequency bandwidth of the signal for enhancing deeper seismic resolution.
6) Swell Filtering
   A lowpass filter in the distance dimension was applied to eliminate fluctuations in the x-direction smaller than a chosen wavelength. This step was used for smoothing the data to remove the effect of sea conditions.
7) Static corrections
   A muting curve above the sea floor was defined to set all data points in the water column to zero amplitude. This was done to clear out all reflections produced in the water column improving visualization and interpretability of the profiles. A time cut was applied to reduce trace length to the desired depth of interest.
8) Gain Adjustment
   AGC (automatic gain control) or manual gain curve applications are used, along with a TVG (time variable gain) curve, to adjust the gain settings over the depth of interest to optimize the visual display
9) Trace Editing & Interpolation
   Processing features in this function include combining multiple profiles into one file, trimming overlap from combined profiles, flipping profiles end to end so all are viewed from the same direction, and more.

Individual reflector and seismic facies characteristics were examined in an attempt to determine the possible material types represented on the profiles. Correlation with the geotechnical data (vibracores) then allowed lithological identities (clay, sand, bedrock, etc.) to be assigned to the shallow portion of the subbottom profiles.

Geotechnical Information

Geotechnical ground truthing of the shallow subbottom profile data was accomplished through use of the OSI vibracore system which retrieves nearly undisturbed samples of the upper 20 feet of sediment. The samples were also collected for engineering and environmental purposes for grain size analysis and other mechanical and chemical property analyses. Field core logs were compiled for each station to document the onsite conditions including position, water depth, penetration rate, and recovery. Cores were delivered onsite to ESS who was responsible for all logging, documentation, supervision of laboratory analyses, and vibracore sample reporting.

The acquisition of deeper geotechnical information was performed by GZA who conducted borings throughout the wind farm site in the upper 100-150 feet of the stratigraphic column. GZA was responsible for all post-survey analyses performed on the borings and subsamples, as well as boring log production and documentation of results.

Correlation of the vibracore and boring samples with specific seismic reflectors on the profiles allows the identification of the sediment horizons generating the acoustic interfaces. Those interfaces or reflectors can then be traced between geotechnical sampling stations to provide extrapolation of sediment units laterally below the survey area. Core and boring locations are shown on the final drawing in both plan and profile panels with sediment descriptions where appropriate.

Underwater Video Imagery

Underwater video was collected along selected transects in the CWA site where habitats of interest to the project were interpreted from side scan sonar images. The video was utilized to obtain representative footage of benthic habitats and seabed composition for documenting site conditions. Video navigation files were processed using HYPACK to generate trackline plots with time stamps at event marks that are directly correlated to the time shown on the video footage. This allows precise positioning of the underwater camera on the seafloor. A DVD containing the digital video files was delivered to ESS for review and analysis, with additional copies backed up for archival. Results of the side scan sonar interpretation and underwater video review were combined to develop a plan view map of submerged aquatic vegetation (SAV) in the site.

APPENDIX 4

Redacted
Confidential Business Information
Not for Public Disclosure

APPENDIX 5

Redacted
Confidential Business Information
Not for Public Disclosure

Appendix B

Avian and Bat Monitoring Plan

ESS Group, Inc.

Cape Wind Avian and Bat Monitoring Plan – Draft Monitoring Protocols

NANTUCKET SOUND, MASSACHUSETTS

PREPARED FOR

Cape Wind Associates
75 Arlington Street, Suite 704
Boston, MA 02116

PREPARED BY

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482

Project No. E159-504

July 27, 2010

CAPE WIND AVIAN AND BAT MONITORING PLAN – DRAFT MONITORING PROTOCOLS
Nantucket Sound,
Massachusetts

Prepared For:

Cape Wind Associates
75 Arlington Street, Suite 704
Boston, Massachusetts 02116

Prepared By:

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482

ESS Project No. E159-504

July 27, 2010

TABLE OF CONTENTS

SECTION **PAGE**

TABLE OF CONTENTS
(Continued)

TABLES

FIGURES

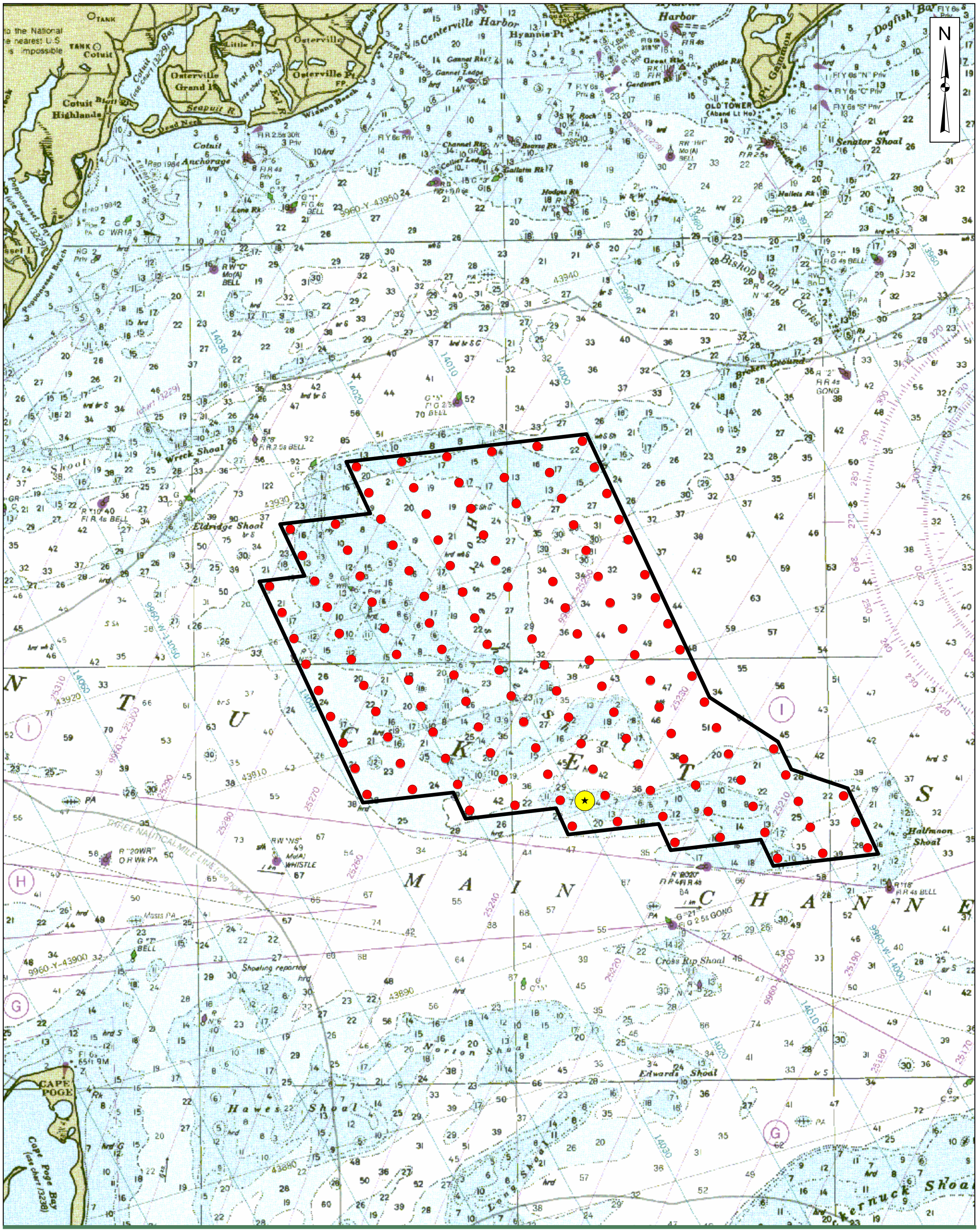
1.0 INTRODUCTION

The *Framework for the Avian and Bat Monitoring Plan for the Cape Wind Proposed Offshore Wind Facility* (ABMP) prepared by the Minerals Management Service (MMS)[1] and Cape Wind Associates (CWA) (September 19, 2008) outlines the general methods that will be used to gather data to assess potential impacts to bird and bat populations as a result of the proposed project. The monitoring will focus on bats and federally and state endangered birds, Roseate Tern and Piping Plover, which are known to occur in and near Nantucket Sound (Figure 1). The ABMP also includes specific study objectives and research questions that will be addressed through pre-construction, construction, and post-construction monitoring techniques. The ABMP will be further refined with input and assistance from regulatory agencies prior to implementation in the field. Thus, the purpose of this *Cape Wind Avian and Bat Monitoring Plan – Draft Monitoring Protocols*, prepared by ESS Group Inc. (ESS), is to present the detailed methodology that will be used to implement the monitoring program and address the study objectives presented in the ABMP.

The monitoring protocols are being developed in coordination with the Bureau of Ocean Management Regulation and Enforcement (BOEM) and the U.S. Fish and Wildlife Service (USFWS) and include several monitoring requirements as a result of previous regulatory review. As a requirement of the USFWS Biological Opinion and the MMS Record of Decision (MMS 4/28/10), the Monitoring Protocols will be peer-reviewed prior to implementation. This peer review will include at least one European scientist currently conducting similar monitoring efforts at off-shore wind projects. The peer review will allow data collection and analysis to be comparable with other ongoing off-shore monitoring efforts. To the greatest extent practicable, the Monitoring Protocols must incorporate methods to assess detectability and sufficiency of negative data. Components of the ABMP, such as radio telemetry, entail the take (i.e., capture, some risk of injury) of Roseate Terns and Piping Plovers and will be contingent on receiving recovery permits under section 10(a)(1)(A) of the United States Endangered Species Act.

[1] Secretarial Order 3302 issued June 18, 2010 renames the Minerals Management Service to the Bureau of Ocean Management Regulation and Enforcement (BOEM)

Location: G:/GIS-Projects/E159/00-mxd/Avian_Monitoring_10/Locus.mxd



DRAFT AVIAN MONITORING PROTOCOLS
Cape Wind Project
Nantucket Sound, Massachusetts

Scale: 1" = 10,000'

0 10,000 Feet

Source: 1) MassGIS, NOAA Chart csi1-13237

Legend

Wind Farm Boundary

Structures

Proposed Wind Turbines

MET Tower
(for monitoring equipment)

Locus Map

Figure 1

ESS Group, Inc.
Engineers
Scientists
Consultants

2.0 PRE-CONSTRUCTION MONITORING PROTOCOLS

The pre-construction monitoring program consists of four components: radio tracking of targeted species (Semipalmated Plover and Common Tern as surrogates for Piping Plover and Roseate Tern), acoustic monitoring to determine avian presence or absence, field-testing and monitoring of anti-perching techniques, and bat presence or absence surveys from the existing meteorological tower (MET tower).

2.1 Radio Tracking

The objective of the pre-construction radio tracking study is to test and refine the use of radio tags. Common Terns will be tracked as a surrogate for Roseate Terns, while Semipalmated Plovers will be used as a surrogate for Piping Plovers. The results of the radio tracking study will guide post-construction studies that will hopefully be successful at radio tracking Roseate Terns and Piping Plovers.

2.1.1 Methods and Schedule

Twelve Common Terns and 12 Semipalmated Plovers will be tagged with radio transmitters and tracked by airplane. Utilizing airplanes for tracking has been determined to be the most efficient and cost effective method to conduct similar tracking exercises. Due to the geographic separation between the likely nesting / capture locations on Bird or Ram Islands in Buzzard's Bay, and the potential to track individuals to Horseshoe Shoal or across Nantucket Sound, it is felt that boats would be too slow and ground tracking would be ineffectual. Common Terns will be tracked at least 12 times between July 1 and September 15. Semipalmated plovers will be tracked twice weekly during the month of August. The detailed methodology for bird capture, tagging, and aerial tracking is provided in the following sections.

Bird Capture

The North American Bander's Manual for Banding Shorebirds (Gratto-Trevor 2004) was the primary source consulted to determine a suitable method to trap plovers and terns. Birds will likely be captured using either nest traps or cannon nets.

Shorebirds are considered nongame migratory birds and so are subject to the Migratory Bird Act of the U.S. Therefore, CWA will first apply for a banding permit from the U.S. Bird Banding Laboratory (United States Geological Survey [USGS], PWRC, Bird Banding Laboratory, 12100 Beech Forest Road, STE-4037, Laurel, Maryland 20708-4037, USA) to band the target species. Additional permission from the banding office will be needed to use radios tags. CWA will apply for the following permits.

- Federal Bird Banding Permit, 50 CFR parts 13 and 21 from USGS – this permit covers bird capture and banding with leg band.
- Federal Migratory Bird Scientific Collection Permit, 50 CFR Parts 10, 13, 21.23 from USFWS– this permit covers the attachment of the radio transmitters to captured birds.

- Massachusetts G.L. c. 131, Sec. 4(2) State Scientific Collection Permit (Commercial) from the Massachusetts Division of Fisheries and Wildlife – this permit will cover the capture and attachment of radio tag birds under state law. Additional approval may be necessary to collect Common Terns, a state-listed species of special concern.
- Massachusetts G.L. c. 131, Sec. 4(2) Massachusetts Bird Banding Permit from the Massachusetts Division of Fisheries and Wildlife – this permit covers bird capture and banding with leg band.

Additional permits or authorization may need to be obtained by USFWS for the use of cannon nets for the capture of Semipalmated Plovers as described in more detail below.

Common Tern Capture

Nests of Common Terns will be identified through consultation with the Massachusetts Natural Heritage and Endangered Species Program. Common Terns will presumably be captured from nesting areas on Bird Island or Ram Island in Buzzards Bay.

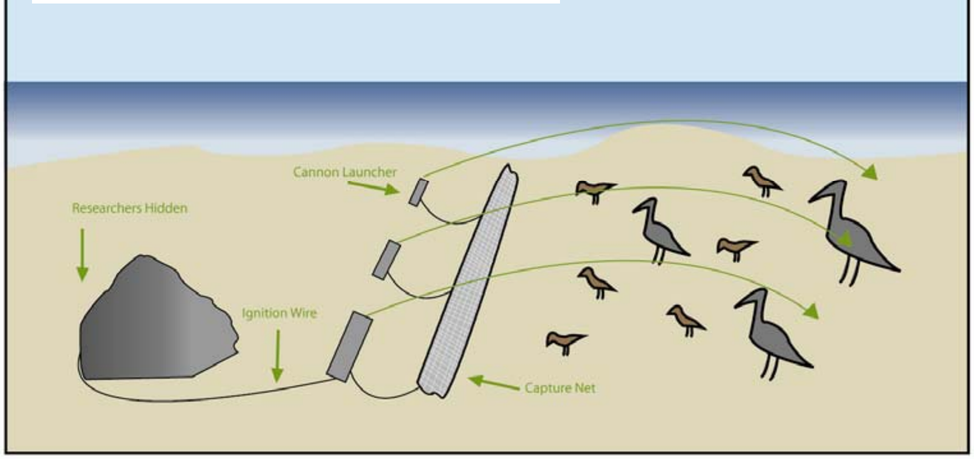
Terns will be captured in a nest trap, which will be made of wire mesh or flexible chicken wire. The chicken wire traps will be bent to accommodate the uneven terrain and rocks encountered at the nesting sites. The trap will be placed on the nest and the door to the trap will be adjusted to fit the size of the bird and held in place with pegs. After the trap is placed on the nest, banders will move away from the nest and remain quiet and motionless. Once a bird is observed in the trap, the bander will approach the trap rapidly towards the trap door, so the bird does not have a chance to flush from the trap. If the bird is able to escape out the door, the trap may need to be adjusted for size.

Semipalmated Plovers

Semipalmated Plovers do not nest in Massachusetts, but are found along intertidal flats and sandy beaches from late July to early September. Attempts will be made to capture Semipalmated Plovers using cannon nets or a comparable method based on consultation with the USFWS. Locating an appropriate location to trap Semipalmated Plovers will be done in consultation with Massachusetts Fish and Wildlife and USFWS. Cannon nets contain cannon explosives as well as projectiles attached to the leading edge of the net. Alternatively rocket nets contain the explosive inside the rockets, which are themselves attached to the leading edge of the net. Because both options involve the use of live charges, permission to use them takes a significant lead time. According to the USGS, the use of cannon nets/rocket nets is very tightly controlled. Only researchers within federal and state agencies or with a direct university link are normally allowed to purchase and use cannon/rocket net charges. Contractors (even contractors for agencies), pest control companies, and private individuals are not normally approved to purchase the cannon/rocket net charges. The capture of Semipalmated Plovers using cannon/rocket nets will likely be done in conjunction with USFWS or another regulatory agency.

As cannon nets can be set at more exact angles and are considered safer, cannon nets will be the preferred option for capturing Semipalmated Plovers. The typical cannon net methodology as outlined by Gratto-Trevor (2004) is presented below.

Figure 2. Typical cannon net set-up



An appropriate site for cannon netting will be selected based on initial reconnaissance and agency consultation. The ideal site will have a large concentration of Semipalmated Plovers, adequate cover for the netting team to hide, and minimal public presence. The area will be cleared of large debris that could potentially snag the net or prevent it from landing flat on the ground.

The cannon net system typically consists of cannons that contain explosives and a net that has been fitted with projectiles attached to the leading edge of the net. The cannon net is initially tethered to the ground along its rear edge. The net will be furled along the tethered edge and the cannons are placed at an appropriate angle near the furled net. When the cannons are fired, the projectiles attached to the lead edge of the net shoot out to open the net (Figure 2). The cannons are attached to a battery-operated firing box, or they may be fired remotely with a radio system.

To minimize injury or death to birds, the net will not be fired if birds are on top of the furled net or in the air in front of the net before it is fired. Cannons will be set at appropriate angles to fire the net over the roosting birds (not through them), but not so high that the birds can escape before the net settles. The net will be initially test-fired to determine the full extent of the net. Nets, cannons and projectiles will be regularly checked for wear and maintained properly for safety. The cannon charges will be tested to ensure they are sufficient enough to open the net, but not so strong that they pull the tethered edge of the net from the ground.

After the net has been fired, a layer of burlap will be placed over the net to help keep birds calm until they are removed. Birds will be removed from under the leading edge of the net. Measures will be taken to ensure that the number of available personnel will be sufficient to remove and process birds in a timely manner.

Bird Tagging

Birds will be pulled from the trap or net by hand using the bander's grip (upright, with the bird's head between the bander's index and middle finger). One of two possible attachment methods will be selected; either the transmitter will be glued on to the back of the bird or it will be glued to a leg band attached to the bird. Based on consultation with other researchers, the leg band will likely be used.

Glue-on Back

Using the glue-on back method, feathers on the back will first be clipped or trimmed as necessary to create a suitable area for transmitter attachment. The radio transmitter will then be glued to the back of the bird using an epoxy designed for seabirds (one example is from Titan Corporation, Lynnwood, Washington, USA) (Figure 3). Attaching transmitters is a two-person job (Warnock and Warnock 1993). One person will hold the bird in the left hand with the head between the second and third fingers, and the wings between the first and second fingers and third and fourth fingers, leaving the right hand free for clipping. Scissors will be used to clip a 10 mm length of the posterior element of the dorsal feather tract, about 5 mm above the uropygial gland. The second person will mix the epoxy for 1.5 minutes and then apply the epoxy to the bird and radio tag. Epoxy is placed on the cleared area on the bird's back with a flat toothpick. Epoxy will also be applied to a radio tag after it has been scored with sandpaper. The tag will be held in place for approximately one minute until a firm bond is set.

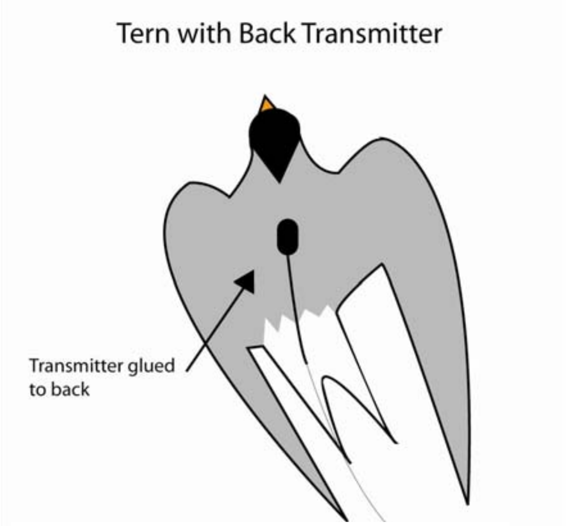
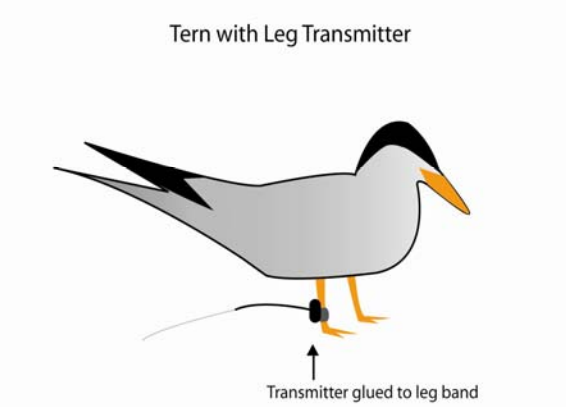


Figure 3. Glue-on Back Transmitter

Leg Band

If chosen, it is anticipated that bird bands will be obtained in coordination with USGS from the Patuxent Wildlife Research Center. The bands come in various sizes and are inscribed with a unique eight or nine digit number. Common Terns will be banded with size 2 bands, while Semipalmated plovers will be banded with size

Figure 4. Leg Band Transmitter



1A or 1B bands. The butt-end band, a round band with two edges that butt evenly together when closed correctly, is the type of band that will be used. The band will be made of a hard metal, typically stainless steel, monel or incoloy, which will last longer in the salt-water environment than standard aluminum bands.

Bands will be attached using the following methods as outlined in the *North American Bird Banding Manual* (Gustafson et al. 1997). The band will be placed on the tarsus and, when closed, should be free enough to move up and down without abrasively rubbing either round or elliptical tarsi. Closed butt-end bands, lock-on, and any other closed bands will be opened before being placed on the bird's tarsus. When placed on the tarsus, the ends of the closed band should meet tightly and squarely. Special banding pliers will be used to close bands tightly. Care will be taken that the band numbers are not marred in the process of closing the band. Care will be taken to ensure that the ends of the band do not overlap. The right band size gives a proper fit when it is closed with butt-ends meeting tightly. Lock-on bands can be squeezed shut with the fingers and the flange folded over with a pair of pliers.

As wear on the band will likely occur along the bottom edge where the band number normally would rest, the band may be applied upside down on the bird's foot. This will place the band numbers farther from the wearing edge.

Using the leg band method, the radio transmitter will be fused directly to the leg band using epoxy prior to the leg band being attached to the bird's leg (Figure 4). The epoxy is mixed for 1.5 minutes and then applied to the leg band and radio tag after it has been scored with sandpaper. This method may be preferred over gluing transmitters to a bird's back based on correspondence and recommendations from other tern researchers (Rock, J.C., 2009 and Black A. 2009).

Radio Tags

Following research into radio tag manufacturers, availability and applicability to species, the following recommendations are made. Plovers will be tagged with the Advanced Telemetry Systems (ATS) A2430 tag and terns with the A2470 tag (or equivalent) based on weight and battery life given a pulse rate of 55 ppm (Table 1). Specifications on these ATS tags are provided in Table 1 below.

Table 1. Proposed Radio Tags for Radio Telemetry Study

Radio Tag	Producer	Target Species	Tag Weight	Attachment Method*	Battery Life	Pulse Rate
A2430	ATS	Plover	1.7 grams	Glue-On	40 days	55 ppm
A2470	ATS	Tern	3.1 grams	Glue-On	110 days	55 ppm

*Other attachment methods available include harnesses and leg bands.

Tagged birds will be located in the field using the R4500S receiver available from ATS, which functions as a datalogger and Global Positioning System (GPS) unit and toggles between tracking antennas. The R4500S receiver will record the time and signal strength of each transmitter located. The data is later downloaded and converted into an Excel spreadsheet for post-processing.

A 3-Element folding Yagi antennae will be used to track radio tag signals during the survey. This is the standard antenna used in other telemetry studies reviewed. Two antennas will be needed, one to attach to each wing strut on either side of the airplane. The antennas will be attached using standard kits available from ATS.

Aerial Survey Methods

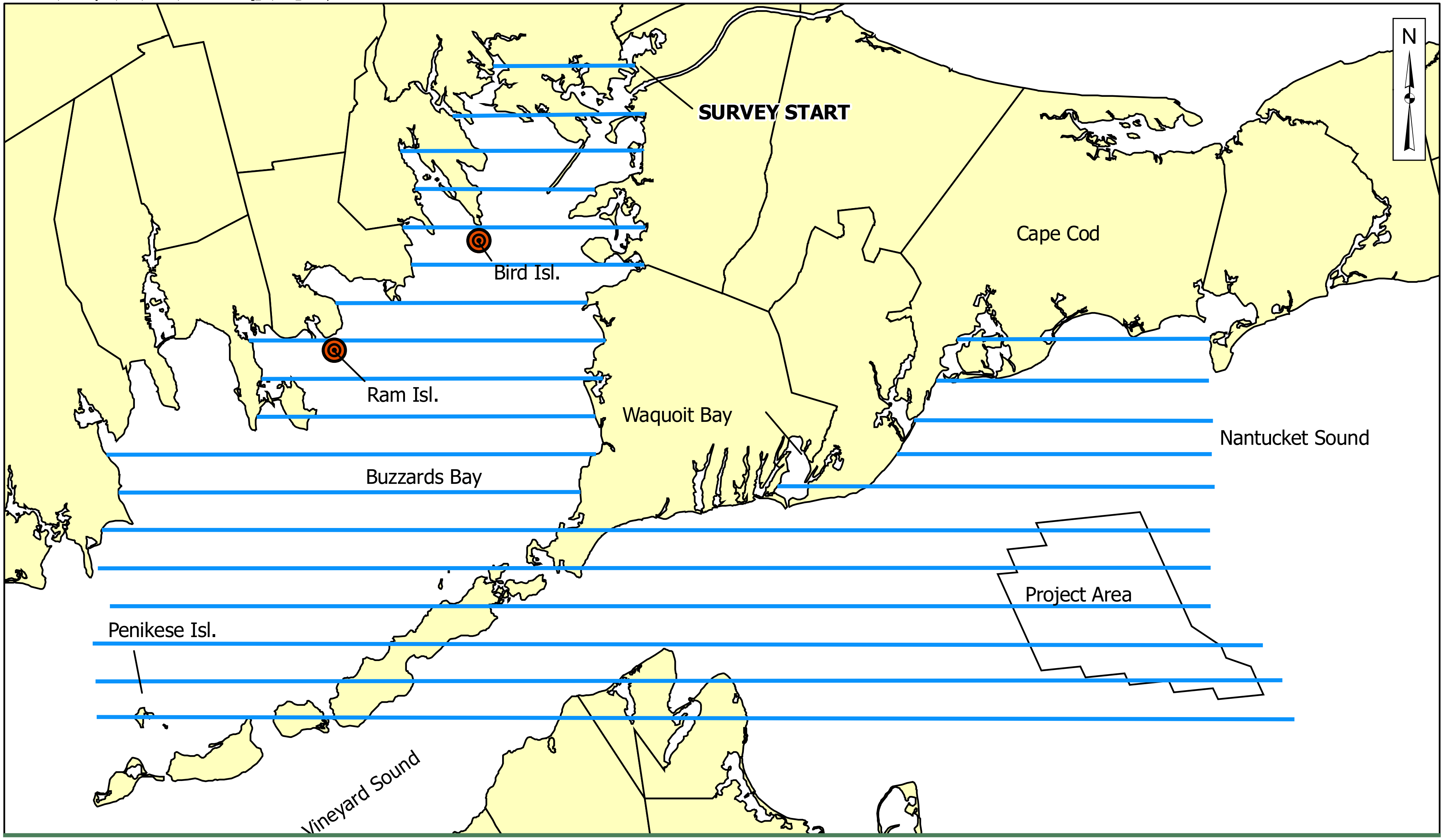
Radio telemetry tracking will be conducted by air using a high-winged aircraft such as a Cessna 172, Cessna 182, Cessna Super Cub or a Cessna Skymaster. Tracking involves flying at low altitudes and low speeds which is not typical of normal aircraft flight.

An aircraft will be chartered and take off from the Barnstable Municipal Airport on Cape Cod, Massachusetts. The aircraft will fly along predetermined transects. Because Common Terns and Semipalmated Plovers are expected to be found in different shore areas, the flight plan will depend on the species being tracked. The route for Common Terns will cover Buzzards Bay as well as the project area over Horseshoe Shoal (Figure 5). Depending on where the Semipalmated Plovers are captured, the plan routes will likely focus on the southern side of Cape Cod and Nantucket Sound (Figure 6). The airplane will immediately begin searching for tagged birds upon reaching the initial survey starting points (Figures 5 and 6). The starting points will alternate between two locations. For terns, the end points are at Buttermillk Bay and near Horseshoe Shoal. The end points of the plover survey are within Nantucket Sound. The tracking method will depend on the success of locating tag birds and their location.

As described in Gilmer et al. (1981) and implemented by Ackerman et al. (2009) and Rock et al. (2007), basic aerial survey methods are the following.

1. Receiver operator will begin the search with the switchbox set to "both" right-wing and left-wing antenna to cover both sides of the aircraft.
2. At start, the RF gain (adjustment for receiver sensitivity) will be set to the maximum setting.
3. Aircraft altitude should be low, between 150 to 300 meters and follow set transects (Figures 5 and 6).
4. Operator will scan through various transmitter frequencies until a steady signal is received.
5. After receiving signal, the receiver operator will switch the switchbox between the left and right signal to determine which side the signal is coming from.
6. The aircraft will then be directed to fly in the direction of the signal (to the right or left) and the switchbox is set back to the "both" setting. Flying straight towards the signal will cause a signal null (see number 7 below).
7. As the aircraft gets closer to the transmitter, the signal strength will increase again and at this point the operator can begin to pinpoint the location of the bird.

Location: G:/GIS-Projects/E159/00.mxd/Avian Monitoring_10/Tern_Survey.mxd



ESS Group, Inc.
Engineers
Scientists
Consultants

DRAFT AVIAN MONITORING PROTOCOLS
Cape Wind Project
Nantucket Sound, Massachusetts

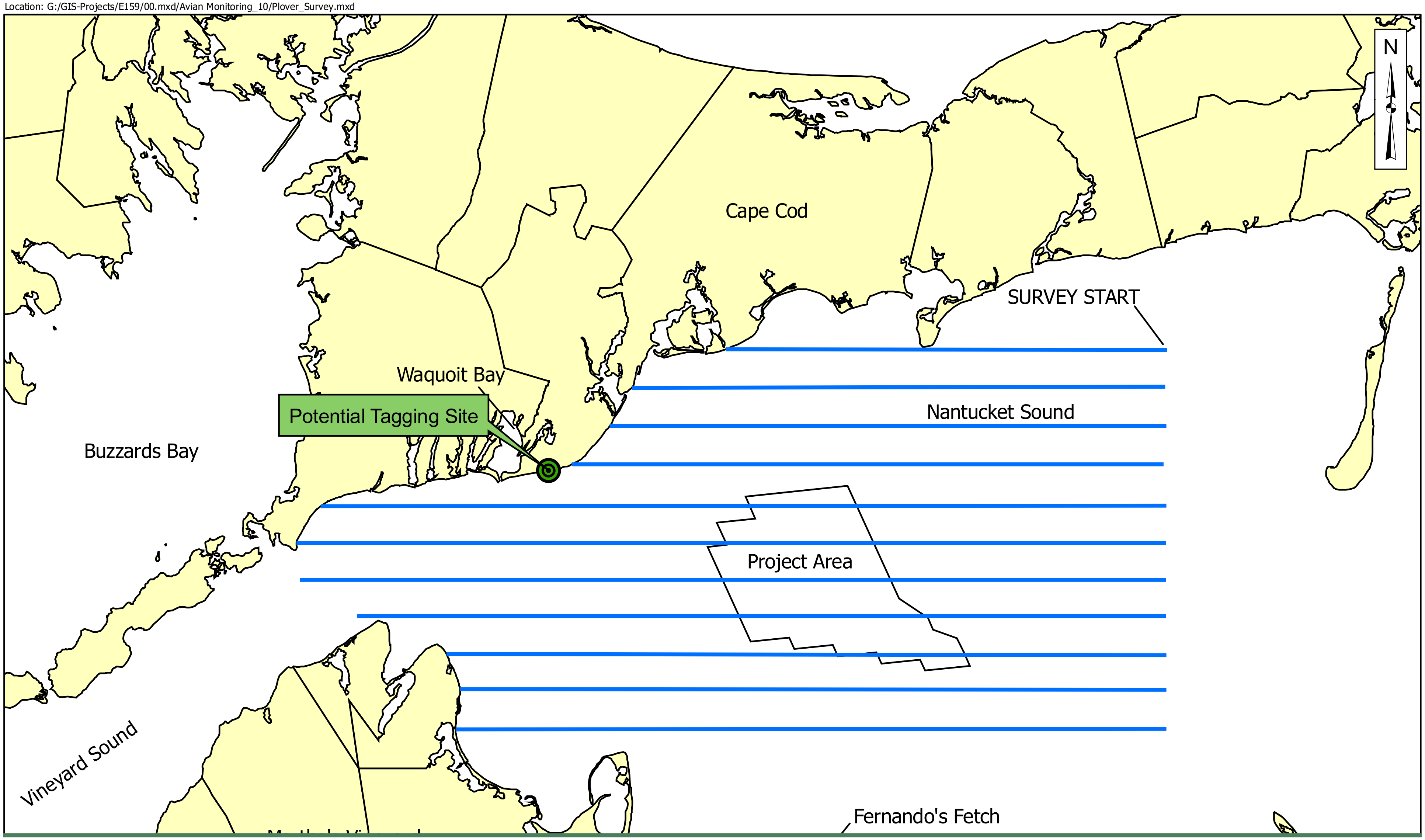
Scale: 1" = 24,000'
0 4 Kilometers

Transect Spacing: 1' latitude = 1.2 miles
Transect Total Length: 380 miles (not including turns)
Survey Area: 540 square miles
Ram Island to Project Area: >22 miles/35 km

Tern Radio Tracking Aerial Transects

Figure 5

Location: G:/GIS-Projects/E159/00.mxd/Avian Monitoring_10/Plover_Survey.mxd



ESS Group, Inc.
Engineers
Scientists
Consultants

DRAFT AVIAN MONITORING PROTOCOLS
Cape Wind Project
Nantucket Sound, Massachusetts

Scale: 1" = 24,000'
0 4 Kilometers

Transect Spacing: 1' latitude = 1.2 miles
Transect Total Length: 245 miles (not including turns)
Survey Area: 281 square miles
Waquoit Bay to Project Area: 6 miles/9.5 kilometers

Plover Radio Tracking
Aerial Transects

Figure
6

8. The receiver operator will again toggle between right and left switches to determine on which side of the airplane the bird is located. The RF setting may need to be turned down at this point since the target is closer and louder.
9. Based on which side is stronger, the pilot will be directed to make a 360-degree turn. If the signal strength remains consistently strong on the same side, then the target bird is located within the radius of the airplane's 360-degree turn.
10. Circling and toggling between left and right switches will continue until the bird is located.
11. After the bird is located, the airplane will return to flying along the transects (Figures 5 and 6).

The flight plan may vary on the success of locating tagged birds and their location. If all tagged birds are located in one area, following transects away from the birds is not necessary. Tracking would then focus on the located birds.

Surveys will last for a maximum of four hours because of operator fatigue and available fuel. Depending on the number of birds tracked and the distance they are followed, it may not be possible to fly each transect during the survey. Flight plans may need adjustment based on tagged bird locations and movements.

Methods to Assess Sufficiency of Negative Data

Prior to initiating the study, CWA will conduct a trial survey to assess the range and detectability of the radio tags in an offshore environment. Tags will be placed in known locations and a field team will test the range of the radio tag signal by scanning for its frequency at varying distances from an airplane. The results of the study will help guide future radio tracking efforts.

2.1.2 Reporting

The data collected during the telemetry surveys will be downloaded from the receiver and imported into Excel for further processing using the basic software package ATSWinrec available from ATS. During the survey, the receiver will be set to the aerial mode. The following data is collected when in aerial mode.

- Year, month, hour, minute, second (in separate fields within the excel spreadsheet)
- Transmitter frequency
- Signal strength
- Number of pulses received during the recorded scan
- Pulse rate of detected transmitter
- Number of valid pulses during scan
- Calculated measurement from variable rate transmitters
- X and Y coordinates if GPS is used (this will be X & Y of airplane)

- How long ago GPS position was taken in seconds

This raw data will then be uploaded into Ranges software (or other similar software) for further processing. The GPS coordinates of bird sightings will be loaded into the software so habitat maps, ranges and other analyses can be completed. The final product will include polygon overlays of tern and plover use of Nantucket Sound and the surrounding area based on the telemetry surveys. The geographic information systems extension tool, Animal Movement, may also be used to analyze results. Data will be presented to show concentric circles around 95% of observations, 75% of observations and 50% of observations (See Figure 2 in Rock et al. 2007). The 50% density circle will show the greatest concentration of tern foraging and plover locations.

The results will be summarized in a report that provides recommendations for subsequent studies. The report will be submitted to the BOEM and the USFWS at the end of the pre-construction study.

2.2 Avian Acoustic Monitoring

The objective of the avian acoustic monitoring program is to determine whether and how often the target bird species cross a given section of the project area. Bird calls can be recorded and analyzed to determine species occurrence. The limitations of acoustic monitoring include the relatively small portion of the overall project area that will be within the range of the microphones and the bias of the recording unit to collect calls from louder and lower-flying birds. As of May 2010, there has been very little offshore testing of Autonomous Recording Units (ARUs) and there is only one known published study that presents results of ARU use in an offshore environment (Farnsworth 2010).

2.2.1 Methods and Schedule

The acoustic monitoring system will be developed in consultation with Andrew Farnsworth, PhD, of the Cornell Lab of Ornithology or another avian acoustic expert. At the MET tower, the acoustic monitoring program will run from May through October and weather permitting, during at least three 24-hour intervals per month from November to April. An array (2) of Autonomous Recording Units (ARUs) will be set up on the MET tower prior to construction. Each ARU consists of a microphone, amplifier, frequency filter, programmable computer, software that schedules, records, and stores the data, and a disk drive to store the data. Each ARU microphone will be covered with a wind screen to reduce ambient background noise and the ARU will be placed in a flower pot on the deck of the MET tower. It may be possible to arrange the array of ARUs to estimate the elevation of the bird when the call is made. It is assumed that the ARUs will be able to be placed on the MET tower at a height above the ambient background noise of waves. The height of the MET tower deck is 10 meters above mean low low water (elevation 0.0 NAD 83). The range of the ARUs is uncertain, but with the microphones positioned at 10-20 meters above the water on the deck of the MET tower, the expected range is several hundred meters. The ARUs can run for up to 70 days off D-cells or 12-volt batteries. The ARUs will be retrieved at the end of the study period and the data will be downloaded.

One ARU will be placed in a Roseate Tern breeding area and one ARU will be placed near a Piping Plover breeding area. The data will be used to verify the effectiveness of acoustic microphones for detection of these species and discrimination among tern and shorebird species.

Methods to Assess Sufficiency of Negative Data

Methods to assess the sufficiency of negative data were developed in consultation with Dr. Andrew Farnsworth. An initial noise survey using a calibrated noise meter will be conducted on the MET tower. The noise survey will be conducted under a variety of conditions and will be used to assess the ambient background noise level. The survey results will be analyzed to determine those frequencies that will be difficult to detect using the ARU, given the ambient background noise levels. Following the initial noise assessment, the ARU range and capabilities will be tested using bird call playback units. Bird calls will be played from varying distances from a playback unit mounted on boat and an ARU mounted on a boat or the MET tower. It should be possible to collect useful data on the ARU range and effectiveness with this initial upfront noise survey and bird call playback (Farnsworth 2010). The results of the trial tests will be used to develop and deploy an ARU system that rejects as much noise from the ocean surface as possible.

2.2.2 Reporting

Acoustic recordings will be analyzed using a software package (Raven) available from the Cornell Lab of Ornithology. The analysis will be used to identify species, relative frequency of occurrence and altitude if possible. The results will be summarized in a report that provides recommendations for subsequent studies. The report will be submitted to the BOEM and the USFWS at the end of the pre-construction study.

2.3 Anti-perching Monitoring

The objective of anti-perching monitoring is to evaluate the effectiveness of various bird perching deterrents that will be field-tested on the MET tower prior to the construction of the wind park. These deterrents include a fence to prevent access from the side, a stainless wire on top of the railing and a 0.65-meter-tall panel to restrict visibility of any avian species from the deck. Bird behavior around the deterrents will be analyzed to determine the most effective anti-perching technique and will guide selection of the anti-perching deterrents that will be used on the wind turbine monopoles following construction.

2.3.1 Methods and Schedule

The ABMP calls for monitoring of the anti-perching devices on the MET tower with remote video cameras for a length of time that provides sufficient data on anti-perching. We propose monitoring anti-perching devices from April to September when Roseate Terns are known to be present in Nantucket Sound. A camera produced by SeeMore Wildlife Systems that is suitable for use in an offshore environment will be set up on the MET tower. The video camera will be equipped with a trigger mechanism to limit the amount of data that will need to be reviewed and processed.

If possible data collected from the camera will be relayed by antennae to a remote station that will be set up on the mainland. An appropriate remote station location will be selected in consultation with SeeMore Wildlife Systems. Finding a site at a relatively high elevation is the key element in identifying an inland location as the remote station needs a clear line of sight to the MET tower. From the remote station, the images/data will be uploaded to an FTP site or e-mailed.

Methods to Assess Sufficiency of Negative Data

Prior to initiating the study, several trial tests will be run with the camera to establish appropriate settings for the triggering software. This will minimize the number of false positives collected during the actual study. The camera will be field tested to ensure that it captures bird movements within a given direction and distance of the MET tower.

2.3.2 Reporting

The observations recorded by the camera will be analyzed to determine whether birds displayed avoidance behavior around the anti-perching deterrents. CWA anticipates that after data has been collected, avian experts will characterize whether a recorded observation shows a bird displaying attraction behavior. Any bird that lands on either the MET tower or one of the anti-perching devices will be considered to be displaying "attraction" behavior. The results will be summarized in a report that provides recommendations for subsequent studies or alterations to anti-perching devices. The report will be submitted to the BOEM and the USFWS at the end of the pre-construction study.

2.4 Bat Surveys

The purpose of the bat surveys is to assess the functionality of bat detection equipment in the marine environment and further characterize bat use of Nantucket Sound. There are no known bat migration corridors through the proposed wind park and bat movement across Nantucket Sound is expected to be sporadic (MMS 2009). Data gathered from the bat surveys will be used to further assess whether bats pass over Nantucket Sound.

2.4.1 Methods and Schedule

Pre-construction equipment testing and bat surveys will be conducted from April to October to determine whether bats are present in the project area. A passive bat monitoring station will be set up on the MET tower using an AnaBat SD2 Bat Detector available from Titley Electronics. The detector is hooked up to a microphone. The detector will be set up on the MET tower platform and connected to the microphone via electrical cable. The microphone will be placed within a waterproof casing ("bat-hat"). The power source for the detectors will likely be solar.

Equipment used for the bat monitoring will be obtained primarily from Titley Electronics and includes the following.

- AnaBat™ SD2 Bat detector

- CF card/s: up to 4 GB cards may be used
- CF card reader
- Microphone: three choices available, Green (Hi), Black (Low) or White (Lo). See more on microphone choices below.
- USB to Serial adaptor
- Chirper: used to confirm that the Anabat Detector is logging calls.
- Power options: the detector will be run via a solar panel.
- GML1 remote download: enables the user to check the detector daily, verify and change settings, and download data through a secure server.
- Microphone would be installed in a bat hat (available from EME Systems) to protect from weather and provide waterproofing.

Microphones

The Hi (green) microphones available from Titley Electronics will be used on the MET tower. The Hi (green) microphone is designed to be used with extension cables. It is designed to drive the bat call data down a cable without loss of frequency response. The other potential microphone option is the Lo (white) microphone, which is designed for increased sensitivity to bats echolocating under 20kHz, while still having good sensitivity to bats calling in other frequency ranges. While the Lo Microphone is specially designed for its enhanced sensitivity to low frequency bats, it is also much more affected by background noise than the other microphones. Thus, the Lo microphone will most likely not be used on the MET tower in the offshore environment.

Data Analysis

The data stored on the SD2 AnaBat detector will be downloaded remotely each night if there is suitable general packet radio service cellular phone network coverage in the area around the MET tower. AT&T may provide coverage over the project area; further investigation is required to ensure coverage.

Assuming some form of remote download is possible, the data will be downloaded periodically to the GetMyLog website. The GetMyLog website is a dedicated site that will be used to connect directly to the detector, verify its status, change recording settings, and upload data. With the SD2 AnaBat detector, the system will be used to gauge battery power and change settings such as division ratio, sensitivity setting, and record start and end times.

CWA will use some of the assumptions of Gannon et al. (2003) and Hayes (2000) and Sherwin et al. (2000), as cited in Arnett et al. 2007, when analyzing bat calls. A bat pass will be considered a sequence of echolocation calls consisting of two or more individual calls (Gannon et al. 2003 and Thomas 1988, O'Farrell and Gannon 1999, as cited in Arnett et al. 2007). Bat passes will be treated as discrete, independent, events. We will assume that species consistently call at either high or low frequencies and that 35 kHz (average minimum call frequency) can be used as a threshold to accurately separate these species into two groups. Finally, we will assume that the number of bat passes is a valid reflection of bat activity in the area.

Methods to Assess Sufficiency of Negative Data

Prior to deployment, the AnaBat detector will be calibrated and field tested to ensure it is working properly. In addition, pre-recorded bat calls will be played from a boat at varying distances from the AnaBat detector on the MET tower to assess its range over the open ocean. The AnaBat chirper, available from Titley Electronics, will be used to confirm that the detector is logging calls properly.

2.4.2 Reporting

AnaLookW software will be used to manage, view and measure bat call data after it is downloaded from the AnaBat Detector. The data will be processed to identify species, bat presence/absence and bat abundance. The results will be summarized in a report that provides recommendations for subsequent studies. The report will be submitted to the BOEM and the USFWS at the end of the pre-construction study.

3.0 CONSTRUCTION MONITORING PROTOCOLS

Building upon information obtained during the pre-construction survey activities presented above in Section 2.0, monitoring will continue during the construction period. Passive monitoring will continue from equipment deployed on the MET tower while the balance of structures (wind turbines and ESP) that will be utilized in post-construction monitoring are constructed. Autonomous Recording Units (ARUs) will continue to gather data on avian acoustic signatures, the video camera will continue to monitor the effectiveness of the anti-perching devices deployed on the MET tower, and the AnaBat will continue to monitor for evidence of bat activity. The results of the passive monitoring during construction will be submitted to BOEM.

4.0 POST-CONSTRUCTION MONITORING PROTOCOLS

The post-construction monitoring protocols consist of five primary components: anti-perching monitoring, abundance and spatial distribution surveys, avian acoustic monitoring, radio telemetry, and the installation of Thermal Animal Detection Systems (TADS). These components may be modified or revised based on the results of the pre-construction monitoring program. The goal of the post-construction monitoring program is to document movements and locations of avian species in Nantucket Sound and determine how the wind park may be impacting the distribution of birds in the project area. Studies will again focus on the Roseate Tern and Piping Plover. Three years of data will be collected, analyzed and reported after the completion of construction activities.

4.1 Anti-perching Monitoring

The objective of the post-construction, anti-perching monitoring is to evaluate the effectiveness of additional anti-perching devices that will be installed on wind turbine platforms and the Electric Service Platform (ESP).

4.1.1 Methods and Schedule

Following construction, two video cameras will be placed on the ESP and two turbine monopoles (suggested WTGs A4 and I0) to monitor the effectiveness of the anti-perching deterrents. The camera on the MET tower will remain. Assuming the camera system used during the pre-construction monitoring were sufficient, the same camera system available from SeeMore Wildlife Systems will be used. The ABMP Framework calls for six cameras on six monopoles. The purpose of the cameras is to measure the effectiveness of anti-perching devices. Since the ESP provides more potential perching areas than turbine monopoles, two cameras will be used on the ESP. Given the high per camera system cost, installation and attendant labor effort, we believe that monitoring the effectiveness of the anti-perching devices on two turbines is adequate to determine the effectiveness of the methodology.

Biologists will be deployed to the ESP and select turbines to monitor avoidance or attraction around perching deterrents. The biologists will be deployed during the breeding season from mid-May to late July and the staging season from mid-August to late September to observe tern behavior around the ESP and adjacent turbines. Observers will collect 32 hours of observations (staggered during day light hours) in field journals and photo document birds where possible.

4.1.2 Reporting

The results of the anti-perching monitoring will be summarized based on observations of bird behavior near the anti-perching devices. The results of monitoring on the ESP and turbines will initially be submitted to BOEM in bimonthly reports during the first year of project operation. The frequency of reporting will then change to annually unless BOEM determines that the data indicate a need for more frequent reporting.

4.2 Abundance and Spatial Distribution Surveys

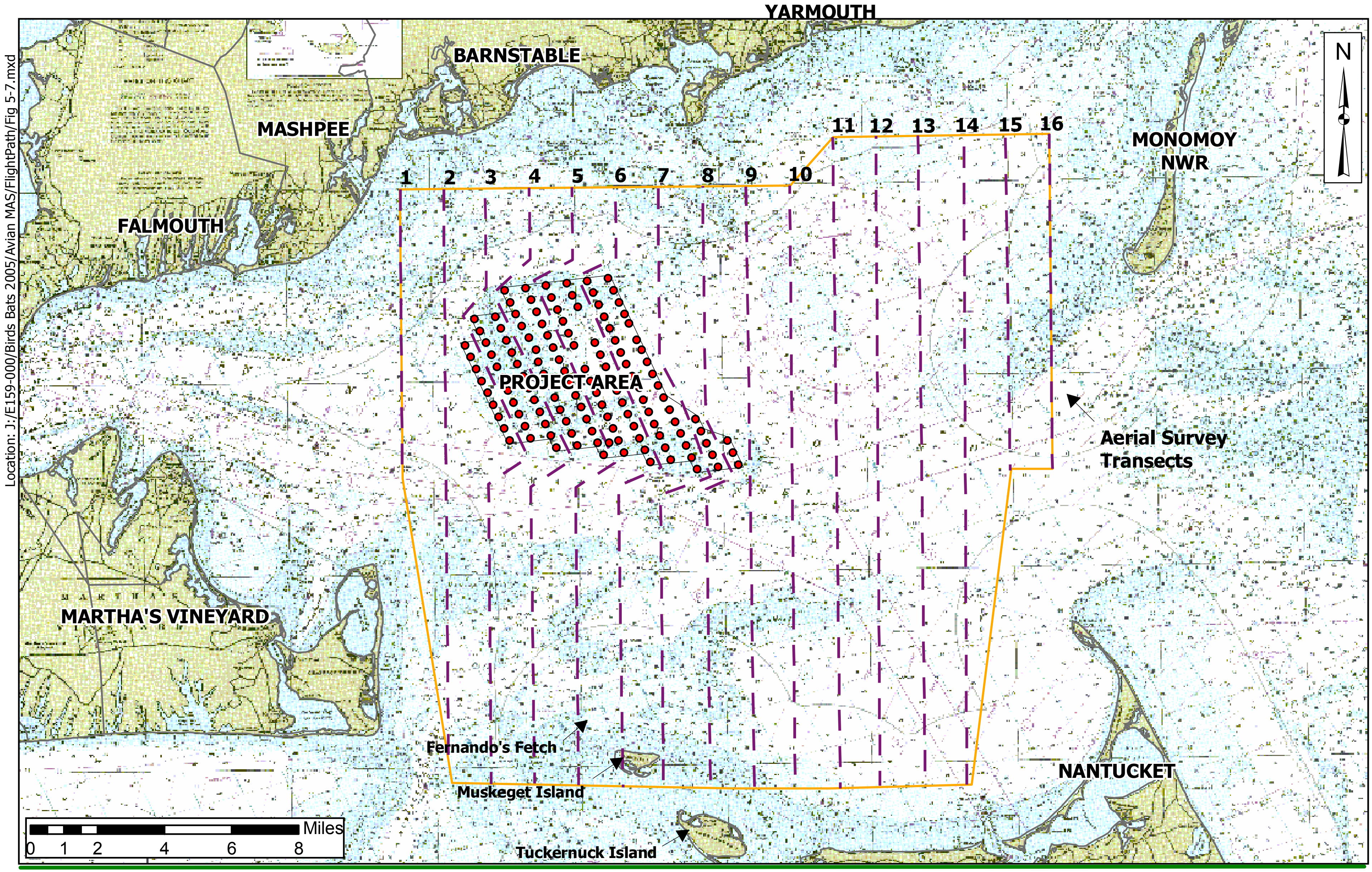
The objective of the abundance and spatial distribution surveys is to document any changes in relative abundance and distribution of avian species within Nantucket Sound following construction.

4.2.1 Methods and Schedule

Surveys will be conducted by air using the same methods that were used to collect data on avian species during the preparation of the National Environmental Policy Act and the Massachusetts Environmental Policy Act review process. This will allow for statistical comparison with pre-construction avian surveys.

CWA will fly five (5) aerial surveys from May to late July (tern breeding period), four (4) surveys during the tern fall staging period from mid-August to late September, and ten (10) surveys during the winter (mid-October to mid-April) to monitor sea ducks and waterbirds for an annual (4 seasons) total of 19 aerial surveys.

The flight plan for winter sea ducks and waterbirds is illustrated in Figure 7. The flight plan during the tern breeding and staging period will shift to include a transect near Monomoy Island (Figure 8) as was done in the Mass Audubon surveys (Perkins et al. 2003, Perkins et al. 2004ab).



ESS Group, Inc.
Engineers
Scientists
Consultants

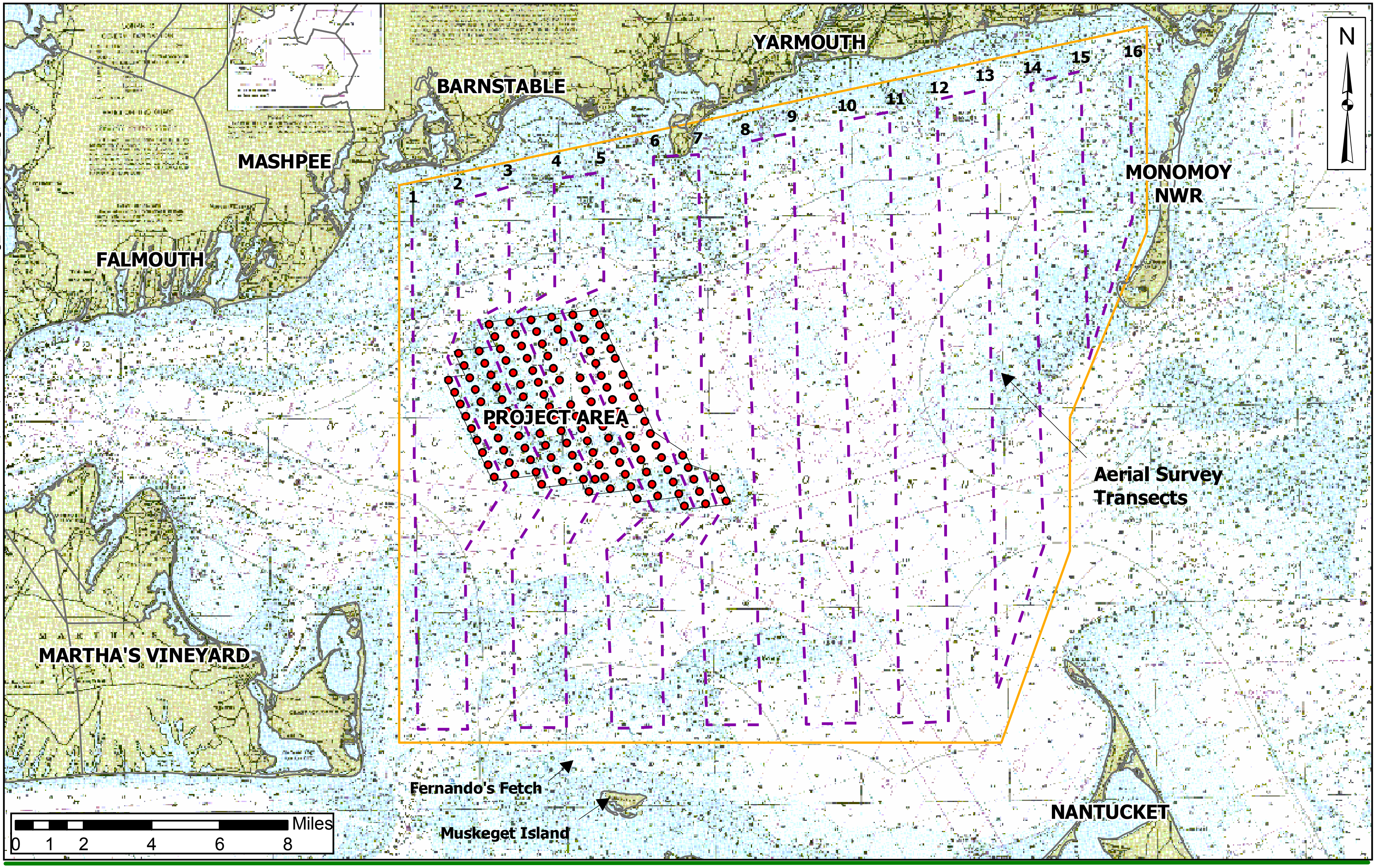
CAPE WIND AVIAN MONITORING PLAN
Nantucket Sound, Massachusetts

Scale: 1:260,000
Source: 1) NOAA Chart #13229 2) ESS, Approximate Site Boundary

Legend:
- Survey Transects
- Study Area Boundary
- Project Area

Flight Plan for Winter Sea Ducks and Waterbirds

Figure 7



ESS Group, Inc.
Engineers
Scientists
Consultants

CAPE WIND AVIAN MONITORING PLAN
Nantucket Sound, Massachusetts

Scale: 1:260,000
Source: 1) NOAA Chart #13229 2) ESS, Approximate Site Boundary

Legend: Survey Transects; Study Area Boundary; Project Area

Flight Plan for Tern Breeding and Staging Period

Figure 8

CWA will fly surveys at an altitude of 76 meters (250 feet), which was chosen as the lowest possible altitude in order to observe individuals clearly down to sea level with minimal disturbance to bird behavior. This flight height will be confirmed to be safe by a professional research flight pilot prior to the start of surveys. The surveys will be flown in a float plane (or equivalent) which will maintain an air speed of approximately 90 knots, or the slowest speed the aircraft can safely fly. The 76-meter altitude corresponds approximately to the rotor hub height (80.5 meters) of the proposed wind turbines. The flight lines will be slightly adjusted from pre-construction flight paths so that they are between turbine strings. Any proposed changes to the flight height or air speed resulting from safety concerns of a professional research pilot will be resolved between CWA, BOEM and USFWS prior to the start of surveys. Consultation with FAA will occur if deemed necessary.

Birds will be counted and identified along 16 transects spaced approximately 2,286 meters (7,500 feet) apart. Surveys will be flown at different times of the day, at different tides, and in somewhat varying weather conditions, but only when visibility is either good or excellent to ensure that birds can be seen. No observations will be made when sea states are greater than three (wave heights 0.5 to 1.5 meters) to ensure birds on the water can be seen. Flights will not take place during inclement weather when the safety of the pilot and survey crew would be compromised.

The survey team will consist of the pilot, a data recorder, and two observers. The pilot will maintain the airplane on transect, at the correct altitude and speed, and at the proper wing level altitude. Two observers will be seated on either side of the airplane. An aluminum rod will be attached perpendicular to the wing strut on each side of the airplane to delineate the transect boundaries. A clinometer will be used to measure the calculated angle for the placement of these aluminum rods. The distances between the airplane's float and the aluminum rods will be verified initially by flying over the airport at 76 meters (250 feet) using pre-measured 200-meter (656-foot) markers on the ground. The area visible between the float on the airplane and the aluminum rod will provide each observer with a 200-meter (656-foot) transect width within which all birds shall be counted. The observers will not be able to see the area directly below the airplane.

The data recorder and observers will maintain direct communication using aviation headsets. The observers will identify species, number of species, activity of bird (i.e., foraging or flying), and time of sighting. The data recorder will be responsible for entering the data identified by the observers and record a GPS point of the location at the beginning and end of each transect in addition to a GPS point every minute during each transect. Each observer's sightings shall be independently recorded on an audiotape linked directly to each headset.

4.2.2 Reporting

Results of the surveys will be transferred to a geographic information systems map to show abundance and spatial distribution of key bird species during specific times of year (tern breeding season, tern fall staging, winter sea ducks, and winter waterbirds). Sea duck species include Common Eider, Long-tailed Duck, Surf Scoter, Black Scoter, and White-winged Scoter. Winter waterbird species include loons, grebe, Northern Gannet, American Black Duck, American Goldeneye, mergansers, alcids, dovekie, and Razorbill. The results of the post-construction monitoring survey will be compared with pre-construction aerial surveys. The results of the aerial surveys will be submitted to BOEM in an annual report for each year of post-construction monitoring.

4.3 Avian Acoustic Monitoring

The objective of the post-construction avian acoustic monitoring is to record calls of the target species Roseate Tern and Piping Plover and determine whether there is any change in their distribution in the project area during the operation of the wind park. The post-construction monitoring program may require modifications based on the results of pre-construction monitoring based on recording effectiveness.

4.3.1 Methods and Schedule

Acoustic microphones will be placed on ten monopoles and ESP if pre-construction monitoring is effective. One microphone would be placed on each of the four corners of the project area (WTGs A4, I0, K16, A12), one in the approximate middle of the western and northern sides (WTGs A8, F0), and four placed at random in the interior of the project array (WTGs D5, H4, D10, H12). These would record flight calls of birds over the project 24 hours a day, seven days a week, from May through October and during three 24-hour intervals per month from November through April, weather permitting, to determine bird presence or absence in the airspace in and around the project site. The power source (batteries) would likely need replacement three times during this period or the recorders may run off of the turbines.

4.3.2 Reporting

Acoustic recordings will be analyzed using a software package available from the Cornell Lab of Ornithology. The analysis will be used to identify species, relative frequency of occurrence, and altitude if possible. The results of the acoustic monitoring will be submitted to BOEM annually for each year of post-construction monitoring.

4.4 Radio Tracking

Post-construction radio tracking will be used to document movements and locations of Roseate Terns and Piping Plovers over Nantucket Sound and the proposed project area.

4.4.1 Methods and Schedule

Assuming the pre-construction radio tracking of Common Terns and Semipalmated Plovers is effective and safe for the birds, radio transmitters will be attached to adult Roseate Terns and adult Piping Plovers using the similar methods as pre-construction radio tracking. The final number of birds to be sampled needs to be determined. The originally suggested numbers of 25 of each species may, upon further consideration, be a larger sampling than necessary and not warrant the additional risk to the species. It is suggested that a smaller sampling, possibly 8-12 of each species, is an appropriate and operationally more manageable survey size. Piping Plovers would be trapped on nests in consultation with USFWS and Massachusetts Natural Heritage and Endangered Species Program. It is assumed that Roseate Terns would be trapped on nests on Bird Island or Ram Island. The birds will again be tracked by airplane using the same methods as pre-construction monitoring.

Post-construction radio tracking will also include the use of a passive monitoring station. A receiver will be set up on the ESP and set to scan through the various radio tag frequencies over a longer period of time. The receiver will be connected to a power source available on the ESP. This set-up will use an omni-directional dipole antenna instead of a Yagi antenna. Because the receiver functions as a datalogger, data will be downloaded and analyzed after retrieval. The passive monitoring station will be used to collect presence/absence data rather than determining actual foraging locations.

4.4.2 Reporting

The results of the radio tracking survey will be analyzed using the same methods and software that was used during the pre-construction survey. The results will be summarized in a report that also provides recommendations for subsequent studies and/or study revisions. The report will be submitted to BOEM and USFWS on an annual basis for each year of post-construction monitoring.

4.5 Thermal Animal Detection Systems (TADS)

The objective of the TADS study is to collect data that can be used to quantify avian collision risk at the wind park. The TADS is a thermal imaging camera system that can be used to record bird or bat collisions with wind turbine blades. The cameras are capable of recording collisions at night and during foggy conditions which is not possible with conventional cameras.

4.5.1 Methods and Schedule

The ABMP calls for the installation of TADS on wind turbines post construction to record any collisions. The TADS will remain in place for a minimum of three years. TADS will be set up on two different turbines. A TADS will be placed on a turbine on the eastern perimeter (WTG I8) of the wind park, and the northern perimeter (WTG F0) of the wind park.

Cameras will be configured to cover as much of the rotor-swept-zone as practicable. The coverage will depend on the lens of the camera. A lens with a wider field of view has a shorter range than a lens with a narrower field of view.

Methods to Assess Sufficiency of Negative Data

The TADS monitoring program will be limited by several factors. The existing modeling has demonstrated that because collision risk of terns has been estimated to be so low, the probability of detecting a collision is very low. The cameras used in the TADS will not be able to cover the entire rotor-swept-zone. These factors will need to be taken into consideration when evaluating the results of the TADS study.

Prior to initiating data collection, field tests will be conducted on the TADS to evaluate system performance under varying weather conditions. Similar to methods used at the Nysted Offshore Wind Farm in Denmark (Desholm 2005), the camera will be tested under various weather conditions to see how well the waterproof box, pan/tile head, windscreen wiper, sprinkler system, water valve and rubber vibration absorbers perform. If the images collected by the camera are not of reduced quality during poor weather conditions, then the TADS will be considered to be effective. In addition, the camera-triggering software will require testing and adjustments to reduce the number of false positives that it records.

4.5.2 Reporting

The results of the TADS study will be used to evaluate total annual tern and plover collision risk within the wind park. A report that summarizes the results of the study will be prepared and provided to BOEM and the USFWS for review. The report will be submitted at the end of the each year for three years following construction.

5.0 SUMMARY

These Monitoring Protocols provide the methodology that will be used to implement the ABMP and address the research questions that are outlined in the ABMP. The data gathered during the pre-construction and post-construction studies will be used to assess potential impacts to bird and bat populations as a result of the proposed project with a focus on endangered avian species. The studies include radio tracking, avian acoustic monitoring, anti-perching monitoring, bat detection surveys, abundance and spatial distribution surveys and installation of TADS. The Monitoring Protocols include proposed methods to assess the sufficiency of negative data to the maximum extent practicable as required in the USFWS Biological Opinion (11/11/08).

The Monitoring Protocols will be further refined based on comments from a scientific peer review, BOEM, and USFWS. Additional modifications to the Monitoring Protocols may be made as a result of pre-study field testing and results obtained during pre-construction monitoring. Any such modifications will be made in consultation with BOEM and USFWS.

6.0 REFERENCES

Arnett, E. B., M. M. P. Huso, D. S. Reynolds, and M. Schirmacher. 2007. Patterns of pre-construction bat activity at a proposed wind facility in northwest Massachusetts. An annual report submitted to the Bats and Wind Energy Cooperative. Bat Conservation International. Austin, Texas, USA.

Black, Amie. 2009. Personal Communication. Wildlife Technician, Environment Canada.

Desholm, M. 2005. Preliminary investigations of bird-turbine collisions at Nysted offshore wind farm and final quality control of Thermal Animal Detection System (TADS). National Environmental Research Institute (NERI), Ministry of Environment, Denmark.

Desholm, M., A.D. Fox, P.D.L Beasley and J. Kahlert. 2006. Remote techniques for counting and estimating the number of bird-wind turbine collisions at sea: a review. British Ornithologists' Union, Ibis, 148, pp. 76-89.

Gannon, W. L., R. E. Sherwin, and S. Haymond. 2003. On the importance of articulating assumptions when conducting acoustic studies of bats. Wildlife Society Bulletin 31: 45–61.

Gratto-Trevor, C.L. 2004. *North American Bander's Manual for Breeding Shorebirds*. North American Banding Council. Canadian Wildlife Service, Environment Canada, Prairie and Wildlife Research Center, Saskatoon, SK.

Gustafson, M. E., J. Hildenbrand and L. Metras. 1997. The North American Bird Banding Manual (Electronic Version). Version 1.0.

Hayes, J. P. 2000. Assumptions and practical considerations in the design and interpretation of echolocation-monitoring studies. Acta Chiropterologica 2: 225–236.

Mehl, K.R., K.L. Drake, G.W. Page, P.M. Sazenbacher, S.M. Haig, and J.E. Thompson. 2003. *Capture of Breeding and Wintering Shorebirds with Leg-Hold Noose Mats*. Journal of Field Ornithology 74(4): 401-405.

Minerals Management Service. 2009. Cape Wind Energy Project, Final Environmental Impact Statement. U.S. Department of Interior, Herndon, Virginia.

O'Farrell, M. J., and W. L. Gannon. 1999. A comparison of acoustic versus capture technique for the inventory of bats. Journal of Mammalogy 80: 24–30.

Perkins, S., A. Jones, and T. Allison. 2003. Survey of tern activity within Nantucket Sound, Massachusetts, during pre-migratory fall staging. Final Report for Massachusetts Technology Collaborative. Massachusetts Audubon Society, Lincoln, Mass.

Perkins, S., T. Allison, A. Jones, and G. Sadoti. 2004a. A survey of tern activity within Nantucket Sound, Massachusetts, during the 2003 breeding season. Final Report for Massachusetts Technology Collaborative.

Perkins, S., T. Allision, A. Jones, and G. Sadoti. 2004b. A survey of tern activity within Nantucket Sound, Massachusetts, during the 2003 fall staging period. Final Report for Massachusetts Technology Collaborative.

Rock, J.C., M.L. Leonard, and A.W., Boyne. 2007. Foraging habitat and chick diets of Roseate Tern, Sterna dougalli, breeding on Country Island, Nova Scotia. Avian Conservation and Ecology 2(1):4. [online] URL http://www.ace-eco.org/vol2/iss1/art4/

Rock, J.C. 2009. Personal Communication. Species at Risk Technician. Parks Canada Atlantic Service Center.

Sherwin, R. E., W. L. Gannon, and S. Haymond. 2000. The efficacy of acoustic techniques to infer differential use of habitat by bats. Acta Chiropterlogica 2: 145–153.

Thomas, D. W. 1988. The distribution of bats in different ages of Douglas-fir forests. Journal of Wildlife Management 52: 619–626.

Warnock, N. and S. Warnock. 1993. *Attachment of Radio-Transmitters to Sandpipers: Review and Methods*. Wader Study Group Bulletin. 70:28-30.

Whitworth, D., S. Newman, T. Mundkur and P. Harris. 2007. *Wild Birds and Avian Influenza: an introduction to applied field research and disease sampling techniques*. FAO Animal Production and Health Manual - 5: pp. 123.

Appendix C

Oil Spill Response Plan (OSRP)

Oil Spill Response Plan

CAPE WIND ASSOCIATES, LLC
BOSTON, MASSACHUSETTS

PREPARED FOR	Cape Wind Associates, LLC 75 Arlington Street Boston, Massachusetts 02116
PREPARED BY	ESS Group, Inc. 401 Wampanoag Trail, Suite 400 East Providence, Rhode Island 02915
	Project No. E159-601
	April 2011

www.essgroup.com

ESS Group, Inc.

OIL SPILL RESPONSE PLAN
Cape Wind Associates, LLC
Boston, Massachusetts

Prepared For:

Cape Wind Associates, LLC
75 Arlington Street
Boston, Massachusetts 02116

Prepared By:

ESS Group, Inc.
401 Wampanoag Trail, Suite 400
East Providence, Rhode Island 02915

ESS Project No. E159-601

April 2011

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

ESS Group, Inc.

TABLE OF CONTENTS (Continued)

FIGURES (Embedded)

TABLES (Embedded)

APPENDICES

1.0 OSRP QUICK GUIDE (OPTIONAL)

As required by the regulations at 30 CFR 254, this Oil Spill Response Plan (OSRP) has been completed for the Cape Wind project. This OSRP provides further detail on the topics addressed in the Draft OSRP that was provided as Appendix D in the FEIS. Cape Wind has included a quick guide that consists of a spill response contact list in the event of a spill. The spill response contact list includes contact information for individuals and agencies that may be required in the event of an oil spill.

Table 1.0-1 Quick Guide Spill Response Contact List

Agency / Company / Individuals	Telephone Number
Scott Metzger (Qualified Individual / Incident Commander) Clean Harbors Environmental Services 42 Longwater Drive, P.O. Box 9149 Norwell, Massachusetts 02061-9149	800-OIL-TANK 800-645-8265 (24-Hour Nationwide Emergency Response Phone Number) 781-727-1819 Mobile
National Response Center c/o United States Coast Guard (CG-5335) - Stop 7581 2100 2nd Street, SW Washington, DC 20593-0001	800-424-8802 202-267-2675

In the event of a spill at the facility Clean Harbors Environmental Services will mobilize from its Weymouth, MA field service centers to the Cape Wind Onshore Control Center as quickly as possible. Depending on the volume of the spill, resources could cascade in from surrounding Clean Harbors service centers in East Providence, RI, South Portland, ME, Bow, NH, Worcester, MA, and Bristol, CT.

2.0 PREFACE

2.1 Record of Revisions

Table 2.1-1 Record of Revisions

Date of Review	Person Conducting Review	Reason for Review (biennial update, amendment, or modification)	Sections Affected	Date Next Review Required

2.2 Cross Reference Table (30 CFR 254)

The outline of this OSRP is consistent with the suggested format in "Contents of a Regional or Sub-regional Oil Spill Response Plan (OSRP)" in NTL02-G09. However, some readers may be more familiar with the format for drafting a response plan that is contained in 30 CFR 254.21. Consequently, the following table provides a cross-reference for the recommended sections based on 30 CFR 254, with the applicable sections in this OSRP.

Table 2.2-1 Cross Reference Table

Required Sections and Sub-sections Based on 30 CFR 254	30 CFR 254 Reference	Applicable Section(s) in this OSRP
(1) Introduction and plan contents	254.21(b)	Section 3
Facility Info. Table of Contents Record of Changes	254.22(a) 254.22(b) 254.22(c)	Sections 3d – 3e Section 2a Section 2b
(2) Spill Response Action Plan	254.21(b)	Sections 1, 4 – 11, 13 – 16, 18, and 19
Qualified Individual Spill Management Team Spill Response Operating Team Operations Center & Communication Types & Characteristics of Oil Spill Detection Spill Procedures (inc. Notification)	254.23(a) 254.23(b) 254.23(c) 254.23(d) 254.23(e) 254.23(f) 254.23(g)	Section 4a Section 4b Section 4c Sections 5a – 5b Appendix H Sections 6a – 6c Sections 1, 7a – 7e, 8a – 8c, 9, 10c – 10d, 11, 13, 14, 15, 16, 18, and 19
(3) Appendices	254.21(b)	Appendices
(i) Equipment Inventory	254.24	Appendix E
(ii) Contractual Agreements	254.25	Appendix D

Required Sections and Sub-sections Based on 30 CFR 254	30 CFR 254 Reference	Applicable Section(s) in this OSRP
(iii) Worst Case Discharge Scenario	254.26	Section 10 and Appendix H
(iv) Dispersant Use Plan	254.27	Section 18
(v) In-site Burning Plan	254.28	Section 19
(vi) Training and Drills	254.29	Appendix B and Appendix C

2.3 Abbreviations and Acronyms

ACP	Area Contingency Plan
ASA	Applied Science Associates, Inc
BOEMRE	Bureau of Ocean Energy Management, Regulation and Enforcement
CFR	Code of Federal Regulations
COTP	Captain of the Port
CW	Cape Wind Associates, LLC
DEIS	Draft Environmental Impact Statement
DOI	Department of the Interior
EPA	Environmental Protection Agency
ESP	Electric Service Platform
FEIS	Final Environmental Impact Statement
FOSC	Federal On-scene Coordinator
GOMR	Gulf of Mexico OCS Region
IAP	Incident Action Plan
IC	Incident Commander
IO	Information Officer
MassDEP	Massachusetts Department of Environmental Protection
MMS	Minerals Management Service
NIIMS	National Interagency Incident Management System
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NCP	National Contingency Plan
NTL	Notice to Lessees and Operators
OCS	Outer Continental Shelf
OSC	On Scene Coordinator
OSHA	Occupational Safety and Health Administration
OSRC	Oil Spill Response Coordinator
OSRO	Oil Spill Removal Organizations
OSRP	Oil Spill Response Plan
ROW	Right of Way
QI	Qualified Individual
SMT	Spill Management Team
SROC	Spill Response Operations Center

SROT	Spill Response Operating Team
USACE	U.S. Army Corp of Engineers
USCG/NRC	U.S. Coast Guard / National Response Center
USFWS	U.S. Fish and Wildlife Service
WTG	Wind Turbine Generator

3.0 INTRODUCTION

3.1 Companies Covered

Cape Wind Associates, LLC (Cape Wind) is the sole developer/owner of the project, and will be the asset manager of the operating facility. Cape Wind is the holder of Renewable Energy Lease Number OCS-A-0478.

3.2 Purpose and Use

This Oil Spill Response Plan (OSRP) has been prepared in accordance with the Department of the Interior Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) regulations at 30 CFR 254, "Oil Spill Response Requirements for Facilities Located Seaward of the Coastline." These regulations require owners/operators of oil handling, storage, or transportation facilities located seaward of the coastline to submit a spill response plan to BOEMRE for approval prior to facility operation.

This OSRP does not address incidental spills associated with marine vessel operation during construction or routine maintenance of the facility. Cape Wind will ensure that construction contractors and vessel operators provide documentation of adequate training and equipment for spill containment and clean up. Contractors and subcontractors are required to provide their employees with proper training, supplies, and personal protective equipment prior to initiating work on the Cape Wind Project.

In accordance with the requirements of 30 CFR 254, this OSRP demonstrates that Cape Wind can respond quickly and effectively in the unlikely event that oil is discharged from the facility. As recommended by the BOEMRE, this OSRP is consistent with BOEMRE Notice to Lessee No. 2006-G21, dated October 26, 2006, which includes the Guidelines for Preparing Regional and Subregional Oil Spill Response Plans.

The Cape Wind facility will be in the lowest potential worst-case discharge rating (Rating A: 0 to 1,000 barrels as defined in the regulations at 30 CFR 254 and associated Guidelines). In the event of a release of oil to the ocean, Cape Wind and those providing support services (see Section 4) will refer to this OSRP to ensure that the appropriate spill response actions are taken in a timely manner to prevent impacts to sensitive receptors.

It should be noted that Cape Wind has prepared a complete OSRP in accordance with guidelines for Oil, Gas, and Sulphur leases for a Regional and Subregional Plan.

3.3 Types of Leases and ROW Pipelines

The Cape Wind Project Area is covered by a Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf.

3.4 Facility Information Statement

The Cape Wind Energy Facility will consist of 130 wind turbine generators (WTGs) arranged in a grid pattern in the Horseshoe Shoal region of Nantucket Sound, Massachusetts. Solid dielectric submarine inner-array cables (33 kilovolt) from each wind turbine generator will interconnect within the grid and terminate on an electrical service platform (ESP). The electric service platform will serve as the common interconnection point for all of the wind turbine generators. The proposed submarine transmission cable system (115 kilovolt) connecting the Project to Cape Cod is approximately 12.5 miles in length (7.6 miles within the Massachusetts 3 mile territorial line) from the ESP to the landfall location in Yarmouth, Massachusetts. Only the ESP and WTGs are relevant to the Oil Spill Response Plan, given that the submarine cable systems are solid dielectric cables and do not contain oil. Additional details about the WTGs and ESP are provided in Appendix A.

3.5 Coverage Area

The Project will be located in the Horseshoe Shoals region of Nantucket Sound off the coast of Massachusetts. The following blocks or portions of blocks lying within Official Protraction Diagram Providence NK19-07 are located within the lease area and are depicted on the map below.

1. Block 6479, E1/2 of SE1/4
2. Block 6480, S1/2
3. Block 6481, that portion of the SW1/4 lying seaward of the Submerged Lands Act Boundary
4. Block 6529, NE1/4; E1/2 of SE1/4
5. Block 6530, all of block
6. Block 6531, NW1/4; S1/2; that portion of the W1/2 of NE1/4 lying seaward of the Submerged Lands Act Boundary
7. Block 6532, SW1/4 of SW1/4
8. Block 6579, NE1/4 of NE1/4
9. Block 6580, N1/2; N1/2 of SE1/4
10. Block 6581, N1/2; N1/2 of S1/2
11. Block 6582, NW1/4; SW1/4 of NE1/4; N1/2 of SW1/4; SE1/4 of SW1/4; W1/2 of SE1/4

A location plat illustrating the project area is provided in Appendix A, which includes a table with geographic coordinates for facility components.

3.6 Contract Certification Statement

Cape Wind hereby certifies that the executed Stand-By Service Agreement between Cape Wind and Clean Harbors Environmental Services is in effect and provides immediate access to Clean Harbors spill response equipment and personnel. A copy of this agreement is provided in Appendix D.

4.0 ORGANIZATION

The chain-of-command responsibilities in the event of an oil spill, including spill team members, contractors, and outside agencies are identified below and discussed in detail in the following sections. As the owner/operator of the facility, Cape Wind is ultimately responsible for oil spill response although Clean Harbors has been designated as the Primary Oil Reponse Contractor. Clean Harbors is an experienced oil spill response contractor with adequate equipment, personnel, and resources to respond to any potential Cape Wind oil spill.

4.1 Qualified Individual

Scott Metzger (Clean Harbors) is designated as the Cape Wind Facility Qualified Individual (QI). Cape Wind will also have a second QI whose identity is to be determined.

As the QI, Mr. Metzger is available on a 24-hour basis and responsible to:

- Activate and engage the Spill Response Contractor (Clean Harbors)
- Coordinate with the federal and Massachusetts officials
- Obligate funds required to carry out response activities

Mr. Metzger has full authority to obligate funds on behalf of Cape Wind.

4.2 Spill Management Team

The Spill Management Team (SMT) is comprised of staff from Cape Wiind and Clean Harbors. In addition to serving as the QI, Scott Metzger is designated as the Oil Spill Response Coordinator (OSRC)/Incident Commander (IC). Cape Wind’s second OSRC/IC is to be determined. In accordance with the National Interagency Incident Management System (NIMS) format, the following roles of the SMT may be assigned depending on the magnitude of the spill:

- Command – Sets objectives and priorities and has overall responsibility at the incident or event
- Operations – Conducts tactical operations to carry out the plan, develops tactical objectives, and directs all organizational and equipment resources
- Planning – Develops the action plan to accomplish the objectives, collects and evaluates information, and maintains the situation and resource status
- Logistics – Provides support to meet incident needs, provides resources and all other services needed to support the incident

- Finance/Administration – Monitors cost related to the incident and provides procurement

The team member assignments will be designated by the QI and IC as necessary. The team will be event-specific and not all positions need to be filled. The size of the organization is dependent on the magnitude of the incident and will be expanded or contracted as necessary during the individual response effort.

The training required of SMT members for spill management decisionmaking is described in Appendix B "Training Information". An executed Stand-By Agreement between Cape Wind and Clean Harbors is provided in Appendix D "Contractual Agreements".

4.3 Spill Response Operating Team

The Spill Response Operating Team (SROT) is comprised of trained individuals who are available on a 24-hour per day basis. The SROT and the SMT are identical in terms of personnel and functionality, although the SROT includes the field staff and subconsultants responsible for deployment, operation, and recovery of response equipment. The following table provides the names, the duties, responsibilities, and authorities of each SROT member.

Table 4.3-1 Spill Response Operating Team

Organization	Role	Staff Available	Responsibilities
Cape Wind	Qualified Individual	▪ Assistant Project Director ▪ Environmental Coordinator ▪ Marine Coordinator ▪ H&S Coordinator	▪ Notifies external authorities (oral and written notifications) ▪ Provides daily incident reports to federal, state, and local authorities ▪ Coordinates with first responders, including response contractor ▪ Directs Cape Wind personnel during response activities ▪ Provide appropriate personal protective equipment to Cape Wind personnel ▪ Ensures security and safety during response activities ▪ Holds daily safety meetings during oil spill situations ▪ Coordinates proper cleanup, salvage, and recovery

Organization	Role	Staff Available	Responsibilities
Clean Harbors Environmental Services. (Boston, MA Area Service Center)	Spill Response Contractor	40-Hour OSHA Trained Personnel: Supervisor: 10 Foreman: 20 Equipment Operator: 23 Field Technician: 25	▪ Work with U.S. Coast Guard and local authorities to provide proper cleanup, salvage, and recovery
Environmental Regulatory Compliance Consultant ESS Group, Inc.	▪ Provide regulatory compliance consultation	N/A	▪ Provided regulatory compliance assistance to Cape Wind, as requested
Trajectory Analysis and Modeling Firm Applied Science Associates, Inc.	▪ Provide trajectory analysis consultation	N/A	▪ Provided trajectory analysis assistance to Cape Wind, as requested
Wildlife Rehabilitation (if necessary) Tri-State Bird Rescue	▪ Provide support for rehabilitation of oiled birds	N/A	▪ Communicate with U.S. Fish and Wildlife Service, Massachusetts Division of Fisheries and Wildlife and on-scene coordinator to discuss and coordinate their role in the response. ▪ Train volunteers ▪ Establish operations control / logistics, medical husbandry and cleaning areas within the wildlife rehabilitation facility

Appendix D includes the terms and conditions of spill agreements/contracts between Cape Wind and the designated spill response contractor.

4.4 Oil Spill Removal Organizations

Clean Harbors is identified as the Primary Oil Spill Removal Organization (OSRO) and will provide oil spill response materials and supplies, equipment, and dedicated vessels in the event of a non-incidental oil spill. The supplied equipment and materials will be of sufficient quantity and recovery capacity to respond effectively to oil spills from the facilities and leases covered by the regional or Subregional OSRP. In the event that additional vessels or diving services are required, the following local subcontractors may be hired to support the oil spill recovery effort.

Table 4.4-1 Oil Spill Removal Organizations

Emergency Response Subcontractor	Contact	Services Provided
Boston Line & Service Co. Black Falcon Cruise Terminal 1 Black Falcon Ave. Boston, MA 02210 (617) 951-9957	Barry M. Cox John J. Rinkus Tim Shea Paul Fratic	Tug, Boom & Barge Services
Boston Towing and Transportation 36 New Street East Boston, MA 02128 (617) 567-9100 (617) 567-5896 FAX	Philip K. Chase, GM	Tug Boat Services
Northeast Diving Services 28 West Narragansett Avenue Newport, RI 02840 (401) 841-0446	Eva Longobard	Diving/Recovery/Video
Harbor Ready Marine Wickford, RI (401) 295-8711	John Andrews	Kropp Rescue
Packer Marine, Inc. P.O. Box 308 Vineyard Haven, MA 02568 (508) 693-0900	Ralph Packer John Packer	Barges

5.0 SPILL RESPONSE OPERATIONS CENTER AND COMMUNICATIONS

5.1 Spill Response Operations Center

The Spill Response Operations Center (SROC), also known as the Incident Command Post (ICP) will be operated and maintained by the SMT during an incident. The Spill Response Operations Center will be initially located at the Tides Motel of Falmouth, which is located at the mouth of Falmouth Harbor. Figure 5.1-1 illustrates the location of the SROC/ICP relative to the facility.

Tides Motel of Falmouth
267 Clinton Avenue
Falmouth, Massachusetts 02540
(508) 548-3126

Mobile command sites may be established locally in the vicinity, if oil comes on shore or wildlife habitat rehabilitation efforts are required. Upon selection of a Cape Wind operations center location on Cape Cod, the SROC/ICP will be moved to that location.

Upon activation of the SROC/ICP, the IC/QI will assume control and coordination responsibility.

5.2 Communications

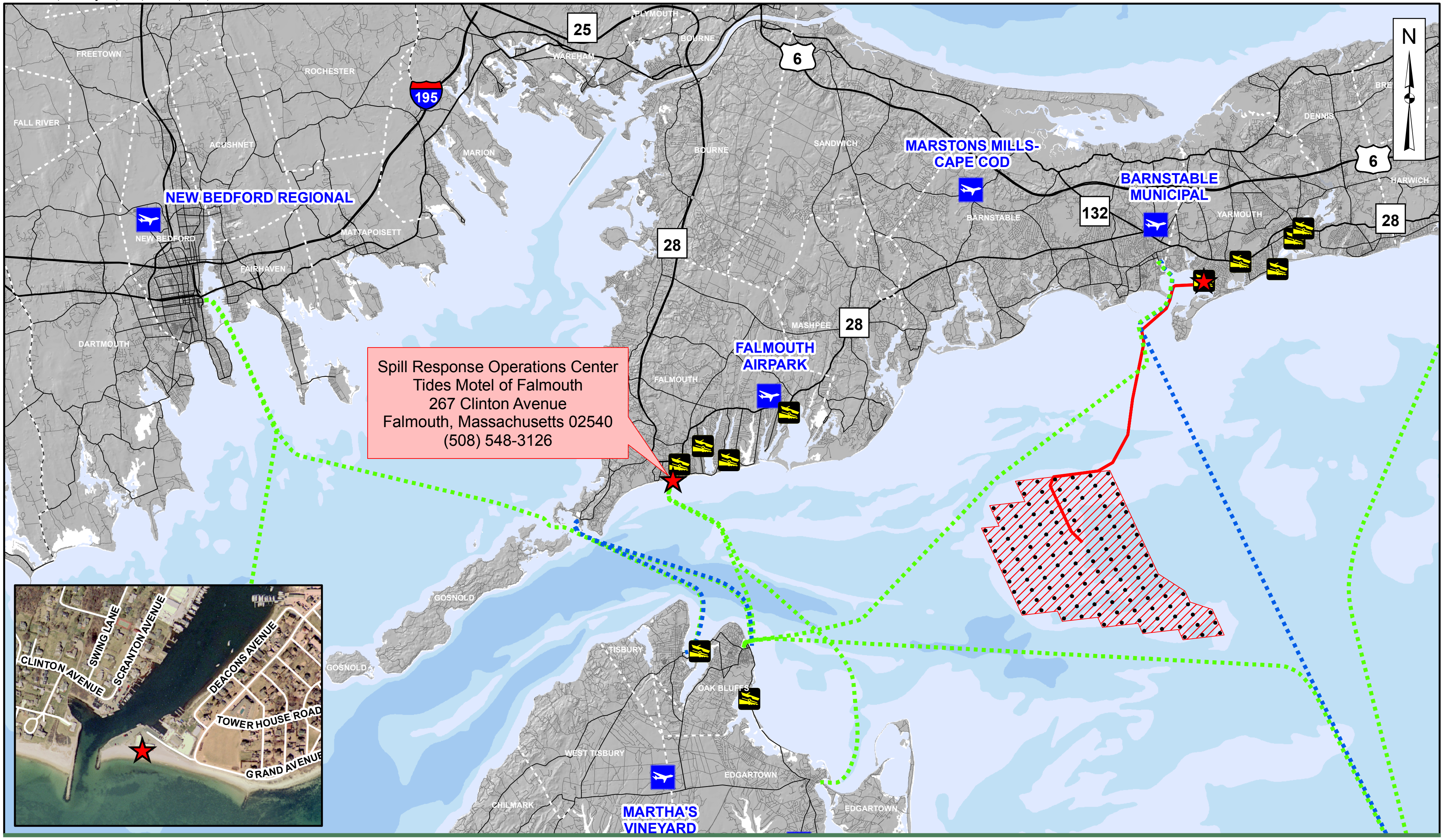
Communication systems such as telephones, mobile phones, radio communications, and pagers will be used during a spill event. All employees will be provided with mobile communication devices during work hours. Additional communication devices (telephones, fax machines, computers, etc.) will be located at the SROC and CWA staff will have direct contact with U.S. Coast Guard (USCG) through VHF radio per terms of the OCS lease.

The following table provides a resource of radio frequencies that may be useful during spill response.

Table 5.2-1 Important Radio Frequencies for Spill Response

Channel	Frequency	Use	Remarks
6	156.300	Ship to Ship Safety	Ship to ship safety and search and rescure
13	156.650	Bridge to Bridge	Communication with neighboring vessels
16	156.800	International Distress	Hailing and distress
18A	156.900 MHz	Clean Harbors Working Channel	Primary
19A	156.950 MHz	Clean Harbors Working Channel	Secondary
21A	157.500	USCG USE ONLY	
22A	157.100	USCG Communications	Communications with USCG. USCG maritime safety broadcasting
23A	157.050	USCG USE ONLY	
81A	157.075	USEPA USE ONLY	
83A	157.175	USCG ONLY	
NOAA WX1	162.550	NWS – Local Weather	Cape and Islands Local Marine Weather and Forecasts

Location: G:/GIS-Projects/E159/00-mxd/OSRP/CW-SROC.mxd



ESS Group, Inc.

Engineers
Scientists
Consultants

CAPE WIND
Nantucket Sound, Massachusetts

Scale: 1" = 5 Miles

0 5 Miles

Source: 1) Base data provided by MassGIS
2) ESS, Cape Wind Project Area, 2006
3) ESS, Spill Response Data, 2011

Legend

- Cape Wind Turbine Location
- Cape Wind Project Area
- Cape Wind Submarine Cable
- Spill Response Operations Center
- Airport
- Boat Access

Ferry Types

- Passenger Service
- Passenger and Vehicle Service

Oil Spill Response Plan
Spill Response Operations Center

Figure 5.1-1

6.0 SPILL DETECTION AND SOURCE IDENTIFICATION AND CONTROL

6.1 Spill Detection

SCADA systems will monitor the WTGs and ESP for a variety of parameters, including oil levels. The WTG SCADA and ESP SCADA will be capable of fully interfacing with the wind farm SCADA system. The systems will be capable of providing real-time information on all facility data and communications to the Onshore Control Center. The facility will be monitored 24/7 in the Onshore Control Room.

In the event of an oil leak, oil level alarms will sound in the Onshore Control Room and operators will immediately shut down equipment associated to the suspected source of the leak. Maintentance staff will be immediately dispatched to investigate the potential leak, if conditions are safe to travel between the Operations Control Room and facility by boat. If maintenance staff observe oil in the water or confirm a breach in the containment system which provides a pathway for oil to reach water, the Oil Spill Response Plan will be activated in accordance with the procedures described below in Section 7.1. Inspections will be conducted during day or night, so long as working conditions are safe.

In the event of an oil level alarm, if conditions are unsuitable to travel to the facility by boat, an overflight will be conducted if the SCADA System indicates that the structural integrity of the facility has been compromised and secondary containment reservoirs may be breached. Overflight operations can be conducted day and night, and during inclement weather through the use of infrared imagery.

The following local resources are available to provide overflight services in the event of an incident:

Table 6.2-1 Local Helicopter Charter Companies

Company	Address	Phone
Heliops, LLC	226 South Meadow Road Plymouth, MA 02360	781-934-7079 (Base) 617-571-6117 (Cell)
Ryan Rotors	246 S Meadow Rd # 16 Plymouth, MA 02360-4775	508-746-3111

6.2 Pipeline Spill Detection and Location

There will be no oil-containing pipelines associated with the Cape Wind facility.

6.3 Source Control

Cape Wind will actively evaluate and conduct source control operations at the site of a release. Dive and salvage operations will be assessed if needed and a written salvage plan will be produced.

6.3.1 WTG Fluid Containment

The WTG will utilize lubricating oil, cooling liquids, and grease, all of which will be located in the nacelle/hub or tower. The WTG has been carefully configured to contain any fluid leakage and prevent overboard discharges. The primary WTG components and the fluids contained are explained as follows:

- Nacelle/hub – Approximately 90 gallons of hydraulic oil and 220 gallons of gear oil are contained within the nacelle. In the event of leaking gear oil or a broken hose/pipe, the leaking oil will be guided through the manhole in the bottom of the bedplate and collected on the upper internal platform of the tower.

- Tower - The upper internal platform is designed and sealed in such a way that it can withhold the total amount of gearbox and hydraulic fluid until it can be transferred to containers for safe disposal. The lower tower will include a transformer located near the access door, which will contain approximately 370 gallons of transformer oil. Any oil that might leak from this transformer would be contained with in the lower section of the tower.

Oil will be loaded in the WTG components during pre-commissioning activiies onshore prior to delivery and installation at the Project Area.

6.3.2 ESP Fluid Containment

The ESP will have small amounts of lubricating oil, greases and coolants in pumps, fans, air compressors, emergency backup system and miscellaneous equipment. The ESP will also have four oil-cooled step up transformers.

The primary systems and fluid contained are as follows:

- Main Transformer - The four 110-megavolt amp (MVA) oil cooled main step up transformers will each have a capacity of approximately 10,000 gallons (37,854 liters) of dielectric cooling oil. The oil will be circulated through oil/air heat exchangers mounted on the roof of the platform. Each transformer will be mounted in a leak-proof detention area that will have the capacity of holding 150% of the volume of transformer oil. Each of the detention areas will be connected via valves to a storage tank that has the capacity to store 100% of the oil from all four transformers. The oil piping to the coolers and the coolers will be configured so that any failures will result in oil being drained to the detention area.

- Miscellaneous equipment - Various pumps, fans, and an air compressor will be installed on the platform. They will be lubricated with either grease or oil in small quantities. The equipment will be installed in such a way that any leakage will be contained on the sealed deck areas of the ESP.

The ESP will have sealed, leak-proof decks in the appropriate areas, which will act as fluid containment. In addition, spill containment kits will be available near all equipment. Oil will be loaded in the ESP components during pre-commissioning activiies onshore prior to delivery and installation at the Project Area.

7.0 QI, SMT, SROT, AND OSRO NOTIFICATIONS

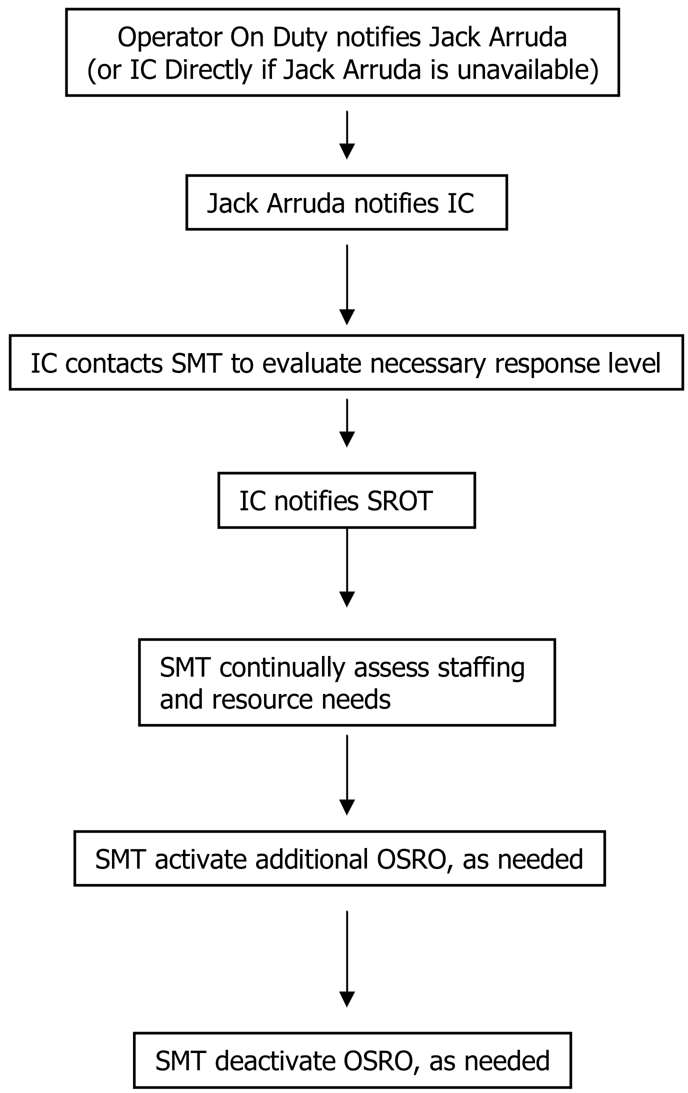
7.1 Reporting Procedures

In the event that a non-incidental spill is confirmed at an offshore facility component (WTG or ESP), the onsite staff will notify the Cape Wind Manager on duty or delegated individual in the Operation Control Center using pre-determined radio frequency communication (see Section 5.2). The Cape Wind Manager on duty in the Operation Control Center will then notify Jack Arruda, who is responsible for notifying Clean Harbors and initiating the procedures described in the OSRP. In the event that Jack Arruda is unavailable, the Manager on duty has authority to notify Clean Harbors directly. The Reporting Procedure is illustrated in Figure 7-1.

Non-incidental spills are those that pose a hazard to human health or the environment and include the release of oil into the ocean. Incidental spills would include minor drips or leaks that are contained within bermed areas, can be easily cleaned and controlled with minimal amount of sorbents. The staff responsible for assessing potential leaks will be trained to evaluate incidental from non-incidental spills.

The SMT may be activated as a group or individually depending on the size and complexity of the incident. All notifications illustrated in Figure 7-1 will made immediately following an incident occurrence (one hour or less).

Figure 7.1-1 Internal Notification Procedure



7.2 Company Contact Information

Contact information (work address, telephone numbers, fax number, etc.) are provided below.

Table 7.2-1 Contact Information

Duty/Company	Name	Contact Information
Manager, Construction Services Cape Wind	Jack Arruda	75 Arlington Street, Suite 704 Boston, MA 02116 508-942-4078 jarruda@emienergy.com

Duty/Company	Name	Contact Information
Oil Spill Response Contractor Clean Harbors Environmental Services	Scott Metzger	42 Longwater Drive Norwell, MA 02061 800-645-8265 24-hr emergency line 781-727-1819 mobile 781-792-5740 direct metzgers@cleanharbors.com
Environmental Site Compliance Supervisor ESS Group, Inc.	Chris Rein	401 Wampanoag Trail East Providence, RI 02915 401.330.1205 direct 401.524.4969 mobile 401.434.5560 main 401.434.8158 FAX crein@essgroup.com
Spill Trajectory Analysis Director Applied Science Associates, Inc.	Craig Swanson	55 Village Square Drive South Kingstown, RI 02879 (401) 789-6224 cswanson@asascience.com
Wildlife Rehabilitation Senior Coordinator Tri-State Bird Rescue & Research Inc.	Rebecca Dunne	110 Possum Hollow Rd. Newark, DE 19711 302-737-9543 x109 RDunne@tristatebird.org

7.3 OSRO Contact Information

Contact Information for Cape Wind's OSRO has been provided in the Quick Guide Spill Response Contact List in Section 1.0. The Emergency Response subcontractors are available to provide materials and supplies, equipment, and trajectory simulation services. Additional details regarding support services and capabilities are provided in Appendix F, "Support Services and Supplies."

7.4 Internal Spill Reporting Forms

Cape Wind will maintain records of events and response activities that occur during oil spill response activities. These records will be used to develop daily incident updates and final written release reports. The records, updates, and reports will be archived at the Operations Center and will become a part of Cape Wind's permanent environmental files.

A copy of the Internal Spill Reporting Form is provided in Appendix G, "Notification and Reporting Forms."

8.0 EXTERNAL NOTIFICATIONS

Cape Wind is responsible for notifying the National Response Center (NRC) in the event of any oil spill at the facility. If the volume of oil released is equal or greater than one barrel, Cape Wind must also notify BOEMRE. A spill notification log is provided in Appendix G.

8.1 National Reponse Center

In the event of an incident, the QI/IC or a designee will report the incident to the NRC **immediately** (one hour or less).

National Response Center
1-800-424-8802

The following details will be requested by the NRC:

- Name, organization, and telephone number
- Name and address of the party responsible for the incident
- Date and time of the incident
- Location of the incident
- Source and cause of the discharge
- Types of material(s) discharged
- Quantity of materials discharged
- Danger or threat posed by the discharge
- Number and types of injuries (if any)
- Weather conditions at the incident location
- Other information to help emergency personnel respond to the incident

A spill reporting form for contacting the National Response Center is provided in Appendix G.

8.2 BOEMRE

8.2.1 Oral Notification

If the volume of oil released into the water is equal to or greater than one barrel (42 gallons), notify the BOEMRE Gulf of Mexico Regional Office. If the spill is 10 barrels or less, make the required notification by facsimile to the appropriate MMS GOMR District office. If the spill is more than 10 barrels, make the required notification to the appropriate MMS GOMR office by telephone.

New Orleans District
504-734-6740 (Office)
504-734-6742 (Office)
504-734-6741 (Fax)
504-615-0114 (Cell Phone)

The following details will be requested by BOEMRE:

- Date and time of occurrence
- Operator, and operator representative's, name and telephone number
- Contractor, and contractor representative's name and telephone number (if a contractor is involved in the incident or injury/fatality)
- Lease number, OCS area, and block
- Platform/facility name and number
- Type of incident or injury/fatality
- Operation or activity at time of incident
- Description of the incident, damage, or injury/fatality

A spill reporting form for contacting BOEMRE is provided in Appendix G.

8.2.2 Written Notification

Within 15 calendar days following an incident a written follow-up report must be submitted to the BOEMRE District Office. The written report must include the following details:

- Date and time of occurrence
- Operator, and operator representative's name and telephone number;
- Contractor, and contractor representative's name and telephone number (if a contractor is involved in the incident or injury)
- Lease number, OCS area, and block
- Platform/facility name and number, or pipeline segment number
- Type of incident or injury
- Operation or activity at time of incident (i.e. , drilling, production, workover, completion, pipeline, crane etc.)
- Description of incident, damage, or injury (including days away from work, restricted work or job transfer), and any corrective action taken
- Property or equipment damage estimate (in U.S. dollars)

8.3 State and Local Notification Requirements

In accordance with the Massachusetts Contingency Plan, Cape Wind will notify the Massachusetts Department of Environmental Protection (MassDEP) within 2 hours of a spill event.

Massachusetts Department of Environmental Protection
Emergency Response Section
1-800-304-1133

The following information will be requested by MassDEP:

- Name and telephone number of the caller
- Location of the release
- Date and time the release occurred
- Description (i.e., name) of oil
- Approximate quantity of the oil that has been released
- Source of the release
- Brief description of the release
- Name and telephone number of the owner/operator
- Name and telephone number of a contact person at the site where the release occurred
- Description of Immediate Response Actions taken or proposed to be taken in response to the release
- Names of other federal, state or local government agencies that have been notified of and/or have responded to the release
- Any other information, including without limitation, potential environmental impacts, that is relevant to assessing the degree of hazard posed by the release or threat of release

A spill reporting form for contacting MassDEP is provided in Appendix G. Following the verbal notification of the incident to MassDEP, Cape Wind will complete and submit the MassDEP Bureau of Waste Site Cleanup form BWSC103C (also provided in Appendix G).

In addition to notifying MassDEP, local fire departments of any communities at risk of oiling will be notified. The assessment of at-risk communities will be based on spill trajectory modeling (see Section 10.3).

8.4 External Spill Reporting Forms

The NRC provides an online tool for incident reporting located at http://www.nrc.uscg.mil/nrchp.html.

9.0 AVAILABLE TECHNICAL EXPERTISE

There are a number of resources available that can provide assistance during the development and implementation of a spill response effort. Table 9.0-1 provides a summary of available federal resource agencies. Table 9.0-2 provides contact information for federal and state agency technical experts. Table 9.0-3 provides contact information for local organizations that may provide technical support. Table 9.0-4 provides contact information for local scientists and individual technical experts. The contact information provided in the tables below were provided by the "Rhode Island and Southeastern Massachusetts Area Contingency Plan" [USCG Marine Safety Office Providence, 2002].

Table 9.0-1 Overview of Federal Agencies and Resources

Resource/Agency	Information Provided
National Ocean Service (NOS) Map Finder	Images and data including coastal aerial photography, nautical charts, coastal survey maps, environmental sensitivity index atlases, hydrographic survey outlines, historical maps, water level station data, geodetic control points, and estuarine bathymetry data
National Oceanic and Atmospheric Administration National Weather Service	Weather data, forecasts, warnings, and current conditions
Weather.gov	Weather watches, warnings, forecasts, and current conditions
National Oceanic and Atmospheric Administration Marine Prediction Center	Forecasts for oceans including real-time buoy observations
NOS Center for Operational Oceanographic Products and Services	Observation and predictions of water levels and currents
MA Department of Fish and Wildlife	Assistance in sensitive receptor and resource identification for oil spills that reach shorelines
US Fish and Wildlife Service	Assistance in sensitive receptor and resource identification for oil spills that reach shorelines
National Marine Fisheries Service	Assistance in sensitive receptor and resource identification for oil spills that reach shorelines

Table 9.0-2 Contact Information for Technical Expertise: Agencies

Agency	Contact Information	Area of Expertise
USCG National Strike Force[1] ▪ USCG Atlantic Strike Team ▪ National Strike Force ▪ National Strike Force Coordination Center	 609-724-0008 609-724-0009 252-331-6000	Source of technical and managerial expertise to federal on-scene coordinators responding to oil or hazardous materials pollution incidents.
National Oceanic and Atmospheric Administration Scientific Support Coordinator	Steve Lehmann 617-223-8016 (Office) 206-526-4911 (Emergency)	Provides comprehensive solutions to environmental hazards caused by oil, chemicals, and marine debris.
Massachusetts Department of Fisheries and Wildlife (www.masswildlife.org)	508-563-1799 (Division of Marine Fisheries)	Restoration, protection and management of fish and wildlife resources.

Agency	Contact Information	Area of Expertise
Massachusetts Coastal Zone Management (www.state.ma.us/czm)	508-362-1760 (Cape Cod and the Islands)	Coodirnation with state agencies, federal agencies, local governments, academic institutions, nonprofit groups, and the general public to promote sound management of the Massachusetts coast
Ecological Research & Development Group	302-236-5383 (Dover, DE)	Wildlife rescue organization with experience in oiled wildlife response (advisory role)
The Coalition for Buzzards Bay	508-540-6222 (Woods Hole, MA)	Designated by the MassDEP to coordinate volunteers during oil spill incidents within the Buzzards Bay area

Table 9.0-3 Contact Information for Technical Expertise: Organizations

Organization	Contact Information	Area of Expertise
Cape Wildlife Center In partnership with The Fund for Animals	508-362-0111 ext. 225 Theresa Barbo, Director	Provides emergency care and wildlife rehabilitation.
Cape Cod Stranding Network	508-743-9548 (24-hour Hotline)	Responds to live and dead stranded marine mammals; plans and conducts relcaotion and release procedures; locates rehabilitation facilities for appropriate candidates; aids in transport of animals to facilities.
New England Aquarium Marine Animal Rescue Program	617-973-5247 (Stranding Hotline) 617-973-5200 (Main Aquarium) 617-973-5213 (Tony LaCasse)	MA – Boston and South / Stranding Response & Rehabilitation Cetaceans, Pinnipeds & Sea Turtles
Wellfleet Bay Wildlife Sanctuary Massachusetts Audubon	508-349-2615 ext. 102 Bob Prescott, Director wellfleet@massaudubon.org	MA – Cape Cod / Stranding Response Sea Turtles
National Marine Life Center	508-743-9888 ext. 301 Kathy Zagzebski, Executive Director	Rehabilitation and release hospital for the treatment of stranded sea turtles and seals.
New England Aquarium Marine Animal Rescue Program Central Wharf Boston, MA 02110-3399	617-973-5200	Rehabilitation Cetaceans, Pinnipeds & Sea Turtles

Table 9.0-4 Contact Information for Technical Expertise: Individuals

Scientist/ Expert	Affiliation	Office Location	Contact Phone Number	Area of Expertise/ Specialty
Duncan Fitzgerald, Ph. D.	Boston Univ.	MA	617-353-2530	Coastal geology
Joseph Costa, Ph.D.	Buzzards Bay Project	MA	508-291-3625	Marine biology, eel grass
Charles "Stormy" Mayo, Ph.D.	Center For Coastal Studies	MA	508-487-3623 ext. 110	Whales, marine mammals
James N.Butler, Ph.D.	Harvard University, Emeritus	MA	518-761-4051	Chemistry
Carolyn Mostello	MA Dept. of Fish & Wildlife	MA	508-389-6372	Roseate tern
Tom O'Shea	MA Dept. of Fish & Wildlife	MA	508-389-6327	Birds, wildlife
Scott Melvin, Ph.D.	MA Div. of Fisheries & Wildlife	MA	508-389-6345	Shore birds, piping plover
Neil Churchill	MA Div. of Marine Fisheries	MA	617-727-0394	Marine biology
Tom French	MA Div. of Marine Fisheries	MA	508-389-6355	State-Listed Wildlife
Scott Kraus	New England Aquarium	MA	617-973-5457	Whales, right whale
Ian Nisbet, Ph.D.	Private consultant	MA	508-564-4958	Roseate tern
Jeremy Hatch, Ph.D.	Univ. of Massachusetts	MA	617-287-6615	Roseate tern
Bruce Tripp, Ph.D.	WHOI Coastal Research Center	MA	508-289-2900	Chemist
Malcolm Spaulding, Ph. D.	URI Graduate School of Oceanography	RI	401-874-6666	Oil Spill Trajectory Modelling
Peter Cornillon, Ph. D.	URI Graduate School of Oceanography	RI	401-874-6283	Physical Oceanography
David Smith, Ph. D.	URI Graduate School of Oceanography	RI	401-874-6172	Marine Microbial Ecology

10.0 SPILL ASSESSMENT

10.1 Locating a Spill

In the event that the wind farm SCADA system indicates the potential for an oil leak, a maintenance crew will be dispatched to investigate. During the transit from the Operation Center to the WTG or ESP, the crew will monitor the water for signs of oil. If oil is detected, the crew will immediate radio Cape Wind's Assistant Asset Manager or delegated senior staff member with coordinates and details that describe the boundary of the oil spill plume.

In the event that oil is observed in the water, a helicopter will be dispatched to conduct a visual assessment of the spill extent from the air. A Cape Wind or Clean Harbors responder will be the spotter and report back to the facility manager or IC the estimate extent of the oil. Aerial photographs will be taken during the overflight to aid in assessment of the spill extent.

10.2 Determining the Size and Volume of a Spill

Because of the type of oil used at the facility, spilled materials are expected to float and the sheen will be easily detected visually from either a boat or airplane. The aerial extent of the spill will be estimated using information provided by overflights.

Information from the SCADA system will provide a maximum possible volume of oil, released into the water. Based on pressure gauges and oil level sensors, facility operators will be able to estimate the volume of oil released into primary spill containment reservoirs within the facility component (WTG or ESP). In the event that oil is observed in the water, a spill response will be developed based on the assumption that all internal spill containment has failed and the maximum possible volume of oil was released. In the event that the SCADA system malfunctions, a spill response will be developed based on the total volume of oil contained within any affected facility component.

10.3 Predicting Spill Movement

Cape Wind will rely on Applied Science Associates, Inc. (ASA) to conduct real-time oil spill trajectory simulations using the OILMAP model in the event of an actual spill. The input variables required (e.g., wind, current, sea state, spill size) for the trajectory analysis will be obtained from local meteorological stations maintained by NOAA and Cape Wind. The National Data Buoy Center maintains a real-time montoring station in Nantucket Sound, which provides real time marine conditions as well as a link to the regional marine forecast. The information is available online at the following address:

Station 44020 (LLNR 13665) - NANTUCKET SOUND
Nantucket Sound Main Channel Lighted Gong Buoy 17
http://www.ndbc.noaa.gov/station_page.php?station=44020

Cape Wind personnel can initiate a spill trajectory model by submitting the Request Form provided in Figure 10.3-1. As shown, the following information is required to conduct a spill trajectory analysis:

- Wind Speed & Direction
- Current Speed & Direction
- Sea State
- Air & Water Temperature
- Latitude & Longitude (release point)
- Spill Volume
- Aerial extent of Spill
- Direction of Spill Movement
- Time of Next High Tide & Low Tide

Spill Trajectory model results will be transmitted to Cape Wind and Clean Harbors personnel via email.

Figure 10.3-1 Spill Trajectory Request Form

Company Information	
Company Name:________________________________	
Company Contact Name:________________________________	
Telephone Number:________________________________	
Alternate Telephone Number(s):________________________________	
Fax Number:________________________________	
Email Address:________________________________	
Spill Site Information	
Lease Number / OCS Area / Block:________________________________	
Latitude: _____° _____′ _____″	Longitude: _____° _____′ _____″
Date of Incident: ___ / ___ / _____	Time of Incident: ___ : ___ (Military Time)
Type of Product Spilled:_____________________	API Gravity:__________
Estimated Volume of Release:______________________ Barrels or Gallons (Please Circle)	
Release Rate:_________ bbls/hr or gal/hr	How Long:___________ hr
Weather Conditions	
Wind Direction (at the time of spill):___________	Wind Speed (at the time of spill): _______mph or knots (Please Circle)
Air Temperature:_____________°F	Water Temperature:__________°F
High Tide: ___:___ (Military Time)	Low Tide: ___:___ (Military Time)
Weather Forecast	
Overflight Information	
Date of Overflight: ___ / ___ / _____	Time of Overflight: ___ : ___ (Military Time)
Leading Edge Location: Latitude: _____° _____′ _____″ Longitude: _____° _____′ _____″	Trailing Edge Location: Latitude: _____° _____′ _____″ Longitude: _____° _____′ _____″
Length of Spill:________Feet / Yards / Miles	Width of Spill:_________Feet / Yards / Miles
Slick Appearance (Please estimate the length and Width)	
Barely Visible: L ___ x W ___ ____%	Silvery: L ___ x W ___ ____%
Slight Color: L ___ x W ___ ____%	Bright Color: L ___ x W ___ ____%
Dull: L ___ x W ___ ____%	Dark: L ___ x W ___ ____%

10.4 Monitoring and Tracking Spill Movement

Vigilant monitoring of spill movement is critical to an effect response plan. Cape Wind will maintain overflights throughout the spill response along with updated spill trajectory modeling as environmental conditions change. Surveilance operations can be conducted day and night, and during inclement weather through the use of infrared imagery.

11.0 RESOURCE IDENTIFICATION

In the event of a spill, the spill trajectory model results will be compared to the MassDEP Environmental Sensitivity Maps, which were developed by MassDEP to provide access to the NOAA Environmental Sensitivity Index (ESI) data. The ESI data characterize marine and estuarine environments and wildlife by their sensitivity to spilled oil. The ESI data include information for three main components: shoreline habitats, sensitive biological resources, and human-use resources. These maps will be used by the SMT and SROT to identify sensitive coastal environmental resources including recreational beaches, bird nesting locations, waterfowl habitat, anadromous fish habitat and other marine and shoreline resources.

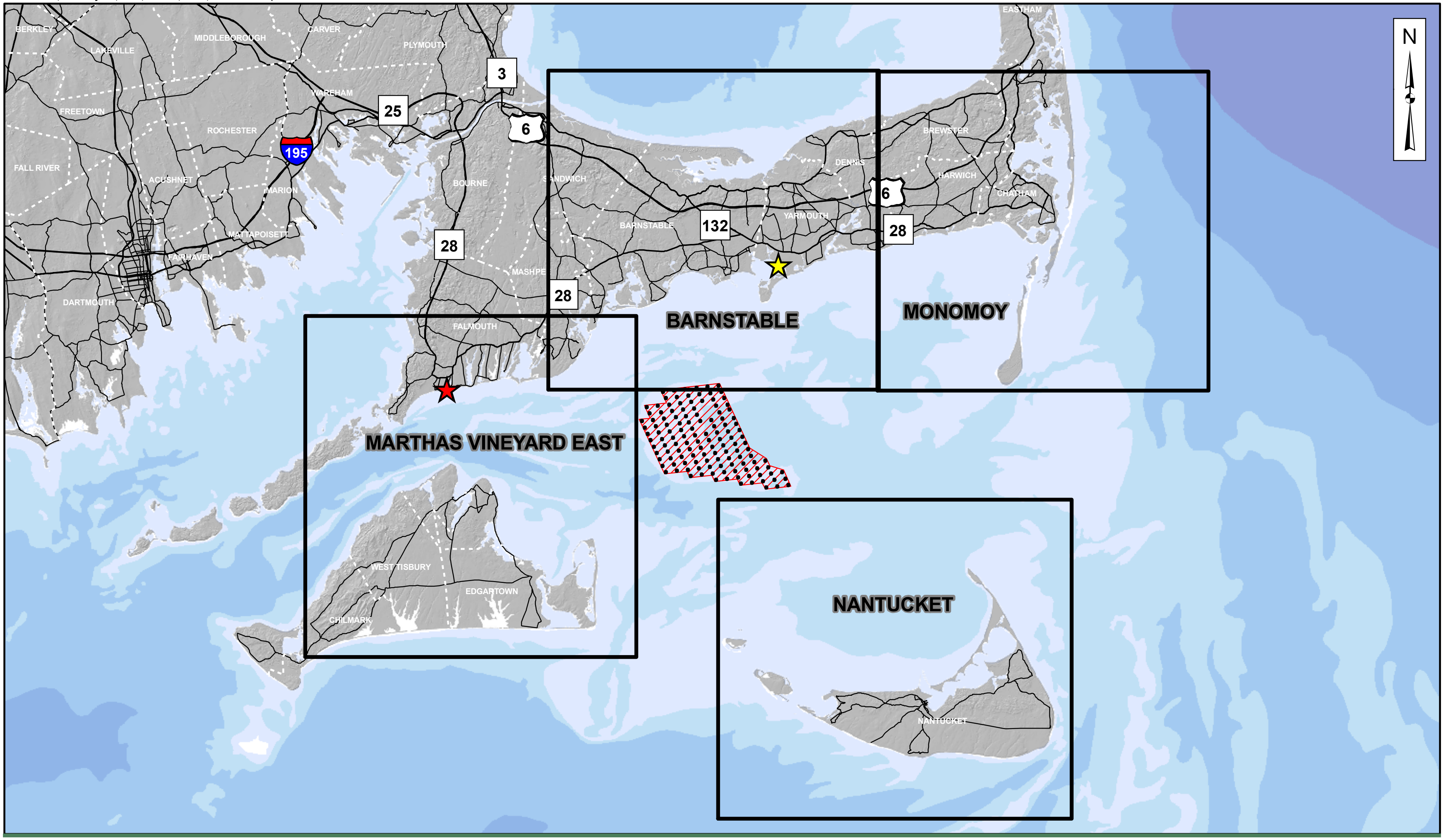
An index map (Figure 11.0-1) is provided to quickly determine which map is applicable to a given spill trajectory model result. The four maps that encompass the area surrounding the facility are provided below (Figures 11.0-2a-d).

In addition to reviewing the ESI data, resource agencies identified in Section 9.0 will be contacted (as practicable) in order to confirm the at-risk resources and identify any additional resources not previously identified.

The following process will be implemented as part of the initial effort to develop an incident response plan in the event of a spill:

1. Access MassDEP Environmental Sensitivitiy Maps
2. Compare spill trajectory model results to maps
3. Contact resource agencies (Section 9.0) to confirm at-risk resources

Location: G:/GIS-Projects/E159/00-mxd/OSRP/ESI-Index-Map rev.mxd



ESS Group, Inc.

Engineers
Scientists
Consultants

CAPE WIND
Nantucket Sound, Massachusetts

Scale: 1" = 8 Miles

0 8 Miles

Source: 1) Base data provided by MassGIS
2) ESS, Cape Wind Project Area, 2006
3) ESS, Spill Response Data, 2011

Legend

- Cape Wind Turbine Location
- Spill Response Operations Center
- Alternative Deployment Location
- Cape Wind Project Area
- ESI Index Map

Massachusetts Department of Environmental Protection
Environmental Sensitivity Maps Index

Figure 11.0-1

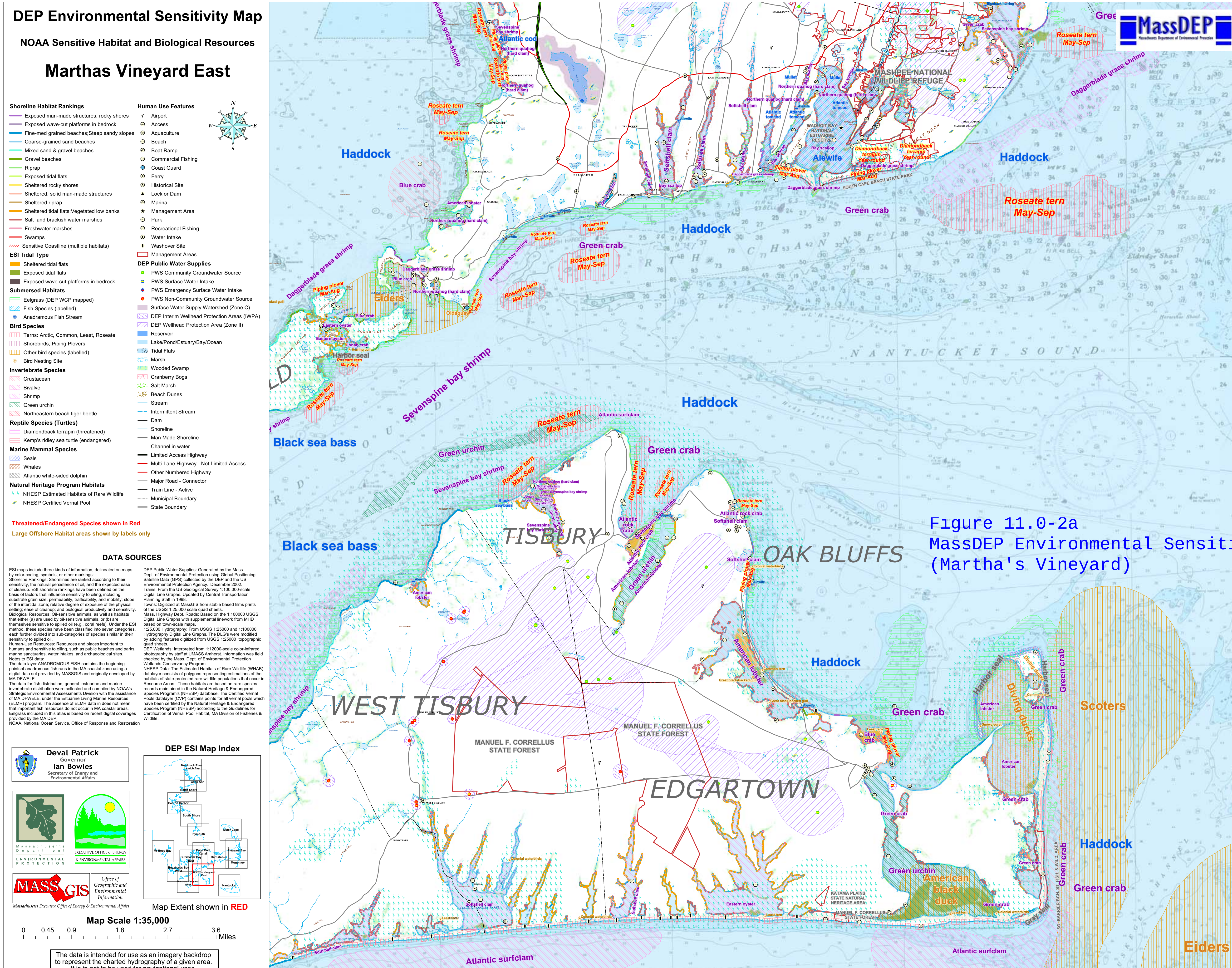


Figure 11.0-2a
MassDEP Environmental Sensitivity Maps
(Martha's Vineyard)

DEP Environmental Sensitivity Map

NOAA Sensitive Habitat and Biological Resources

Barnstable

Shoreline Habitat Rankings
- Exposed man-made structures, rocky shores
- Exposed wave-cut platforms in bedrock
- Fine-med grained beaches;Steep sandy slopes
- Coarse-grained sand beaches
- Mixed sand & gravel beaches
- Gravel beaches
- Riprap
- Exposed tidal flats
- Sheltered rocky shores
- Sheltered, solid man-made structures
- Sheltered riprap
- Sheltered tidal flats;Vegetated low banks
- Salt and brackish water marshes
- Freshwater marshes
- Swamps
- Sensitive Coastline (multiple habitats)

ESI Tidal Type
- Sheltered tidal flats
- Exposed tidal flats
- Exposed wave-cut platforms in bedrock

Submersed Habitats
- Eelgrass (DEP WCP mapped)
- Fish Species (labelled)
- Anadramous Fish Stream

Bird Species
- Terns: Arctic, Common, Least, Roseate
- Shorebirds, Piping Plovers
- Other bird species (labelled)
- Bird Nesting Site

Invertebrate Species
- Crustacean
- Bivalve
- Shrimp
- Green urchin
- Northeastern beach tiger beetle

Reptile Species (Turtles)
- Diamondback terrapin (threatened)
- Kemp's ridley sea turtle (endangered)

Marine Mammal Species
- Seals
- Whales
- Atlantic white-sided dolphin

Natural Heritage Program Habitats
- NHESP Estimated Habitats of Rare Wildlife
- NHESP Certified Vernal Pool

Human Use Features
- Airport
- Access
- Aquaculture
- Beach
- Boat Ramp
- Commercial Fishing
- Coast Guard
- Ferry
- Historical Site
- Lock or Dam
- Marina
- Management Area
- Park
- Recreational Fishing
- Water Intake
- Washover Site
- Management Areas

DEP Public Water Supplies
- PWS Community Groundwater Source
- PWS Surface Water Intake
- PWS Emergency Surface Water Intake
- PWS Non-Community Groundwater Source
- Surface Water Supply Watershed (Zone C)
- DEP Interim Wellhead Protection Areas (IWPA)
- DEP Wellhead Protection Area (Zone II)
- Reservoir
- Lake/Pond/Estuary/Bay/Ocean
- Tidal Flats
- Marsh
- Wooded Swamp
- Cranberry Bogs
- Salt Marsh
- Beach Dunes
- Stream
- Intermittent Stream
- Dam
- Shoreline
- Man Made Shoreline
- Channel in water
- Limited Access Highway
- Multi-Lane Highway - Not Limited Access
- Other Numbered Highway
- Major Road - Connector
- Train Line - Active
- Municipal Boundary
- State Boundary

Threatened/Endangered Species shown in Red

Large Offshore Habitat areas shown by labels only

DATA SOURCES

ESI maps include three kinds of information, delineated on maps by color-coding, symbols, or other markings:
Shoreline Rankings: Shorelines are ranked according to their sensitivity, the natural persistence of oil, and the expected ease of cleanup. ESI shoreline rankings have been defined on the basis of factors that influence sensitivity to oiling, including substrate grain size, permeability, trafficability, and mobility; slope of the intertidal zone; relative degree of exposure of the physical setting; ease of cleanup; and biological productivity and sensitivity.
Biological Resources: Oil-sensitive animals, as well as habitats that either (a) are used by oil-sensitive animals, or (b) are themselves sensitive to spilled oil (e.g., coral reefs). Under the ESI method, these species have been classified into seven categories, each further divided into sub-categories of species similar in their sensitivity to spilled oil.
Human-Use Resources: Resources and places important to humans and sensitive to oiling, such as public beaches and parks, marine sanctuaries, water intakes, and archaeological sites.
Notes to ESI data:
The data layer ANADROMOUS FISH contains the beginning pointsof anadromous fish runs in the MA coastal zone using a digital data set provided by MASSGIS and originally developed by MA DFWELE.
The data for fish distribution, general estuarine and marine invertebrate distribution were collected and compiled by NOAA's Strategic Environmental Assessments Division with the assistance of MA DFWELE, under the Estuarine Living Marine Resources (ELMR) program. The absence of ELMR data in does not mean that important fish resources do not occur in MA coastal areas.
Eelgrass included in this atlas is based on recent digital coverages provided by the MA DEP.
NOAA, National Ocean Service, Office of Response and Restoration

DEP Public Water Supplies: Generated by the Mass. Dept. of Environmental Protection using Global Positioning Satellite Data (GPS) collected by the DEP and the US Environmental Protection Agency. December 2002.
Trains: From the US Geological Survey 1:100,000-scale Digital Line Graphs. Updated by Central Transportation Planning Staff in 1998.
Towns: Digitized at MassGIS from stable based films prints of the USGS 1:25,000 scale quad sheets.
Mass. Highway Dept. Roads: Based on the 1:100000 USGS Digital Line Graphs with supplemental linework from MHD based on town-scale maps.
1:25,000 Hydrography: From USGS 1:25000 and 1:100000 Hydrography Digital Line Graphs. The DLG's were modified by adding features digitized from USGS 1:25000 topographic quad sheets.
DEP Wetlands: Interpreted from 1:12000-scale color-infrared photography by staff at UMASS Amherst. Information was field checked by the Mass. Dept. of Environmental Protection Wetlands Conservancy Program.
NHESP Data: The Estimated Habitats of Rare Wildlife (WHAB) datalayer consists of polygons representing estimations of the habitats of state-protected rare wildlife populations that occur in Resource Areas. These habitats are based on rare species records maintained in the Natural Heritage & Endangered Species Program's (NHESP) database. The Certified Vernal Pools datalayer (CVP) contains points for all vernal pools which have been certified by the Natural Heritage & Endangered Species Program (NHESP) according to the Guidelines for Certification of Vernal Pool Habitat, MA Division of Fisheries & Wildlife.

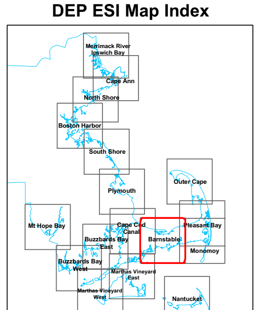
Deval Patrick
Governor
Ian Bowles
Secretary of Energy and Environmental Affairs

Massachusetts Department of Environmental Protection

Executive Office of Energy & Environmental Affairs

MASS GIS — Office of Geographic and Environmental Information
Massachusetts Executive Office of Energy & Environmental Affairs

DEP ESI Map Index



Map Extent shown in **RED**

Map Scale 1:35,000

0 0.45 0.9 1.8 2.7 3.6 Miles

The data is intended for use as an imagery backdrop to represent the charted hydrography of a given area. It is not to be used for navigational uses.

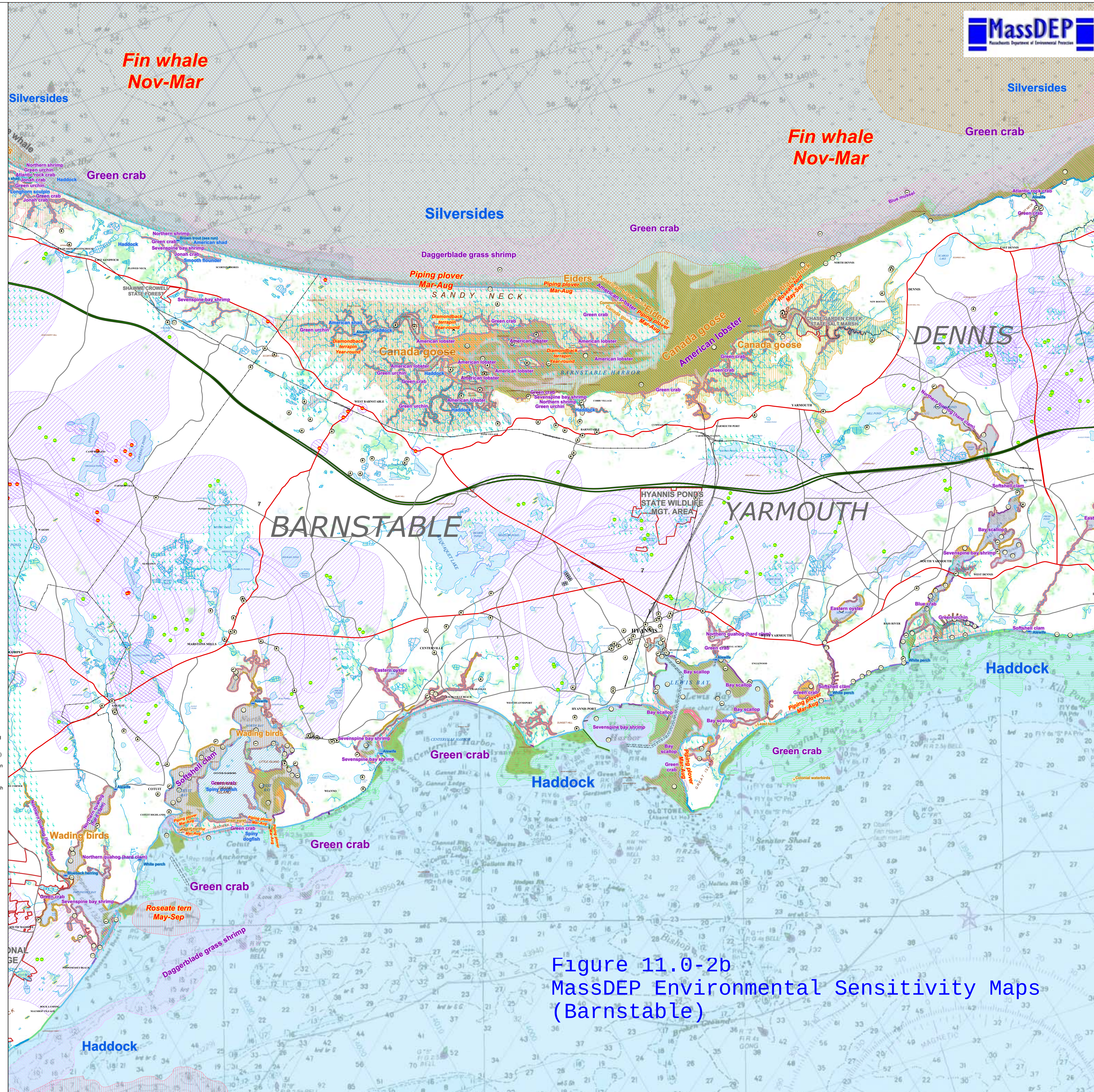


Figure 11.0-2b
MassDEP Environmental Sensitivity Maps
(Barnstable)

DEP Environmental Sensitivity Map

NOAA Sensitive Habitat and Biological Resources

Monomoy

Shoreline Habitat Rankings

- Exposed man-made structures, rocky shores
- Exposed wave-cut platforms in bedrock
- Fine-med grained beaches;Steep sandy slopes
- Coarse-grained sand beaches
- Mixed sand & gravel beaches
- Gravel beaches
- Riprap
- Exposed tidal flats
- Sheltered rocky shores
- Sheltered, solid man-made structures
- Sheltered riprap
- Sheltered tidal flats;Vegetated low banks
- Salt and brackish water marshes
- Freshwater marshes
- Swamps
- Sensitive Coastline (multiple habitats)

ESI Tidal Type

- Sheltered tidal flats
- Exposed tidal flats
- Exposed wave-cut platforms in bedrock

Submersed Habitats

- Eelgrass (DEP WCP mapped)
- Fish Species (labelled)
- Anadramous Fish Stream

Bird Species

- Terns: Arctic, Common, Least, Roseate
- Shorebirds, Piping Plovers
- Other bird species (labelled)
- Bird Nesting Site

Invertebrate Species

- Crustacean
- Bivalve
- Shrimp
- Green urchin
- Northeastern beach tiger beetle

Reptile Species (Turtles)

- Diamondback terrapin (threatened)
- Kemp's ridley sea turtle (endangered)

Marine Mammal Species

- Seals
- Whales
- Atlantic white-sided dolphin

Natural Heritage Program Habitats

- NHESP Estimated Habitats of Rare Wildlife
- NHESP Certified Vernal Pool

Human Use Features

- Airport
- Access
- Aquaculture
- Beach
- Boat Ramp
- Commercial Fishing
- Coast Guard
- Ferry
- Historical Site
- Lock or Dam
- Marina
- Management Area
- Park
- Recreational Fishing
- Water Intake
- Washover Site
- Management Areas

DEP Public Water Supplies

- PWS Community Groundwater Source
- PWS Surface Water Intake
- PWS Emergency Surface Water Intake
- PWS Non-Community Groundwater Source
- Surface Water Supply Watershed (Zone C)
- DEP Interim Wellhead Protection Areas (IWPA)
- DEP Wellhead Protection Area (Zone II)
- Reservoir
- Lake/Pond/Estuary/Bay/Ocean
- Tidal Flats
- Marsh
- Wooded Swamp
- Cranberry Bogs
- Salt Marsh
- Beach Dunes
- Stream
- Intermittent Stream
- Dam
- Shoreline
- Man Made Shoreline
- Channel in water
- Limited Access Highway
- Multi-Lane Highway - Not Limited Access
- Other Numbered Highway
- Major Road - Connector
- Train Line - Active
- Municipal Boundary
- State Boundary

Threatened/Endangered Species shown in Red

Large Offshore Habitat areas shown by labels only

DATA SOURCES

ESI maps include three kinds of information, delineated on maps by color-coding, symbols, or other markings:
Shoreline Rankings: Shorelines are ranked according to their sensitivity, the natural persistence of oil, and the expected ease of cleanup. ESI shoreline rankings have been defined on the basis of factors that influence sensitivity to oiling, including substrate grain size, permeability, trafficability, and mobility; slope of the intertidal zone; relative degree of exposure of the physical setting; ease of cleanup; and biological productivity and sensitivity.
Biological Resources: Oil-sensitive animals, as well as habitats that either (a) are used by oil-sensitive animals, or (b) are themselves sensitive to spilled oil (e.g., coral reefs). Under the ESI method, these species have been classified into seven categories, each further divided into sub-categories of species similar in their sensitivity to spilled oil.
Human-Use Resources: Resources and places important to humans and sensitive to oiling, such as public beaches and parks, marine sanctuaries, water intakes, and archaeological sites.
Notes to ESI data:
The data layer ANADROMOUS FISH contains the beginning pointsof anadromous fish runs in the MA coastal zone using a digital data set provided by MASSGIS and originally developed by MA DFWELE.
The data for fish distribution, general estuarine and marine invertebrate distribution were collected and compiled by NOAA's Strategic Environmental Assessments Division with the assistance of MA DFWELE, under the Estuarine Living Marine Resources (ELMR) program. The absence of ELMR data in does not mean that important fish resources do not occur in MA coastal areas.
Eelgrass included in this atlas is based on recent digital coverages provided by the MA DEP.
NOAA, National Ocean Service, Office of Response and Restoration

DEP Public Water Supplies: Generated by the Mass. Dept. of Environmental Protection using Global Positioning Satellite Data (GPS) collected by the DEP and the US Environmental Protection Agency. December 2002.
Trains: From the US Geological Survey 1:100,000-scale Digital Line Graphs. Updated by Central Transportation Planning Staff in 1998.
Towns: Digitized at MassGIS from stable based films prints of the USGS 1:25,000 scale quad sheets.
Mass. Highway Dept. Roads: Based on the 1:100000 USGS Digital Line Graphs with supplemental linework from MHD based on town-scale maps.
1:25,000 Hydrography: From USGS 1:25000 and 1:100000 Hydrography Digital Line Graphs. The DLG's were modified by adding features digitized from USGS 1:25000 topographic quad sheets.
DEP Wetlands: Interpreted from 1:12000-scale color-infrared photography by staff at UMASS Amherst. Information was field checked by the Mass. Dept. of Environmental Protection Wetlands Conservancy Program.
NHESP Data: The Estimated Habitats of Rare Wildlife (WHAB) datalayer consists of polygons representing estimations of the habitats of state-protected rare wildlife populations that occur in Resource Areas. These habitats are based on rare species records maintained in the Natural Heritage & Endangered Species Program's (NHESP) database. The Certified Vernal Pools datalayer (CVP) contains points for all vernal pools which have been certified by the Natural Heritage & Endangered Species Program (NHESP) according to the Guidelines for Certification of Vernal Pool Habitat, MA Division of Fisheries & Wildlife.

Deval Patrick
Governor
Ian Bowles
Secretary of Energy and Environmental Affairs

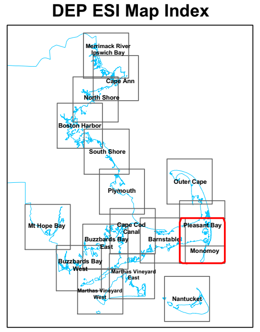
Massachusetts Department of Environmental Protection

Executive Office of Energy & Environmental Affairs

MassGIS — Office of Geographic and Environmental Information

Massachusetts Executive Office of Energy & Environmental Affairs

DEP ESI Map Index



Map Extent shown in **RED**

Map Scale 1:35,000

0 | 0.45 | 0.9 | 1.8 | 2.7 | 3.6 Miles

The data is intended for use as an imagery backdrop to represent the charted hydrography of a given area. It is in not to be used for navigational uses.

Figure 11.0-2c
MassDEP Environmental Sensitivity Maps (Monomoy)

DEP Environmental Sensitivity Map

NOAA Sensitive Habitat and Biological Resources

Nantucket

Shoreline Habitat Rankings
- Exposed man-made structures, rocky shores
- Exposed wave-cut platforms in bedrock
- Fine-med grained beaches;Steep sandy slopes
- Coarse-grained sand beaches
- Mixed sand & gravel beaches
- Gravel beaches
- Riprap
- Exposed tidal flats
- Sheltered rocky shores
- Sheltered, solid man-made structures
- Sheltered riprap
- Sheltered tidal flats;Vegetated low banks
- Salt and brackish water marshes
- Freshwater marshes
- Swamps
- Sensitive Coastline (multiple habitats)

ESI Tidal Type
- Sheltered tidal flats
- Exposed tidal flats
- Exposed wave-cut platforms in bedrock

Submersed Habitats
- Eelgrass (DEP WCP mapped)
- Fish Species (labelled)
- Anadromous Fish Stream

Bird Species
- Terns: Arctic, Common, Least, Roseate
- Shorebirds, Piping Plovers
- Other bird species (labelled)
- Bird Nesting Site

Invertebrate Species
- Crustacean
- Bivalve
- Shrimp
- Green urchin
- Northeastern beach tiger beetle

Reptile Species (Turtles)
- Diamondback terrapin (threatened)
- Kemp's ridley sea turtle (endangered)

Marine Mammal Species
- Seals
- Whales
- Atlantic white-sided dolphin

Natural Heritage Program Habitats
- NHESP Estimated Habitats of Rare Wildlife
- NHESP Certified Vernal Pool

Human Use Features
- Airport
- Access
- Aquaculture
- Beach
- Boat Ramp
- Commercial Fishing
- Coast Guard
- Ferry
- Historical Site
- Lock or Dam
- Marina
- Management Area
- Park
- Recreational Fishing
- Water Intake
- Washover Site
- Management Areas

DEP Public Water Supplies
- PWS Community Groundwater Source
- PWS Surface Water Intake
- PWS Emergency Surface Water Intake
- PWS Non-Community Groundwater Source
- Surface Water Supply Watershed (Zone C)
- DEP Interim Wellhead Protection Areas (IWPA)
- DEP Wellhead Protection Area (Zone II)
- Reservoir
- Lake/Pond/Estuary/Bay/Ocean
- Tidal Flats
- Marsh
- Wooded Swamp
- Cranberry Bogs
- Salt Marsh
- Beach Dunes
- Stream
- Intermittent Stream
- Dam
- Shoreline
- Man Made Shoreline
- Channel in water
- Limited Access Highway
- Multi-Lane Highway - Not Limited Access
- Other Numbered Highway
- Major Road - Connector
- Train Line - Active
- Municipal Boundary
- State Boundary

Threatened/Endangered Species shown in Red

Large Offshore Habitat areas shown by labels only

DATA SOURCES

ESI maps include three kinds of information, delineated on maps by color-coding, symbols, or other markings:
Shoreline Rankings: Shorelines are ranked according to their sensitivity, the natural persistence of oil, and the expected ease of cleanup. ESI shoreline rankings have been defined on the basis of factors that influence sensitivity to oiling, including substrate grain size, permeability, trafficability, and mobility; slope of the intertidal zone; relative degree of exposure of the physical setting; ease of cleanup; and biological productivity and sensitivity.
Biological Resources: Oil-sensitive animals, as well as habitats that either (a) are used by oil-sensitive animals, or (b) are themselves sensitive to spilled oil (e.g., coral reefs). Under the ESI method, these species have been classified into seven categories, each further divided into sub-categories of species similar in their sensitivity to spilled oil.
Human-Use Resources: Resources and places important to humans and sensitive to oiling, such as public beaches and parks, marine sanctuaries, water intakes, and archaeological sites.
Notes to ESI data:
The data layer ANADROMOUS FISH contains the beginning pointsof anadromous fish runs in the MA coastal zone using a digital data set provided by MASSGIS and originally developed by MA DFWELE.
The data for fish distribution, general estuarine and marine invertebrate distribution were collected and compiled by NOAA's Strategic Environmental Assessments Division with the assistance of MA DFWELE, under the Estuarine Living Marine Resources (ELMR) program. The absence of ELMR data in does not mean that important fish resources do not occur in MA coastal areas.
Eelgrass included in this atlas is based on recent digital coverages provided by the MA DEP.
NOAA, National Ocean Service, Office of Response and Restoration

DEP Public Water Supplies: Generated by the Mass. Dept. of Environmental Protection using Global Positioning Satellite Data (GPS) collected by the DEP and the US Environmental Protection Agency. December 2002.
Trains: From the US Geological Survey 1:100,000-scale Digital Line Graphs. Updated by Central Transportation Planning Staff in 1998.
Towns: Digitized at MassGIS from stable based films prints of the USGS 1:25,000 scale quad sheets.
Mass. Highway Dept. Roads: Based on the 1:100000 USGS Digital Line Graphs with supplemental linework from MHD based on town-scale maps.
1:25,000 Hydrography: From USGS 1:25000 and 1:100000 Hydrography Digital Line Graphs. The DLG's were modified by adding features digitized from USGS 1:25000 topographic quad sheets.
DEP Wetlands: Interpreted from 1:12000-scale color-infrared photography by staff at UMASS Amherst. Information was field checked by the Mass. Dept. of Environmental Protection Wetlands Conservancy Program.
NHESP Data: The Estimated Habitats of Rare Wildlife (WHAB) datalayer consists of polygons representing estimations of the habitats of state-protected rare wildlife populations that occur in Resource Areas. These habitats are based on rare species records maintained in the Natural Heritage & Endangered Species Program's (NHESP) database. The Certified Vernal Pools datalayer (CVP) contains points for all vernal pools which have been certified by the Natural Heritage & Endangered Species Program (NHESP) according to the Guidelines for Certification of Vernal Pool Habitat, MA Division of Fisheries & Wildlife.

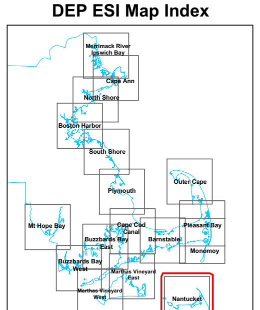
Deval Patrick
Governor
Ian Bowles
Secretary of Energy and Environmental Affairs

Massachusetts Department of Environmental Protection

Executive Office of Energy & Environmental Affairs

MassGIS
Office of Geographic and Environmental Information
Massachusetts Executive Office of Energy & Environmental Affairs

DEP ESI Map Index



Map Extent shown in **RED**

Map Scale 1:40,000

0 0.5 1 2 3 4 Miles

The data is intended for use as an imagery backdrop to represent the charted hydrography of a given area. It is in not to be used for navigational uses.

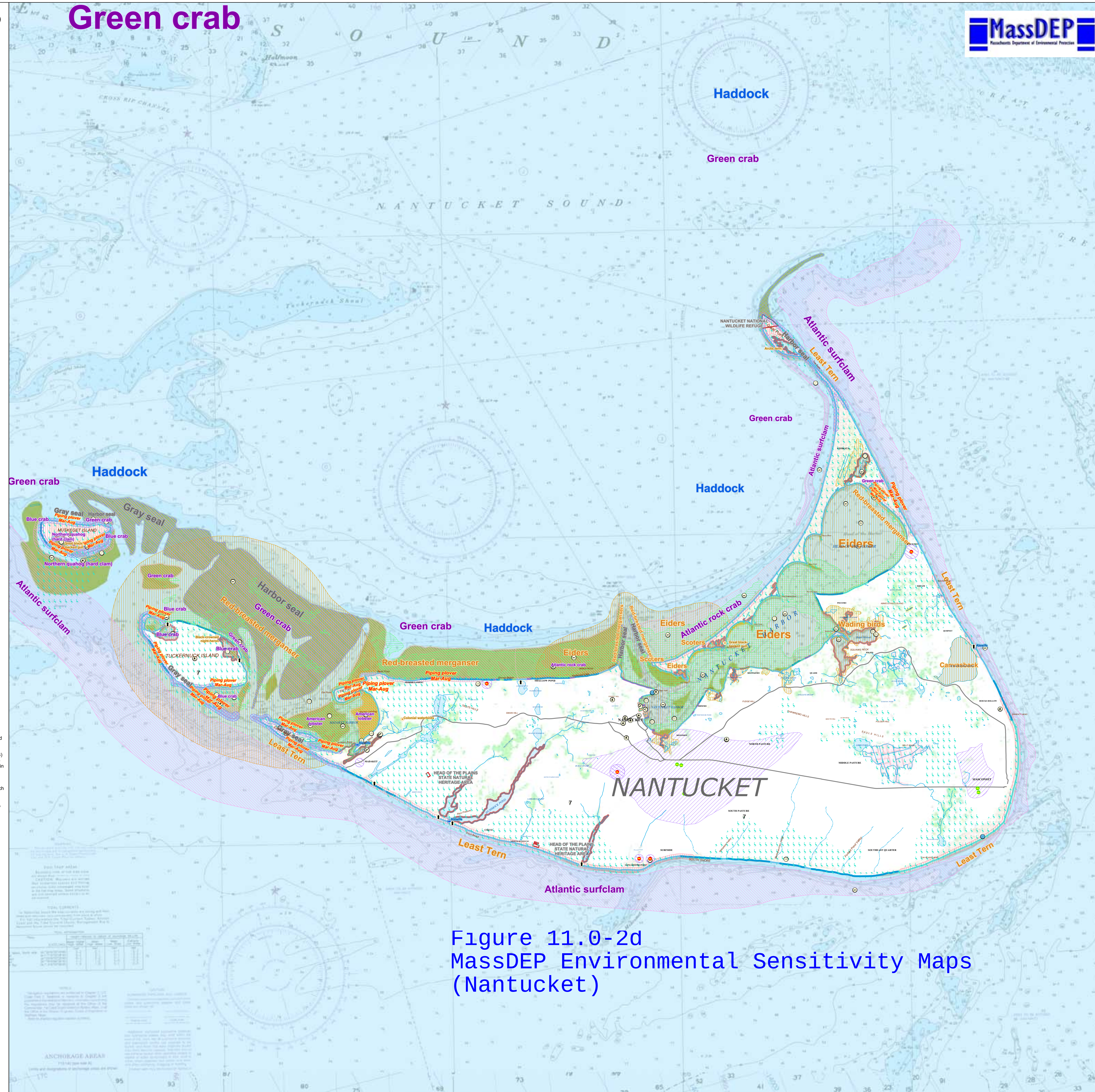


Figure 11.0-2d
MassDEP Environmental Sensitivity Maps
(Nantucket)

12.0 STRATEGIC RESPONSE PLANNING

This plan is consistent with the Area Contingency Plan for Rhode Island and southeastern Massachusetts. The Cape Wind Strategic Response to any oil spill incident will be dictated by the IC through consultation with the SMT in accordance with the following priorities:

1. Maintain safety of public and personnel responding to the incident
2. Control and/or eliminate the pathway for oil into the water
3. Manage coordinated response effort
4. Address necessary environmental resource protection
5. Contain and recover spilled oil
6. Rehabilitate Impacted Wildlife
7. Remove oil from impacted areas

An incident response plan will be developed that addresses each of the objectives above, in order. Specific methods and/or procedures to implement the priorities are provided throughout this OSRP. A list of actions is provided below for each priority and will be addressed in the response plan. Depending on the nature and extent of a spill incident, all actions listed below may not be required.

Priority 1: Maintain Safety of Public and Personnel Responding to the Incident

- Identify hazards of released material
- Establish site control (hot zone, warm zone, cold zone, and security)
- Establish vessel traffic control
- Set up decontamination stations
- Develop a Health and Safety Plan for responding personnel

Priority 2: Control and/or Eliminate the Pathway for Oil into the Water

- Complete emergency shutdown of all necessary facility components
- Initiate temporary repairs
- Conduct salvage operations as necessary

Priority 3: Manage Coordinated Response Effort

- Complete or confirm notifications
- Established a unified command organization and facility for government oversight

- Ensure mobilization and trackling of response resources
- Account for personnel and equipment

Priority 4: Address Necessary Environmental Resource Protection

- Request/Conduct spill trajectory analysis
- Identify resources at risk of being impacted by spill
- Prioritize at risk resources for implementation of protection tactics (see below)
- Deploy resource protection equipment
- Track spill movement
- Develop/implement appropriate protection tactics

Environmental Resource Protection Strategy

A key step in the initial response actions is the determination of whether shoreline protection is required. This determination is made in consultation with the spill trajectory analysis provided by ASA and based upon estimated spill volume and environmental conditions (see Section 10.3). If landfall is predicted, responders will be directed to deploy booms and other protective measures at the potentially impacted areas.

The FWSEA Annex lists several criteria for determining which environmental resources should receive the highest priority for protection in order to provide a time-sensitive and coordinated response. The federal and state on-scene coordinators (OSC) will consult with relevant federal, state, or tribal natural trustees and managers to determine which natural resources should receive the highest priority for protection in the event of an oil spill. Some natural resources that, at any given time or location, may warrant a high level of protection include the following categories of lands and species:

a) Federally listed endangered and threatened species, their designated critical habitat, and other habitats known to be utilized by these species.

b) Migratory birds including waterfowl, wading birds, shorebirds, raptors, and songbirds.

c) State-listed endangered and threatened species and their habitats.

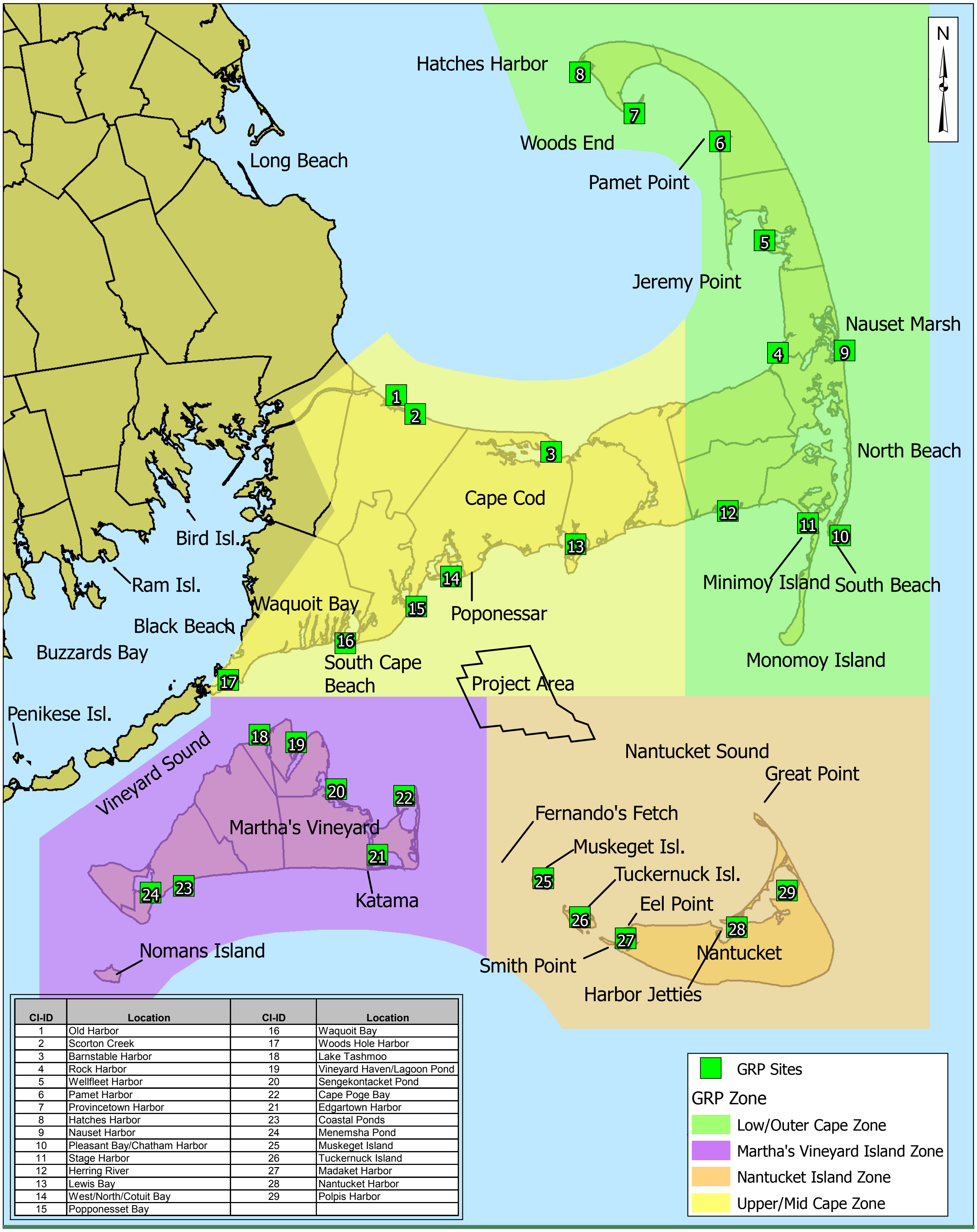
d) Designated areas of high quality fish and wildlife habitat such as federal and state wildlife refuges and wildlife management areas, state and federal fish hatcheries, natural area preserves, parks, and forests.

e) Surface waters in general including coastal marine, estuarine and freshwater systems and their associated wetland systems that support fish, wildlife and protected plant species and their associated wetland habitats.

f) Other species of fish and wildlife (game and non-game) and their associated habitats.

The Cape and Island site-specific Geographic Response Plans (September 2009) are complete and have been approved by the Southeastern New England Area Committee for incorporation into the Southern Massachusetts and Rhode Island Area Plan for Oil Spills and Hazardous Materials Response. Eighteen selected sites are located on Nantucket Sound on the southern side of Cape Cod, Martha's Vineyard, and Nantucket Island (see Figure 12.0-1). The Cape and Islands GRP Site Selection Matrix lists sites in order of priority (see Table 12.0-1).

Location: G:/GIS-Projects/E159/00-mxd/OSRP.mxd



CI-ID	Location	CI-ID	Location
1	Old Harbor	16	Waquoit Bay
2	Scorton Creek	17	Woods Hole Harbor
3	Barnstable Harbor	18	Lake Tashmoo
4	Rock Harbor	19	Vineyard Haven/Lagoon Pond
5	Wellfleet Harbor	20	Sengekontacket Pond
6	Pamet Harbor	22	Cape Poge Bay
7	Provincetown Harbor	21	Edgartown Harbor
8	Hatches Harbor	23	Coastal Ponds
9	Nauset Harbor	24	Menemsha Pond
10	Pleasant Bay/Chatham Harbor	25	Muskeget Island
11	Stage Harbor	26	Tuckernuck Island
12	Herring River	27	Madaket Harbor
13	Lewis Bay	28	Nantucket Harbor
14	West/North/Cotuit Bay	29	Polpis Harbor
15	Popponesset Bay		

ESS Group, Inc.
Engineers
Scientists
Consultants

CAPE WIND
Nantucket Sound, Massachusetts

Scale: 1" = 45,000'

0 10 Miles

Cape Cod/Island GRP Zones and Sites

Figure 12.0-1

Source: 1) Massachusetts Geographic Response Plan (GRP), GRP Sites and GRP Zones, 2009

Table 12.0-1 Cape and Islands Geographic Response Plan (GRP), Sites of Concern for Cape Wind OSRP

GRP # Final	Sub-Zone	Site Name	2007 Priority	Marine Mammals	Fish	Invertebrates	Birds	Threatened/ Endangered Species	Cult Res	Subsistence	Human Use	Comm Fish	Land Mgt	Coastal Habitat
10	LO	Pleasant Bay & Chatham Harbor	H1	S		LCS, SU	Se, Sh	RT	H		B, BR/M, RF		NWR	B, D
11	LO	Stage Harbor	H1			LCS, SU	Se				B, BR/M, RF	CF	NWR	B, D
12	LO	Herring River	H1		A	LCS					B, RF			B, D
13	MU	Lewis Bay	H1		A, F	LCS, SU	Sh, Se	P		F,S	B, BR/M, RF	A, CF		TF, B, R,RR, M, D
14	MU	West, Cotuit & North Bay	H1											
15	MU	Poponesset Bay	H1		F		Se, Sh, N				B		NWR	TF, B
16	MU	Waquoit Bay	H1		A, F	SU	Se, Sh				B, RF		NERR, ACEC	TF, B, M, D
17	MU	Woods Hole Harbor	H1											
18	mv	Lake Tashmoo	H1		F	LCS, SU	Se, N	RT			B, BR/M	CF	CH	B, D, RR, R
19	mv	Vineyard Haven Harbor & Lagoon Pond	H1		A	LCS, SU	Se, N	RT	H		B, BR/M, RF	CF	CH	B, D, M, RR, R
20	mv	Sengekontacket Pond	H1				Se, Sh, N					CF		
21	mv	Edgartown Harbor & Katama Bay	H1	S	A	LCS, SU	Sh, Se, N	P	H		BR/M, RF	A	CH	B, D, M
22	mv	Cape Poge Bay	H1	S		LCS	Se		H			CF	CH	B, D
23	mv	Martha's Vineyard Coastal Ponds	H1		A?	SU	Se, Sh, N							B, D

GRP # Final	Sub-Zone	Site Name	2007 Priority	Marine Mammals	Fish	Invertebrates	Birds	Threatened/ Endangered Species	Cult Res	Subsistence	Human Use	Comm Fish	Land Mgt	Coastal Habitat
24	mv	Menemsha Pond Complex	H1	F		LCS, SU	Sh, Se, N	P			BR/M, RF	A, CF		TF, B, D, M
25	N	Muskeget Island	H1	S		LCS	Sh, N	P					CH	TF, B, D
26	N	Tuckernuck Island	H1			LCS	Sh, Se, N	P				CF	CH	TF, B
27	N	Madaket Harbor	H1		A	LCS	Sh, Se	P			B, BR/M, RF	CF	CH	TF, B, R
28	N	Nantucket Harbor	H1	S			Se		H		BR/M	A, CF	CH	TF, B, R
29	N	Polpis Harbor	H1											

Source: Modified from GRP Site Selection Matrix, 2009, available from http://grp.nukaresearch.com/documents/071219%20SSM%20CI.pdf

Key:

Invertebrates
LCS = Lobster, crabs, shrimp
SU = Shellfish, urchins

Birds
Se = Seabirds (terns, loons, shearwaters, petrels, cormorants)
Sh = Shorebirds (plovers, sandpipers, herons, bitterns, ibises, egrets, cranes, coot, rails)
N = Nests

Human Use
B = Beach
BR/M = Boat ramp or marina
RF = Recreational fishing

Commercial Fishing
CF = Commercial fishing
A = Aquaculture

Land Management
NWR = National Wildlife Refuge
NER = National Estuarine Reserve
ACEC = Area of Critical Environmental Concern
CH = Critical Habitat (Natural Heritage Program Estimated Habitats of Rare Wildlife)

Coastal Habitat
B = Beach
D = Dunes
TF = Tide flats
R = Rocky shore
RR = Rip-rap
M = Marsh/swamp

Priority 5 - Contain and Recover Spilled Oil

- Deploy oil containment/sorbent boom at the spill source
- Conduct open water skimming
- Develop disposal plan

Priority 6 – Rehabilitate Impacted Wildlife

- Establish oiled wildlife reporting hotline
- Conduct injured wildlife search and rescue operations
- Notify wildlife agencies and reputable wildlife rescue services and request necessary approvals to handle oiled wildlife
- Setup/Operate wildlife rehabilitation center
- Initiate and coordinate citizen volunteer efforts

Priority 7 – Remove oil from impacted areas

- Conduct necessary shoreline clean up efforts
- Clean oiled structures (piers, docks, etc.)
- Clean oiled vessels

A spill response plan and implementation strategy will be developed and regularly updated by the QI/IC and SMT throughout the spill response. Updates will address changes in the condition of the spill and tactics required to fully address the spill response.

13.0 RESOURCE PROTECTION METHODS

Cape Wind is dedicated to protecting the nearby beaches, waterfowl, wildlife, marine and shoreline resources, and other areas of special economic or environmental importance. Cape Wind consulted with U.S. Fish and Wildlife Services on February 7, 2011 as part of the development of this OSRP. Because of the type of oil used at the off-shore site, spilled materials are expected to float and will be easily contained and recoverable via mechanical methods.

Initial assessment and defensive response actions will occur immediately upon notification of an oil spill.

In accordance with the ACP, the first step taken in the event of an oil spill will be to make a determination of what action is necessary to respond to the spill. After initial information on the spill is compiled, Clean Harbors will determine the appropriate protection techniques. The response technique to be employed in a spill will depend upon the volume of material spilled, location of the spill, weather, and tidal conditions during the time of the spill. All efforts will be made to contain and clean up the spill offshore, before any shoreline impacts occur.

Resource protection will be conducted using guidelines from the Area Contingency Plan (ACP) and the Geographic Response Plan (GRP). The GRP provides information on response priorities after a spill is first reported. The GRP contains mapping of coastal resource areas and detailed information on response techniques to be used in the event of an oil spill. Specific recovery and protection tactics, equipment and personnel requirements, directions/access to the sensitive areas are also detailed in the GRP. Protection tactics include a variety of booming types, berms and dams and animal protection measures which are selected depending on the nature of the spill.

Based on the spill trajectory model, Cape Wind and Clean Harbors will evaluate whether or not shoreline protection is required. In the unlikely event that offshore techniques are unable to contain spill movement, Clean Harbors will employ all available resources to prevent oil from reaching the shore and limit the damage to potentially affected areas. If the spill can be quickly contained or environmental conditions (wind and current) will prevent oil from reaching shore, then shoreline protection may not be necessary.

Should shoreline cleanup operations become necessary, Cape Wind will work with federal, state, and local authorities to ensure that appropriate techniques are employed in a timely and environmentally-sensitive manner. Such techniques may include:

- Natural recovery
- Manual removal
- Mechanical removal
- Collection with sorbents
- Vacuum
- Sediment reworking/tilling
- Vegetation cutting/removal
- Water washing
- Sand blasting

The response procedures established in this OSRP ensure that all releases are quickly identified, addressed, and recovered. In the unusual event that impact to sensitive areas or wildlife occur, Cape Wind will dedicate the necessary resources (with assistance from the response contractor) and will work with federal, state, and local authorities to fully remedy the impacts.

13.1 Threatened and Endangered Birds

The effects from a potential oil spill to threatened and endangered species habitat is well documented in the USFWS Biological Opinion, 2008, MMS Biological Assessment, 2008, and the MMS

FEIS, 2009. Oil spill probability (Etkin 2006) and trajectory modeling (Knee et al. 2006) predict a very low risk to Roseate Tern and Piping Plover habitats.

Roseate terns forage at the sea surface and frequently loaf and bathe in near-shore areas around their nesting colonies, primarily in Buzzards Bay. Roseate Terns are in the project area from May to September, but are generally found on Horseshoe Shoal in low numbers in May and then again in late August through mid-September. The primary risk of an oil spill to Roseate Terns would be to foraging terns during the months of May through September.

Piping Plovers nest above the high tide line and forage along the wrack line and intertidal areas. Piping Plovers are in Nantucket Sound from March to September, but do not frequent the project area. An oil spill that reached a shoreline where plovers nest or forage could impact Piping Plovers. Sensitive tern and plover habitats are shown in Figures 13.1-1 and 13.1-2.

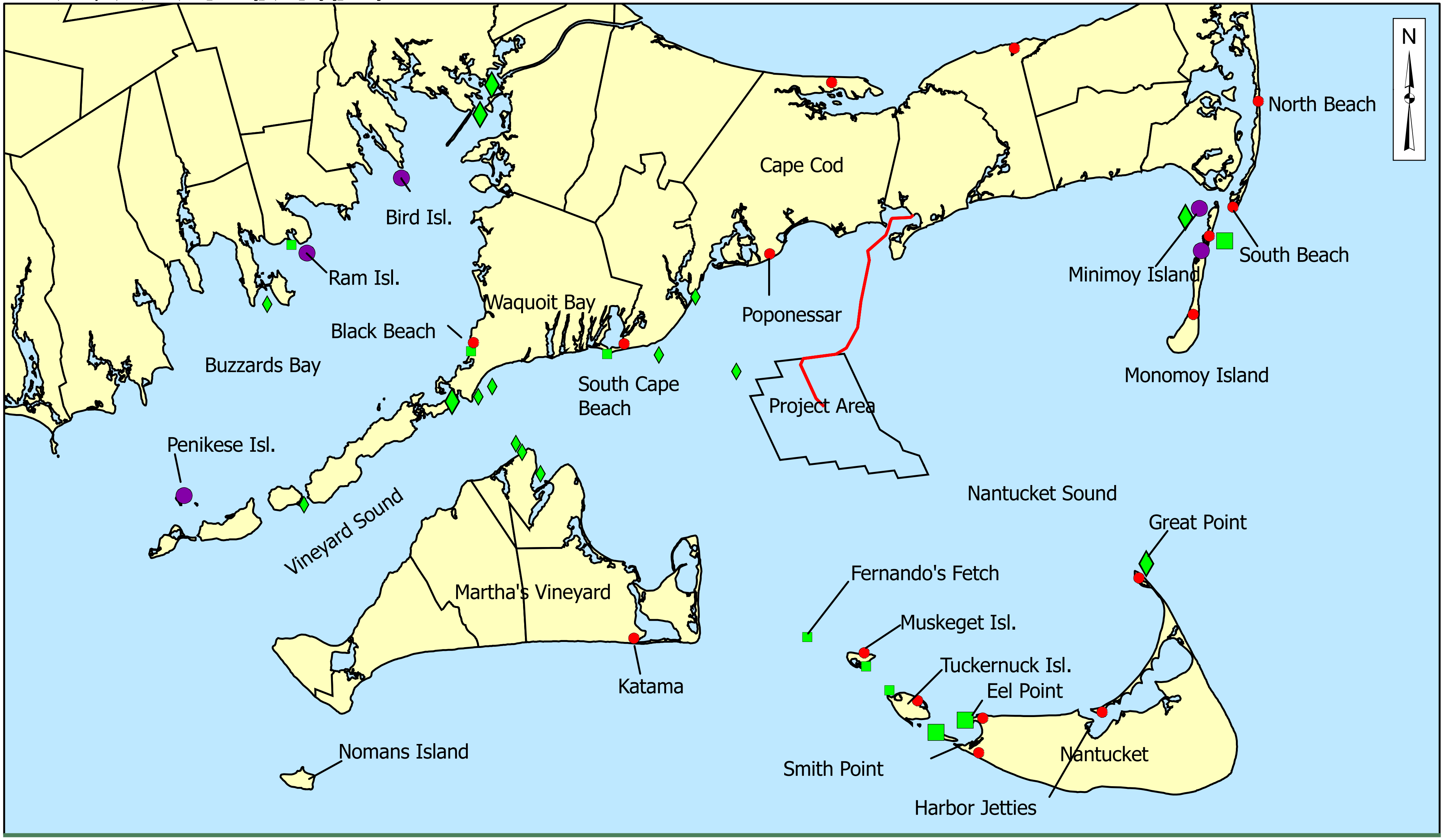
In the event of an oil spill, trust responsibilities for threatened and endangered birds and their habitats are given to the U.S. Fish and Wildlife Service (USFWS) through the Comprehensive Environmental Response, Compensation and Liability Act, Clean Water Act, National Oil and Hazardous Substances Pollution Contingency Plan, Migratory Bird Treat Act, and Endangered Species Act. The Commonwealth of Massachusetts also has trust responsibilities for threatened and endangered species within state waters and on land. The federal and state OSC are the only entities that have authority over bird-related response decisions. The OSC will consult with the USFWS and DFW when migratory birds may be impacted to determine appropriate response measures. For incidents that could significantly impact trust resources such as Roseate Terns or Piping Plovers, the OSC may request that an agency representative become part of the command.

A team of specialists from USFWS, Massachusetts Division of Fisheries and Wildlife (MDFW), and Tri-State Bird Rescue and Rehabilitation will be assembled that make response decisions in consultation with the federal and/or state OSC. All bird-related response activities will be detailed in the Incident Action Plan (IAP). Depending on the nature and extent of the spill, such activities may include wildlife reconnaissance, carcass recovery, hazing, wild bird capture and transport, safety and communications, and rehabilitation and release. The Incident Command must approve all migratory bird response actions. The objective of the response activities in reference to Roseate Terns and Piping Plovers will be to eliminate oil contact risk to the maximum extent practicable and rehabilitate any oiled birds.

13.2 Roseate Tern Protection

The highest probability of an oil spill would be located near the ESP in open waters and there is a 90% chance that an oil spill would be of 50 gallons or less (Etkin 2006). Oil spill response in Roseate Tern habitat during the months of May through September will be cognizant of the potential for foraging Roseate Terns in the spill area. If the spill is contained to open waters in Roseate Tern habitat, the USFWS, Tri-state Bird Rescue and Rehabilitation, and/or MDFW will assess the immediate presence or potential impact to Roseate Terns and may decide that a deterrence program should be implemented as part of the IAP.

Location: G:/GIS-Projects/E159/00-mxd/Avian_Monitoring_10/Tern_Staging_Breeding.mxd



ESS Group, Inc.

Engineers
Scientists
Consultants

CAPE WIND
Nantucket Sound, Massachusetts

Scale: 1" = 36,000'

0 10 Miles

Roseate Tern Colonies
Tern Staging Areas
Submarine cable route

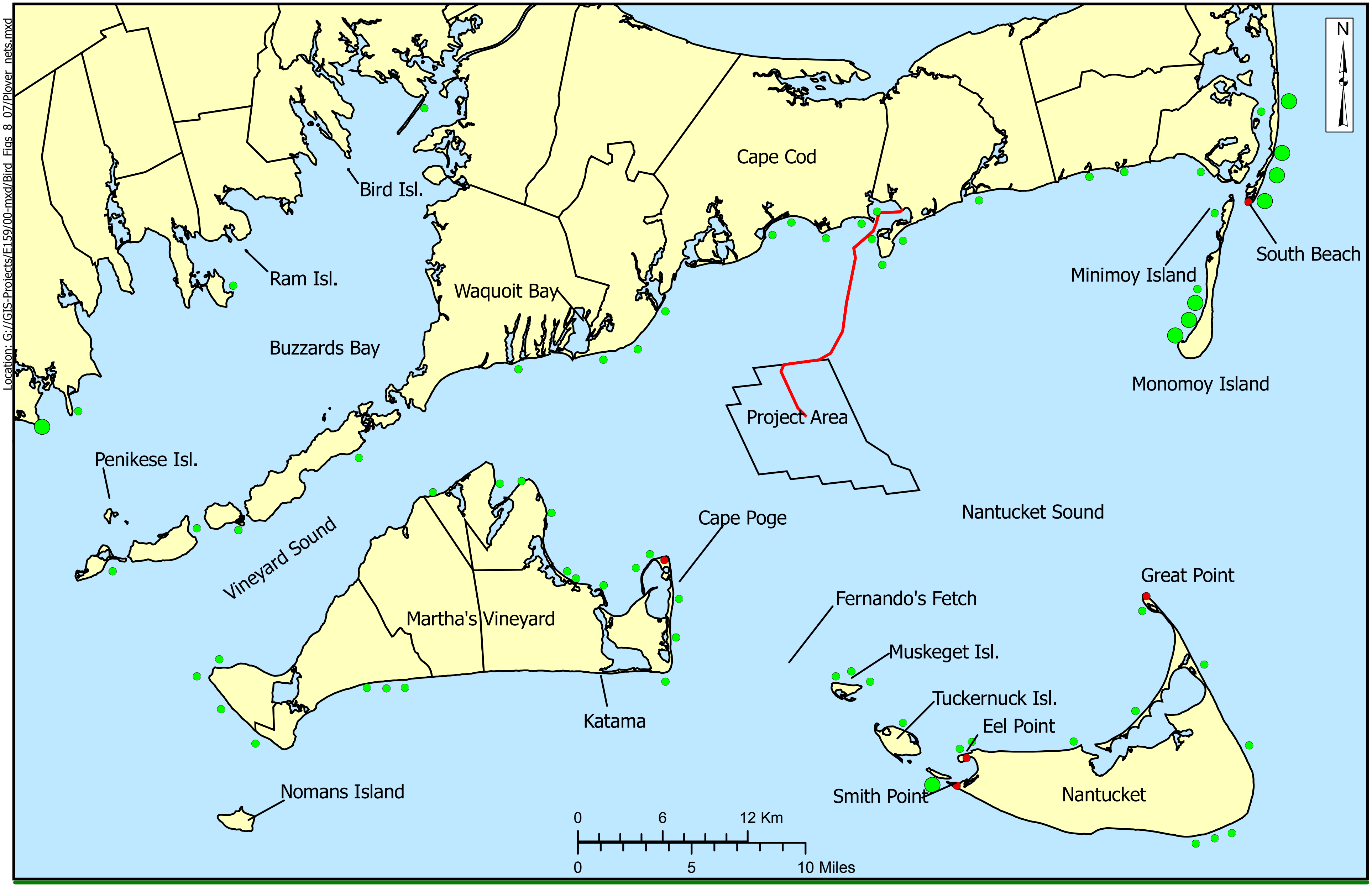
Resting
Major
Minor

Fixed Foraging
Major
Minor

Source: 1) Tern colony & staging locations compiled from Trull et al. 1999;
MMS Biological Assessment, 2008; RTRT, 2007;
MDFW-NHESP, personal communication and Jedrey et al. 2010.

Roseate Terns in Nantucket Sound and Buzzards Bay

Figure 13.1-1



ESS Group Inc.
Engineers
Scientists
Consultants

CAPE WIND
Nantucket Sound, Massachusetts

Scale: 1" = 6 miles

Source: 1) MassGIS, Town Boundary 2) ESS Cable Route, 2007
3) Monomoy shoreline digitized from MassGIS ortho, 2005,
4) Nest locations, Melvin and Mostello, 2007; MMS FEIR, 2009.

Piping Plover Nests in Nantucket Sound and Buzzards Bay

Piping Plover Nests
1-3
10

Potential Staging Areas
Submarine cable route

Figure 13.1-2

The deterrence program used to disperse Roseate Terns may include both auditory and visual techniques. If warranted, deterrence activities would be initiated as soon as possible following an oil spill to prevent Roseate Terns from establishing or continuing regular use patterns within the contaminated area. All deterrence activities require authorization from and oversight by the designated USFWS and/or MDFW representative. Any deterrence procedures would be consulted with the OSC to ensure compatibility and safety with other response activities. A communication line will be established by Incident Command between deterrence personnel and any Air Operations to avoid potential bird/aircraft collisions. The goal of the deterrence program will be to disperse and exclude un-oiled Roseate Terns from the contaminated area to reduce mortality.

Potential deterrence measures include cracker shells and scare cartridges, Phoneix Wailers, and propane cannons. Shell crackers and scare cartridges are fired from a 12-guage shotgun with the shell shot being replaced by a bulldog or M-80 firecracker that explodes at 100-150 yards (91-136 m). Shell crackers and scare cartridges are effective in offshore environments and have a relatively high radius of effectiveness (at least 200 m from source up to 1 km for some bird species (USFWS 2003). Phoenix Wailers broadcast loud, intermittent electronically synthesized sounds that are in the audible range of birds. Phoenix Wailers are useful in open water environments and can be deployed directly into the oil slick which maximizes bird dispersion. Propane cannons are another suitable audible dispersion mechanism for use in land or offshore spills. Deterrence measures may continue until the open water spill is cleaned-up.

If Roseate Terns are oiled, representatives from USFWS, Tri-state Bird Rescue and/or MDFW in consultation with the OCS will determine if bird capture is possible depending on the particular spill and response activities. Only authorized and trained individuals are allowed to undertake the capture and treatment of oiled birds under the direction of the Tri-state Bird Rescue. All capture activities will be developed within the Planning Section, coordinated within the Incident Command System, and must be authorized by the Incident Command in the event of an incident.

A bird capture program would be implemented as early as is safely possible in a spill response effort to increase the survival rates of Roseate Terns. Captured terns are to receive medical evaluation and preliminary treatment as quickly as possible. Bird capture techniques will be decided by representatives of USFWS and/or MDFW in consultation with Tri-state Bird Rescue. All bird carcasses that are discovered during capture will be collected to prevent secondary oiling. Capture teams will receive guidance from the USFWS regarding carcass collection protocols and how to record the location and condition of each carcass prior to collection.

All bird handling will be done in a manner that minimizes stress to the birds and ensures that the bird does not injure itself or the handler. Only authorized, permitted and trained individuals may handle oiled birds. Captured birds will be immediately placed onto containers that provide safety for both the bird and the handlers. Containers may include well-ventilated, solid-sided carriers, such as modified cardboard boxes, plastic carriers, or shipping kennels. Oil contaminated birds that are captures may require stabilization in the field prior to being transported to an on-shore rehabilitation facility.

13.3 Piping Plover Protection

Should the spill trajectory modeling suggest that the oil spill will approach land when Piping Plovers are within the action area, protective measures for known Piping Plover beaches will be implemented as necessary. These protective measures are described in Section 13. The USFWS and/or MDFW may require shorebird monitors in known Piping Plover beaches based on the oil spill trajectory.

Should these protective measures fail, rehabilitation and clean-up of Piping Plover habitat will occur in the intertidal zone near breeding or forging areas. Cleanup procedures for beaches used by Piping Plover will be dealt with on a case-by-case bases depending on the specifics of the shoreline oiling, plover location, nesting status, and tolerance for disturbance. All surface oil will be removed under the surveillance of shorebird monitors identified by the Wildlife Unit. Should any Piping Plovers become oiled, response activities will follow those response actions listed above for Roseate Terns.

14.0 MOBILIZATION AND DEPLOYMENT METHODS

Quick mobilization is a key component to response and recovery. All efforts will be made to contain and clean up the spill offshore, before any shoreline impacts occur. In order to minimize the initial response time, Cape Wind will maintain and response equipment at the Operations Center. A mobile response trailer with 1,000' of 18" containment boom, anchoring systems, safety equipment and sorbent materials/skimming equipment will be staged at the operations center for immediate deployment upon notification of an oil spill at the direction of the QI/IC. The Cape Wind work boat will be available for immediate deployment of response equipment and can be on-scene at any facility component within one hour of notification that a spill has occurred.

Spill response resources beyond the equipment stored on-site at the Cape Wind Operations Center will be provided by Clean Harbors. Clean Harbors equipment is stored at local service centers and is ready for immediate deployment in the event of an incident.

In the event that mobilization of shore-side resources are required on either Martha's Vineyard or Nantucket, the SMT will contact the Steamship Authority and arrange for equipment deliveries. The Steamship Authority operates nine large transport vessels, of which four are specifically designed for supply deliveries. The Steamship Authority operates terminals in Woods Hole, Hyannis, Nantucket, and Martha's Vineyard. Arrangements can be made through the general manager:

Steamship Authority
Wayne C. Lamson, General Manager
508-548-5011 ext. 200

The transit from the Steamship Authority terminal in Falmouth to Matha's Vineyard is approximately 45 minutes. The transit from Hyannis to Nantucket is approximately 2 hours and 15 minutes. The Steamship Authority vessels are designed to accept roll-on/roll-off equipment, therefore the loading/unloading of equipment is expected to be minimal in an emergency situation.

Table 14.0-1 provides a list of the Clean Harbors Northeast Region Service Centers and the estimated time of arrival for equipment that will be mobilized from those facilities (if necessary) to the Cape Wind

Operations Center, Martha's Vineyard, or Nantucket. In order to account for loading/unloading activities 30 minutes are factored into the ETA for Martha's Vineyard and Nantucket. The ultimate destination of the resources will depend on the nature of an actual spill event, but the table provides a useful resource to evaluate response time.

Table 14.0-1 Estimated Time of Arrival (ETA) from Regional Clean Harbors Service Centers

Clean Harbors Regional Service Centers	ETA (Hours)		
	Cape Wind Operations Center	Martha's Vineyard	Nantucket
Boston, MA 781-803-4100	1.25	2.5	4
Providence, RI 401-431-1847	1.5	2.75	4.25
Shrewsbury, MA 508-842-8014	1.75	3	4.5
Bow, NH 603-224-6626	2.5	3.75	5.25
Springfield, MA 413-827-8557	2.5	3.75	5.25
Bristol, CT 860-583-8917	3.25	4.5	6
Milford, CT 203-878-1740	3.25	4.5	6
South Portland, ME 207-799-8111	3.5	4.75	6.25
Albany, NY 518-434-0149	4	5.25	6.75
Newburgh, NY 845-566-5071	4.75	6	7.5
Edison, NJ 732-248-1997	5.25	6.5	8
Bangor, ME 207-262-9504	5.5	6.75	8.25
Philadelphia 856-467-3102	6.5	7.75	9.25
Baltimore, MD 301-939-6000	9.5	10.75	12.25
Richmond, VA 804-843-2180	12	13.25	14.75
Norfolk, VA 757-543-9240	12	13.25	14.75

In the event of a spill, the SROT will identify one or more onshore staging areas based on the spill location and direction of spill movement. Staging areas may be moved during the course of spill response depending on the movement of the plume. Four staging areas have been identified to satisfy the requirements of any conceivable spill scenario(see Figure 14.0-1). Two staging areas (Falmouth and

Yarmouth) are identified on the south shore of Cape Cod to support small (<35 feet) trailer-able response vessels that can be on scene and fully deployed within 3 or 4 hours. Two staging areas (Boston and Fairhaven, MA) are identified to support large vessels (>100 feet), which are capable of operating in rough weather but take slightly longer to reach the facility (~6.5 hours). All staging areas will provide adequate parking, telephone, restrooms, and potable water for the response team personnel.

Table 14.0-2 provides a matrix of travel times from the Clean Harbors Service Centers to the staging areas described above and ultimated the site of an incident. Based on the Worst Case Scenario response provided in Appendix H, only response equipment from the Boston and Providence Service Centers will be required for on water operations. Travel times have been determined using the online mapping application provided by Google.com.

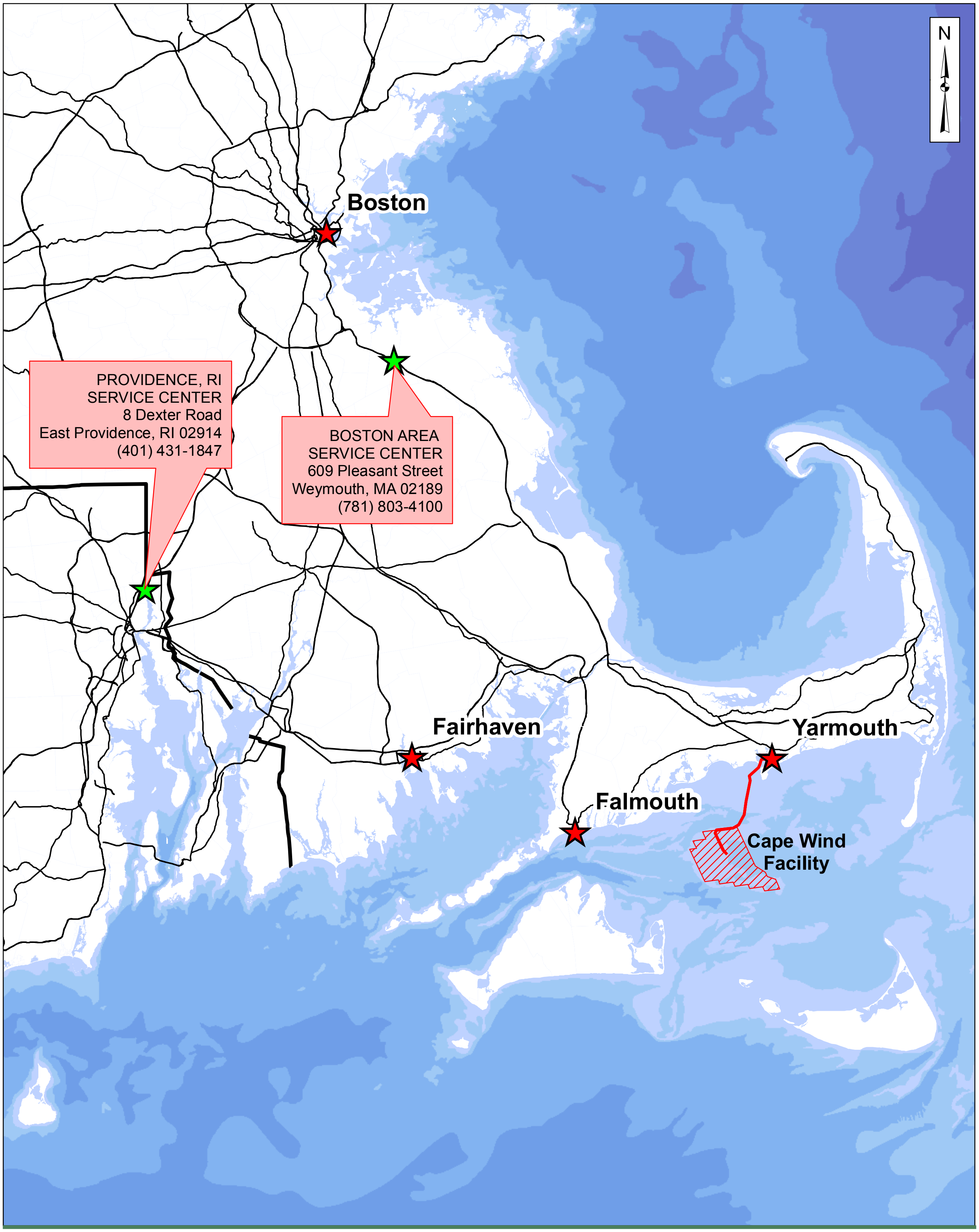
Cape Wind and Clean Harbors estimate that it will take approximately one to two hours to procure and mobilize the necessary equipment from the service centers to the staging areas. It will take another 30 minutes to either load the equipment onto vessels or deploy the trailer-able vessels at the staging area. The travel time between the staging area and the scene of the incident vary for each staging area, but will likely range from one to five hours. Once on-scene, Clean Harbors personnel will be immediately prepared to deploy the response equipment. Table 14.0-1 provides a summary of the response timeline for Clean Harbors to arrive on scene.

Table 14.0-2 Estimated Response Time for Clean Harbors to Incident Location

Equipment Storage Center	Staging Area	Response Times (Hours)			
		Transit to Staging Area	Loadout Time	Transit to Incident Location	Total ETA
Boston Service Center	**Boston**	1	0.5	5	**6.5**
	Fairhaven	1.5	0.5	3	**4.5**
	Yarmouth	1.5	0.5	1	**3**
	Falmouth	1.5	0.5	1	**3**
Providence Service Center	**Boston**	1.5	0.5	5	**7**
	Fairhaven	1	0.5	3	**4.5**
	Yarmouth	2	0.5	1	**3.5**
	Falmouth	2	0.5	1	**3.5**

If additional support is required, a number of agencies are available to support Clean Harbors. These agencies may include the local fire and police departments, and the local emergency response, USCG personnel, and other state agencies. Appendix F provides details for additional personnel, materials and supplies, equipment, and services available in the event of a release.

Location: G:/GIS-Projects/E159/00-mxd/OSRP/CW-Staging-Areas-rev.mxd



ESS Group, Inc.
Engineers
Scientists
Consultants

CAPE WIND
Nantucket Sound, Massachusetts

Scale: 1" = 13 Miles

0 13 Miles

Source: 1) Base data provided by MassGIS
2) ESS, Cape Wind Project Area, 2006
3) ESS, Spill Response Data, 2011

Legend

Staging Areas

Clean Harbors Service Centers

Oil Spill Response Plan
Staging Areas

Figure 14.0-1

For offshore spills, vessels will be utilized for spill response. A vessel support unit leader will be responsible for implementing a vessel routing plan for the incident and coordinating transportation on the water and between shore resources. Since most vessels will be supported by their own infrastructure, the vessel support unit may be requested to arrange fueling, dockage, maintenance and repair of vessels on a case-by-case basis.

The response techniques employed in a spill will depend on the product spilled, quantity, location, response time, weather conditions, responder capability, and availability of response equipment. Two methods have been identified for recovering oil; booms and skimming. Booms are floating barriers that can be set around a spill source to confine leaking oil, or set to prevent oil from reaching environmentally sensitive areas. Booms may also be towed between vessels to collect and concentrate spilled oil for removal by a skimmer. Skimming is a procedure that separates oil and water and removes oil from the surface of the water. The efficiency depends on the thickness of the slick, its viscosity, sea conditions, and storage capabilities. Skimmers are utilized with booms towed behind two vessels to form a "U" or a "J" shape. The oil collected by skimmers is pumped to a vessel, a temporary storage bladder, or a barge for further separation, storage, and disposal. (Rhode Island and Southeastern Massachusetts Area Contingency Plan, December 2010).

15.0 OIL AND DEBRIS REMOVAL PROCEDURES

15.1 Offshore Procedures

A list of available response equipment is provided in Appendix E. A summary of response and containment techniques for offshore spill response are described in Table 15.1-1. Cape Wind and Clean Harbors will develop an incident-specific spill response plan using appropriate containment and disposal techniques for the scale and nature of a specific spill incident. All efforts will be made to contain and clean up the spill offshore, before any shoreline impacts occur.

Table 15.1-1 Response and Containment for Offshore Procedures

Protection Technique	Purpose / Use	Advantages	Disadvantages
Free-oil recovery	Free-oil recovery or skimming may be utilized in the offshore and nearshore environment depending on spill location and trajectory. Deploy free-oil recovery strike teams upwind and up current. Use aerial surveillance to locate incoming oil slicks.	Can be used in a large area of open waters	Responders must have experience with on-water free-oil recovery.
Exclusive Booming	Used across small bays, harbor entrances, inlets, river or creek mouths where currents are less than 1 knot and breaking waves are less than 25cm in height.	Can be used in small areas; avoid oil entering a marina	Cannot be used for currents greater than 1 knot and waves greater than 25 cm; must be tended throughout the tide

Protection Technique	Purpose / Use	Advantages	Disadvantages
Diversion Booming	Used on inland streams where currents are greater than 1 knot; may be used across small bays, harbor entrances, inlets, river or creek mouths where currents exceed 1 knot and breaking waves are less than 25 cm, and on straight coastline areas to protect specific sites, where breaking waves are less than 25cm.	Minor disturbance to substrate at shoreline anchor points; can be used where currents are greater than 1 knot and waves exceed 25 cm.	Causes heavy shoreline oil contamination on downstream end.
Containment Booming	Used on open water to surround an approaching oil slick to protect the shoreline area where surf is present and oil slick does not cover a large area; also on inland waters where current are less than 1 knot.	Minor disturbance to substrate on in land anchor point.	No effect on open water
Sorbent Booming	Used on quiet water with minor oil contamination	Minor disturbance to shoreline at anchor points.	Cannot be used in rough waters

Oil and debris removal procedures require the deployment of containment boom, skimming devises, vacuum and fluid transfer equipment in conjunction with adequately sized oil contaminated substance storage plus marine vessels suitable for safe navigation of impacted area.

Upon notification, oil spill response equipment and trained personnel will mobilize to the release area utilizing marine vessels ranging in size from 19’ to 136’ in length. Vessels deploy with a variety of resources in support of containment booming, skimming and decontamination operations.

Containment boom is primarily utilized for oil deflection, collection and protection purposes. Containment boom is subject to marine currents, height and frequency of waves plus direction and velocity of the wind.

Containment boom is anchored in place preventing further oil and debris migration where deemed appropriate. Ancillary equipment, applicable for this operation, is typically (but not limited to) anchors and rope with tripping buoys.

Migrating oil and debris subject to wind and current requires containment boom paired with two or three maneuvering vessels employing the U, V or J containment techniques in conjunction with skimming operations to capture floating oil.

Recovery of oil is conducted by employing various types of skimming operations ranging from self propelled, dynamic or stationary methods. Efficient skimming and Effective Daily Recovery Capacity is dependant upon the type, thickness and viscosity of oil, presence of trash and debris, degree of emulsification, sea and weather conditions, plus vacuum and vessel storage capacity. The primary skimming device employed during an off shore spill would be the Oleophilic type or drum, brush, disk or belt skimmer. Oil and debris recovery is achieved through the use of mechanical, air and hydraulic vacuum systems and various types of transfer pumps collecting oil, water and debris in collection devices ranging from vacuum trucks and frac tanks secured to vessel decks or below deck vessel designed storage.

Collection of oil contaminated debris too large for boom and skimming strategies is manually or mechanically retrieved by maneuvering the vessel in place. Once on deck, debris is consolidated amongst like items i.e. recyclables, spent sorbents or household/industrial trash is then bagged and or containerized in DOT approved shipping containers for future on shore consolidation, transportation and recycling or disposal.

Decontamination of contaminated non-organic surfaces is achieved by application of approved cleaner, wiping or hot/cold power washing of impacted surfaces until clean. Workers utilize appropriate personal protective equipment and health and safety practices to ensure federal, state and local compliance.

15.2 Shallow Water Procedures

A list of available response equipment is provided in Appendix E. A summary of response and containment techniques for shallow waters and shoreline spill response are described in Table 15.2-1. Cape Wind and Clean Harbors will develop an incident-specific spill response plan using appropriate containment and disposal techniques for the scale and nature of a specific spill incident. All efforts will be made to contain and clean up the spill offshore, before any shoreline impacts occur.

Table 15.2-1 Response and Containment for Shallow Waters and Shoreline Procedures

Protection Technique	Purpose / Use	Advantages	Disadvantages
Beach Berms	Used on sandy, low energy beaches to protect the upper intertidal area from oil contamination.	Useful for areas that are exposed to the air at low tide and underwater at high tide	Disturbs upper 60cm of midintertidal zone
Berms and Dams	Used on shallow streams or rivers where booms are not available or cannot be deployed, or where dams are part of the hydrological control system.	May be used when booms cannot be used or not available	Disturbs stream or river bottom, adds suspended sediments to water.
Culvert Blocking	Flow of oil is excluded through a culvert leading into a river or a bay area. An inflatable culvert is used to plug in the culvert. If the inflatable plug is not available, plywood or similar sheeting material may be used with stacked sandbags against the plywood sheeting	Useful for culverts	More useful to block the culvert on the ebb tide; must be monitored frequently to ensure integrity.

Protection Technique	Purpose / Use	Advantages	Disadvantages
Exclusion Booming	Flow of oil may be excluded from entering streams and intertidal areas; an earthen berm, an underflow dam, or a small length of boom may be deployed across the stream mouth	May be used at high tide; restrict a pollutant from contaminating an area	Must be tended throughout the tide

Shallow water procedures employ the same booming and skimming strategies as "Off Shore Procedures" only with smaller vessel resources and spill recovery equipment. Additionally, shore line or coastal clean up work involves a significantly larger labor work force and variety of additional mechanical equipment necessary for oil collection and remediation of impacted areas.

Establishing staging areas in close proximity to shore line impacted sites are critical to oil collection and site remediation efficiency. Topography plays an integral role in the success of day to day operations limiting access of personnel and resources into contaminated areas. Non-accessible shore line areas can be reached via landing craft vessels or an alternate route could be constructed by use of tracking pads to facilitate wheeled equipment movement.

Beach and sand related shore line cleanup requires the use of many personnel wearing appropriate personal protective equipment with shovels, rakes, sorbent boom and pads, pom-poms plus clear bags to assist in the waste consolidation process. Mechanical devices such as 4x4 utility vehicles, skid steers, backhoes, bucket loaders, tracked excavators and articulated dump trucks, tractors with beach cleaning trailers or people movers and vacuum units could be deployed as necessary to combat continued threat of oil washing ashore.

Heavily vegetated shoreline requires non-evasive methods. This is accomplished by limiting the amount of mechanical equipment and increasing the labor force in those areas while flushing impacted areas with large amounts of fresh water and trimming oil contaminated vegetation without removal of subsequent root system to prevent erosion. Contaminated organic matter and soil is bagged then carried out and consolidated with other like waste streams at the closest staging area. Rinsate generated during flushing operations is collected in the same manner as booming and skimming procedures identified in Section 15.1.

Rocky shore line clean up is somewhat more challenging and requires much more diligence by workers to prevent injury due to slips trips and falls. Additionally, changes in tide could adversely affect clean up operations. Oil penetrating into rock fractures and burrows created by animals are just two of the many challenges associated with rocky coastline clean up. Techniques include flushing with high volume low pressure water to release oil trapped between or under boulders. Use of rags, pom-poms, absorbent boom and pads with degreasing cleaners are the preferred choice. Aggressive methods like hot and or cold water pressure washing of non-porous surfaces may be necessary depending upon how much oil adhesion is applied to contaminated rocks. Collection of waste streams during flushing operations is the same as booming and skimming procedures identified above.

16.0 OIL AND DEBRIS DISPOSAL PROCEDURES

Collection of oil, solids and debris requires a significantly sized staging or collection area.

Bulk oil and water captured by smaller vessel skimming operations is consolidated into larger capacity vessels with increased below deck capabilities or multiple frac tanks secured on deck of similar type vessels. Once docked, the oil water mixture is either transferred from vessel into transport tankers and delivered to one of Clean Harbors nearby permitted disposal facilities or transferred directly into a temporary collection area comprised of frac tanks or modular bulk containment resources for potential decanting operations if volume of waste is too high for sustained facility processing.

Decanting is the process of draining off recovered water from portable containers to increase the available storage capacity of recovered oil. When decanting is conducted properly, most of the oil can be removed from the water. In accordance with 33 CFR 153.301 and 40 CFR 300, decanting is considered an "incidental discharge" and does not require an additional permit or constitute a prohibited discharge. However, additional authority approval is necessary prior to decanting during oil recovery. Should decanting be deemed necessary during response operation, Clean Harbors (on behalf of Cape Wind) will request the authority to conduct such operations.

Solid wastes i.e. bagged oil contaminated soil, debris, trash, spent sorbents and personal protective equipment generated on site during shoreline clean up or off shore vessel recovery is comingled with like waste streams then bulked into multiple roll off containers for transport and disposal to permitted facility.

Should volume of oil contaminated soil increase such that it warrants separation from Solid Wastes identified above; separate roll off containers would be identified specifically for contaminated soil and both waste steams would be transported independently.

Non contaminated waste generated during clean up activities will be consolidated into staging area refuse identified roll off containers and managed separately from contaminated waste steams.

Clean Harbors is responsible for collecting and transporting any recovered materials obtained during the spill response. Clean Harbors is a permitted hazardous waste transporter capable of transporting materials both off-shore and on-shore.

Any material that is gathered during the spill response activities will be properly stored and disposed in accordance with state and federal waste regulations. The quantities of waste materials are expected to be minimal, and designated disposal locations have been identified. These facilities are authorized to accept the types of materials that are anticipated for oil spill containment and recovery operations, have adequate space for recovered materials, and are provided with secondary containment.

16.1 Designated Disposal Locations

SOLID WASTE AND DEBRIS

SEMASS Facility
141 Cranberry Road
Rochester, MA 02770

(508) 291-4400

RECOVERED OIL OR OIL/WATER MIXTURE

Clean Harbors Wouburn Oil Facility
252 Salem Street
Woburn, MA 01801
(781) 935-9066

17.0 WILDLIFE REHABILITATION PROCEDURES

Rehabilitation of oiled wildlife is a complex crisis oriented process that requires experienced staff with veterinary, technical, and crisis management skills. Federal and state permit clearances are required and compliance with Occupation Health and Safety Administration regulations are needed to conduct comprehensive oiled wildlife response. The ultimate goal of wildlife rehabilitation is to care for injured animals and rehabilitate them so they can return to the wild. Much of the information provided in the following sections was obtained from the U.S. Fish and Wildlife *Service's Best Practices for Migratory Bird Care During Oil Spill Response* (2003).

17.1 Migratory Birds

In the event of an oil spill, trust responsibilities for migratory birds and their habitats are given to the USFWS through the Comprehensive Environmental Response, Compensation and Liability Act, Clean Water Act, National Oil and Hazardous Substances Pollution Contingency Plan, Migratory Bird Treat Act, and Endangered Species Act. Massachusetts would become part of the response team if a spill that occurs at the ESP in federal waters expands to affect state waters. The Commonwealth of Massachusetts also has trust responsibilities for threatened and endangered species within state waters. The federal and state OSC are the only entities that have authority over bird-related response decisions. The OSC will consult with the USFWS and DFW when migratory birds may be impacted to determine appropriate response measures. For incidents that could significantly impact trust resources such as Roseate Terns or Piping Plovers, the OSC may request that an agency representative become part of the Incident Command.

A team of specialists from USFWS and MDFW will be assembled to make response decisions in consultation with the federal and/or state OSC. All bird-related response activities will be detailed in the Incident Action Plan (IAP), which is prepared with spill specific details and is therefore not part of the OSRP. Depending on the nature and extent of the spill, such activities may include wildlife reconnaissance, carcass recovery, hazing, wild bird capture and transport, safety and communications, and rehabilitation and release. The Incident Command must approve all migratory bird response actions.

If warranted, Tri-state Bird Rescue will be brought in for migratory bird oil spill response. Tri-state Bird Rescue and Research is staffed 24/7, 365 days a year and can be contacted at 800-710-0695 or 800 710-0696. Tri-State will communicate with USFWS, MDFW and OSC to discuss and coordinate their role in the response. Two to five key members of the Tri-state Brid Rescue Wildlife Response Team (Tri-State Team) will be deployed to the SROC as soon as possible, following notification to work with USFWS and MDFW to help determine priorities for wildlife response. The Tri-Sate Team will work with USFWS and MDFW to discuss methods of preventing contamination of wildlife at risk, safety hazard, hazing, baiting, retrieval equipment and methods for handling wildlife.

Oiled Bird Capture

Only authorized individuals and trained wildlife rehabilitators with appropriate licenses in accordance with 50 CFR 21.31 will be permitted to capture oiled birds. The authorization to capture oiled birds will be obtained from the Incident Command. Bird capture will be initiated as early as possible in the spill response in order to increase the survival rates of oiled birds, if deemed necessary.

Reconaissance surveys by boat and/or overflights will be conducted to locate oiled birds. Important bird colonies, breeding areas and nesting areas will be searched for oiled birds in case a bird leaves a contaminated area and returns to their breeding or nesting colony.

A variety of bird capture methods are available; however, the primary goal of each method is to capture the bird as quickly as possible with the least amount of disturbance and noise. The most common capture techniques include the use of dip nets, net guns, and mist nets. Other techniques have been developed to target specific species groups (e.g. the use of foot traps for small shorebirds). Spotlights may be used at night to capture birds that are especially skittish and difficult to approach during the day. The capture method will be selected based on the time-of-year, tides, current weather conditions and species targeted. Bird capture will also seek to minimize safety risk to wildlife rehabilitators. The priority will be to first capture oiled birds that have beached themselves and then approach oiled birds on the water by boat.

After capture, birds will be handled and transported to the wildlife rehabilitation facility in a manner that minimizes stress. Only authorized wildlife rehabilitors will be permitted to handle oiled birds. Birds will never be handled with bare hands; instead, lightweight gloves, sheets or towels will be used. Different handling grips can be used to maintain control over a bird's head and beak so the bird does not injure itself or the handler. The appropriate handling technique will be determined based on the size and species of the bird. If necessary, birds will be stabilized in the field by clearing the mouth, nostrils and eyes, regulating the bird's temperature and providing treatment for dehydration.

Appropriate transport containers with suitable ventilation such as cardboard boxes, plastic kennels or shipping kennels will be used to transport birds to the rehabilitation center. The transport container should provide suitable room for the bird, a secure lid and should be lined with oil-aborbent towels. The container will be labeled with pertinent information on the bird species, date/time of capture and notes on any injuries.

Bird Rehabilition Facility

A suitable facility for wildlife rehabilitation that meets the guidelines specified in the Rhode Island and Southeastern Massachusetts Area Contingency Plan will be identified. The facility must be large enough so that it can be easily reconfigured to accomadate the needs of the wildlife rehabilitation process. The facility must have appropriate hot and cold water capacity, electrical and lighting systems, HVAC systems, communications and supplies. A local facility for bird rehabilitation that meets these requirements is the Cape Wildlife Center in Barnstable, Massachusetts, which is a licensed wildlife rehabilitators and has trained volunteers for bird rescue.

Table 17.1-1 Wildlife Rehabilitators

Organization	Contact Information	Purpose
Cape Wildlife Center 4011 Main Street Barnstable, MA 02637 In partnership with The Fund for Animals	508-362-0111 (tel) 508-362-0268 (fax) capewildlifeinfo@fundforanimals.org Theresa Barbo (Director)	Provides emergency care and wildlife rehabilitation. Full-time veterinarian licensed wildlife rehabilitators volunteers.

Operations control/logistics, medical husbandry and cleaning areas will be established within the wildlife rehabilitation facility. The facility will be stocked with veterinarian supplies, bird husbandry supplies, disinfecting/cleaning supplies and other supplies needed for bird care and rehabilitation. Established bird areas within the facility will include bird intake, holding, wash/rinse, drying, pools/outdoor caging, food preparation, hospital/isolation, morgue/necropsy and storage locations. Staff and volunteers will be supervised by qualified members of the Tri-State Team and will provide medical and rehabilitative care for the oiled birds retrieved and delivered to the wildlife rehabilitation facility. Reports will be prepared for federal and state agencies as well as the responsible party and a chain of custody will be maintained as required.

Bird Rehabilitation Procedures

Wildlife rehabilitation will only be carried out after receiving authorization from the Incident Command. A rehabilitation permit from the U.S. Fish and Wildlife Service under 50 CFR 21.31 is required prior to treating oiled birds. The goal of wildlife rehabilition is to return formerly-oiled birds back into the wild.

Volunteers and/or agency personnel will be trained, prior to initiating rehabilitation efforts. Training will include details on the extent of hazards and safety training. Those that receive training will be required to sign informed consent of release forms. Training will be conducted by authorized and licensed wildlife rehabilitators. Tri-State Bird Rescue will provide an OSHA-trained staff with supervisory and oil spill experience, including wildlife rehabilitators, wildlife veterinarians, and support staff, to manage the wildlife response. In accordance with federal regulations, a veterinarian-of-record will provide medical supervision and oversight of the wildlife rehabilitation procedures.

Operations control/logistics, medical husbandry and cleaning areas will be established within the wildlife rehabilitation facility. Staff and volunteers will be supervised by qualified members of the Tri-State Team and will provide medical and rehabilitative care for the oiled birds retrieved and delivered to the wildlife rehabilitation facility. Reports will be prepared for federal and state agencies as well as the responsible party and a chain of custody will be maintained as required.

After arriving at the rehabilitation facility, oiled birds will first be evaluated and admitted. This process involves the collection of biomedical data and development of a plan to treat the bird. Blood samples will be collected at this time. The evaluation procedure will be conducted quickly to minimize additional stress and disturbance to the oiled bird. Priority for treatment will be given to those birds that are deemed to have the greatest chance of survival. However, an endangered species or a species of special concern may be given priority over resident waterfowl or an exotic species with the same or more critical condition.

After evaluation and admission, oiled birds willl be cleaned. Bird handlers will work in teams during cleaning, and continually monitor birds for signs of stress or instability. A non-toxic cleaning agent that is able to remove oil from the feathers without damaging them will be used. Typically, Dawn® dishwashing liquid is used as the cleaning agent.

Following cleaning, birds will be dried. An ambient background temperature of 90 to 95 degrees will be maintained using a pet dryer in the drying area. Heat lamps or brooders will be used to dry some species such as shorebirds. Birds will continue to be monitored during drying to check for stress and to ensure they do not overheat.

After drying, birds are transported to freshwater pools where they will be evaluated to determine whether they are fully "waterproofed". A bird will be considered waterproofed if it exhibits normal behavior, body temperature and buoyancy after 24 hours in a pool with no haul-outs.

Birds will be housed in pens that are designed to meet the needs of species being held. Housing will be used to keep any birds that need more time for recovery, or require additional treatment beyond oil removal. The housing area will be kept clean and disinfected as needed to minimize the likelihood of disease transmission and infections from spreading among birds.

Birds that have a low likelihood of recovery will be humanely euthanized in a designated euthanasia area. Euthanasia is appropriate for birds that will not be able to survive in the wild or are unsuitable for captivity. The euthanasia of birds will be conducted in consultation with the veterinarian-of-record and the U.S. Fish and Wildlife Service. Following euthanasia, necropsies may be conducted to provide information that could be valuable for treatment of oiled birds in the future.

Record-Keeping for Birds

Record collection enhances individual bird care, response evaluations, and the ability to accurately characterize the best practices for appropriate care. In-house records will be maintained at the rehabilitation facility and copies will be provided to the U.S. Fish and Wildlife Service. A final report that will include carcass chain-of-custodies and sample collection records will be sent to the USFWS at the end of rehabilitation activities.

The following scientific records will be kept as needed as described by the USFWS (2003):

- Resources-at-Risk Survey: provides information regarding the location of birds and other animals in relation to the spilled oil.

- Oiled bird sightings: records andmaps for all reports of oiled birds.
- Field Retrieval Report: records for all birds collected in field.
- Live Bird Log.
- Dead Bird Log.
- Run tally: list of all in-house birds by species and case number.
- Daily Care Report: documents care for each bird or enclosure, including feedings, treatments, medications, normal/abnormal activities.
- End-of-Day Report: reports current and next day's work.
- Oiled Bird Examination Report: individual record summary of retrieval, medical exm, diagnostic results, samples collected (chemical, blood, and tissue), cleaning, treatment, evaluation, chain-of-custody, federal bird bands, and final disposition.
- Record of samples collected (chemical, blood, feather, and tissue).
- Lab Analyses Report: identifies all samples sent to labs; requested analyses; and lab results.
- Federal Bird Banding Report: lists all birds banded for release.
- Necropsy Report.

The following administrative reports associated with an oil spill response effort for entities such as the Incident Command System, USFWS Rehabilitation Permit Office of Migratory Bird Management, and law enforcement, among others will be prepared as needed:

- Incident Action Plan – ICS 200: Includes Site Safety and Health Plan.
- Communications Plan, Organizational Structure, and Group Assignments.
- Pollution Incident Daily Resource Report (USCG Daily Report).
- Chain-of-Custody Record: all migratory birds that die as a result of contact with exposed oil represent evidence of a potential violation of the Migratory Bird Treaty Act. As such, each bird carcass must be labeled with an Evidence Seizure Tag provided by the USFWS Division of Law Enforcement or other law enforcement agency, through the designated USFWS representative. The bird carcasses are then delivered to a central, secure, evidence storage area and a Chain-of-Custody record completed.
- Qualified Wildlife Responder Application.
- Some sample administrative record forms are provided in Appendix 6.

17.2 Marine Mammals and Sea Turtles

Should the spill solely occur in federal waters, trust responsibilities for marine mammals would fall to the NOAA under the Marine Mammal Protection Act, the Endangered Species Act, and the National Contingency Plan. NOAA is authorized to manage and protect marine mammals during oil spills. NOAA and the USFWS share trustee resource responsibility for spill response as it pertains to sea turtles and their critical habitat, which would specifically involve clean up and rehabilitation. The MDFW is also a co-trustee for any wildlife in Massachusetts state waters or land.

If necessary, the trustees may initiate the Cape Cod Stranding Network (Cape Cod) and/or the New England Aquarium (Martha's Vineyard and Nantucket) to provide marine mammal response. The New England Aquarium and/or the Wellfleet Bay Wildlife Sanctuary would provide support for sea turtle response. Overall response to marine mammals and sea turtles would rely upon the local stranding programs, but may call upon the national network of responders to assist as needed. Local marine mammals and sea turtle responders are listed in Table 17.2-1 below and marine mammal and sea turtle rehabilitation facilities are listed in table 17.2-2. below. The information provided in the following sections was compiled from NOAA's *Marine Mammal Oil Spill Response Guidelines* (NOAA, 2006).

Oiled Marine Mammal and Sea Turtle Capture

Marine mammal and sea tutle capture will be conducted after receiving authorization from the Incident Command. Capture will be carried out in coordination with the USFWS and NOAA after recieiving necessary permits.

Reconnaissance for oiled marine mammals and sea turtles will be conducted based on the known extent of the spill. Beaches will be searched for any stranded marine mammals or sea turtles.

Because capture is stressful to marine wildife and can have negative consequences, capture will be limited to oiled marine mammals and sea turtles that have beached themselves. Capture will not be initiated on free-swimming marine mammals or turtles, even if they are swimming near the oil spill area. Capture will only be peformed by authorized individuals with appropriate training for capturing and transporting marine mammals.

The capture method will be selected based on the target species and site specific conditions. Long-handled dip nets, floating bag nets, and a net gun have all been used for capture. Depending on the species involved, aquatic captures may use tangle nets, float nets, or Wilson traps

After capture, the animal will be stabilized if necessary. Stabilization involves assessment of body temperature, general condition and dehydration status. If necessary, oil is removed from the eyes and nares and an electrolyte solution is provided at this time.

After capture and field stabilization, the oiled animal should be placed in a well-ventilated area on a stretcher or foam or in a transport box, airline kennel, or cage for transport. Animals should be staged in a quiet, sheltered area or moved directly into the transport vehicle. The cage should be large enough to allow the animal to lie down in a comfortable position. Animals should be monitored during transport and treated as necessary for hyper- or hypo-thermia. Sedation of animals is not recommended during transport to the rehabilitation center.

Marine Mammal and Sea Turtle Rehabilitation Center

The list of of marine mammal and sea turtle rehabilitators presented in Table 17.2-1 and 17.2-2 will be contacted to provide rehabilition services and a rehabilitation center on an as needed basis. The size of the spill and number of animals impacted by the spill will dictate the most appropriate facility to use for rehabilitation. The facility will include the following elements: intake/physical exam/evidence processing area; a veterinary hospital with isolation capabilities; indoor wildlife housing/caging areas; food storage and preparation facilities; animal washing and rinsing areas; drying areas; outdoor pool and pen areas; pathology facilities; volunteer training and eating areas (with restrooms); administrative offices with multiple phone/fax lines and conference space; storage; and access to a large parking area. The facility will have adequate ventilation, areas where precise environmental controls can be achieved, quarantine to isolate sick animals, adequate water supply and waste water stream to dispose to animal wastes.

Table 17.2-1 Marine Mammal and Sea Turtle Responders

Organization	Contact Information	Purpose
Cape Cod Stranding Network 290 Summer Street Yarmouth Port, MA 02675 Affiliated with IFAW	508-743-9548 (24hr Stranding Hotline) 508-744-2271 508-744-2099 (fax)	Responds to live and dead stranded marine mammals (whales, dolphins, porpoises, and seals) on the shores of Cape Cod & SE Mass. Plan and conduct relocation and release procedures; locate rehab facilities for appropriate candidates, and aid in the transport of animals to facilities. 5 FT staff ~300 trained volunteers Equipment including 2 trailers
New England Aquarium Marine Animal Rescue Program Central Wharf Boston, MA 02110-3309	617-973-5247 (Stranding Hotline) 617-973-5200	MA – Boston and South Stranding Response & Rehabilitation Cetaceans, Pinnipeds & Sea Turtles
Wellfleet Bay Wildlife Sanctuary Massachusetts Audubon 291 State Highway, Route 6 South Wellfleet, MA 02663	508-349-2615 wellfleet@massaudubon.org	MA – Cape Cod Stranding Response Sea Turtles

Table 17.2-2 Marine Mammal and Sea Turtle Wildlife Rehabilitators

Organization	Contact Information	Purpose

National Marine Life Center 120 Main Street P.O. Box 269 Buzzards Bay, MA 02532-0269	508-743-9888 508-759-5477 (fax) nmlc@nmlc.org Kathy Zagzebski Executive Director	Rehabilitation and release hospital for the treatment of stranded sea turtles and seals, with future plans to expand to treat dolphins, porpoises, and small whales. 3FT Staff 2 Veterinarians ~36 Volunteers
New England Aquarium Marine Animal Rescue Program Central Wharf Boston, MA 02110-3309	617-973-5200	Rehabilitation Cetaceans, Pinnipeds & Sea Turtles

Marine Mammal and Sea Turtle Rehabilitation Procedures

After arriving at the rehabilitation center, the marine mammal or sea turtle will go through a standard intake process. The inake process will begin with an examination to conduct an initial health assessment and to determine whether there are any life-threatening injuries that need immediate attention. The examination will include physical exam (weight/length), flipper inspection, blood sample collection, oil sample collection and photograph, Animals will be sexed, aged and tagged for identification. Animals will be monitored throughout the entire rehabilitation process to watch for stress or other instabilities.

After the initial intake, animals will be washed in a cleaning area that has been designed to accommodate the variety of animals that will need treatment. In general, animals will be washed in teams of two to three. Seals may require teams of four or five persons because the density of their fur requires much greater effort. Large animals, aggressive animals, seals may require sedation and veterinary assistance for washing and cleaning. The dishwasing soap Dawn® is recommended for cleaning as it is non-toxic and has been shown to remove oil from the fur. The washing technique will depend on the animal. Marine mammals with denser fur may be washed with a slightly different technique than those with less dense fur. Sea turtles may be washed using different techniqes than marine mammals. Further information on washing techniques is provided in NOAA's Marine Mammal Oil Spill Response Guidelines (2006).

After being washed, marine mammals and sea turtles will continue to be monitored for signs of stress. It generally takes a minimum of seven to ten days for marine mammals fur to recover its water repellency. Any marine mammals or sea turtles that do not appear to be able to recover will be humanely euthanized in consultation with a veterinarian and NOAA. Euthanasia is appropriate for oiled animals with injuries that will render it unable to survive in the wild or unsuitable for captivity.

Necropsies may be performed concurrent with response activities to identify cause of death in order to differentiate between a natural versus pollution related mortality. This information can be valuable for developing future oil response protocols. Necropsies will be supervised by the veterinarian-of-record in consultation with NOAA.

Record-keeping for Marine Mammals and Sea Turtles

Record collection enhances individual marine wildlife care, response evaluations, and the ability to accurately characterize the best practices for appropriate care. In-house records will be maintained at the rehabilitation facility and copies will be provided to NOAA when appropriate. A final report that will include carcass chain-of-custodies and sample collection records will be sent to NOAA at the end of rehabilitation activities.

Records collected will include:

- Field logbook - All pertinent information on field activities and sampling efforts should be recorded in a field logbook
- Animal logs - At admittance to a wildlife care and processing facility, the animal must be logged into appropriate databases
- Sample collection records
- Intake Forms – Collected during initial examination and arrival at facility
- Chain-of-custody forms
- Tissue-sampling records

17.3. Response Activities in Federal and Massachusetts-listed Roseate Tern and Piping Plover Habitats

In a spill situation, response and rehabilitation permit needs for endangered and threatened species will be determined by the USFWS on an emergency case-by-case basis administered under 50 CFR 17.21, 22, 31, and 32. Specific information with regard to obtaining a federal permit for endangered species rehabilitation will be obtained through the USFWS Region 5 Ecological Services Operations at Hadley, Massachusetts. USFWS personnel will handle all federal permit activities through the Ecological Services Field Office responsible for the area where the spill occurs. The Field Office will coordinate Migratory Bird and Endangered Species permit needs with appropriate Regional Office staff. Permitting for rehabilitation of Massachusetts-listed species would be through the Massachusetts Natural Heritage and Endangered Species Program and MDFW in Westborough, Massachusetts.

18.0 DISPERSANT USE PLAN

Use of dispersants in Nantucket Sound are not pre-approved and therefore will not be used by Cape Wind or its contractors.

19.0 IN SITU BURNING PLAN

The anticipated spill product is not conducive to in situ burning and therefore this technique will not implemented by Cape Wind or its contractors.

20.0 ALTERNATIVE CHEMICAL AND BIOLOGICAL RESPONSE STRATEGIES

Cape Wind and its contractors do not anticipate using alternative chemcial and biological response strategies

21.0 DOCUMENTATION

Cape Wind will utilize the standard forms and supporting documents developed as part of the Incident Command System (ICS). The ICS documentation will be used to convey directions for the accomplishment of the objectives and distributing information. Table 21.0-1 provides a list and description of the standard ICS forms that will be used by Cape Wind, which are provided in Appendix G.

Table 21.0-1 Summary of ICS Reporting Forms

Standard Form Title	Description
Incident Briefing ICS 201	Provides the Incident Command/Unified Command and General Staffs with basic information regarding the incident situation and the resources allocated to the incident. This form also serves as a permanent record of the initial response to the incident.
Incident Objectives ICS 202	Describes the basic strategy and objectives for use during each operational period.
Organization Assignment List ICS 203	Provides information on the response organization and personnel staffing.
Field Assignment ICS 204	Used to inform personnel of assignments. After Incident Command/Unified Command approve the objectives, staff members receive the assignment information contained in this form.
Incident Communications Plan ICS 205	Provides, in one location, information on the assignments for all communications equipment for each operational period. The plan is a summary of information. Information from the Incident Communications Plan on frequency assignments can be placed on the appropriate Assignment form (ICS Form 204).
Medical Plan ICS 206	Provides information on incident medical aid stations, transportation services, hospitals, and medical emergency procedures.
Incident Status Summary ICS 209	Summarizes incident information for staff members and external parties, and provides information to the Public Information Officer for preparation of media releases.
Check-In/Out List ICS 211	Used to check in personnel and equipment arriving at or departing from the incident. Check-in/out consists of reporting specific information that is recorded on the form.
General Message ICS 213	Used by: ▪ Incident dispatchers to record incoming messages that cannot be orally transmitted to the intended recipients. ▪ EOC and other incident personnel to transmit messages

Standard Form Title	Description
	via radio or telephone to the addressee. ▪ Incident personnel to send any message or notification that requires hard-copy delivery to other incident personnel.
Unit Log ICS 214	Provides a record of unit activities. Unit Logs can provide a basic reference from which to extract information for inclusion in any after-action report.
Operational Planning Worksheet ICS 215	Documents decisions made concerning resource needs for the next operational period. The Planning Section uses this Worksheet to complete Assignment Lists, and the Logistics Section uses it for ordering resources for the incident. This form may be used as a source document for updating resource information on other ICS forms such as the ICS 209.
Incident Action Plan Safety Analysis ICS 215A	Communicates to the Operations and Planning Section Chiefs safety and health issues identified by the Safety Officer.
Air Operations Summary ICS 220	Provides information on air operations including the number, type, location, and specific assignments of helicopters and fixed-wing aircraft.
General Plan ICS 226	Addresses long-term objectives approved by Incident Command/ Unified Command. These objectives are often expressed as milestones (i.e., timeframes for the completion of all and/or portions of incident response operations). A General Plan should identify the major tasks to be carried out through to the end of emergency response operations, the duration of the tasks, and the major equipment and personnel resources needed to accomplish the tasks within the specified duration.

22.0 PREVENTION MEASURES FOR FACILITIES LOCATED IN STATE WATERS

All oil bearing components of the Cape Wind Facility are located in federal water. The spill response methods and procedures described in Sections 13 through 17 may be required in state waters if the oil plume extends beyond the limit of federal water.

Appendix A

Facility Information

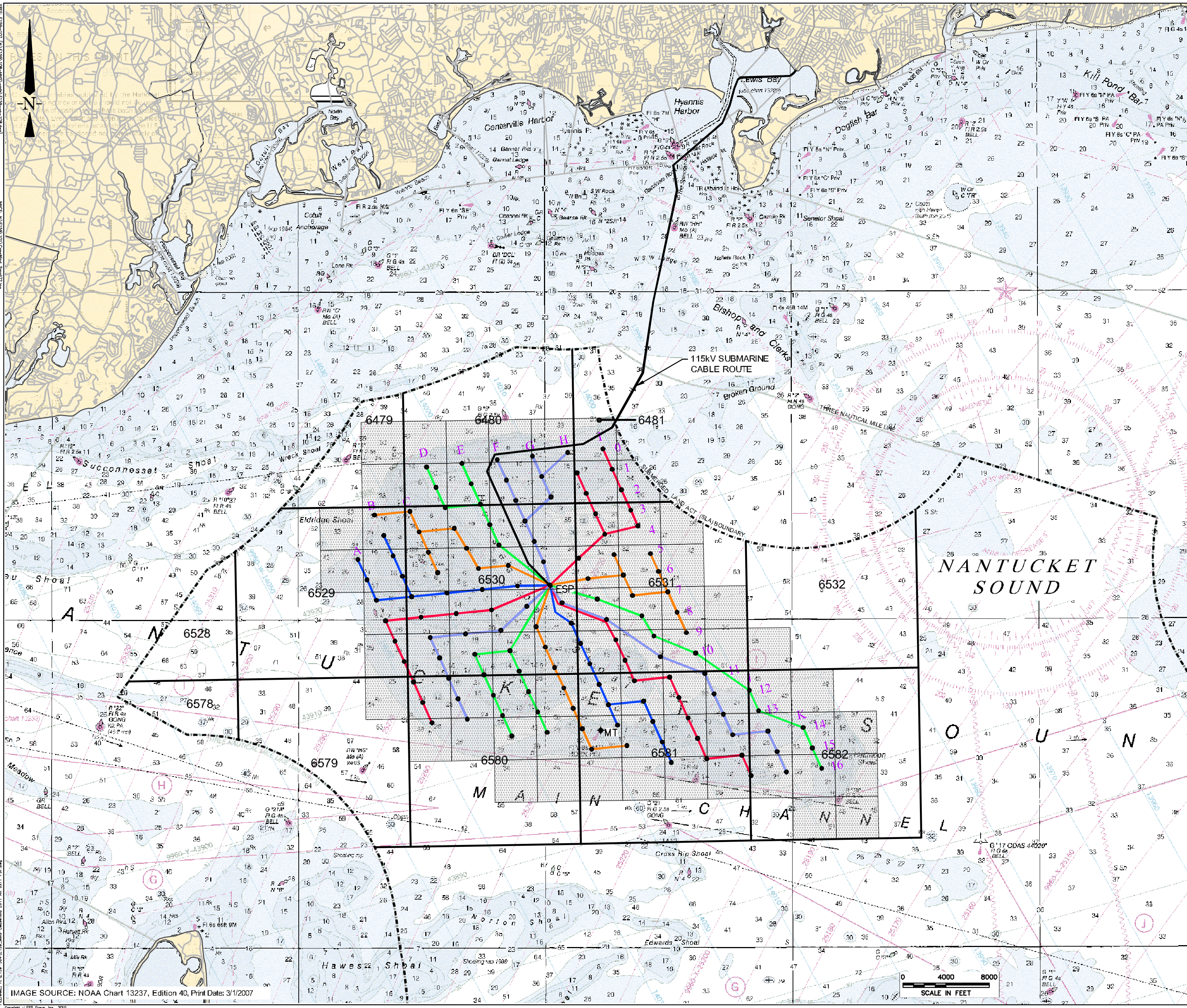
APPENDIX A
Facility Information

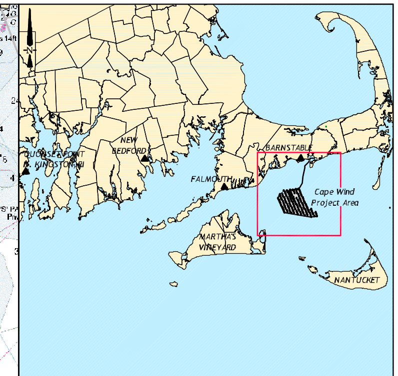
This Oil Spill Response Plan (OSRP) addresses the entirety of the Cape Wind Energy Facility in Nantucket Sound under the jurisdiction of the Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE). The facility includes 130 Wind Turbine Generators (WTG) and an Electric Service Platform (ESP). A Location Plat is provided below to illustrate the geographic area of the facility. Table 1 provides detailed information for each facility component (WTGs & ESP). The distance to shore measurement was made to the nearest point of land.

According to the Rating system for potential worst case discharge the Cape Wind Facility is Rated A (Volume 0 -1,000 barrells).

Note that in Appendix A of NTL06-G21 "Contents of a Regional or Sub-regional Oil Spill Response Plan (OSRP)," BOEMRE requires owners and operators to provide information about their facilities in four different tables (Tables 1 to 4). All applicable information for the Cape Wind facility is provided in Table A-1. Although a requirement under NTL06-G21, Tables 2 through 4 are excluded from this Appendix since they are not applicable to the Cape Wind facility for the following reasons:

- Table 2 – Cape Wind will not have any oil-containing ROW pipelines
- Table 3 – Cape Wind will not have any existing production platforms or satellite structures in state waters seaward of the coastline
- Table 4 – Cape Wind will not have any oil-containing state ROW pipelines in state waters seaward of the coastline





LOCUS MAP

Scale: 1"= 12 Miles

LEGEND:

6580 OCS Blocks Official Protraction Diagram (OPD) Providence NK19-07

Cape Wind Associates LLC Lease Area

Submerged Land Act (SLA) Boundary

Inner Array - 33kV Submarine Cable (Multi-colors)

115kV Submarine Cable

Wind Turbine

ESS Group, Inc.

Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW		CHECKED BY: PRW	
DESIGNED BY:		APPROVED BY: PRW	

Cape Wind Associates, LLC

Cape Wind Project

Location Plat

PROJECT No.: E159-504.1

DRAWING No. 1

DATE OF ISSUE: October 2010

SHEET No.: 1 of 1

SCALE: As Shown

1	2	3	4	5	6	7
Area	**Block**	**Lease**	**Facility (Location) ID**	**Water Depth (MLLW feet)**	**Latitude and Longitude (deg. min. sec.)**	**Distance from Shore (miles)**
OPD Providence NK19-07	6530	OCS-A 0478	ESP[1]	28.0	41 30 31.91088 N, 70 19 54.73761 W	7.5
OPD Providence NK19-07	6529	OCS-A 0478	A4	22.9	41 30 55.77389 N, 70 23 48.35701 W	5.0
OPD Providence NK19-07	6529	OCS-A 0478	A5	25.3	41 30 37.08711 N, 70 23 37.11240 W	5.4
OPD Providence NK19-07	6529	OCS-A 0478	A6	21.8	41 30 18.40254 N, 70 23 25.83975 W	5.8
OPD Providence NK19-07	6529	OCS-A 0478	A7	25.9	41 29 59.71501 N, 70 23 14.59952 W	6.1
OPD Providence NK19-07	6529	OCS-A 0478	A8	32.1	41 29 41.02910 N, 70 23 03.33086 W	6.2
OPD Providence NK19-07	6529	OCS-A 0478	A9	24.4	41 29 22.34190 N, 70 22 52.09290 W	6.0
OPD Providence NK19-07	6580	OCS-A 0478	A10	25.0	41 29 03.65340 N, 70 22 40.85804 W	5.8
OPD Providence NK19-07	6580	OCS-A 0478	A11	27.2	41 28 44.96457 N, 70 22 29.62366 W	5.6
OPD Providence NK19-07	6580	OCS-A 0478	A12	30.2	41 28 26.27541 N, 70 22 18.39108 W	5.5
OPD Providence NK19-07	6529	OCS-A 0478	B2	28.7	41 31 36.41158 N, 70 23 27.96360 W	4.8
OPD Providence NK19-07	6529	OCS-A 0478	B3	19.8	41 31 17.72429 N, 70 23 16.71881 W	5.1
OPD Providence NK19-07	6529	OCS-A 0478	B4	14.1	41 30 59.04369 N, 70 23 05.37957 W	5.5
OPD Providence NK19-07	6529	OCS-A 0478	B5	13.7	41 30 40.36346 N, 70 22 54.04306 W	5.8
OPD Providence NK19-07	6530	OCS-A 0478	B6	16.1	41 30 21.66924 N, 70 22 42.87661 W	6.2
OPD Providence NK19-07	6530	OCS-A 0478	B7	18.0	41 30 02.98152 N, 70 22 31.63176 W	6.5
OPD Providence NK19-07	6530	OCS-A 0478	B8	23.2	41 29 44.29349 N, 70 22 20.38870 W	6.6
OPD Providence NK19-07	6530	OCS-A 0478	B9	22.2	41 29 25.60414 N, 70 22 09.15401 W	6.4

1	2	3	4	5	6	7
Area	**Block**	**Lease**	**Facility (Location) ID**	**Water Depth (MLLW feet)**	**Latitude and Longitude (deg. min. sec.)**	**Distance from Shore (miles)**
OPD Providence NK19-07	6580	OCS-A 0478	B10	22.3	41 29 06.91448 N, 70 21 57.92242 W	6.2
OPD Providence NK19-07	6580	OCS-A 0478	B11	25.0	41 28 48.22449 N, 70 21 46.69130 W	6.1
OPD Providence NK19-07	6580	OCS-A 0478	B12	28.0	41 28 29.53517 N, 70 21 35.46329 W	6.0
OPD Providence NK19-07	6530	OCS-A 0478	C2	13.3	41 31 39.68764 N, 70 22 44.86759 W	5.2
OPD Providence NK19-07	6530	OCS-A 0478	C3	15.4	41 31 20.99325 N, 70 22 33.71482 W	5.6
OPD Providence NK19-07	6530	OCS-A 0478	C4	15.5	41 31 02.30340 N, 70 22 22.48232 W	5.9
OPD Providence NK19-07	6530	OCS-A 0478	C5	11.9	41 30 43.62200 N, 70 22 11.14907 W	6.3
OPD Providence NK19-07	6530	OCS-A 0478	C6	14.1	41 30 24.92663 N, 70 21 59.98588 W	6.6
OPD Providence NK19-07	6530	OCS-A 0478	C7	18.0	41 30 06.23776 N, 70 21 48.74430 W	7.0
OPD Providence NK19-07	6530	OCS-A 0478	C8	21.7	41 29 47.54856 N, 70 21 37.50450 W	7.0
OPD Providence NK19-07	6530	OCS-A 0478	C9	22.9	41 29 28.85611 N, 70 21 26.29541 W	6.9
OPD Providence NK19-07	6530	OCS-A 0478	C10	19.9	41 29 10.16530 N, 70 21 15.07364 W	6.7
OPD Providence NK19-07	6580	OCS-A 0478	C11	27.2	41 28 51.47318 N, 70 21 03.85367 W	6.6
OPD Providence NK19-07	6580	OCS-A 0478	C12	28.9	41 28 32.78172 N, 70 20 52.63548 W	6.5
OPD Providence NK19-07	6580	OCS-A 0478	C13	41.5	41 28 14.08896 N, 70 20 41.42697 W	6.5
OPD Providence NK19-07	6480	OCS-A 0478	D0	21.9	41 32 20.32366 N, 70 22 24.44582 W	4.8
OPD Providence NK19-07	6480	OCS-A 0478	D1	21.9	41 32 01.63460 N, 70 22 13.20332 W	5.2
OPD Providence NK19-07	6530	OCS-A 0478	D2	12.7	41 31 42.94522 N, 70 22 01.96262 W	5.6
OPD Providence NK19-07	6530	OCS-A 0478	D3	14.5	41 31 24.24969 N, 70 21 50.81312 W	6.0

1	2	3	4	5	6	7
Area	**Block**	**Lease**	**Facility (Location) ID**	**Water Depth (MLLW feet)**	**Latitude and Longitude (deg. min. sec.)**	**Distance from Shore (miles)**
OPD Providence NK19-07	6530	OCS-A 0478	D4	14.4	41 31 05.82707 N, 70 21 36.04193 W	6.4
OPD Providence NK19-07	6530	OCS-A 0478	D5	18.5	41 30 47.38255 N, 70 21 21.57281 W	6.8
OPD Providence NK19-07	6530	OCS-A 0478	D6	17.7	41 30 28.18056 N, 70 21 17.07951 W	7.1
OPD Providence NK19-07	6530	OCS-A 0478	D7	8.9	41 30 09.49538 N, 70 21 05.77414 W	7.4
OPD Providence NK19-07	6530	OCS-A 0478	D8	23.2	41 29 50.79921 N, 70 20 54.61910 W	7.5
OPD Providence NK19-07	6530	OCS-A 0478	D9	21.1	41 29 32.10172 N, 70 20 43.46453 W	7.4
OPD Providence NK19-07	6530	OCS-A 0478	D10	21.2	41 29 13.40975 N, 70 20 32.24602 W	7.2
OPD Providence NK19-07	6580	OCS-A 0478	D11	30.3	41 28 54.71647 N, 70 20 21.02931 W	7.2
OPD Providence NK19-07	6580	OCS-A 0478	D12	24.6	41 28 36.02386 N, 70 20 09.81438 W	7.1
OPD Providence NK19-07	6580	OCS-A 0478	D13	35.3	41 28 17.33383 N, 70 19 58.55788 W	7.0
OPD Providence NK19-07	6480	OCS-A 0478	E0	18.6	41 32 23.57913 N, 70 21 41.53312 W	4.9
OPD Providence NK19-07	6480	OCS-A 0478	E1	22.2	41 32 04.88891 N, 70 21 30.29389 W	5.3
OPD Providence NK19-07	6480	OCS-A 0478	E2	22.5	41 31 46.19837 N, 70 21 19.05646 W	5.7
OPD Providence NK19-07	6530	OCS-A 0478	E3	21.9	41 31 27.50750 N, 70 21 07.82212 W	6.1
OPD Providence NK19-07	6530	OCS-A 0478	E4	22.4	41 31 08.81631 N, 70 20 56.58827 W	6.5
OPD Providence NK19-07	6530	OCS-A 0478	E5	22.6	41 30 50.12578 N, 70 20 45.35752 W	6.9
OPD Providence NK19-07	6530	OCS-A 0478	E6	22.7	41 30 31.42908 N, 70 20 34.18640 W	7.3
OPD Providence NK19-07	6530	OCS-A 0478	E7	24.1	41 30 12.73692 N, 70 20 22.95791 W	7.7
OPD Providence NK19-07	6530	OCS-A 0478	E8	13.1	41 29 54.05025 N, 70 20 11.65892 W	8.0

1	2	3	4	5	6	7
Area	**Block**	**Lease**	**Facility (Location) ID**	**Water Depth (MLLW feet)**	**Latitude and Longitude (deg. min. sec.)**	**Distance from Shore (miles)**
OPD Providence NK19-07	6530	OCS-A 0478	E9	28.2	41 29 35.35260 N, 70 20 00.50761 W	7.9
OPD Providence NK19-07	6530	OCS-A 0478	E10	24.9	41 29 16.65947 N, 70 19 49.28580 W	7.8
OPD Providence NK19-07	6580	OCS-A 0478	E11	19.9	41 28 57.96601 N, 70 19 38.06447 W	7.7
OPD Providence NK19-07	6580	OCS-A 0478	E12	47.4	41 28 39.27223 N, 70 19 26.84624 W	7.6
OPD Providence NK19-07	6581	OCS-A 0478	E13	20.7	41 28 20.57067 N, 70 19 15.73175 W	7.6
OPD Providence NK19-07	6581	OCS-A 0478	E14	29.8	41 28 01.87983 N, 70 19 04.47163 W	7.6
OPD Providence NK19-07	6480	OCS-A 0478	F0	17.0	41 32 26.83015 N, 70 20 58.61924 W	5.1
OPD Providence NK19-07	6480	OCS-A 0478	F1	20.6	41 32 08.13878 N, 70 20 47.38328 W	5.5
OPD Providence NK19-07	6480	OCS-A 0478	F2	24.5	41 31 49.44708 N, 70 20 36.14910 W	5.9
OPD Providence NK19-07	6530	OCS-A 0478	F3	24.3	41 31 30.75506 N, 70 20 24.91804 W	6.3
OPD Providence NK19-07	6530	OCS-A 0478	F4	25.6	41 31 12.06271 N, 70 20 13.68744 W	6.7
OPD Providence NK19-07	6530	OCS-A 0478	F5	27.6	41 30 53.36616 N, 70 20 02.51123 W	7.0
OPD Providence NK19-07	6530	OCS-A 0478	F7	31.2	41 30 15.97986 N, 70 19 40.07476 W	7.8
OPD Providence NK19-07	6530	OCS-A 0478	F8	34.0	41 29 57.28621 N, 70 19 28.84476 W	8.2
OPD Providence NK19-07	6531	OCS-A 0478	F9	27.2	41 29 38.59323 N, 70 19 17.62310 W	8.4
OPD Providence NK19-07	6531	OCS-A 0478	F10	19.9	41 29 19.89894 N, 70 19 06.40456 W	8.3
OPD Providence NK19-07	6581	OCS-A 0478	F11	33.9	41 29 01.20141 N, 70 18 55.22328 W	8.3
OPD Providence NK19-07	6581	OCS-A 0478	F12	36.4	41 28 42.50938 N, 70 18 43.97152 W	8.2
OPD Providence NK19-07	6581	OCS-A 0478	F13	22.7	41 28 23.81027 N, 70 18 32.81614 W	8.2

1	2	3	4	5	6	7
Area	**Block**	**Lease**	**Facility (Location) ID**	**Water Depth (MLLW feet)**	**Latitude and Longitude (deg. min. sec.)**	**Distance from Shore (miles)**
OPD Providence NK19-07	6581	OCS-A 0478	F14	24.6	41 28 05.11468 N, 70 18 21.60343 W	8.2
OPD Providence NK19-07	6480	OCS-A 0478	G0	15.8	41 32 30.07480 N, 70 20 15.72521 W	5.3
OPD Providence NK19-07	6480	OCS-A 0478	G1	16.2	41 32 11.38227 N, 70 20 04.49383 W	5.7
OPD Providence NK19-07	6480	OCS-A 0478	G2	17.3	41 31 52.68943 N, 70 19 53.27081 W	6.1
OPD Providence NK19-07	6531	OCS-A 0478	G5	35.3	41 30 56.61084 N, 70 19 19.56121 W	7.1
OPD Providence NK19-07	6531	OCS-A 0478	G6	38.2	41 30 37.91283 N, 70 19 08.39662 W	7.3
OPD Providence NK19-07	6531	OCS-A 0478	G7	41.7	41 30 19.21835 N, 70 18 57.17466 W	7.6
OPD Providence NK19-07	6531	OCS-A 0478	G8	42.2	41 30 00.52355 N, 70 18 45.95580 W	7.9
OPD Providence NK19-07	6531	OCS-A 0478	G9	41.2	41 29 41.82843 N, 70 18 34.73742 W	8.2
OPD Providence NK19-07	6531	OCS-A 0478	G10	19.6	41 29 23.13397 N, 70 18 23.52213 W	8.5
OPD Providence NK19-07	6581	OCS-A 0478	G11	29.7	41 29 04.43530 N, 70 18 12.34412 W	8.8
OPD Providence NK19-07	6581	OCS-A 0478	G12	33.2	41 28 45.74210 N, 70 18 01.09561 W	8.8
OPD Providence NK19-07	6581	OCS-A 0478	G13	35.0	41 28 27.04085 N, 70 17 49.94351 W	8.8
OPD Providence NK19-07	6581	OCS-A 0478	G14	22.1	41 28 08.34510 N, 70 17 38.73405 W	8.8
OPD Providence NK19-07	6581	OCS-A 0478	G15	47.6	41 27 49.64707 N, 70 17 27.53427 W	8.7
OPD Providence NK19-07	6480	OCS-A 0478	H0	21.8	41 32 33.31792 N, 70 19 32.78791 W	5.5
OPD Providence NK19-07	6481	OCS-A 0478	H1	16.4	41 32 14.62522 N, 70 19 21.55847 W	5.8
OPD Providence NK19-07	6481	OCS-A 0478	H2	17.8	41 31 55.92829 N, 70 19 10.36108 W	6.0
OPD Providence NK19-07	6531	OCS-A 0478	H3	32.4	41 31 37.23687 N, 70 18 59.10630 W	6.3

1	2	3	4	5	6	7
Area	**Block**	**Lease**	**Facility (Location) ID**	**Water Depth (MLLW feet)**	**Latitude and Longitude (deg. min. sec.)**	**Distance from Shore (miles)**
OPD Providence NK19-07	6531	OCS-A 0478	H4	31.5	41 31 18.54220 N, 70 18 47.88224 W	6.5
OPD Providence NK19-07	6531	OCS-A 0478	H5	34.3	41 30 59.84722 N, 70 18 36.66128 W	6.8
OPD Providence NK19-07	6531	OCS-A 0478	H6	36.4	41 30 41.14805 N, 70 18 25.49996 W	7.1
OPD Providence NK19-07	6531	OCS-A 0478	H7	44.8	41 30 22.45242 N, 70 18 14.28126 W	7.4
OPD Providence NK19-07	6531	OCS-A 0478	H8	55.6	41 30 03.75647 N, 70 18 03.06567 W	7.7
OPD Providence NK19-07	6531	OCS-A 0478	H9	50.5	41 29 45.31893 N, 70 17 48.41865 W	8.0
OPD Providence NK19-07	6531	OCS-A 0478	H10	43.7	41 29 26.36358 N, 70 17 40.63852 W	8.3
OPD Providence NK19-07	6581	OCS-A 0478	H11	44.3	41 29 07.66764 N, 70 17 29.42698 W	8.6
OPD Providence NK19-07	6581	OCS-A 0478	H12	40.5	41 28 48.97040 N, 70 17 18.21853 W	9.0
OPD Providence NK19-07	6581	OCS-A 0478	H13	13.0	41 28 30.42276 N, 70 17 07.41467 W	9.3
OPD Providence NK19-07	6581	OCS-A 0478	H14	14.0	41 28 11.56987 N, 70 16 55.74002 W	9.1
OPD Providence NK19-07	6581	OCS-A 0478	H15	22.0	41 27 52.87190 N, 70 16 44.66697 W	8.8
OPD Providence NK19-07	6481	OCS-A 0478	I0	22.8	41 32 36.55564 N, 70 18 49.87046 W	5.2
OPD Providence NK19-07	6481	OCS-A 0478	I1	19.4	41 32 17.86079 N, 70 18 38.64429 W	5.4
OPD Providence NK19-07	6481	OCS-A 0478	I2	25.8	41 31 59.16370 N, 70 18 27.45017 W	5.7
OPD Providence NK19-07	6531	OCS-A 0478	I3	32.1	41 31 40.47112 N, 70 18 16.19865 W	6.0
OPD Providence NK19-07	6531	OCS-A 0478	I4	32.7	41 31 26.00431 N, 70 18 07.56009 W	6.2
OPD Providence NK19-07	6531	OCS-A 0478	I5	37.9	41 31 00.69969 N, 70 17 52.38729 W	6.6
OPD Providence NK19-07	6531	OCS-A 0478	I6	41.9	41 30 44.37885 N, 70 17 42.60211 W	6.9

1	2	3	4	5	6	7
Area	**Block**	**Lease**	**Facility (Location) ID**	**Water Depth (MLLW feet)**	**Latitude and Longitude (deg. min. sec.)**	**Distance from Shore (miles)**
OPD Providence NK19-07	6531	OCS-A 0478	I7	45.9	41 30 25.68206 N, 70 17 31.38668 W	7.2
OPD Providence NK19-07	6531	OCS-A 0478	I8	14.7	41 30 06.98495 N, 70 17 20.17435 W	7.5
OPD Providence NK19-07	6531	OCS-A 0478	I9	48.8	41 29 48.28751 N, 70 17 08.96249 W	7.8
OPD Providence NK19-07	6531	OCS-A 0478	I10	49.5	41 29 29.58975 N, 70 16 57.75374 W	8.2
OPD Providence NK19-07	6581	OCS-A 0478	I11	16.2	41 29 10.89167 N, 70 16 46.54545 W	8.5
OPD Providence NK19-07	6581	OCS-A 0478	I12	28.7	41 28 52.19039 N, 70 16 35.38364 W	8.9
OPD Providence NK19-07	6581	OCS-A 0478	I13	25.0	41 28 33.49070 N, 70 16 24.19469 W	9.2
OPD Providence NK19-07	6581	OCS-A 0478	I14	19.4	41 28 14.79195 N, 70 16 12.99215 W	9.2
OPD Providence NK19-07	6581	OCS-A 0478	I15	17.3	41 27 56.09230 N, 70 16 01.79850 W	8.9
OPD Providence NK19-07	6582	OCS-A 0478	I16	18.4	41 27 37.39263 N, 70 15 50.60702 W	8.6
OPD Providence NK19-07	6582	OCS-A 0478	J12	47.1	41 28 55.41269 N, 70 15 52.46083 W	8.8
OPD Providence NK19-07	6582	OCS-A 0478	J13	24.1	41 28 36.70898 N, 70 15 41.31851 W	9.1
OPD Providence NK19-07	6582	OCS-A 0478	J14	25.1	41 28 18.00878 N, 70 15 30.11885 W	9.4
OPD Providence NK19-07	6582	OCS-A 0478	J15	31.8	41 27 59.30443 N, 70 15 18.98140 W	9.1
OPD Providence NK19-07	6582	OCS-A 0478	J16	39.0	41 27 40.60359 N, 70 15 07.78530 W	8.8
OPD Providence NK19-07	6582	OCS-A 0478	K14	27.3	41 28 21.22147 N, 70 14 47.24476 W	9.5
OPD Providence NK19-07	6582	OCS-A 0478	K15	30.7	41 28 02.51598 N, 70 14 36.11058 W	9.3
OPD Providence NK19-07	6582	OCS-A 0478	K16	31.9	41 27 43.81398 N, 70 14 24.91774 W	9.0

Wind Turbine Generators

The Project will utilize pitch-regulated upwind WTGs with active yaw and a three-blade rotor. The WTG nacelle hub height will be approximately 264.1 feet (80.5 meters) from the Mean Low Lower Water (MLLW) datum (0.0 feet = MLLW). The main components of the WTG are the rotor, the transmission system, the generator, the yaw system, and the control and electrical systems, which are located within the WTGs nacelle. The WTGs nacelle will be mounted on a manufactured steel tower supported by a monopile foundation system. The main support tower will have a base diameter of either approximately 16.75 feet or 18 feet (5.1-5.5 meters) at the MLLW datum plane (depending upon water depth). At the base of the tower, a pre-fabricated access platform and service vessel landing (approximately 32 feet (9.6 meters) from MLLW) will be provided. The WTG and all its components described in this section will be designed to IEC standard 61400-1 or 61400-3 as applicable. The design is also verified by an independent Certified Verification Agent. Design criteria for the turbine and foundation system will also include the hurricane criteria as indicated in the API-RP 2A WSD considering a 100-year storm occurrence and will also be designed to the loads specified in the controlling design standards. The steel tower and nacelle will be mounted on a transition piece which is attached through a grouted connection to a welded steel monopile foundation as described in more detail below.

1) Nacelle

   The nacelle is the portion of the WTG that encompasses the drive train and supporting electromotive generating systems that produce the wind-generated energy. For offshore applications, the nacelle is specially designed to seal the interior from salt spray and moisture while providing controlled environmental conditions for its working components. The nacelle includes maintenance cranes, access hatches, and also has wind sensors located on its peak.

2) Rotor

   The WTG rotor has three blades manufactured from fiberglass-reinforced epoxy, mounted on the hub. The rotors will have an overall diameter of approximately 351 feet (107 meters). The rotor blades are pitch-regulated to continually control their pitch angle to the wind in order to optimize wind energy production with minimal noise. The blades will be pitched to prevent rotation when wind speed exceeds 55 mph (25 m/sec) and will also engage the disc brake system to positively lock the rotor. Each blade is protected against potential damage from lightning strikes by copper plates mounted in the blade tips and a grounding wire brought back to the rotor and connected to the tower by carbon brushes. This establishes a proper ground connection and will dissipate any lightning strikes. Temporary icing of a rotor blade would activate vibration sensors causing turbine shutdown in order to prevent rotor damage or hazard from flying ice.

3) Tower

   A manufactured tubular conical steel tower supports the WTG nacelle. This tower will have an internal personnel hoist as well as internal access ladders and platforms providing access to the nacelle. The tower will be designed to meet all relevant codes and standards associated with site-specific wind loads, earthquake loads, sea-state conditions, and other loading conditions. There are various auxiliary structures such as access platforms, ladders, and boat docking structures attached to the transition piece to allow service vessels to transfer technicians and equipment for routine maintenance of the WTGs. The tower is accessed from the platform by a galvanized steel hatch door. Access to the platform is from the boat ladder through the lockable hatch.

Each of the perimeter WTGs will be lighted with one red flashing FAA light on top of the nacelle (approximate height of 271 feet (82.5 meters) above MLLW) and all WTGs will have two flashing amber USCG lights on the lower access platform (approximate height of 35 feet (10.7 meters) above MLLW). Lights will vary in intensity depending on the specific location of the individual turbine, and all lights will be synchronized to flash simultaneously in order to effectively mark the entire wind park as one entity when viewed from the air.

4) Marine Based Design

The WTGs have been specially designed for the offshore marine environment and include a number of special features that are not found on land based WTGs. Some of the items that support the marine usage of the proposed WTGs are as follows:

- Air tight tower and nacelle
- De-humidifying system
- Heat-exchanger cooling system for gear box and generator
- Offshore corrosion protection
- Permanent crane in nacelle for smaller components

5) Configuration of WTGs

In order to generate maximum wind energy production, the WTGs will be arranged in specific parallel rows in a grid pattern to obtain an optimal energy-generating arrangement. For this area of Nantucket Sound, the wind power density analysis conducted by Cape Wind determined that orientation of the array in a northwest to southeast alignment provides optimal wind energy potential for the WTGs. This alignment will position the WTGs perpendicular to prevailing winds, which are generally from the northwest in the winter and from the southwest in the summer for this geographic area of Nantucket Sound. The WTGs will have a computer-controlled yaw system that ensures that the nacelle is always turned into the wind and perpendicular to the rotor. In addition to maximizing potential wind energy production, the WTGs must also be sufficiently spaced within the array in order to minimize power losses due to wind shear and turbulence caused by other WTGs within the array.

Other technical and economic siting criteria were established for the array design that factored into the development of the proposed WTG configuration. These include:

- Water depth criteria: a minimum water depth of 12 feet (3.6 meters) MLLW and a maximum water depth of 50 feet (15.2 meters) MLLW was established as the design criteria necessary to properly address construction techniques and pile design and cost considerations. The minimum water depth of 12 feet (3.6 meters) was established based upon the vessel size required for installation of the turbines and the maximum water depth was established based upon design fatigue load.

- Energy loss criteria: minimize energy losses for WTGs located within the array due to lower mean wind speeds in the wakes of upstream WTGs. By installing several WTGs in an array, each WTG will generate a wake that will affect the output from other downstream WTGs in the Wind Park.
- Maximize spacing to allow existing watersheet uses to continue.
- Minimize mechanical fatigue loads on the WTG and support tower: develop inner-array spacing of the WTGs that minimizes mechanical turbulent wakes of upstream WTGs.
- Minimize energy transmission losses: develop inner-array spacing that minimizes the amount of inner-array submarine cabling to maintain maximum energy transfer to the ESP, and minimize energy losses due to cabling lengths.

As a result of the wind energy production performance analysis for this geographic area of Nantucket Sound, including the WTG configuration and performance criteria cited above, it was determined that the optimal WTG spacing within the array is 0.34 nautical mile (629 meters) by 0.54 nautical mile (1,000 meters) between each WTG.

6) WTG Fluid Containment

The WTG will utilize lubricating oil, cooling liquids, and grease, all of which will be located in the nacelle/hub or tower. The WTG has been carefully configured to contain any fluid leakage and prevent overboard discharges. The primary WTG components and the fluids contained are explained as follows:

- Nacelle/hub – Approximately 90 gallons of hydraulic oil and 220 gallons of gear oil are contained within the nacelle. In the event of leaking gear oil or a broken hose/pipe, the leaking oil will be guided through the manhole in the bottom of the bedplate and collected on the upper internal platform of the tower.
- Tower – The upper internal platform is designed and sealed in such a way that it can withhold the total amount of gearbox and hydraulic fluid until it can be transferred to containers for safe disposal. The lower tower will include a transformer located near the access door, which will contain approximately 370 gallons of transformer oil.

Oil will be loaded in the WTG components during pre-commissioning activiies onshore prior to delivery and installation at the Project Area.

The possibility of spills may occur in two different situations: (1) during service and maintenance and (2) during operation:

- Service - During the servicing and maintenance of a WTG, a spill could happen during oil changes of hydraulic pump units or the gearbox oil conditioning system.

- Operation failures- During WTG operation leakage may occur as the result of broken gear oil hoses/pipes, and / or broken coolant hoses/pipes. Gear oil leaks will be contained within the hub and main bed frame and/or tower as described above. Coolant leaks can occur on a number of locations within the nacelle and will be contained inside the nacelle fiberglass cover. It is also possible that a leak could develop in the transformer that would be contained within the lower section of the tower.

Electrical Service Platform (ESP)

An ESP will be installed and maintained within the approximate center of the WTG array. The ESP will serve as the common interconnection point for all of the WTGs within the array. Each WTG will interconnect with the ESP via a 33 kV submarine cable system. These cable systems will interconnect with circuit breakers and transformers located on the ESP in order to increase the voltage level and transmit wind-generated power through the 115 kV shore-connected submarine cable system. The two 115 kV submarine circuits will then ultimately connect to the existing land-based NSTAR Electric transmission system on Cape Cod.

The ESP will provide electrical protection and inner-array cable sectionalizing capability in the form of circuit breakers. It will also include voltage step-up transformers to step the 33 kV inner-array transmission voltage up to the 115 kV voltage level for the submarine cable connection to the land-based system. The service platform will also function as a helipad and as a maintenance area during periods of servicing the Wind Park equipment.

The ESP will be a fixed template type platform consisting of a jacket frame with six approximately 42-inch (106.7 centimeters) driven piles to anchor the platform to the ocean floor. The platform will consist of a steel superstructure of approximately 100 feet by 200 feet (30.5 meters by 61 meters). The platform will be placed approximately 39 feet (12 meters) above the MLLW datum plane in 28 feet (8.5 meters) of water.

The ESP will include insulated circuit breakers to protect the 33 kV system. The 33 kV circuit breakers will be arranged in four switchgear line-ups, each of which will connect to one of four transformers to increase the voltage level to 115 kV for transmission to shore. The high voltage system on the ESP will include 115 kV insulated switchgear for protection and will be connected to two 115 kV submarine transmission cable systems. Operation will be automated and remotely controlled via the electronic supervisory control and data acquisition system (SCADA). Additionally, the ESP will house the hub for the SCADA link between the WTGs and the Project's shore-based control systems.

In addition to the electrical equipment, the ESP will include fire protection, emergency battery backup system, and other ancillary systems. These systems will include ventilation, safety, communications, temporary living accommodations and required systems. The living accommodations are for emergency periods when crews cannot be removed due to weather issues. These accommodations will utilize waste storage holding tanks that will be pumped to the service vessel for proper disposal. All equipment will be contained within an enclosed weather-protected service area.

Maintenance and service access to the ESP will normally be by service boat. A boat landing dock consisting of a fender structure with ladder is attached to the ESP to allow boat landing and transfer of personnel and equipment and temporary docking of the service craft. The ESP will have a helicopter deck to allow personnel access when conditions preclude marine transport, and for emergency evacuation. Equipment and material transfer will be by a crane mounted on the ESP.

The ESP design is based on a piled jacket/template design with a superstructure mounting on top. The platform jacket and superstructure will be fully fabricated on shore and delivered to the work site by barges.

ESP Fluid Containment

The ESP will have small amounts of lubricating oil, greases and coolants in pumps, fans, air compressors, emergency backup system and miscellaneous equipment. The ESP will also have four oil-cooled step up transformers.

The primary systems and fluid contained are as follows:

- Main Transformer - The four 110-megavolt amp (MVA) oil cooled main step up transformers will each have a capacity of approximately 10,000 gallons (37,854 liters) of dielectric cooling oil. The oil will be circulated through oil/air heat exchangers mounted on the roof of the platform. Each transformer will be mounted in a leak-proof detention area that will have the capacity of holding 150% of the transformer oil. Each of the detention areas will be connected via valves to a storage tank that has the capacity to store 100% of the oil from all four transformers. The oil piping to the coolers and the coolers will be configured so that any failures will result in oil being drained to the detention area.
- A back-up battery system will be installed on the ESP to provide power to essential auxiliary loads in the event of a loss of connection to the NSTAR transmission grid. The system will be designed for redundancy with two independent 125-volt (V) direct current (DC) systems each consisting of a stationary battery bank, battery charger and distribution panel. The batteries will be lead acid type for stationary applications. They will be sized appropriately for a 36-hour duty cycle following an emergency trip (dead bus).
- Miscellaneous equipment - Various pumps, fans, and an air compressor will be installed on the platform. They will be lubricated with either grease or oil in small quantities. The equipment will be installed in such a way that any leakage will be contained on the sealed deck of the ESP.

The ESP will have sealed, leak-proof decks where appropriate, which will act as fluid containment. In addition, spill containment kits will be available near all equipment. Oil will be loaded in the ESP components during pre-commissioning activiies onshore prior to delivery and installation at the Project Area.

Appendix B

Training Information

APPENDIX B
TRAINING INFORMATION

Cape Wind provides a basic level of annual training for all employees, ensuring that all employees are adequately trained to maintain a safe working environment. Cape Wind employees are trained to allow defensive actions in the event of a spill.

In general, training covers spill response and notification procedures, for example:

- Locations, intended use, deployment strategies, and operational and logistical requirements of response equipment maintained at the Cape Wind Operations Center
- Spill reporting procedures
- Oil-spill trajectory analysis requirements and predicting spill movement
- Other responsibilities, as appropriate

Spill response activities beyond the training level of Cape Wind personnel are conducted by Clean Harbors. Any Clean Harbors personnel involved in spill response activities will be properly certified and trained according to all applicable regulations. Clean Harbors is responsible for training its personnel to an appropriate level, depending on the required response activities for each individual. The training records for Clean Harbors staff are maintained and archived by Clean Harbors at their facilities. At a minimum, all Clean Harbors staff are required to have the following:

- OSHA 40-Hr
- Incident Command System (ICS) Training
- Marine Operator Training

a. QI, OSRC/IC, and SMT

Scott Metzger, the designated QI and OSRC/IC, is fully certified in accordance with the Oil Pollution Act of 1990. Mr. Metzger completed Qualified Individual Training on April 12, 2011 (certificate provided below). A second qualified QI/IC will be designated prior to initiating operation of the facility. At this time, the identity of the second QI/IC has not yet been determined.

It is uncertain whether an Operations Section Chief and Planning Section Chief will be required for the SMT. If they are, Cape Wind will designate staff to receive training in spill management decision making. The training will address the requirements specified in 30 CFR 254.41(b), as applicable, and be completed before the start of construction.

b. Other SMT Members

Prior to facility operation, Cape Wind will designate staff to receive training in spill response and identify a training program that suits the needs of the facility staff. The training will address the requirements specified in 30 CFR 254.41, as applicable.

c. SROT

Prior to facility operation, Cape Wind will designate staff to receive training in spill response and identify a training program that suits the needs of the facility staff. The training will address the requirements specified in 30 CFR 254.41(a), as applicable. All Clean Harbors personnel are fully trained and highly qualified in the deployment and operation of Clean Harbors equipment. Personnel responsible for operating spill response equipment receive annual hands-on training in deployment and operation of equipment. Clean Harbors personnel participate in a comprehensive training program that includes the following:

- 40-hour OSHA
- 8-hour refresher
- CPR
- First-aid
- Boating safety
- Monthly preventative maintenance
- Spill response equipment

d. Location of Records

Training records for all Cape Wind staff are maintained and archived at the corporate office:

Cape Wind Associates, LLC
75 Arlington Street
Boston, Massachusetts 02116
617-904-3100

Training records for Clean Harbors personnel are maintained in a Peoplesoft database, which can be accessed at all Clean Harbors service centers.

CleanHarbors®

Certificate of Training

This is to certify that **_Scott Metzger_**

Satisfactorily completed training in

Qualified Individual Refresher Training

As per 33 CFR Part 154

Conducted by

CLEAN HARBORS ENVIRONMENTAL SERVICES

Date: 4/12/2011

Director of Internal Regulatory Training

Jerry Huber

Appendix C

Spill Response Drills

APPENDIX C
SPILL RESPONSE DRILLS

Cape Wind will conduct response exercises to provide response personnel an opportunity to apply applicable training, test the response plans for deficiencies, and identify any aspects of the plan that should be modified. The entire plan will be exercised at least once every three years, in accordance with 30 CFR 254.42. Exercises will be developed and conducted in order to satisfy the 15 core components of the National Preparedness for Response Exercise Program (PREP) Guidelines. Completion of the triennial exercise will be recorded on the table provided below.

In satisfying the triennial exercise requirement, the following annual exercises will be conducted:

1. Spill Management Team Tabletop Exercise

   The Cape Wind Spill Management Team (SMT) will conduct an annual tabletop exercise to ensure that team members are familiar with the OSRP and their individual roles during the response to an incident. The objective of the exercise is practice the SMT's organization, communication, and decision-making in managing a spill response. The internal tabletop exercise will be announced, however, the scenario will be unannounced. The Tabletop Exercise Report Form is provided below.

2. Deployment Exercises

   Cape Wind and Clean Harbors will annually conduct deployment exercises of equipment stored at onshore locations. During these exercises, equipment that is identified in the response plan will be deployed and operated. Each type of equipment will be exercised during each triennial period although it is not necessary to deploy each individual piece of equipment. The Deployment Exercise Report Form is provided below.

3. Notification Exercises

   Cape Wind will annually exercise and test communications between personnel staffing the onshore control center, which operates 24 hours per day, and the Qualified Individual. Information to be provided during the event of a spill will be simulated during this exercise. The Notification Exercise Reporting Form is provided below.

Records of these drills will be maintained at Cape Wind's corporate office:

Cape Wind Associates, LLC
75 Arlington Street
Boston, Massachusetts 02116
617-904-3100

In accordance with 30 CFR 254.42, Cape Wind will be prepared to respond to unannounced exercises initiated by BOEMRE. These exercises may involve Cape Wind and Clean Harbors personnel, the Qualified Individual, Spill Management Team, state and local government, and other federal agencies if BOEMRE so chooses. The exercise will require Cape Wind to respond to the spill scenario posed by BOEMRE. Records of these exercises will be maintained by BOEMRE.

Cape Wind
Internal Exercise Documentation Form
Triennial Exercise Record

													Notification	Staff Mobilization	Operate in RMS[1]	Discharge Contained	Assessment	Containment	Recovery	Protection	Disposal	Communication	Transportation	Personnel Support	Equipment Maintenance	Procurement	Documentation
					Year																						
	CY				CY				CY																		
	Quarters				Quarters				Quarters																		
	1	2	3	4	5	6	7	8	9	10	11	12															
SMT Tabletop																											
Equipment Deployment																											
QI Notification																											
Gov't-initiated Unnannounced																											

For each quarter in which an exercise was completed, mark that with an "X" then mark each core component tested during an exercise.

[1] RMS: Response Management System

Cape Wind
Internal Exercise Documentation Form
Spill Management Team Tabletop Exercise

1.	Date Performed: ___ / ___ / _____
2.	Exercise or Actual Response?____ Is exercise, announced or unannounced?_______________________________________
3.	Location of Tabletop:____
4.	Time Stared: ____ : ____ (Military Time) Time Completed: ____ : ____ (Military Time)
5.	Response plan scenario used (check one): ☐ Average most probable discharge ☐ Maximum most probable discharge ☐ Worst case discharge Size of (simulated) spill _____________________ barrels or gallons
6.	Describe how the following objectives were exercised: (a) Spill Management Team's knowledge of Oil Spill Response Plan: ____ ____ (b) Proper notifications: ____ ____ (c) Communications system: ____ ____ (d) Spill Management Team's ability to access contracted oil spill removal organizations: ____ ____ (e) Spill Management Team's ability to coordinate spill response with On-Scene Coordinator, state, and applicable agencies: ____ ____ (f) Spill Management Team's ability to access sensitive site and resource information in the Area Contingency Plan: ____ ____
7.	Identify which of the 15 core components of the response plan were exercised during this particular exercise: ____ ____

8.	Attach a description of lesson(s) learned, procedures and schedule for implementation, and person(s) responsible for follow up of corrective measures.
Certification Signature: Signature:_____________________________________ Date: ___ / ___ / _____ Printed Name:__________________________________	
Retain form for a minimum of three (3) years.	

Cape Wind
Internal Exercise Documentation Form
Equipment Deployment Exercise

1.	Date Performed: ___ / ___ / _____
2.	Exercise or actual response?______________________________ If an exercise, announced or unannounced?______________________
3.	Deployment Locations: ______________________________ ______________________________
4.	Time Started: ____ : ____ (Military Time) Time Clean Harbors called: ____ : ____ (Military Time) Time on-scene: ____ : ____ (Military Time) Time boom deployed: ____ : ____ (Military Time) Time recovery equipment arrives on-scene: ____ : ____ (Military Time) Time completed: ____ : ____ (Military Time)
5.	Equipment deployed was (check one): ☐ Cape Wind ☐ Clean Harbors______________________ ☐ Both
6.	List type and amount of all equipment (e.g. boom and skimmers) deployed and number of support personnel employed: ______________________________ ______________________________ ______________________________
7.	Describe goals of the equipment deployment and list any Area Contingency Plan strategies tested. (Attach a sketch of equipment deployments and booming strategies): ______________________________ ______________________________ ______________________________

8.	For deployment of Cape Wind equipment, was the amount of equipment deployed at least the amount necessary to respond to the most probable spill? ☐ Yes ☐ No ☐ N/A Was the equipment deployed in its intended operating environment? ☐ Yes ☐ No ☐ N/A
9.	For deployment of Clean Harbors equipment, was a representative sample (at least 1,000 feet of each boom type and at least one of each skimmer type deployed? ☐ Yes ☐ No ☐ N/A Was the equipment deployed in its intended operating environment ☐ Yes ☐ No ☐ N/A
10.	Are all Cape Wind personnel that are responsible for response operations involved in a comprehensive training program and all pollution response equipment involved in a comprehensive maintenance program? ☐ Yes ☐ No ☐ N/A If yes, describe the program: ____ ____ Date of last equipment inspection: ___ / ___ / _____
11.	Was the equipment deployed by personnel responsible for its deployment in the event of an actual spill? ☐ Yes ☐ No ☐ N/A
12.	Was all deployed equipment operational? ☐ Yes ☐ No ☐ N/A If no, describe: ____ ____

13.	Identify which of the 15 core components of your response plan were exercised during this particular exercise: ____ ____ ____ ____
Attach description of lesson(s) learned and person(s) responsible for follow up of corrective measures.	
Certification Signature: Signature:______________________________ Date: ___ / ___ / _____ Printed Name:____________________________	
Retain form for a minimum of three (3) years.	

Cape Wind
Internal Exercise Documentation Form
Notification Exercise

Notification Exercise Information	
Date: ___ / ___ / _____	
Name of person notified: ___________________________________	Is this person indentified in the response plan as IC or QI? ____
Time drill was initiated from facility (open loop): ____ : ____ (Military Time)	Time IC voice contact was made (closed loop): ____ : ____ (Military Time)
Description of Notification Procedure: ____________________ ____________________ ____________________	
Suggested Action Items: ____________________ ____________________ ____________________	
Date Completed: ___ / ___ / _____	
Certification	
I certify that this drill was completed, met the objectives stated above, and was evaluated to determine the effectiveness of the response plan components which were exercised.	
Certification Signature: Signature:__________________________________ Date: ___ / ___ / _____ Printed Name:______________________________	

Appendix D

Contractual Agreements

REDACTED

Confidential business information.
Not for public disclosure.

Appendix E

Response Equipment

APPENDIX E
RESPONSE EQUIPMENT

a. Equipment Inventory

Cape Wind

Cape Wind will maintain the following response equipment at the Operations Center, for quick deployment (exact details such as size/capacities and quantities to be determined prior to operating the facility):

- One high-speed 30-foot boat for personnel emergencies and quick access
- At least one larger (~35' to 45') work boat for routine access and storage of initial response equipment, including:
  - Containment bladders
  - Personal protective equipment – including boots, gloves, goggles, etc.
  - Broom, shovel, sorbents, pigs, socks, and other equipment for response to minor leaks and spills
  - Spill overpack drum

Cape Wind will maintain the following response equipment at the ESP, for response to minor leaks and contained spills:

- Personal protective equipment – including boots, gloves, goggles, etc.
- Broom, shovel, sorbents, pigs, socks, and other equipment for response to minor leaks and spills
- Spill overpack drum

Cape Wind will inspect the above equipment at least once per month during a routine maintenance visit. A record for each inspection and maintenance procedure will be maintained at the Operations Center.

Oil Spill Response Contractor

Offshore resources have been identified and are available to Clean Harbors under Master Service Agreements with those providers.

The Clean Harbors Emergency Response Resource Book provides a complete catalogue of resources available to Cape Wind in the event of an incident and is available at the following web address: (http://clark.cleanharbors.com/tt/sl.ashx?z=219847c5&dataid=1271&ft=1).

b. Inspection and Maintenance Programs

The Cape Wind and Clean Harbors equipment inspection and maintenance programs comply with by 30 CFR 254.43. Cape Wind will inspected the response equipment listed above at least monthly and maintain it as necessary, to ensure optimal performance. Records of the inspections and maintenance activities will be kept for at least 2 years and will be made available to any authorized BOEMRE representative upon request.

c. Response Procedures and Capabilities of Contractors

Each year Clean Harbors manages over three thousand environmental emergency responses or disaster recovery operations on land and water throughout North America. Clean Harbors has the capability to deal with large-scale multiphase containment and clean-up of a coastal oil spill, or damage from a hurricane. Clean Harbors is recognized as having the expertise and technical knowledge to handle emergency situations with the highest regard to the environment and health and safety (Clean Harbors 2010). Under the U.S. Coast Guard's (OSRO) Classification Program, Clean Harbors holds a Captain of the Port rating for facilities and vessels in ports in Boston and Southern New England. Clean Harbors is designated with OSRO Number 0013. Clean Harbors capabilities include the deployment of hard boom and recovery of product from water (skimmers, pumps, vacuum trucks), including temporary storage and disposal.

Appendix F

Support Services and Supplies

APPENDIX F
SUPPORT SERVICES AND SUPPLIES

The following provides details for additional personnel, materials and supplies, equipment, and services available in the event of a release. Refer to the Spill Response Contact List in Section 1.0 of this document for specific contact information.

Private Resources

Clean Harbors – Spill Response and Cleanup Contractor

See Appendix E for an example of Clean Harbors' list of available equipment, staff, resources, and response methods. See Appendix D for the executed Stand-By agreement between Cape Wind and Clean Harbors

Otis ANGB/Air Station Cape Cod - Airstrips/Air Access

This local airport may be used for additional air services.

Corporate Air Charter, Inc. (T.F. Green Airport, Rhode Island), Ocean Wings (Nantucket, Massachusetts), and Eastern Air Charter (Norwood, Massachusetts) - Air Charter Services

These businesses provide air service charters that may be used in the event of an oil spill response. Such services may be useful for quick off-shore access, or to complete fly-over investigations. Between these facilities, a number of aircraft are available for private use.

Federal Resources/Agencies

In the event of an oil spill at the facility, federal agencies would be the primary agencies involved in oversight of response activities.

USCG/NRC - Response and Restoration

The USCG/NRC is primarily responsible for overseeing spill response activities in open water. While this agency is not expected to provide financial assistance, they would be a useful source of information for response methods and procedures. They may also provide some fire services, if necessary.

NOAA - Response and Restoration

The NOAA will likely provide oceanographic and marine species information to support the oil spill response, including suggested response methods, environmental damage remedies, coastal resources impact assessment and restoration, discharge and trajectory modeling, oceanic and atmospheric modeling, and other response measure for individually materials.

State Resources/Agencies

Massachusetts State Police - Law Enforcement and Security

The Massachusetts State Police Department may be called upon to work in cooperation with other agencies in providing on-shore access control, crowd control, and traffic control. The State Police have adequate staff and vehicle to address any security situations that might occur at Cape Wind.

MassDEP - Response and Restoration

The MassDEP may be called upon in a spill situation to support response actions. Support services would primarily include on-shore response-related activities, such as cleanup, salvage, and recovery. Financial support would be provided by Cape Wind.

Local Resources/Agencies

Depending on the volume and extent of the spill, local agencies may assist in spill response and provide local information to help develop the spill response plan. The local agencies that may become involved in a spill response plan include natural resources, environmental, law enforcement, fire services, hospitals/EMS and LEPCs/response teams. Financial support would be provided by Cape Wind.

Boat Launches - The Falmouth Inner Harbor provides a public boat launch that may be used in the event of a release. The following are additional public boat launch locations in the area:

- Childs River, Off Rte 28
- Great Pond, Harrington Street
- Green Pond, Menauhant Road
- Megansett Harbor, County Road
- Waquoit Bay, Seapit Road
- West Falmouth Harbor, Old Dock Road
- Wild Harbor, Old Silver Beach
- Great Harbor, Woods Hole

Additional Agencies

The following agencies may also become involved in an oil spill:

- Coastal Zoning Committee
- Harbor Masters / Natural Resource Agents
- Cape Cod Commission
- Other local authorities (Nantucket, Cape Cod, Martha's Vineyard) if events warrant

The contact information for these agencies will be determined as necessary.

Appendix G

Notification and Reporting Forms

APPENDIX G
NOTIFICATION AND REPORTING FORMS

This appendix contains reporting forms for internal communication and external reporting for regulatory compliance.

INTERNAL SPILL REPORTING FORMS

- Cape Wind Internal Incident Reporting Form

EXTERNAL SPILL REPORTING FORMS

- Notification Status Report
- Cape Wind Reporting Form – National Response Center
- Cape Wind Reporting Form – BOEMRE
- Cape Wind Reporting Form – Massachusetts Department of Environmental Protection (MassDEP)
- MassDEP Bureau of Waste Site Cleanup form BWSC103C

RESPONSE DOCUMENTATION

- Incident Command System Standard Forms

Cape Wind Internal Incident Reporting Form

Name:______________________________ Date Form Filled Out:__________________ Report No.__________

1. DATE AND TIME OF INCIDENT:	2. LOCATION OF INCIDENT/RELEASE:

3.TYPE OF INCIDENT: (Check all that apply)
☐ Spill/Release ☐ Security ☐ Other (Describe)
☐ Fire/Explosion ☐ Natural Disaster
☐ Medical

4. TYPE OF MATERIAL INVOLVED IN INCIDENT/RELEASED (Attach MSDS):	5. QUANTITY OF MATERIAL INVOLVED:

6. PROVIDE A DESCRIPTION OF THE SOURCE OF THE INCIDENT AND FACTORS CAUSING THE INCIDENT (Include identification of all potentially responsible parties; Attach additional sheets if necessary):

7. NAME PERSON(S) WHO DISCOVERED INCIDENT AND DESCRIBE HOW IT WAS DISCOVERED:	8. TRANSPORTER INVOLVED, IF APPLICABLE: Name: Company Name: Vehicle ID/Plate #:

9. PLEASE PROVIDE ANSWERS TO THE FOLLOWING:

Did the release enter the ocean? ☐ Yes ☐ No

Did the release result in injury or illness to personnel? ☐ Yes ☐ No If yes, describe:

Did the incident impact other sensitive receptors? ☐ Yes ☐ No If yes, describe:

12. INDICATE EMERGENCY PERSONNEL CONTACTED/ON SCENE:

Contacted	On Scene	
☐	☐	MA Police Dept. (specify whether local or state)
☐	☐	Spill Contractor
☐	☐	Emergency Medical
☐	☐	US Coast Guard
☐	☐	Other (Describe)

____

14. PROVIDE A DESCRIPTION OF THE RESPONSE TO THE INCIDENT, INCLUDING A DESCRIPTION OF HOW POTENTIAL HAZARDS TO PUBLIC HEALTH, SAFETY, OR THE ENVIRONMENT WERE REDUCED OR REMEDIED (Attach additional sheets if necessary):

15. DID THE INCIDENT EXCEED A REPORTING THRESHOLD?

CIRCLE ONE: Federal State Local/Other None

Federal Reportable Quantity (RQ): ___________ State RQ: ____________ Local/Other RQ: ________________

INDICATE AGENCIES NOTIFIED (See Emergency Contact List for phone numbers):

USCG/NRC	☐ NA	☐ Notified	Date/Time Notified ______________________
MassDEP	☐ NA	☐ Notified	Date/Time Notified ______________________
MDEP/MASERC	☐ NA	☐ Notified	Date/Time Notified ______________________
Other (Describe)	☐ NA	☐ Notified	Date/Time Notified ______________________

IF APPLICABLE, **ATTACH A RECORD OF EACH AGENCY NOTIFICATION**. RECORD MUST INCLUDE: NAME AND TELEPHONE NUMBER OF THE AGENCY NOTIFIED; NAME OF THE PERSON WHO RECEIVED THE NOTIFICATION; DATE AND TIME OF NOTIFICATION; NAME OF TECHNIC PERSONNEL MAKING THE NOTIFICATION; CASE NUMBER ASSIGNED BY AGENCY; AND ANY COMMENTS OR OTHER INFORMATION PROVIDED BY THE AGENCY.

16. DESCRIBE CORRECTIVE ACTIONS/FOLLOWUP NECESSARY:	Responsible Person	Date(s) for Completion
1)	1)	1)
2)	2)	2)
3)	3)	3)

17. ATTACH THE FOLLOWING SUPPLEMENTAL DOCUMENTATION AS APPROPRIATE FOR THE INCIDENT (AS SOON AS IT IS AVAILABLE):

a) Material Safety Data Sheet(s) (MSDSs) for material released

b) Record of interviews with Cape Wind or other personnel who caused or discovered the release, and other persons who were witnesses to the release (include name, address, and telephone number of interviewee)

c) Photographs taken at the site of the release, if available

d) Documentation of cleanup activities, such as manifests/shipping papers for soil removal, record of payment to emergency spill cleanup contractor, etc.

18. NAME AND TITLE OF PERSON COMPLETING THIS REPORT:

19. SIGNATURE:	20. DATE:

Notification Status Report

Incident:				**Prepared by:**			**at:**	
Period:__ /__ /_____ ___ : __ to __ /__ /_____ __ : __				**Version Name:**				
Organization Notified	**Phone**	**Date / Time Notified**	**Person Contacted**	**Email of Person Contacted**	**Case No.**	**Follow Up**	**ETA On Site**	**Notified By**
	(___) ___-_____	__ / __ / ____ ___:___				☐Y ☐N	HR	
Notes:								
	(___) ___-_____	__ / __ / ____ ___:___				☐Y ☐N	HR	
Notes:								
	(___) ___-_____	__ / __ / ____ ___:___				☐Y ☐N	HR	
Notes:								
	(___) ___-_____	__ / __ / ____ ___:___				☐Y ☐N	HR	
Notes:								
	(___) ___-_____	__ / __ / ____ ___:___				☐Y ☐N	HR	
Notes:								
	(___) ___-_____	__ / __ / ____ ___:___				☐Y ☐N	HR	
Notes:								
	(___) ___-_____	__ / __ / ____ ___:___				☐Y ☐N	HR	
Notes:								
	(___) ___-_____	__ / __ / ____ ___:___				☐Y ☐N	HR	
Notes:								
	(___) ___-_____	__ / __ / ____ ___:___				☐Y ☐N	HR	
Notes:								

Cape Wind Spill Reporting Form
National Response Center

Facility and Release Information	
Name of Person Completing this Report: ______________________________	Date and Time of Report: ___ / ___ / _____ ____ : ____ (Military Time)
Date and Time of Spill: ___ / ___ / _____ ____ : ____ (Military Time)	Date and Time of Spill was Discovered: ___ / ___ / _____ ____ : ____ (Military Time)
Operator:______________________________ Operator's Representative's Name:________________ Operator's Telephone Number:___________________	Contractor:______________________________ Contractor's Representative's Name:_______________ Contractor's Telephone Number:__________________
Location of Facility: Latitude: _____° _____' _____"	Longitude: _____° _____' _____"
Spill Source:______________________________	Type of Material Released:______________________
Release Rate:___________ bbls/hr or gal/hr	Length of Time Discharge Occurred:_______________
Estimated Volume of Release:___________________	Estimated Volume of Recovery:__________________
Weather Condition Information	
Weather Forecast: ☐ Clear ☐ Cloudy	☐ Fog ☐ Rain
Wind Direction (at the time of the spill):___________	Wind Speed (at the time of the spill):______________
Air Temperature :______________°F	Water Temperature:_____________°F
Ceiling:______________________________	Wave Height:______________________________
Spill Information	
Did spill affect any water?________ If yes, describe and name?________________________________	Size of overall spill: L _____ x W _____ Percent Coverage:_______%
Location of Oil: Latitude: _____° _____' _____" Longitude: _____° _____' _____"	Description of effects of spill:_____________________ ____
Direction of Movement:_________________________	Cause of Spill:______________________________
Damage Estimate (U.S. Dollars)__________________	Injuries:______________________________

Indicate emergency personnel contacted and were on scene:

Contacted	On Scene	
☐	☐	Massachusetts Police Department (specify local or state)
☐	☐	Clean Harbors
☐	☐	Emergency Medical
☐	☐	US Coast Guard
☐	☐	Other (Please Describe)____

Additional remarks and recommendations:____
____

____
Supervisor in Charge

National Response Contact Information: 1-800-424-8802

Cape Wind Spill Reporting Form
BOEMRE

Facility and Release Information			
Name of Person Completing this Report: ____________________________	Date and Time of Report: ___ / ___ / _____ ____:____ (Military Time)		
Date and Time of Spill: ___ / ___ / _____ ____:____ (Military Time)	Date and Time of Spill was Discovered: ___ / ___ / _____ ____:____ (Military Time)		
Operator:____________________________ Operator's Representative's Name:____________ Operator's Telephone Number:______________	Contractor:____________________________ Contractor's Representative's Name:___________ Contractor's Telephone Number:______________		
Platform/Facility Name:____________________ Platform/Facility Number:__________________ Pipeline Segment Number:__________________	Lease Number: _______	OCS Area: _______	Block: _______
Spill Information			
Operation or Activity at the Time of Incident:____			
Description of Incident:____			
Description of Spill:____			
Damage Estimate (U.S. Dollars)______________			
Description of effects of spill:____			
Injury Information			
Injuries:____			
Days away from work:______________________			
Restricted Work or Job Transfer:____			
Corrective Actions Information			
Corrective Action Taken:____			
Containment and cleanup measures taken:____			
Additional remarks and recommendations:____ ____			
____________________________ Supervisor in Charge			

BOEMRE New Orleans District Contact Information: 504-734-6740

Cape Wind Spill Reporting Form
MassDEP

Release Information	
Name of Caller: ______________________________	Telephone Number of Caller: ______________________________
Date and Time Release Occurred: ___ / ___ / _____ _____ : ____ (Military Time)	Location of Release: ______________________________

Spill Information
Description (i.e. name) of oil:______________________________
Estimated Volume of Release:______________________ Barrels or Gallons (Please Circle)
Source of Release:______________________________
Brief Description of Release:______________________________ ______________________________

Facility Information	
Name of the Owner/Operator: ______________________________	Telephone Number of the Owner/Operator: ______________________________
Name of a Person at the site where the release occurred: ______________________________	Telephone Number of a Person at the site where the release occurred: ______________________________
Actions Taken	
Description of Immediate Response Actions taken or proposed to be taken in response to the release: ______________________________ ______________________________	
Indicate other federal, state, or local government agencies that have been notified of and/or have responded to the release:	

Contacted	On Scene	
☐	☐	Massachusetts Police Department (specify local or state)
☐	☐	US Coast Guard
☐	☐	Other (Please Describe)______________________________

Any other information, including without limitation, potential environmental impacts, that is relevant to assessing the degree of hazard posed by the release or threat of release: ______________________________ ______________________________

MassDEP Contact Information:
Emergency Response Section
1-800-304-1133

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC103

RELEASE NOTIFICATION & NOTIFICATION RETRACTION FORM

Pursuant to 310 CMR 40.0335 and 310 CMR 40.0371 (Subpart C)

Release Tracking Number ☐ - ________

A. RELEASE OR THREAT OF RELEASE LOCATION:

1. Release Name/Location Aid: ____________________

2. Street Address: ____________________

3. City/Town: ____________________ 4. ZIP Code: ____________________

5. UTM Coordinates: a. UTM N: __________ b. UTM E: __________

B. THIS FORM IS BEING USED TO: (check one)

☐ 1. Submit a **Release Notification**

☐ 2. Submit a **Revised Release Notification**

☐ 3. Submit a **Retraction of a Previously Reported Notification** of a release or threat of release including supporting documentation required pursuant to 310 CMR 40.0335 (Section C is not required)

(All sections of this transmittal form must be filled out unless otherwise noted above)

C. INFORMATION DESCRIBING THE RELEASE OR THREAT OF RELEASE (TOR):

1. Date and time of Oral Notification, if applicable: __________ (mm/dd/yyyy) Time: __________ (hh:mm) ☐ AM ☐ PM

2. Date and time you obtained knowledge of the Release or TOR: __________ (mm/dd/yyyy) Time: __________ (hh:mm) ☐ AM ☐ PM

3. Date and time release or TOR occurred, if known: __________ (mm/dd/yyyy) Time: __________ (hh:mm) ☐ AM ☐ PM

Check all Notification Thresholds that apply to the Release or Threat of Release:
(for more information see 310 CMR 40.0310 - 40.0315)

4. 2 HOUR REPORTING CONDITIONS

- ☐ a. Sudden Release
- ☐ b. Threat of Sudden Release
- ☐ c. Oil Sheen on Surface Water
- ☐ d. Poses Imminent Hazard
- ☐ e. Could Pose Imminent Hazard
- ☐ f. Release Detected in Private Well
- ☐ g. Release to Storm Drain
- ☐ h. Sanitary Sewer Release (Imminent Hazard Only)

5. 72 HOUR REPORTING CONDITIONS

- ☐ a. Subsurface Non-Aqueous Phase Liquid (NAPL) Equal to or Greater than 1/2 Inch
- ☐ b. Underground Storage Tank (UST) Release
- ☐ c. Threat of UST Release
- ☐ d. Release to Groundwater near Water Supply
- ☐ e. Release to Groundwater near School or Residence
- ☐ f. Substantial Release Migration

6. 120 DAY REPORTING CONDITIONS

- ☐ a. Release of Hazardous Material(s) to Soil or Groundwater Exceeding Reportable Concentration(s)
- ☐ b. Release of Oil to Soil Exceeding Reportable Concentration(s) and Affecting More than 2 Cubic Yards
- ☐ c. Release of Oil to Groundwater Exceeding Reportable Concentration(s)
- ☐ d. Subsurface Non-Aqueous Phase Liquid (NAPL) Equal to or Greater than 1/8 Inch and Less than 1/2 Inch

C. INFORMATION DESCRIBING THE RELEASE OR THREAT OF RELEASE (TOR): (cont.)

7. List below the Oils (O) or Hazardous Materials (HM) that exceed their Reportable Concentration (RC) or Reportable Quantity (RQ) by the greatest amount.

O or HM Released	CAS Number, if known	O or HM	Amount or Concentration	Units	RCs Exceeded, if Applicable (RCS-1, RCS-2, RCGW-1, RCGW-2)

☐ 8. Check here if a list of additional Oil and Hazardous Materials subject to reporting is attached.

D. PERSON REQUIRED TO NOTIFY:

1. Check all that apply: ☐ a. change in contact name ☐ b. change of address ☐ c. change in the person notifying

2. Name of Organization: ____________________

3. Contact First Name: ____________________ 4. Last Name: ____________________

5. Street: ____________________ 6. Title: ____________________

7. City/Town: ____________________ 8. State: __________ 9. ZIP Code: __________

10. Telephone: ____________________ 11. Ext.: __________ 12. FAX: ____________________

☐ 13. Check here if attaching names and addresses of owners of properties affected by the Release or Threat of Release, other than an owner who is submitting this Release Notification (required).

E. RELATIONSHIP OF PERSON TO RELEASE OR THREAT OF RELEASE:

☐ 1. RP or PRP ☐ a. Owner ☐ b. Operator ☐ c. Generator ☐ d. Transporter

☐ e. Other RP or PRP Specify: ____________________

☐ 2. Fiduciary, Secured Lender or Municipality with Exempt Status (as defined by M.G.L. c. 21E, s. 2)

☐ 3. Agency or Public Utility on a Right of Way (as defined by M.G.L. c. 21E, s. 5(j))

☐ 4. Any Other Person Otherwise Required to Notify Specify Relationship: ____________________

F. CERTIFICATION OF PERSON REQUIRED TO NOTIFY:

1. I,____________________________________ , attest under the pains and penalties of perjury (i) that I have personally examined and am familiar with the information contained in this submittal, including any and all documents accompanying this transmittal form, (ii) that, based on my inquiry of those individuals immediately responsible for obtaining the information, the material information contained in this submittal is, to the best of my knowledge and belief, true, accurate and complete, and (iii) that I am fully authorized to make this attestation on behalf of the entity legally responsible for this submittal. I/the person or entity on whose behalf this submittal is made am/is aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for willfully submitting false, inaccurate, or incomplete information.

2. By: ____ 3. Title: ____________________
Signature

4. For: ____ 5. Date: ____________________
(Name of person or entity recorded in Section D) mm/dd/yyyy

☐ 6. Check here if the address of the person providing certification is different from address recorded in Section D.

7. Street: ________________________________

8. City/Town: ______________________________ 9. State: ______ 10. ZIP Code: ____________

11. Telephone: __________________ 12. Ext.: _____ 13. FAX: ______________________

YOU ARE SUBJECT TO AN ANNUAL COMPLIANCE ASSURANCE FEE OF UP TO $10,000 PER BILLABLE YEAR FOR THIS DISPOSAL SITE. YOU MUST LEGIBLY COMPLETE ALL RELEVANT SECTIONS OF THIS FORM OR DEP MAY RETURN THE DOCUMENT AS INCOMPLETE. IF YOU SUBMIT AN INCOMPLETE FORM, YOU MAY BE PENALIZED FOR MISSING A REQUIRED DEADLINE.

Date Stamp (DEP USE ONLY:)

ICS Form 201

INCIDENT BRIEFING	1. Incident Name	2. Date Prepared	3. Time Prepared
4. Map Sketch			
ICS 201 Page 1 of 4	**5. Prepared by (Name and Position)**		

6. Summary of Current Actions

7. Current Organization

8. Resources Summary				
Resources Ordered	**Resource Identification**	**ETA**	**On Scene**	**Location/Assignment**

ICS Form 202

INCIDENT OBJECTIVES	1. INCIDENT NAME	2. DATE	3. TIME
4. OPERATIONAL PERIOD (DATE/TIME)			
5. GENERAL CONTROL OBJECTIVES FOR THE INCIDENT (INCLUDE ALTERNATIVES)			
6. WEATHER FORECAST FOR OPERATIONAL PERIOD			
7. GENERAL SAFETY MESSAGE			

8. Attachments (☑ if attached)

☐ Organization List (ICS 203)	☐ Medical Plan (ICS 206)	☐ Weather Forecast
☐ Assignment List (ICS 204)	☐ Incident Map	☐ ______
☐ Communications Plan (ICS 205)	☐ Traffic Plan	☐ ______

9. PREPARED BY (PLANNING SECTION CHIEF)	10. APPROVED BY (INCIDENT COMMANDER)

Organization Assignment List, ICS Form 203

ORGANIZATION ASSIGMENT LIST	1. INCIDENT NAME	2. DATE PREPARED	3. TIME PREPARED
POSITION NAME	4. OPERATIONAL PERIOD (DATE/TIME)		

5. INCIDENT COMMAND AND STAFF

INCIDENT COMMANDER	
DEPUTY	
SAFETY OFFICER	
INFORMATION OFFICER	
LIAISON OFFICER	

6. AGENCY REPRESENTATIVES

AGENCY	NAME

7. PLANNING SECTION

CHIEF	
DEPUTY	
RESOURCES UNIT	
SITUATION UNIT	
DOCUMENTATION UNIT	
DEMOBILIZATION UNIT	
TECHNICAL SPECIALISTS	

8. LOGISTICS SECTION

CHIEF	
DEPUTY	

a. SUPPORT BRANCH

DIRECTOR	
SUPPLY UNIT	
FACILITIES UNIT	
GROUND SUPPORT UNIT	

b. SERVICE BRANCH

DIRECTOR	
COMMUNICATIONS UNIT	
MEDICAL UNIT	
FOOD UNIT	

9. OPERATIONS SECTION

CHIEF		
DEPUTY		
a. BRANCH I- DIVISION/GROUPS		
BRANCH DIRECTOR		
DEPUTY		
DIVISION/GROUP		
DIVISION/ GROUP		
DIVISION/ GROUP		
DIVISION/GROUP		
DIVISION /GROUP		
b. BRANCH II- DIVISIONS/GROUPS		
BRANCH DIRECTOR		
DEPUTY		
DIVISION/GROUP		
DIVISION/GROUP		
DIVISION/GROUP		
DIVISION/GROUP		
c. BRANCH III- DIVISIONS/GROUPS		
BRANCH DIRECTOR		
DEPUTY		
DIVISION/GROUP		
DIVISION/GROUP		
DIVISION/GROUP		
d. AIR OPERATIONS BRANCH		
AIR OPERATIONS BR. DIR.		
AIR TACTICAL GROUP SUP.		
AIR SUPPORT GROUP SUP.		
HELICOPTER COORDINATOR		
AIR TANKER/FIXED WING CRD.		

10. FINANCE/ADMINISTRATION SECTION

CHIEF	
DEPUTY	
TIME UNIT	
PROCUREMENT UNIT	
COMPENSATION/CLAIMS UNIT	
COST UNIT	

PREPARED BY (RESOURCES UNIT)

Sample Assignment List, ICS Form 204

1. BRANCH	2. DIVISION/GROUP	ASSIGNMENT LIST
3. INCIDENT NAME	4. OPERATIONAL PERIOD DATE ______ TIME ______	

5. OPERATIONAL PERSONNEL

OPERATIONS CHIEF ______ DIVISION/GROUP SUPERVISOR ______
BRANCH DIRECTOR ______ AIR TACTICAL GROUP SUPERVISOR ______

6. RESOURCES ASSIGNED TO THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	EMT	LEADER	NUMBER PERSONS	TRANS. NEEDED	PICKUP PT./TIME	DROP OFF PT./TIME

7. CONTROL OPERATIONS

8. SPECIAL INSTRUCTIONS

9. DIVISION/GROUP COMMUNICATIONS SUMMARY

FUNCTION		FREQ.	SYSTEM	CHAN.	FUNCTION		FREQ.	SYSTEM	CHAN.
COMMAND	LOCAL				SUPPORT	LOCAL			
	REPEAT					REPEAT			
DIV./GROUP TACTICAL					GROUND TO AIR				

PREPARED BY (RESOURCE UNIT LEADER)	APPROVED BY (PLANNING SECT. CH.)	DATE	TIME

Sample Incident Communications Plan, ICS Form 205

INCIDENT RADIO COMMUNICATIONS PLAN			1. Incident Name	2. Date/Time Prepared	3. Operational Period Date/Time
4. Basic Radio Channel Utilization					
System/Cache	Channel	Function	Frequency/Tone	Assignment	Remarks
5. Prepared by (Communications Unit)					

MEDICAL PLAN

MEDICAL PLAN	1. Incident Name	2. Date Prepared	3. Time Prepared	4. Operational Period

5. Incident Medical Aid Station

Medical Aid Stations	Location	Paramedics Yes	No

6. Transportation

A. Ambulance Services

Name	Address	Phone	Paramedics Yes	No

B. Incident Ambulances

Name	Location	Paramedics Yes	No

7. Hospitals

Name	Address	Travel Time Air	Ground	Phone	Helipad Yes	No	Burn Center Yes	No

8. Medical Emergency Procedures

Prepared by (Medical Unit Leader)	10. Reviewed by (Safety Officer)

INCIDENT STATUS SUMMARY
FS-5100-11

1. Date/Time	2. Initial ☐ Update ☐ Final ☐	3. Incident Name	4. Incident Number

5. Incident Commander	6. Jurisdiction	7. County	8. Type incident	9. Location	10. Started Date/Time

11. Cause	12. Area Involved	13. % Controlled	14. Expected Containment Date/Time	15. Estimated Controlled Date/Time	16. Declared Controlled Date/Time

17. Current Threat	18. Control Problems

19. Est. Loss	20. Est. Savings	21. Injuries	Deaths	22. Line Built	23. Line to Build

24. Current Weather WS Temp WD RH	25. Predicted Weather WS Temp WD RH	26. Cost to Date	27. Est. Total Cost

28. Agencies

Resources																					Totals
Kind of Resource	SR	ST	SR	ST	SR	ST	SR	ST	SR	ST	SR	ST	SR	ST	SR	ST	SR	ST	SR	ST	
ENGINES																					
DOZERS																					
CREWS Number of Crews:																					
Number of Crew Personnel:																					
HELICOPTERS																					
AIR TANKERS																					
TRUCK COS.																					
RESCUE/MED.																					
WATER TENDERS																					
OVERHEAD PERSONNEL																					
TOTAL PERSONNEL																					

30. Cooperating Agencies

31. Remarks

32. Prepared by	33. Approved by	34. Sent to: Date Time By

ICS Form 211

INCIDENT CHECK-IN LIST	1. Incident Name	2. Check-In Location (complete all that apply)					3. Date/Time
Check one: ☐ Personnel ☐ Handcrew ☐ Misc. ☐ Engines ☐ Dozers ☐ Helicopters ☐ Aircraft		☐ Base	☐ Camp	☐ Staging Area	☐ ICP Restat	☐ Helibase	

Check-In Information

4. List Personnel (overhead) by Agency & Name -OR- List equipment by the following format: Agency	Single	Kind	Type	I.D. No/Name	5. Order/Request Number	6. Date/ Time Check-In	7. Leader's Name	8. Total No. Personnel	9. Manifest Yes	No	10. Crew or Individual's Weight	11. Home Base	12. Departure Point	13. Method of Travel	14. Incident Assignment	16. Other Qualifications	16. Sent to RESTAT Time/Int

Page ___ of ____	17. Prepared by (Name and Position) *Use back for remarks or comments*

ICS 213

GENERAL MESSAGE		
TO:	POSITION:	
FROM:	POSITION:	
SUBJECT:	DATE:	TIME:
MESSAGE:		
SIGNATURE:	POSITION:	
REPLY:		

DATE:	TIME:	SIGNATURE/POSITION:

UNIT LOG	1. Incident Name	2. Date Prepared	3. Time Prepared
4. Unit Name/Designators	5. Unit Leader (Name and Position)		6. Operational Period

7. Personnel Roster Assigned		
Name	ICS Position	Home Base

8. Activity Log	
Time	Major Events

9. Prepared by (Name and Position)

ICS Form 215

OPERATIONAL PLANNING WORKSHEET			1. Incident Name	2. Date Prepared Time Prepared	3. Operational Period (Date/Time)

4. Division/Group or Other Location	5. Work Assignments		Resource by Type (Show Strike Team as ST)																6. Reporting Location	7. Requested Arrival Time
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		
		Req																		
		Have																		
		Need																		
		Req																		
		Have																		
		Need																		
		Req																		
		Have																		
		Need																		
9. Total Resources - Single		Req																		
		Have																		
		Need																		
Total Resources - Strike Teams		Req																	Prepared by (Name and Position)	
		Have																		
		Need																		

Incident Action Plan Safety & Risk Analysis Form, ICS 215A

INCIDENT ACTION PLAN SAFETY ANALYSIS		1. Incident Name				2. Date		3. Time	
Division or Group	**Potential Hazards**								**Mitigations (e.g., PPE, buddy system, escape routes)**
	Type of Hazard:	Type of Hazard:	Type of Hazard:	Type of Hazard:	Type of Hazard:	Type of Hazard:	Type of Hazard:	Type of Hazard:	
Prepared by (Name and Position)									

AIR OPERATIONS SUMMARY	1. Incident Name		Helibases Fixed Wing Bases	

4. Personnel and Communications	Name	Air/Air Frequency	Air/Ground Frequency
Air Operations Director			
Air Attack Supervisor			
Helicopter Coordinator			
Air Tanker Coordinator			

5. Remarks (Spec. Instructions, Safety Notes, Hazards, Priorities)

6. Location/Function	7. Assignment	8. Fixed Wing		9. Helicopters		10. Time		11. Aircraft Assigned	12. Operating Base
		No.	Type	No.	Type	Available	Commence		
13. Totals									

14. Air Operations Support Equipment	15. Prepared by *(include Date and Time)*

INDIVIDUAL PERFORMANCE RATING

INSTRUCTIONS: The immediate supervisor will prepare this form for a subordinate person. Rating will be reviewed with the individual who will sign and date the form. The completed rating will be given to the Planning Section Chief before the rater leaves the incident.

1. NAME	2. INCIDENT NAME AND NUMBER — START DATE OF INCIDENT
3. HOME UNIT ADDRESS	4. INCIDENT AGENCY AND ADDRESS

5. POSITION HELD ON INCIDENT	6. TRAINEE POSITION	7. INCIDENT COMPLEXITY	8. DATE OF ASSIGNMENT
	☐ YES ☐ NO	☐ I ☐ II ☐ III	FROM: TO:

9. List the main duties from the Position Checklist, on which the position will be rated.

Enter X under the appropriate column indicating the individuals level of performance for each duty listed.

Duties	PERFORMANCE LEVEL				
	Did not apply on this Incident	Unacceptable	Need to Improve	Fully Successful	Exceeds Successful
	EXPLAIN IN REMARKS				

10. REMARKS

11. THIS RATING HAS BEEN DISCUSSED WITH ME (Signature of individual being rated.)	12. DATE

13. RATED BY (Signature)	14. HOME UNIT	15. POSITION HELD ON THIS INCIDENT	16. DATE

Appendix H

Worst Case Discharge Scenarios

ESS Group, Inc.

APPENDIX H
WORST CASE DISCHARGE SCENARIOS

a. Worst Case Discharge Scenario Selection

Cape Wind has determined that the Worst Case Discharge Scenario would be an incident resulting in a structural malfunction of the Electric Service Platform (ESP) resulting in a breach of the primary and secondary internal containment systems. According to this scenario, all contents of the ESP would be released to Nantucket Sound. The OILMAP program was used to simulate spill trajectories of the Worst Case Discharge Scenario volume (see below) for an instantaneous release of oil at the facility based upon realistic environmental conditions using historic observation data. The model was designed to evaluate oil spill trajectory over a 10-day period and assumes no spill response which maximizes the possibility of oil reaching shore. Eight hundred individual trajectory models were set up as part of the analysis.

Based on the Oil Spill Trajectory Analysis that was conducted, an incident during the winter months (Dec-Feb) is considered the worst case scenario, due to the prevailing weather conditions. This scenario is consistent with guidance provided by the BOEMRE GOMR (Mr. Rusty Wright).

b. Worst Case Discharge Scenario Discussion

(i) Facility Information

Electric Service Platform
OPD Providence NK19-07 Lease Block 6530
Water Depth: 28 feet (Mean Lower Low Water)
Distance from Shore: 7.5 miles

(ii) Volume

Based on conversations with the GOMR, and assuming all material is released from the ESP, the worst case scenario is a discharge 42,000 gallons (1,000 barrels).

(iii) Land Segment Identification

Land areas that could be potentially impacted by the discharge described herein were determined using OILMAP trajectory analysis results. The OILMAP program evaluated oil spill trajectory over a 10-day period and assumed no spill response. The OILMAP trajectory analysis indicates that a plume migrating toward Martha's Vineyard may impact the eastern most point of land within 4 hours. Given the urgency with which an oil spill response must be mounted in the event that a plume heads toward Martha's Vineyard in order to prevent oiling of the shoreline, this is identified as the Worst Case Scenario.

(iv) Resource Identification

As outlined above, the worst case discharge scenario would occur during the winter months (December-February) and in this scenario the spilled oil would make landfall within 4 hours. According to the NOAA ESI data provided in the MassDEP Environmental Sensitivity Map for Martha's Vineyard East (see map provided in Section 11 of this OSRP), the following resources may be impacted by oil in the worst case scenario:

- Sevenspine bay shrimp
- Natural Heritage Endagered Species Program Estimated Habitat of Rare Wildlife
- Colonial waterbirds
- Alewife
- Haddock
- Harbor Seals

Certain species listed in the MassDEP Environmental Sensitivity Map for Martha's Vineyard East are not likely to be impacted during the worst case scenario. The worst case event would occur during the winter (December-Februaru) and therefore the eelgrass and some bird species identified in the Environmental Sensitivity Map would not be present in the area. The mapped benthic species (crabs and clams) may be present but the material properties of the ESP oil is such that animals on or under the seafloor are unlikely to be impacted by oil because the oil floats in a thin surface layer. The following species identified the MassDEP Environmental Sensitivity Map for Martha's Vineyard East are unlikely to be negatively affected if the worst case discharge scenario were to occur:

- Eelgrass
- Roseate Term May-Sep
- Atlantic Rock Crab
- Green Crab
- Softshell Clam
- Piping Plover Mar-Aug
- Terns: Arctic, Common, Least, Roseate
- Crustaceans

The following Geographic Response Plans for the Cape and Islands are relevant to the worst case discharge scenario:

- Vineyard Haven Harbor & Lagoon Pond (Site 19)
- Sengekontacket Pond (Site 20)
- Edgartown Harbor (Site 21)
- Cape Poge Bay (Site 22)

(v) Response

Cape Wind will make every effort to respond to the worst case discharge scenario as effectively and quickly as possible. Quick mobilization is the key component to response and recovery. All efforts will be made to contain and clean up the spill offshore, before any shoreline impacts occur. Upon detection of a spill event, Cape Wind would initiate the procedures described in the OSRP.

Immediately upon detection of a release, Cape Wind will make its notifications in accordance with Section 7.0 (Q1, SMT, SROT, and OSRO Notifications) and Section 8.0 (External Notificatons).

Upon notification of the spill, the IC will request mobilization of equipment identified in Appendix E, including but not limited to containment boom, skimming devises, vacuum and fluid transfer equipment, oil contaminated substance storage, marine vessels, and personnel. In addition, the IC will request an overflight of the spill area to evaluate the dimensions of the plume, if conditions are acceptable.

In accordance with Priority 1 of the Strategic Response Planning (Section 12.0), an incident-specific Health and Safety Plan will be created at the start of the response with the intention to maintain the safety of public and personnel responding to the incident. Implementation of the plan will involve identification of all materials that may have been released into the environment based on available information. In addition, the Health and Safety Plan will outline the establishment of site control, vessel traffic control, and decontamination stations.

In accordance with Priority 2 of the Strategic Response Planning (Section 12.0), the emergency shutdown of the entire facility will be completed. The worst case discharge scenario assumes the entire volume of ESP transformer oil is released into the environment, which implies the fixed reservoir of oil is empty and therefore a pathway of oil into the water does not exist.

In accordance with Priority 3 of the Strategic Response Planning (Section 12.0), the SMT will focus on managing the coordinated response effort. The initial effort in managing the response will be to ensure that all necessary notifications have been made, followed by establishment of a unified command organization and facility for government oversight. As part of this effort, the SMT will monitor the mobilization and arrival of response resources and personnel to the site of the incident.

In the worst case discharge scenario, the aerial overflight observation could indicate that the plume may be approximately 0.5 miles by 0.5 miles wide one hour after the spill event. In order to chase the plume and initiate on-the-water recovery efforts, the IC would request mobilization of the following:

- M/V Scarlett Isabella (deployed from Boston)
- M/V Mathew Hughes (deployed from Fairhaven)
- 2 x chase boats (deployed from Falmouth)

- 4 x near shore skimming vessels, JBF 420 or equivalent (deployed from Falmouth)
- 4 x workboats (26 feet or larger) (deployed from Falmouth)
- 5 miles of containment boom

The resources identified above will be divided into two teams and operated in a configuration that minimizes delays associated with offloading oil from the skimming vessels during recovery operations. Each large vessel (Scarlett Isabella / Mathew Hughes) will have a team of two near-shore skimming vessels, two workboats, and one chase boat. The two workboats are responsible for towing boom in a V-shape, while one of the near shore skimming vessels is positioned at the bottom of the V to recover the oil. The large vessel is designated as a storage facility so that when the near shore skimming vessel gets full, it disconnects from the boom (V) and travels to the large vessel to offload the oil/water mixture. In order to avoid down time on the recovery operation, the second near shore skimming vessel joins the V and starts to fill its storage tanks with recovered oil. This operation will continue during daylight hours, so long as sea conditions are safe.

Table H-1 provides the response time for each vessel along with its equipment package and temporary storage equipment. The table includes anticipated travel times needed for procurement, mobilization, transfer of equipment and personnel to spill vessels, travel time to the site, and deployment.

Based on the skimming equipment readily available, the estimated EDRC exceeds 7,000 BBLs per day. As noted in Section 14.0, response equipment can be on board a spill response vessel and transiting toward a spill in as little as 2 hours. Assuming a one-hour transit from the staging area to the scene of a spill, Clean Harbors' personnel can be on scene responding to an incident in 3 hours.

In accordance with Priority 4 of the Strategic Response Planning (Section 12.0), necessary environmental resource protection requirements will be evaluated and addressed. In order to identify what resources are at risk from oiling, spill trajectory modeling will be requested/conducted incorporating on-site observations of environmental conditions (wind, wave, and currents) and the dimension and apparent movement of the plume from the aerial spotter.

As noted above in Section b.iv, the worst case discharge scenario assumes the plume migrates toward the eastern shore of Martha's Vineyard. In this worst case, the IC requests the following resources:

- Vacuum Equipment:
    - 3 x 3,000 gallon straight trucks
    - 3 x 5,000 gallon tractor trailers trucks
- 30 pickup trucks (3 personnel per vehicle)
- 6 x 53-foot trailers full of sorbent boom and pads

- 33 x jon boats with 25 horsepower outboard engines (delivered on a flatbed trailer)
- 12 x hotsy trailers with associated power washing equipment
- 25 miles of 18-inch containment boom
- 30 x additional boats (up to 26 feet in length) – for close shore activity
- 12 x farm tractors (90 horsepower or above with 4-wheel drive) pulling tandem axle landscape trailers
- 6 x farm tractors with portable toilets mounted
- 4 x 3-cubic yard (or greater) front end loaders
- 3 x 48-foot tractor trailers loaded with 4mm bags (DOT drum liners), assorted personal protective equipment, and miscellaneous consumable supplies
- 500 beach workers
    - 50 Clean Harbors staff
    - 450 subcontracted workers (through Clean Harbors for finance, logistics, operations, planning, health and safety)

The equipment above is intended to support a wide range of shoreline access possibilities. In some cases it is anticipated that road access to areas of impacted shoreline would be severely limited and therefore it will be more efficient to mobilize resources and personnel from small workboats or jon boats. Conversely, it may be easiest to move equipment and personnel around with large farm tractors and trailers. The equipment inventory developed above is designed to provide maximum flexibility and sufficient resources to mount a comprehensive and efficient incident response.

Table H-2 provides a summary of the anticipated arrival times for the equipment listed above. Given the great extent of resources required for the response and the isolated nature of Martha's Vineyard, the SMT will contact the Steamship Authority to arrange for a number of resource deliveries between Woods Hole and Martha's Vineyard.

In accordance with Section 11.0, the spill trajectory analysis results will be evaluated in the context of the Environmental Sensitivity Maps in order to determine a deployment strategy for booming resources as they arrive on scene. As described in Section 12.0, the SMT will work with the federal and state on scene coordinators to determine which natural resources should receive the highest priority for protection. In addition, the Geographic Response Plans for the potentially impacted areas will be consulted and implemented as necessary and appropriate.

For the worst case discharge scenario, it is anticipated that the highest priority will be to place boom across inlets to minimize or eliminate the access of oil into inland water bodies. Boom will be deployed inside inlets, as close to the mouth as feasible, with sufficient anchoring to counter any currents or water level changes that may be experienced. Sorbent boom will be deployed in conjunction with containment boom, to the maximum extent practicable.

Once all inlets are protected, boom will be deployed along shoreline areas that are designated as critical habitat and most at-risk of becoming oiled, based on spill trajectory modeling. Shoreline boom will be deployed from workboats, seaward of the surf zone in order to minimize the turbulence experienced by the boom. Anchoring will be used as necessary based on existing and forecasted conditions.

In accordance with Priority 5 of the Strategic Response Planning (Section 12.0), once environmental resource protection is established adequately, containment and recovery efforts will be the focus of the spill response. It is anticipated that on-water containment and recovery happens simultaneously with shoreline protection implementation. In the worst case scenario, the total volume of oil is released instantaneously and therefore source containment is not feasible. Instead, on-water vessels will be chasing the plume as it moves toward shore. As the plume makes landfall, the on-water vessels will be in close proximity to shore and will be able to continue recovering the oil/water mixture from the seaward side of the plume, while workers on shore recover oil from the landward side of the plume.

During implementation of Priority 5 a disposal plan for the recovered oil/water mixture will be developed. Temporary storage of recovered oil/water mixes will be accomplished by utilizing on-board tankage or storage tanks placed on deck depending on the engaged vessel. In addition to the temporary storage tanks available through Clean Harbors, additional resources can be obtained from Baker Tanks (1-800-Baker12) and Rain For Rent (1-800-742-7246). These tanks will be placed on deck in secondary containment pads. It is anticipated that the large vessels mobilized from Boston and Fairhaven will serve as temporary/intermediate storage facilties to support the skimmer operations and maintain their utilization during daylight hours. The large storage vessels will work in tandem such that at least one vessel is always on site, while the other heads to the mainland to offload waste at an approved and properly maintained storage facility in preparation for transportation to the final disposal location. The staging area for waste disposal is uncertain at this time, but may happen in Falmouth or Hyannis. It is anticipated that all oil/water mixtures will go for recycling at the Clean Harbors facility in Woburn, MA and all solids will be taken to the Clean Harbors waste-to-energy facility in Rochester, MA.

In accordance with Priority 6 of the Strategic Response Planning (Section 12.0), once containment and recovery operations are established and a disposal plan is in place, the SMT will focus on rehabilitating impacted wildlife. As stated in Section 17.0, rehabilitation of oiled wildlife requires experienced staff with veterinary, technical, and crisis management skills. Federal and state permit clearance will be required for any wildlife response. The worst case discharge scenario would occur during the winter months (December-February), which minimizes the amount of wildlife that may be exposed to oil. The Environmental Sensitivity Maps suggest that harbor seal populations may be present on the eastern side of Martha's Vineyard. Seals are protected by the Marine Mammal Protection Act and therefore involvement of the National Marine Fisheries Service, Office of Protected Resources would be required during development of the plan to rehabilitate wildlife. As part of the wildlife response, it is anticipates that Cape Wind's environmental consultant (ESS Group, Inc.) would develop and implement a monitoring program to evaluate the long-term efficacy of a spill response. It is anticipated that the environmental monitoring program could last six to nine months, given the size of the potentially impacted shoreline area in the worst case scenario.

In accordance with Priority 7 of the Strategic Response Planning (Section 12.0), the removal of oil from impacted areas will continue indefinitely until all recoverable oil has been collected and disposed of properly. On shore clean up will be accomplished using a variety of techniques including shovels and vacuum systems to collect oil/water mixtures, Given the volume of oil and areal extent of the potential shoreline impact, it is estimated that the beach cleanup effort would last approximately two months. After the first month, during which 500 personnel would be actively cleaning the beach during daylight hours for seven days a week, a transition to a smaller crew would occur as practicable.

Table H-1 Initial Response Equipment Inventory

Recovery Team	Duty	Skimming System	Supplier & Phone	Warehouse	Skimming Package	Quantity	Recovery Rate (Barrels/Day)	Storage (Barrels)	Staging Area	Distance to Site from Staging (Nautical Miles)	Response Times (Hours)				
											Staging ETA	Loadout Time	ETA to Site	Deployment Time	Total ETA
RECOVERY TEAM 1	Oil Recovery & Temporary Oil/Water Storage	M/V Scarlett Isabella	Clean Harbors 800-645-8265	Boston	JBF VOSS DIP 400 Unit	1	2,040	900	Boston	97	1	0.5	5	0	**6.5**
					18" Boom	11,400									
					Personnel	6									
					136' Vessel	1									
	Oil Recovery	Near Shore Skimming Vessel (JBF Type)	Clean Harbors 800-645-8265	East Providence	JBF VOSS DIP 400 Unit	1	2,040	43	Yarmouth	7	2	0.5	1	0	**3.5**
					18' Boom	1,000									
					Personnel	3									
					30' Vessel	1									
	Oil Recovery	Near Shore Skimming Vessel (Landing Craft or equivalent)	Clean Harbors 800-645-8265	East Providence	Crucial 1D 18 H-36 Drum Skimmer	1	240	10	Yarmouth	7	2	0.5	1	0	**3.5**
					18' Boom	800									
					Personnel	3									
					34' Vessel	1									
	Tow Containment Boom	Work Boat (26' or larger)	Clean Harbors 800-645-8265	East Providence	Personnel	3	N/A	N/A	Yarmouth	7	2	0.5	1	0	**3.5**
	Tow Containment Boom	Work Boat (26' or larger)	Clean Harbors 800-645-8265	Boston	Personnel	3	N/A	N/A	Yarmouth	7	1.5	0.5	1	0	**3.5**
	Recon	Chase Boat	Clean Harbors 800-645-8265	Boston	Personnel	2	N/A	N/A	Yarmouth	7	1.5	0.5	1	0	**3.5**
RECOVERY TEAM 2	Oil Recovery & Temporary Oil/Water Storage	M/V Mathew Hughes	Clean Harbors 800-645-8265	Boston	Lamor Minimax Brush Skimmer	1	750	157	Fairhaven	50	1	0.5	3	0	**4.5**
					18' Boom	11,400									
					Personnel	6									
					114' Vessel										
	Oil Recovery	Near Shore Skimming Vessel (JBF Type)	Clean Harbors 800-645-8265	Boston	JBF VOSS DIP 400 Unit	1	2,040	43	Yarmouth	7	1.5	0.5	1	0	**3**
					18' Boom	1,000									
					Personnel	3									
					30' Vessel	1									
	Oil Recovery	Near Shore Skimming Vessel (Landing Craft or equivalent)	Clean Harbors 800-645-8265	Boston	Crucial 1D 18 H-36 Drum Skimmer	1	240	10	Yarmouth	7	1.5	0.5	1	0	**3**
					18' Boom	800									
					Personnel	3									
					34' Vessel	1									
	Tow Containment Boom	Work Boat (26' or larger)	Clean Harbors 800-645-8265	Boston	Personnel	3	N/A	N/A	Yarmouth	7	1.5	0.5	1	0	**3**
	Tow Containment Boom	Work Boat (26' or larger)	Clean Harbors 800-645-8265	East Providence	Personnel	3	N/A	N/A	Yarmouth	7	2	0.5	1	0	**3.5**
	Recon	Chase Boat	Clean Harbors 800-645-8265	East Providence	Personnel	2	N/A	N/A	Yarmouth	7	2	0.5	1	0	**3.5**
												Estimated Recovery Rate (BBLS/DAY)	**7,350**		
												Skimming Vessel Storage Capacity (Barrels)	**1,163**		

Table H-2 Proposed Response Equipment Inventory

	Quantity	Boston, MA Service Ctr 609 Pleasant St Weymouth, MA	Providence, RI Service Ctr 8 Dexter Rd East Providence, RI	Shrewsbury, MA Service Ctr 238 Cherry St Shrewsbury, MA	Herz Equipment Rental 45 Gerard St Boston, MA	United Equipment Rental 354 3rd St Everett, MA	ChemTex 1 Front St Cumberland, RI	ArgoTurboServe (ATC) 49 Commerce Rd Carlstadt, NJ	Trident Environmental Group 62 LaCombe St Marlboro, MA	TMC Services One William Way Bellingham, MA	Moran Environmental Recovery 100 Water St East Providence, RI	Moran Environmental Recovery 75 York Ave Randolph MA	Bow, NH Service Ctr 20 Dunklee Rd Bow, NH
Distance to Staging Area (Miles)		60	72	95	75	80	78	254	98	79	74	65	140
Time to Ferry Terminal (Hours)		1.25	1.5	1.75	1.5	1.5	1.5	4.5	2	1.5	1.5	1.5	2.5
ETA Martha's Vineyard		2	2	2	2	2	2	2	2	2	2	2	2
Estimated Response Time		**3.25**	**3.5**	**3.75**	**3.5**	**3.5**	**3.5**	**6.5**	**4**	**3.5**	**3.5**	**3.5**	**4.5**
Vessels & Marine Support Equipment													
Jon Boats	33	3	1										2
Work Boats (up to 26' in length)	30	3	3						2	1	2	1	
Motor Vehicles & Vacuum Equipment													
3,000 Gallon Straight Trucks	3	2							1				
5,000 Gallon Tractor Trailer Trucks	3	1								1		1	
50 Passenger or Greater Bus	9								4	2	1	2	
30 Pickup Trucks	30	3	2						6	2	1	2	
18" Containment Boom	25 miles	0.4	2.5	0.1					0.7	1.0	0.8	0.6	
Clean Up Equipment													
53' Trailers Full of Sorbent Boom and Pads	6						6						
Hotsy Trailers with Associated Power Washing Equipment	12	2	2										
48' Tractor Trailers Loaded with 4mm Bags (DOT drum liners), Assorted PPE, and Miscellaneous Consumable Supplies	3							3					
Farm Tractors with Trailers for Personnel Moving	12				12								
Farm Tractors with Portable Toilets Mounted	6					6							
3 yd^3 or Greater Front End Loaders	4				2	2							
Personnel													
Clean Harbors Personnel	50	15	7										
Additional Personnel (subcontracted)	450								175	110	75	90	

Table H-2 Proposed Response Equipment Inventory (Continued)

	Quantity	Springfield, MA Service Ctr 190 Brookdale Drive Springfield, MA	Bristol, CT Service Ctr 781 Middle Street Bristol, CT	Milford, CT Service Ctr 279 Woodmount Rd Milford, CT	Portland, ME Service Ctr 17 Main Street South Portland, ME	Albany, NY Service Ctr 32 Bask Rd Glenmont, NY	Newburgh, NY Service Ctr 15 Little Brook Lane Newburgh, NY	Edison, NJ Service Ctr 3 Sutton Place Edison, NJ	Bangor, ME Service Ctr 40B Carey Circle Hampden, ME	Bridgeport, NJ Philadelphia Service Ctr 2858 Route 322 Bridgeport, NJ	Laurel, MD Service Ctr 3527 Whiskey Bottom Rd Laurel, MD	Richmond, VA Service Ctr 17465 Eltham Rd West Point, VA	Norfolk VA Service Ctr 804J Industrial Ave Chesapeake, VA
Distance to Staging Area (Miles)		140	175	180	180	220	260	280	315	355	458	615	612
Time to Ferry Terminal (Hours)		2.5	3.25	3.25	3.5	4	4.75	5.25	5.5	6.5	7.5	10	10
ETA Martha's Vineyard		2	2	2	2	2	2	2	2	2	2	2	2
Estimated Response Time		**4.5**	**5.25**	**5.25**	**5.5**	**6**	**6.75**	**7.25**	**7.5**	**8.5**	**9.5**	**12**	**12**
Vessels & Marine Support Equipment													
Jon Boats	33	2	2	1	4	2	1	2		8	2	2	1
Work Boats (up to 26' in length)	30		1	1	4	2	1	1	1	4	1	1	1
Motor Vehicles & Vacuum Equipment													
3,000 Gallon Straight Trucks	3												
5,000 Gallon Tractor Trailer Trucks	3												
50 Passenger or Greater Bus	9												
30 Pickup Trucks	30		2	2	1	1	1	2	1	2	1	1	
18" Containment Boom	25 miles	0.1	0.6	0.6	4.9	0.8	0.4	0.4		9.3	1.9		
Clean Up Equipment													
53' Trailers Full of Sorbent Boom and Pads	6												
Hotsy Trailers with Associated Power Washing Equipment	12		2	2	2	1	1						
48' Tractor Trailers Loaded with 4mm Bags (DOT drum liners), Assorted PPE, and Miscellaneous Consumable Supplies	3												
Farm Tractors with Trailers for Personnel Moving	12												
Farm Tractors with Portable Toilets Mounted	6												
3 yd^3 or Greater Front End Loaders	4												
Personnel													
Clean Harbors Personnel	50		5	4	5	1	1	3	2	3	2	2	
Additional Personnel (subcontracted)	450												

Appendix I

Oceanographic and Meteorological Information for Subregional OSRP's

APPENDIX I
OCEANOGRAPHIC AND METEOROLOGICAL INFORMATION FOR SUBREGIONAL OSRP'S

Currents

An empirical analysis based on current Acoustic Doppler Current Profiler (ADCP) data and historical data was used to determine tidal current speeds and direction for the Project site. Modeling conducted by Woods Hole Group (2002) was used to determine wind-driven currents on Horseshoe Shoal.

Currents in Nantucket Sound are driven by strong, reversing, semidiurnal tidal flows. Wind-driven currents are only moderate because of the sheltering effect of Nantucket and Martha's Vineyard, however, the southwesterly winds during the summer produce eastward flow through Nantucket Sound (Wilkin, 2006). The tidal range and diurnal timing are variable because of the semi-enclosed nature of the Sound and the regional variations in bathymetry. Typical tidal heights are in the range of 1 to 4 feet (0.3 to 1.2 meters), with tidal surges of up to approximately 10 feet (3 meters) having been recorded during hurricanes (Bumpus et al., 1973; Gordon and Spaulding, 1979). Times of high and low tides vary across the Sound by up to two hours.

Tidal flow and circulation within the Sound generate complex currents, the directions of which form an ellipse during the two tidal cycles each day. The complex bathymetry of Nantucket Sound forces the tidal ellipses to take different shapes in different regions of the Sound. Just off the coast of the south shore of Cape Cod, there is a strong rectilinear, semi-diurnal tidal flow approximately parallel to the coast (Goud and Aubrey, 1985). Tides around the Nantucket Shoals produce a strong anticyclonic circulation (Wilkin, 2006). The tidal current flows to the east during the flood tide (incoming) and to the west during the ebb tide (outgoing). Peak tidal currents often exceed two knots (Bumpus et al., 1973). The intensity of tidal flow, in general, decreases from west to east. There is a slow net drift of the water mass toward the east in the Sound. The net drift is about 2,153 square feet (200 square meters) per tidal cycle, roughly five percent of the total easterly and westerly tidal flows (Bumpus et al., 1971).

To characterize site-specific tidal and wind-driven currents at the Proposed Site in Nantucket Sound, analytical models were applied (WHG, 2004), with the results summarized as follows.

- Flood currents on the shoals are generally directed easterly, with ebb currents generally directed westerly.
- Local changes in tidal current direction occur on Horseshoe Shoal due to its bathymetric features, with currents diverted slightly around the shallowest portion of the shoal.
- Flood currents are generally stronger than ebb currents, and spring tidal currents are approximately 15 to 20% stronger than mean tidal currents.
- Tidal current velocities were calculated to be approximately two feet/second (0.61 m/second) at Horseshoe Shoal.
- Wind-driven current velocities modeled at Horseshoe Shoal were found to be much lower than tidal velocities, and were found to be concentrated over the crest of the shoal.

- Current speed and direction were found to vary more with location than water depth.

Waves

There is no extensive source of wave data within Nantucket Sound, so available wind data and analytical models were used to characterize wind-generated waves at the Proposed Site. The major factors affecting the magnitude and period of wind-generated waves in this area are: the fetch length (the distance over which wind acts on the water surface), average water depth, and wind speed. The wave model applied used these factors to estimate wave height and period under different conditions. Fundamentally, larger waves are generated as wind speed, water depth, and fetch length increase. Fetch is restricted within Nantucket Sound due to surrounding landforms including Cape Cod, Monomoy Island, Nantucket Island, and Martha's Vineyard.

Wave model simulations were performed using the USACE's *Wind Speed Adjustment and Wave Growth* model (USACE,1992) to estimate significant wave height (i.e., the average height of the highest 1/3 of waves in a sea state); peak period (i.e., the period that characterizes the majority of the waves in the sea state); and peak direction. The results represent wave conditions at the center of the Proposed Site at Horseshoe Shoal. Generally, the model indicates that Horseshoe Shoal is exposed to the largest waves from the easterly directions. Wind-generated significant wave heights generally range from less than one foot to nearly four feet (0.3 to 1.2 meters), with relatively short spectral peak wave periods (between two and four seconds). Individual wave heights can be higher, and substantially higher waves would be present during storms.

Extremal analysis was performed to estimate wave height and period characteristics for the 2-, 10-, 50-, and 100-year return periods. These were estimated for both locally generated and offshore waves using a computer model entitled "Extrm2: Extremes Program". The extreme storm wave for this Project is defined as the average height of the highest 1 percent of all waves in the spectrum (for the 50-year return the extreme storm wave at Horseshoe Shoal was estimated to be 17.3 feet (5.3 meters).

Data was collected at the Project site between April 2003 and September 2004 using an ADCP. The wave data indicated that the maximum recorded significant wave height reached 6.6 feet (2.0 meters0 while the maximum wave height reached 8.2 feet (2.5 meters). The majority of wave patterns had a significant wave height between 1 foot (0.3 meters) and 1.3 feet (0.4 meters). The wave period varied depending on whether wind-generated waves (2 to 6 second periods) or swell (6 to 12.8 seconds) determined the shape of an individual wave spectrum. The highest waves had periods of approximately six seconds, slightly longer (about one second longer) than periods predicted by wave modeling.

Typically, winds with speeds of 8.8 knots (15 m/s) generated waves with a significant wave height of 3.9 +/- 0.7 feet (1.2 +/- 0.2 meters). This relationship varied slightly, depending on water depth. Measured waves were approximately ten percent higher during periods of high water. A comparison with model results indicates that the observed wave height/wind speed relationship fits well with the results of the model. Wind and wave directions correlated well with a tendency for waves to propagate along the east-west axis of Nantucket Sound.

Appendix J

Bibliography

APPENDIX J
BIBLIOGRAPHY

Bumpus, D.F., R.E. Lynde, and D.M. Shaw. 1973. Physical oceanography. Pp. 1-1 to 1-72, in Coastal and Offshore Environmental Inventory: Cape Hatteras to Nantucket Shoals. Marine Publication Series No. 2. Univ. of Rhode Island, Kingston, RI.

Bumpus, D.F., W.R. Wright, and R.F. Vaccaro. 1971. Sewage disposal in Falmouth, Massachusetts: Predicted effect of the proposed outfall. J. Boston Soc. Civ. Engin. 58: 255-277.

Cape Cod and Islands Geographic Response Plan. Available online at: http://grp.nukaresearch.com/CIgroup.htm

Cape Wind Energy Project, Draft Environmental Impact Statement, US Army Corps of Engineers, November 2004

Cape Wind Energy Project, Final Environmental Impact Statement, US Department of the Interior, Minerals Management Service, January 2009. http://www.boemre.gov/offshore/AlternativeEnergy/PDFs/FEIS/Cape%20Wind%20Energy%20Project%20FEIS.pdf

Clean Harbors Emergency Response Resource Book, February 8, 2011. http://clark.cleanharbors.com/tt/sl.ashx?z=219847c5&dataid=1271&ft=1

Clean Harbors Environmental Services, Inc., Notification Letter for Providing Emergency Response Services, October 27, 2004

"Contents of a Regional or Sub-regional Oil Spill Response Plan (OSRP)" in NTL02-G09, US Department of the Interior, Minerals Management Service, October 1, 2002. http://www.ocsbbs.com/ntls/ntl02-g09-att.pdf

Etkin, D.S. 2006. Oil Spill Probability Analysis for Cape Wind Energy Project in Nantucket Sound. http://www.boemre.gov/offshore/PDFs/CWFiles/SL-ERC2006OilSpillProbability.pdf

Gordon, R.B. and M.L. Spaulding. 1979. A nested numerical tidal model of the Southern New England Bight. Report to NOAA, Hampton, VA, from Univ. of Rhode Island, Kingston, RI.

Goud, M.R. and D.G. Aubrey. 1985. "Theoretical and Observational Estimates of Nearshore Bedload Transport Rates." Marine Geology, vol. 64, 91-111.

Jedrey, E., R.J. Harris and E.A. Ray. 2010. Roseate Terns – Citizens of the World, the Canada to CapeCod Connection. Bird Observer, Volume 38, Number 3: 146 150.

Knee, Kelly, Swanson, Craig, Tatsu Isaji, Whittier, Nicole, and Sakar Subbayya. 2006 Simulation of Oil Spills form the Cape Wind Energy Project Electric Service Platform in Nantucket Sound. August 2006. http://www.boemre.gov/offshore/PDFs/CWFiles/03.pdf

Massachusetts Department of Environmental Protection, Bureau of Waste Site Cleanup, Release Notification & Notification Retraction Form. http://www.mass.gov/dep/cleanup/approvals/bwsc-103.pdf

Melvin, S. M., and C. S. Mostello. 2007. Summary of 2003 Massachusetts piping plover census data. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, Westborough, Mass. January 10, 2007.

Minerals Management Service 2008. Cape Wind Energy Project Nantucket Sound Biological Assessment Minerals Management Service for Consultation with United States Fish and Wildlife Service and NOAA Fisheries. May 2008. http://www.boemre.gov/offshore/PDFs/May2008CapeWindFinalBA.pdf

National Response Center, Storage Tank Report. http://www.nrc.uscg.mil/tankreport.html

Rhode Island Southeastern Massachusetts Area Contingecy Plan, 2002. Available online at: https://homeport.uscg.mil/mycg/portal/ep/contentView.do?channelId=-18361&contentId=55588&programId=88121&programPage=%2Fep%2Fprogram%2Feditorial.jsp&pageTypeId=13489&contentType=EDITORIAL&BV_SessionID=@@@@1732798217.1299894951@@@@&BV_EngineID=cccfademmkkielfcfjgcfgfdffhdghl.0

Roseate Tern Recovery Team (RTRT). 2007. Numbers of nesting pairs and productivity (chicks fledged per pair or per nest) of Roseate Terns in the Northeastern United States and Canada, 2000-2007. 12/11/07.

Title 29, Occupational Safety and Health Administration, Part 1910 (29 CFR 1910), Occupational Safety and Health Standards. http://www.osha.gov/pls/oshaweb/owastand.display_standard_group?p_toc_level=1&p_part_number=1910

Title 30 Mineral Resources, Part 254 (30 CFR 254), Oil Spill Response Requirement for Facilities Located Seaward of the Coast Line. http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title30/30cfr254_main_02.tpl

Title 33, Navigation and Navigable Waters, Part 153 (33 CFR 153), Control of Pollution by Oil and Hazardous Substances, Discharge Removal. http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title33/33cfr153_main_02.tpl

Title 40, Environmental Protection Agency, Part 300 (40 CFR 300), National Oil and Hazardous Substances Pollution Contingency Plan. http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title40/40cfr300_main_02.tpl

Trull, P., S. Hecker, M. J. Watson and I. C. T. Nisbet. 1999. Staging of Roseate Terns *Sterna dougallii* in the post-breeding period around Cape Cod, Massachusetts, USA. Atlantic Seabirds 1: 145–158.

[USFWS] 2003. U.S. Fish and Wildlife Service. 2003. Best Practices for Migratory Bird Care During Oil Spill Response. November 2003. Anchorage, Alaska. http://www.fws.gov/contaminants/OtherDocuments/best_practices.pdf

[USFWS] 2008. U.S. Fish and Wildlife Service. 2008. Biological Opinion for the Cape Wind Energy Project Nantucket Sound, Massachusetts. Concord, New Hampshire. http://www.fws.gov/newengland/pdfs/CapeWind-BO-21November2008_withCovLttr.pdf

Wilkin, J.J. 2006. The summertime heat budget and circulation of Southeast New England shelf waters. Journal of Physical Oceanography 36(11):1997-2011.

Woods Hole Group (WHG) 2004. Analytical Modeling of Alternative Wind Farm Sites Existing Conditions. Prepared on behalf of Cape Wind Associates, LLC.

Appendix D

Materials Management and Disposal Plan

Materials Management and Disposal Plan

CAPE WIND ASSOCIATES, LLC
BOSTON, MASSACHUSETTS

PREPARED FOR

Cape Wind Associates, LLC
75 Arlington Street
Boston, Massachusetts 02116

PREPARED BY

ESS Group, Inc.
401 Wampanoag Trail, Suite 400
East Providence, Rhode Island 02915

Project No. E159-504

October 2010

www.essgroup.com

MATERIALS MANAGEMENT AND DISPOSAL PLAN
Cape Wind Associates, LLC
Boston, Massachusetts

Prepared For:

Cape Wind Associates, LLC
75 Arlington Street
Boston, Massachusetts 02116

Prepared By:

ESS Group, Inc.
401 Wampanoag Trail, Suite 400
East Providence, Rhode Island 02915

ESS Project No. E159-504

October 2010

Approved by:______________________________ Date:________________________

Printed Name:_____________________________ Title:________________________

Approved by:______________________________ Date:________________________

Printed Name:_____________________________ Title:________________________

Record of Revisions

Date of Review	Person Conducting Review	Reason for Review (Biennial update, Amendment, or Modification)	Sections Affected	Date Next Review Required

ESS Group, Inc.

TABLE OF CONTENTS

SECTION **PAGE**

APPENDICES

1.0 INTRODUCTION

Cape Wind Associates, LLC (CWA) proposes to construct 130 Wind Turbine Generators (WTGs) arranged in a grid pattern in the Horseshoe Shoal region of Nantucket Sound, Massachusetts Solid dielectric submarine inner-array cables (33 kilovolt) from each wind turbine generator will interconnect within the grid and terminate at the Electric Service Platform (ESP) located at the center of the array. The electric service platform will serve as the common interconnection point for all of the WTGs. A submarine transmission cable system (115 kilovolt) will deliver the power generated offshore to the onshore distribution grid system. An upland cable will be installed between the submarine cable landfall, located in Yarmouth, Massachusetts, and the NStar Barnstable Switching Station. For the purpose of this document, facility is intended to mean the sum of all project components described above as well as the onshore support facilities including the construction staging area and the control facility.

Construction, operation, and decommissioning of the Facility will involve the purchase, handling, management and use of a variety of materials and products as well as the generation and disposal of non-hazardous and hazardous waste. This plan specifically addresses the materials related to the construction and operation periods. The Materials Management and Disposal Plan will be updated prior to decommissioning in order to reflect best management practices experienced during the lifespan of the project.

Non-hazardous solid wastes generated during operation and maintenance of the facility may include used office materials, oil, solvents, wire, fastening hardware, light bulbs, empty material containers and other spent or surplus supplies. Non-hazardous solid wastes generated during routine maintenance operations at the ESP and WTGs will be transported to shore on the marine service vessel and stored at the onshore service area. Waste will be transported from the onshore service area by a waste management contractor at regular intervals to authorized facilities for disposal. Recyclable or reusable materials, such as oil, wire and bulk metals, will be transported off site by an authorized waste hauler for beneficial reuse.

The Materials Management and Disposal Plan (the Plan) provided herein is intended to serve as the guidance document for standard operating procedures associated with the safe management and disposal of anticipated waste streams for the Cape Wind Energy Project (Project).

The Plan describes procedures that CWA and its subcontractors will employ at the site of the Project to ensure that all non-hazardous materials used on site are controlled, maintained and disposed of in an environmentally compliant manner.

1.1 Purpose and Use

As discussed in Section 5.1 of the BOEMRE Final Environmental Impact Statement (FEIS) for the Project; activities, equipment, materials, and process associated with the Project can be divided into two main categories, those items occurring under normal conditions, and those items occurring under non-routine conditions. Under normal conditions, potential impacts (associated with waste generation, management, and disposal) may occur as a result of the following:

- Maintenance of vessels and crew boats.
- Operation of construction staging facilities.

- Installation of wind turbine generators (WTGs), the electric service platform (ESP), and transmission cables.
- Project operation.

This Plan addresses the storage, handling, and disposal of materials associated with Project construction and operation under normal conditions. This Plan is incorporated as an Appendix to the Project's Construction and Operations Plan (COP).

Although this Plan discusses the use and management of oils among the materials addressed, this Plan does not address oil spill response given the availability of a complete Oil Spill Response Plan (OSRP), which is provided as Appendix C to the COP. The OSRP was prepared in accordance with the BOEMRE regulations at 30 CFR 254, "Oil Spill Response Requirements for Facilities Located Seaward of the Coastline." In the event of a release of oil to the ocean, CWA's employees, contractors, and designated responders will refer to the OSRP to ensure that the appropriate spill response actions are taken in a timely manner to prevent impacts to sensitive receptors.

1.2 Implementation Responsibility

1.2.1 Construction

The protocols described herein are applicable to all staff, subcontractors, and on-site vendors working under the authority of the construction contractor. The contractor will be responsible for implementing this plan and ensuring that all subcontractors are acting in accordance with the Plan. The Construction Supervisor may delegate the compliance monitoring and authority to implement corrective actions to a Site Environmental Coordinator.

1.2.2 Operation

The protocols described herein are applicable to all staff and subcontractors working under the authority of CWA's asset manager. The asset manager will be responsible for ensuring that anyone associated with operating the facility is acting in accordance with the Plan. Implementation of the Plan will be the responsibility of the Operations and Maintenance (O&M) Contractor. It is anticipated that Siemens Energy Inc. will be the O&M Contractor. The O&M Contractor's site operations manager may delegate the compliance monitoring and authority to implement corrective actions to a Site Environmental Coordinator.

2.0 Marine Trash and Debris Management

Marine debris is any object or fragment of wood, metal, glass, rubber, plastic, cloth, paper, or any other man-made item or material that is lost or discarded in the marine environment. CWA employees and contractors working on offshore sites will adhere to the procedures described in this section to minimize and/or eliminate the accidental loss or discharge of any man-made objects into the marine environment.

The Project will adhere to all Federal rules and regulations that prohibit the disposal and/or discharge of any solid waste in the marine environment. In particular, the Project will adhere to the requirements of

30 CFR 250.300(a) and (b) (6), which prohibits the discharge of containers and other similar materials into the marine environment. CWA will ensure that its employees and contractors also adhere to the requirements of 30 CFR 250.300(c), which requires durable identification markings on equipment, tools, and containers, and other materials, used on offshore facilities.

To minimize the loss of man-made items into the marine environment, the following best management practices (BMPs) are established for the Project. These BMPs were developed in accordance with BOEMRE NTL No. 2007-G03.

- Marine Trash and Debris Awareness Training will be included as a part of CWA's annual training for all offshore employees, O&M Contractor's employees and other contractors. All employees and offshore contractors will complete this training at least once prior to engaging in offshore work, and thereafter on an annul basis. The training will consist of the following two parts: (1) viewing a marine trash and debris training video[1] or slide slow, and (2) receiving an explanation from CWA's or their O&M Contractor's management personnel that emphasizes their commitment to minimizing and/or eliminating marine trash and debris.

- A Marine Trash and Debris Awareness Training and Certification Process will be developed to reasonably assure that CWA employees and contractors receive the required training. As part of the certification process, CWA or its O&M Contractor will maintain records of employee attendance at initial and annual training sessions. These records will be made available for inspection by BOEMRE. CWA expects that contractors will maintain their own records of employee training. Appendix B contains a sample form which will be used by CWA to track employee training. CWA will require the use of a similar form by its contractors.

- CWA will provide annual reports signed by a company official to describe the marine trash and debris awareness training process and certify that the training has been followed for the previous year. Appendix B contains a sample report that will be prepared by CWA to self-certify compliance with the training requirements of this Plan.

- Marine Trash and Debris Placards will be posted in prominent locations on the ESP and on all of the WTGs. These placards will be displayed on a 5X8-inch format, at a line-of-sight height. The placards will be referenced, and their contents explained, during any initial orientation given at the facilities to any visitors, employees, or contractors. The placards will be sturdy enough to withstand the local environmental conditions and will be replaced when damage or wear compromises readability. Sample placards are provided in Appendix C.

- CWA will implement the following procedures to prevent the production of marine trash and debris. These procedures will be included in the training provided to employees and contractor under this section of the Plan.

[1] Cape Wind will include the OOC-produced training video as part of its training program. This video is available in for download from the OOC website at www.offshoreoperators.com. As an alternative to the video, an OOC-produced Microsoft PowerPoint presentation is also available at the same website.

- Secure or stow any loose items in baskets or lockers to prevent them from being lost overboard.
- Use hardhat chinstraps and/or tethers.
- Properly dispose of all items.
- Ensure that all bins, trash cans and storage containers have covers that are properly and tightly secured.
- Practice good housekeeping.
- Provide butt buckets in smoking areas.
- Observe placards and follow marine debris training guidelines.
- Wherever possible, reduce the use of pallets by using pallet boxes or alternative bulk containers.
- Conduct survey/hazard hunts to identify potential sources of marine debris.
- Include prevention discussions in pre-job hazard assessment meetings and behavior-based safety programs.
- Increase focus on the prevention of marine debris.

In the event that any materials are accidentally lost overboard, CWA employees and/or its contractors will make reasonable efforts to recover any materials lost overboard as safe operations allow. CWA will prepare any required reports to document lost materials in accordance with the applicable federal regulations.

3.0 NON-HAZARDOUS MATERIAL

3.1 Inventory

Non-hazardous solid wastes generated during construction and operation of the facility will include scrap wood, steel, wire, glass, concrete, paper, and empty non-hazardous waste containers. In addition, the ESP and WTGs will require oils and chemicals to be used during operation. The onshore support facility will receive deliveries and provide storage for bulk quantities of oil and chemicals. The amount of oil and chemicals stored on support vessels, ESP, and WTGs will be minimized to the greatest extent possible.

3.1.1 Electric Service Platform

The ESP will have small amounts of lubricating oil, greases and coolants in pumps, fans, air compressors, emergency backup system and miscellaneous equipment. The ESP also will have four oil-cooled step-up transformers. The primary ESP components and the fluids contained within them are as follows:

- Main Transformer - The four 110-megavolt amp (MVA) oil cooled main step-up transformers will each have a capacity of approximately 10,000 gallons (37,854 liters) of dielectric cooling oil. Each transformer will be mounted in a leak-proof detention area that will have the capacity of holding 150% of the transformer oil. Each of the detention areas will be connected via valves to a storage tank that has the capacity to store 100% of the oil from all four transformers. The oil piping to the coolers and the coolers will be configured so that any failures will result in oil being drained to the detention area.

- A back-up battery system will be installed on the ESP to provide power to essential auxiliary loads in the event of a loss of connection to the NSTAR transmission grid. The system will be designed for redundancy with two independent 125-volt (V) direct current (DC) systems each consisting of a stationary battery bank, battery charger and distribution panel. The batteries will be lead acid type for stationary applications. They will be sized appropriately for a 36-hour duty cycle following an emergency trip (dead bus).

- Miscellaneous equipment - Various pumps, fans, and an air compressor will be installed on the platform. They will be lubricated with either grease or oil in small quantities. The equipment will be installed in such a way that any leakage will be contained on the sealed deck of the ESP.

The ESP will be accessible by service vessels as part of the routine maintenance plan. Helicopter access will also be available as needed. Planned preventative service and maintenance for the Project are described in detail in Section 5.0 of the COP. Planned maintenance activities for the ESP include: (1) the testing and potential changing of all liquids in process equipment, as necessary, and (2) the topping up of all fluids on a regular basis.

As part of the maintenance program, delivery of oils and chemicals to the ESP is a multi-step process that involves: (1) the transfer of materials from trucks and other modes of surface transportation to temporary onshore storage facilities, (2) the transfer of materials from temporary onshore storage facilities to ocean-going maintenance vessels, and (3) the transfer of materials from maintenance vessels to the ESP. A similar number of transfers, but in the reverse order, will be required to remove waste oils and chemicals from the ESP for delivery to onshore waste receiving and processing facilities.

The quantities of materials transferred during each of the steps described above are dependent upon the maintenance schedule for the ESP, which is addressed in section 5.0 of the COP and will be finalized prior to commencing operations. Oils and chemicals will be delivered to and stored at temporary onshore storage facilities in sufficient quantities in support of the manufacturer's recommended schedule for preventive maintenance of the ESP.

3.1.2 Wind Turbine Generators

In addition to the materials stored on the ESP, the WTGs will utilize lubricating oil, cooling liquids, and grease, all of which will be located in the nacelle or hub. The WTG has been carefully configured to contain any fluid leakage and prevent overboard discharges. Total oil storage at each WTG is expected to be approximately 680 gallons (16.2 barrels) at any given time, or approximately 88,400 gallons (2105 barrels) for all 130 WTGs. Table 2 provides a summary of the expected materials usage for each WTG system, including a general description, volumetric capacity, and type of product. Appendix A contains the MSDS for the materials used and stored on the WTGs.

The primary WTG components and the fluids contained within them are explained below:

- Nacelle – Approximately 90 gallons of hydraulic oil and 220 gallons of gear oil are contained within the nacelle. In the event of leaking gear oil or a broken hose/pipe, the leaking oil will be guided through the manhole in the bottom of the bedplate and collected on the upper internal platform of the tower.
- Tower - The upper internal platform is designed and sealed in such a way that it can withhold the total amount of gearbox and hydraulic fluid until it can be transferred to containers for safe disposal. The lower tower will include a transformer located near the access door, which will contain approximately 370 gallons of transformer oil.

Each WTG will be accessible by service vessels as part of a routine maintenance plan. Planned preventative service and maintenance for the Project are described in detail in Section 5.0 of the COP. Planned maintenance activities for each WTG include: (1) the cleaning of machine rooms, (2) the changing of all liquids in process equipment, as necessary, and (3) the topping up of all fluids on a regular basis.

The delivery of oils and chemicals to the WTGs will include the same basic steps that are involved with the delivery of said materials to the ESP. That is, the delivery of materials will include: (1) the transfer of materials from trucks and other modes of surface transportation to temporary onshore storage facilities, (2) the transfer of materials from temporary onshore storage facilities to ocean-going maintenance vessels, and (3) the transfer of materials from maintenance vessels to a WTG. A similar number of transfers, but in the reverse order, will be required to remove waste oils and chemicals from each WTG for the ultimate delivery to onshore waste receiving and processing facilities. Note that the types and quantities of oil and chemicals transferred to and from the WTGs during each step will differ from the deliveries of materials to and from the ESP. The maintenance schedule will involve trips to multiple WTGs during a typical workday under normal conditions.

3.1.3 Onshore Support Facilities

The onshore support facilities will provide a base of operation for personnel and equipment deliveries. Materials will be stocked and organized at the facility and transferred to service or construction vessels and vehicles on an as needed basis. During the construction, activities at the support facility will include assembly of major project components (e.g. monopile structures, WTG components, etc.). As a result, miscellaneous tools and equipment (e.g. grinders, torches, welding rods, wire, etc.) will be required on site that may result in non-hazard materials being generated at the site and managed properly. Non-hazardous cleaning solutions including electronic and parts cleaners will be stored at the onshore support facility and used periodically during routine maintenance activities at the ESP and WTGs.

3.2 Storage

Designated areas will be established for proper storage and management of non-hazardous materials and waste streams. Appropriate and standard housekeeping practices will be implemented on marine construction vessels and at the onshore support facilities to maintain clean and safe working environments. Waste materials (wire, metal shavings, etc.) will be cleaned up on a daily basis from work areas and stored in proper receptacles.

3.2.1 Material Transfer and Delivery

Proper loading and unloading procedures for the transfer of material will be observed during each step in the delivery process. To ensure the overall integrity of individual containers on a delivery vehicle (or vessel), CWA employees and its contractors will visually inspect delivery vehicles arriving at the temporary onshore storage facility. CWA or O&M Contractor's employees and their subcontractors will immediately address any leaks or spills from containers on delivery vehicles, and ensure that proper protective measures are available for personnel and the environment.

The following procedure will be followed for the bulk delivery of oils and chemicals by truck. This procedure will be used when petroleum products (and other bulk chemicals) are being unloaded or transferred from trucks to the temporary onshore storage facility. Note that smoking and ignition sources will be prohibited from in the unloading/transfer areas.

1. Upon arrival on-site, the delivery personnel (vehicle operator, subcontractor, etc.) will notify the Site Environmental Coordinator, or another CWA or O&M Contractor employee with the proper authority, before unloading/transferring bulk oil and chemical containers.

2. CWA or O&M Contractor personnel will inspect the overall integrity of the delivery vehicle and containers. If the vehicle or containers are determined to be in poor condition (e.g. signs of leaks or corrosion), the vehicle's driver or operator will be informed that repairs must be made, or a new shipment must be ordered, before CWA or O&M Contractor can accept delivery.

3. The delivery personnel will turn off the vehicle and set the handbrake, to prevent vehicular movement during container transfer.

4. CWA or O&M Contractor personnel will ensure the containers are properly closed and sealed prior to unloading or transferring the container.

5. The container must be properly secured on forks or pallets to prevent the container from falling during movement.

6. After the above steps have been taken, the delivery personnel will proceed with the transfer of the container, with CWA or O&M Contractor personnel monitoring the transfer.

The procedures outlined above will be followed during subsequent transfers of petroleum products and chemicals during the bulk delivery of materials to the ESP and each WTG. That is, all containers will be visually inspected during the transfer from the temporary onshore storage facility to maintenance vessels, and again during the transfer from the maintenance vessel to the ESP and/or WTG. If the overall integrity of a container is jeopardized, for any reason, during the delivery process, CWA or O&M Contractor personnel and/or their subcontractors will withhold the delivery of the problematic container and take appropriate measures to prevent the discharge of materials into the ocean. CWA or O&M Contractor personnel and/or its subcontractors will maintain records to document the reasons for withholding the delivery of any containers. These records will be maintained at the Operations Center.

3.3 Disposal

Construction-related materials will be stored and/or disposed of in an appropriate manner at the onshore support facility. Recycling, to the maximum practicable extent, will be the preferred and primary disposal method for dealing with waste material. Waste will be temporarily accumulated onsite in designated waste accumulation areas, in accordance with industry-standard practices.

Recyclable waste streams (including lead-acid batteries) will be segregated from regular trash as part of the site recycling program. Small trash items and miscellaneous debris will be placed into secure bins for storage prior to disposal. Waste containers that have the potential for significant paper or dust blowing will be covered. Bin placement will be approved by the Construction Manager. Unprotected plastic bags will not be placed on the ground. Salvageable wastes will be stored onsite in a manner to prevent contamination of storm water and will be removed on a periodic basis. Construction debris collection areas will have legible signs noting the prohibition of mixing with non-hazardous waste. Construction related waste will not be burned on-site.

All wastes will be evaluated to determine the waste's characterization and to determine if the waste is a hazardous waste requiring special provisions. This evaluation will include, but is not limited to laboratory analysis, knowledge of the process, or review of material safety data sheets (MSDS). All wastes will be evaluated when associated materials, processes or conditions change or as required by any permits or exemptions maintained by the operation.

Waste generated during offshore construction and operation will be temporarily stored on the construction vessels in designated areas. Waste will be transported to shore on a regular basis and stored in appropriate containers on CWA property until properly disposed of off site by a licensed contractor. Additional vessel waste and discharge information is provided in Appendix C of this document.

CWA or its O&M Contractor and their subcontractors will only use properly licensed solid waste disposal firms. Solid waste disposal firms must present evidence of required permits and licenses. All contractors will be informed that before a waste disposal vehicle may enter an onshore storage facility, for the transfer of waste material to an approved off-site waste receiving and processing facility, the operator of the waste disposal vehicle must provide a copy of its certifications to the Site Environmental Coordinator. The Site Environmental Coordinator will maintain a list of approved solid waste disposal firms and the list will be available at the security gate. Only waste disposal firms on the approved list will be allowed to enter the site. All documentation will be maintained through the life of the project.

CWA or its O&M Contractor will identify specific disposal firms and off-site waste receiving and processing facilities. One such facility is located in Braintree, Massachusetts, and is owned and operated by Clean Harbors.[2]

3.4 Best Management Practices

The following best management practices are established to ensure the proper storage, handling, and disposal of oils and chemicals during the construction and operation of the Project.

ESP Containment Areas: The ESP will have sealed, leak-proof decks, which will act as fluid containment. In addition, spill containment kits will be available near all equipment. Total maximum oil storage on the ESP is expected to be approximately 42,000 gallons (1,000 barrels) at any given time.

WTG Containment Areas: The WTGs have been carefully configured to contain any fluid leakage and prevent accidental discharges to the ocean.

Transfer of Oils and Chemicals: The ultimate transfer of oils and chemicals from the temporary onshore storage facilities to the ESP and to each WTG will be carried out with appropriate safeguards to prevent the accidental release of oils and chemicals to the marine environment. In the event of an accidental discharge of such materials to the ocean, CWA or O&M Contractor employees and contractors will execute the procedures in the OSRP to contain and recover any discharged materials. The OSRP is included as a separate Appendix to the COP.

Inspection: The Site Environmental Coordinator, as part of his or her daily regimen, will report on all product specific housekeeping activities utilizing a checklist.

Reporting: The results of construction inspections will be documented on the inspection checklist designated for this activity and forms part of the Resident Engineer daily inspection report. It will be distributed and maintained in accordance with project administrative procedures. The Site Construction Manager will receive a copy of all non-compliance notices.

Training: Employees of CWA or O&M Contractor and their subcontractors at the site and home office will be responsible for the management, handling, and preparation for shipment, spill response, and

[2] According to the Clean Harbors website (http://www.cleanharbors.com/locations/index.asp?id=152), the Clean Harbors of Braintree, Inc. facility serves the New England area as the largest storage and treatment fuels blending, stabilization, infectious

maintenance of all waste and/or waste systems. Subcontractor site employees will receive appropriate training on a periodic basis. All training will be documented and retained as long as the employee is employed and then archived per CWA policy.

4.0. HAZARDOUS MATERIAL

CWA does not anticipate hazardous materials being brought on site during construction or operation of the Project.

waste, and incineration facility in New England. Halogenated solvents are reclaimed on-site and certain non hazardous solids are incinerated. Other wastes are treated and disposed at company-owned facilities or other ultimate disposal sites.

Appendix A

Training Information

APPENDIX A
TRAINING INFORMATION

CWA or its O&M Contractor will provide training for all employees in the storage, handling, and disposal of chemicals, oils and hazardous materials in accordance with the purpose and use of this Plan. CWA or its O&M Contractor will provide initial training to all employees – thereafter the training will be repeated on an annual basis. CWA or its O&M Contractor will maintain records of employee training. All CWA contractors and outside agencies will be responsible for certifying the training of their employees.

A. Location of Records

Records of all CWA employee training will be maintained at the Operations Center. Records of spill response contractor's employee training will be maintained at the appropriate facility.

Appendix B

Sample Marine Debris Placards

APPENDIX B
SAMPLE MARINE DEBRIS PLACARDS

WHAT IS MARINE DEBRIS?

Marine debris is any object or fragment of wood, metal, glass, rubber, plastic, cloth, paper or any other man-made item or material that is lost or discarded in the marine environment. Marine debris may be intentionally dumped, accidentally dropped, or indirectly deposited. Whatever the source, marine debris is a direct result of human activities on land and at sea. Depending upon its composition, marine debris may sink to the seafloor, drift in the water column, or float on the surface of the sea. Certain debris, such as plastics, can persist for hundreds of years in the marine environment without decomposing.

WARNING!

YOUR ACTIONS MAY SUBJECT YOU TO SEVERE LEGAL CONSEQUENCES!

The disposal and/or discharge of any solid waste anywhere in the marine environment (other than ground-up food particles) is strictly prohibited by U.S. Coast Guard and Environmental Protection Agency regulations. **THIS INCLUDES MATERIALS OR DEBRIS ACCIDENTALLY LOST OVERBOARD.**

The disposal of equipment, cables, chains, containers or other materials into offshore waters is prohibited by the Minerals Management Service (30 CFR 250.300(b) (6)). **THIS INCLUDES MATERIALS OR DEBRIS ACCIDENTALLY LOST OVERBOARD.**

ATTENTION!

MARINE DEBRIS MAY CAUSE SEVERE ECOLOGICAL DAMAGE!

Marine debris discarded or lost from offshore and coastal sources may injure or kill fish, marine mammals, sea turtles, seabirds and other wildlife.

Thousands of marine animals, including marine mammals, sea turtles and seabirds, die every year from entanglement in fishing line, strapping bands, discarded ropes and nets and plastic six-pack rings. Additionally, unknown numbers of marine animals die each year from internal injury, intestinal blockage and starvation as a result of ingesting marine debris.

Marine debris fouls boat propellers and clogs water intake ports on engines thereby endangering the safety of fishermen and boaters and resulting in heavy loss of time and money.

Marine debris detracts from the aesthetic quality of recreational beaches and shorelines and increases the cost of park and beach maintenance.

ATTENTION!

SECURE ALL LOOSE ARTICLES!

NOAA Fisheries now expects offshore energy industry personnel to pick up and recover any articles lost overboard from boats and offshore structures as safety conditions permit.

Protect marine animals, as well as your valuable time and money, by doing the following to prevent accidental loss of these items:

Properly securing all materials, equipment and personal belongings. Articles such as hardhats, life vests, sunglasses, cigarette lighters, parts bags, buckets, shrink wrap, strip lumber, and pipe thread protectors become marine debris when lost overboard.

Making sure that all trash receptacles have tight fitting lids and that the lids are used.

Providing and using secure cigarette butt containers. Cigarette butts are one of the most common forms of marine debris. Many cigarette butts contain some form of plastic and do not decompose in the ocean. Cigarette butts pose a major threat to marine wildlife as they resemble food and cause gut blockages and starvation when ingested.

Doing your part to eliminate marine debris. Encourage others to be responsible about marine debris by making suggestions to secure potential marine debris on your boat or structure or by participating in a beach cleanup.

Appendix C

Vessel Waste and Discharge Information

Appendix C

Anticipated Vessel and Waste Discharge Information

Type of Waste or Composition	Approximate Total Amount Discharged[1]	Maximum Discharge Rate[1]	Means of Storage or Discharge Method
Sewerage from vessels	25 gal/person/day	NA	MSD Type III
Domestic water	35 gal/person/day	NA	Discharged overboard after treatment
Uncontaminated bilge water	Volume dependent on vessel size/bilge volume	Rate dependent on vessel size and equipment.	Discharged in accordance with USCG Regulations (33 CFR §151.10).
Deck drainage and sumps	Volume dependent on vessel size/deck area [3]	Rate dependent on vessel size/deck area [3]	Discharged overboard after treatment
Uncontaminated ballast water	Volume dependent on vessel size/ballast volumes	Rate dependent on vessel size and equipment	Discharged incidental to the normal operation of the vessels
Uncontaminated fresh or seawater[2]	NA	NA	Discharged overboard
Solid trash or debris	As Generated	NA	Regular Onshore Licensed Trash Hauling

bbl = 42 U.S. gallon barrel, 1 m^3 = 6.3 bbl.

[1] Final discharge volumes and rates will be provided in the Fabrication and Installation Report following execution of contract with the construction contractor and the assignment of a CWA Marine Coordinator.

[2] Used for vessel air conditioning.

[3] Volumes dependent on weather.

Appendix E

Safety Management System

Sustainable Engineering Worldwide

CAPE WIND PROJECT

SAFETY MANAGEMENT SYSTEM

Contents

1 ABBREVIATIONS

Term	Explanation
ANSI	American National Standards Institute
API	American Petroleum Institute
ATON	Aids to Navigation
BoP	Balance of Plant
BOEMRE	Bureau of Ocean Energy Management, Regulation, and Enforcement
BWEA	British Wind Energy Association
CFR	Code of Federal Regulations
COLREGS	International Regulations for Preventing Collisions at Sea 1972
COP	Construction and Operation Plan
CVA	Certification Verification Agency
CWA	Cape Wind Associates LLC
H&S	Health & Safety
EMI	Energy Management, Inc.
ESP	Electrical Service Platform
FAA	Federal Aviation Administration
HAZID	Hazard Identification
HAZOP	Hazard and Operability Study
HV	High Voltage (Typically 600 Volts or greater)
KPI	Key Performance Indicators
LOTO	Lockout Tagout
MC	Marine Coordinator
MOB	Man Over Board
MOC	Management of Change

Term	Explanation
MOU	Memorandum of Understanding
NEC	National Electric Code (NFPA 70)
NFPA	National Fire Protection Association
NSTAR	NSTAR Electric and Gas Corporation
O&M	Operation and Maintenance
OSHA	Operational Safety and Health Administration
OSRP	Oil Spill Response Plan
PATON	Private Aids to Navigation
PLB	Personal Location Beacons
PPE	Personal Protective Equipment
RTA	Road Traffic Accident
SCADA	Supervisory Control and Data Acquisition
SMS	Safety Management System
SOLAS	Safety of Life At Sea
SWL	Safe Working Load
TSA	Turbine Supply Agreement
TP	Transition Piece
USCG	United States Coast Guard
WTG	Wind Turbine Generator

2 INTRODUCTION

CWA has developed a SMS that describes:

- How CWA will ensure the safety of personnel and others near the facilities.
- Remote monitoring, control, and shut down capabilities [with reference to the O&M Plan included in the COP].
- Emergency response procedures [with reference to the COP].
- Fire protection equipment [with reference to the plant design and O&M Plan included in the COP].
- Testing of the SMS.
- Personnel training.

However, it is important to note that the SMS is a living document that will continue to evolve as CWA finalizes contracts for engineering, procurement, construction, and operation of the project. The SMS will also be updated as CWA contractors conduct engineering, construction and operations of the project. Detailed methods and procedures implementing the SMS will be developed in consultation with BOEMRE and the relevant health and safety regulatory agencies.

This SMS plan describes the approach to safety management to be adopted through the engineering, construction, and operation of the Cape Wind offshore wind farm. The plan details the SMS elements including specific safety practices and procedures to be adopted, based on good practice on offshore wind projects in Europe, and other pertinent offshore experience and regulatory requirements in the USA.

3 SAFETY MANAGEMENT SYSTEM ELEMENTS

The SMS elements will comprise:

- Overall policies and objectives.
- Organization and responsibilities.
- Methods to identify and assess hazards (HAZOP, HAZID, risk assessment).
- Methods to control and mitigate hazards (risk management, defined procedures and method statements for specific activities, training).
- Emergency response procedures.
- Monitoring and auditing of compliance with the SMS, good practice and regulations.
- Continuous improvement.

At high level the SMS elements will address the following key aspects of the project:

- All permanently installed offshore structures which will be unmanned, specifically the WTGs and ESP, and their foundations and substructures. The SMS will focus on the procedures for working on these components, and access and egress with a prescribed range of conditions, the main precedents for good practice being set by European projects and experience gained in the US offshore oil and gas sector.

- Construction vessels and jack-up barges which will be used during construction, and potentially during planned and unplanned maintenance should the need for heavy lift operations be required. The SMS will focus on the suitability of vessels to perform the tasks required operating under the site conditions. This will need to recognize US experience and governmental statutory requirements.
- Access and service vessels used during both construction and operational phases which should operate under SOLAS and US regulations, for example 46 CFR 109.
- Emergency evacuation procedures, for example taking into account 33 CFR 146.210 and any other applicable procedures dictated by the regulatory agencies.
- Elements of the SMS will reflect US electric utility industry best practices especially with respect to the high voltage electrical systems on the ESP. Standards and practices set forth in the National Electric Code (NEC), ANSI, and other applicable US standards identified in the COP for the power industry will be considered.
- Onshore transportation and marshalling activities.

3.1 SMS DEVELOPMENT

Methods and procedures will be developed from high level to detailed level as the project progresses through the following stages:

- Appointment of contractors for the engineering, procurement, construction and operation of the project, and the CVA.
- Detail engineering design and specification, HAZOP and risk assessment stages, and regulatory review.
- Pre-construction safety planning including preparation and approval of detailed method statements and procedures for specific activities.

First stage HAZOP and risk assessment is expected early in 2011, following selection of preferred bidders for the main contracts, as this will require their involvement to be meaningful and specific to the project.

Specification of detailed method statements and procedures will be dependent on the specification of the plant to be installed and the equipment to be used to install it, which will necessarily follow appointment of the contractors.

Different detailed method statements and procedures may be adopted for similar activities, for example during construction or operational phases, depending upon the contract strategy and responsibilities for performance and safety management of the particular activity. However, what will be common is the need to robustly demonstrate that proposed methods and procedures adequately assess all safety concerns and that safety training occurs before each activity commences.

Furthermore, the SMS will be developed to incorporate lessons learned as the project progresses through construction and operation.

It should be acknowledged that the offshore wind industry is just emerging in the US and Cape Wind may be the first utility scale offshore wind project constructed. Thus, many method statements and procedures will be initially developed from the experiences of a mature offshore wind industry in Europe.

In preparing the SMS, CWA intends to work with regulators to leverage lessons learned from other industries and address specific safety concerns regulators may have for the US offshore wind industry.

While the majority of best European offshore wind practices may be emulated in the SMS, the Cape Wind project team will consider the lessons learned from US unmanned offshore oil and gas facilities and the requirements of the USCG's regulations in 33 CFR Subchapter N and OSHA Occupational Safety and Health Standards 29 CFR 1910, 1915, 1917, 1918 & 1926 . Relevant sections of the following regulations relating to unmanned facilities may include the following:

- Workplace Safety and Health – 33 CFR Part 142.
- Design and Equipment – 33 CFR Part 143.
- Lifesaving Appliances – 33 CFR 144.10.
- Firefighting Equipment – 33 CFR Part 145.
- Operations – 33 CFR Part 146.

Additionally, CWA will consider studies commissioned by BOEMRE, especially TAR Project #633, "Wind Farm/Turbine Accidents and the Applicability to Risks to Personnel and Property on the OCS, and Design Standards to Ensure Structural Safety/Reliability/Survivability of Offshore Wind Farms on the OCS" – and the proposed SMS template provided with this study.

3.2 REGULATORY JURISDICTIONS

CWA is committed to providing the most comprehensive and highest quality Health and Safety Plan for all of its employees and contractors by complying fully with all the regulatory requirements and policy applicable to the Cape Wind project. It is understood by Cape Wind that BOEMRE has full authority for regulating the working conditions directly associated with offshore renewable energy production activities on the OCS. The USCG will be responsible for working conditions associated with personal protective equipment (PPE), means of escape, housekeeping, guarding of decks areas, life saving devices and equipment, fire extinguishers and systems emergency communication equipment and commercial diving on the OCS. CWA is committed to working closely with the USCG, BOEMRE and OSHA to define areas where there is potential for some overlap as to which standards or jurisdiction apply as a result of the projects various scopes of work. Throughout the SMS structure we have worked to address the areas of uncertainty by referencing our intention to comply with BOEMRE, the USCG and OSHA as required and will seek guidance from all agencies involved to alleviate any potential conflicts or lack of clarity.

4 CAPE WIND PROJECT ORGANIZATION STRUCTURE

4.1 AREAS OF CONTROL

This SMS shall cover the project activities in several geographical locations, which make up the project site. Overall the geographical area of management control related to the H&S responsibility and reporting has been defined as follows:

- "Construction Staging Area" located at Quonset Point, North Kingston, RI or New Bedford Harbor, New Bedford, MA.

- “Offshore Wind Farm Site” area located on Horseshoe Shoal within Nantucket Sound off of Cape Cod, MA.
- “Construction Operations Facilities” means the temporary Owner provided facilities where the contractor operations will likely be based located in Falmouth MA.
- O&M Staging Area” The facility is anticipated to be located in the town of Falmouth, MA, with approximately 550’ of quay within the harbor, and docking facilities on site for two service vessels of approximately 50’ in length. This site may also include the “O&M Warehouse Area” and “Onshore Control Center”. When heavy lifting or repair activities are needed during the O&M phase, these will be staged out of New Bedford, MA
- “O&M Warehouse Area” is the location where the operational spare parts and supplies will be stored. The facility is anticipated to be located in [Falmouth, MA].
- “Onshore Control Center” means the Cape Wind onshore control center which is anticipated to be located in Cape Cod, MA.
- “Cable Installation Zone” meaning the zone in which the export cable is to be installed stretching from the “Offshore Wind Farm Site” to the boundary of the Barnstable Switching Station located in Barnstable, MA.

The activities at the following locations are excluded from the geographical area of management control related to H&S responsibility and reporting, and the appropriate contractors should ensure that they have an appropriate SMS system in place to cover their activities relating to the Contract. The loading and transportation of goods to areas defined above are excluded until the load arrives at an area under the Cape Wind project’s control.

- “TSA Contractor’s Factory” is the fabrication facilities of the TSA Contractor and its subcontractors.
- “Shipping Port” location for transporting the wind turbine generators by the TSA Contractor located at Esbjerg Harbor in Denmark.
- “ESP Fabrication Site” means the site at which the ESP is fabricated.
- “Monopile and TP Fabrication Site” means the fabrication facility for the monopiles and TP’s.
- Onshore utility substation. Any access to the Barnstable Switching Station would be by special arrangement with NSTAR.

On completion of the construction phase the area of main control will be contracted to cover only those areas that are required for continuing operation.

4.2 CAPE WIND ASSOCIATES ORGANIZATION

The CWA management team has direct experience managing the development, construction and operations of innovative power projects. The team is employed by the project manager, EMI. While at EMI, the same individuals developed, financed and managed the construction of a number of new and noteworthy electric generating facilities, including cogeneration projects, the first merchant power project in the United States, early air cooled power projects in New England, the first inlet chilled power project in New England and the largest biomass power project in the United States. As individuals, the members of the CWA team have tremendous experience managing the development, construction of large infrastructure projects and operations of such facilities.

CWA has assembled an interdisciplinary team to manage the development and construction of the project. CWA will also utilize the assistance of proven technical advisors and consultants in developing detailed project management and safety management plans.

CWA will require all contractors and project participants have a strong safety culture and safety first philosophy. It is paramount that all parties involved in the construction and operations of the facility emphasize a strong commitment to safety from the Senior Management level down through all levels of employees. Contractors will be required to integrate safety into all lines of their business. CWA will mandate a commitment by Senior Management to provide the necessary resources in support of safety initiatives and endorse a continued improvement philosophy that encourages employee involvement at all levels while implementing a best practice and personal ownership/accountability culture.

The project is to be organized to ensure that there is a clear chain of command and responsibility between CWA, its contractors and their subcontractors. This chain of command will be essential to ensuring the safe construction and operation of the wind farm. This will be further developed as the project progresses and the contractors are appointed.

CWA and EMI are well aware of the challenges associated with developing, constructing and operating an offshore wind farm. The selected contracting and project management strategy is aimed at mitigating the safety risks normally associated with delivering and operating offshore wind projects. A strong and focused project management team will be formed for the construction phase by CWA, and will include staff with direct offshore wind and marine construction experience.

Experience, skills and resources of the key contractors required for the construction and maintenance of the project is also of considerable importance to the project's successful delivery, and only companies with proven track records have been invited for consideration to participate in construction and maintenance services.

The main contractors for the project are anticipated to be:

- BoP Contractor who will supply the WTG foundations and substructures, electrical cables, and construction vessels; and will be assigned overall responsibility for H&S on the site during the construction phase.
- TSA Contractor or WTG supplier - Siemens Energy.
- ESP supplier, who may be the same as the WTG supplier
- Operations and Maintenance (O&M) Contractor who will undertake O&M during the operational phase, including provision of access vessels; and will be assigned overall responsibility for H&S on the site during the operational phase.

Further contractors or third parties will include:

- The Owner's technical advisors, including construction monitoring team and specific safety advisors anticipated to be SgurrEnergy and others to be determined.
- Foundation designers
- The CVA.
- Environmental Consultant - ESS Group.

Regarding the construction phase, the CWA team, with the assistance of Sgurr Energy and specialists in marine operations, are developing an organizational structure which is presented in Table 1, overleaf.

Regarding H&S, the project team includes:

- Health and Safety Coordinator whose role is to advise CWA on H&S issues during the design and planning phases of construction work. They will coordinate H&S aspects of design work and cooperate with others involved with the project to facilitate good communication between client, designers and contractors.
- The BoP Contractor whose role it is to manage, plan and coordinate the overall H&S compliance for the project. The BoP Contractor will plan, manage and monitor the construction and commissioning phases in liaison with all contractors participating in the project. They will prepare develop and implement a written SMS plan, and distribute the relevant parts of the plan to the other contractors. They will also coordinate with the CWA Project Director and the Health and Safety Coordinator regarding the ongoing compliance with all matters related to H&S. It is the responsibility of all contractors involved in the project to ensure their direct reports comply with their individual company safety policies and overall site policies. The BoP Contractor will have a dedicated H&S Manager to ensure compliance with all H&S and associated regulatory requirements.
- During the operational phase the organizational structure will change and be simplified with the O&M Contractor taking the main responsibility for the development, maintenance and compliance with the SMS system for the project. The O&M Contractor will have a dedicated H&S Manager to ensure compliance with all H&S and associated regulatory requirements.

Table 1: Organizational Structure

Project Director							
Overall Project Management	**Risk Management**	**Contract Management**	**Engineering Management**	**Construction Management**	**Quality Assurance**	**Document Control**	**Asset Management**
Project Director	Health and Safety Coordinator	Contracts Manager	Engineering Manager	Construction Supervisor	Quality Assurance Manager	Document Control Manager	Asset Manager
Assistant Project Director	Security Coordinator	Project Controller	Mechanical Engineer	Construction Inspectors (7)	Quality Inspectors (5)	Office Supervisor	Assistant Asset Manager
Project Admin Assistant	Environment-al Protection Coordinator	Project Accountant (2)	Electrical Engineer	Logistics Supervisor		Construction Admin Assistant (2)	
	Marine Coordinator	Insurance Coordinator	Civil Engineer	Logistics Assistant			
	Public Relations Manager		Junior Engineer				
			Engineering Admin Assistant				

4.2.1 PROJECT DIRECTOR

The Project Director will lead the project and be responsible for the implementation of the project with respect to work scope, budget, and schedule. Equally important is that the Project Director will work to ensure that the project is constructed safely, in accordance with the environmental permits, and to proper quality standards.

The Project Director will be CWA's authorized representative during the engineering and construction period for all matters related to the project. To oversee the project and meet his responsibilities, the Project Director will organize and direct the CWA management team to manage the TSA and BoP Contracts and monitor construction activities.

The Project Director will have ultimate responsibility for administering all the contractual obligations of the Cape Wind Project as well as coordination with government authorities, first-responder emergency agencies, and coordination between contractors.

4.2.2 HEALTH AND SAFETY COORDINATOR

The Health and Safety Coordinator will report to the Project Director and will have a staff to monitor compliance with the approved Construction and Operations Plan SMS and overall health and safety conditions for the project. While day to day responsibility for carrying out compliance with the Safety Management Plan will be a function of the turbine equipment supplier and BoP Contractors for their direct hire employees, the Health and Safety Coordinator will review the contractor's safety management plans for compliance with the COP SMS, law and contract requirements. The Health and Safety Coordinator will be tasked to establish a "safety first" working mentality at the project sites and on vessels involved in transport and construction.

Regularly schedule safety meetings will be held with contractors and their staff on health and safety aspects pertinent to the activities underway or about to be started. The Health and Safety Coordinator will confirm and document that the TSA and BoP Contractors have completed appropriate Health and Safety training prior to the start of construction activities. The Health and Safety Coordinator will also establish a system for all project team members to immediately report any unsafe conditions or practices observed and track corrective measures.

Special attention will be paid to actual and forecast weather conditions as these can significantly impact offshore construction and marine activities. Additionally, the Health and Safety Coordinators will be well versed in crane and heavy lifting safety protocols.

The Health and Safety Coordinator will collect contractors' safety reports and monitor for trends or other areas of concern. The Project Safety Coordinator shall be responsible for responding to health and safety incidents.

The Health and Safety Coordinator will also be responsible for ensuring the appropriate emergency response protocols are in place for interaction with the federal, state and local government first responders.

4.2.3 Security Coordinator

The Security Coordinator will report to the Project Director. While primary responsibility for security will be assigned to the BoP Contractor, the Security Coordinator will liaise with all contractors and subcontractors on the project to address security provisions. In addition to the physical security of the onshore project staging area and port areas, the Security Coordinator will work closely with the Health and Safety Coordinator to ensure that appropriate agency notification plans are in place with federal, state, and local government first responders.

The Security Coordinator will become responsible for security of the offshore WTGs and ESP once these are commissioned.

4.2.4 Environmental Coordinator

The Environmental Coordinator will report to the Project Director and will ensure that all local, state and federal permit requirements and laws relating to environmental protection and reporting are adhered to. CWA has worked with its Environmental Consultant, ESS, to produce a table of applicable permits and permit conditions for the Cape Wind project. Flow-down from these overall permit requirements have been assigned to the TSA and BoP Contractors. The Environmental Coordinator will monitor contractors for compliance with these project specific environmental requirements.

The project Environmental Coordinator shall be responsible for verifying compliance with environmental protection programs and protocols for environmental incident response.

The Environmental Coordinator will coordinate deployment of certified marine mammal observers and other environmental resource observers on the vessels as required by the conditions of the Cape Wind project permits and approvals.

The Environmental Coordinator will ensure contractors have compliant oil spill response plans, hazardous waste plans, and waste management plans in place.

4.2.5 *Marine Coordinator*

The Marine Coordinator will report to the Project Director and will ensure compliance with permit requirements and applicable laws relating to the Cape Wind project vessel activities (including installation vessels, transport vessels, service vessels, tugs, rescue boats, etc.). The Marine Coordinator will be kept informed of all planned vessel deployment each day. The Marine Coordinator will be the primary liaison with the USCG, port authorities, state and local law enforcement, marine patrol, and commercial operators (including ferry, tourist, and fishing boat operators).

The Marine Coordinator will be responsible for all marine updates such as coordination with USCG regarding any required Notice to Mariners.

It will be the Marine Coordinator's responsibility to be knowledgeable of weather forecasts and have a communications plan in place with all contractors and vessels involved in the project.

The Marine Coordinator will be kept informed of all diving and dredging activities.

The Marine Coordinator will coordinate with the USCG and local law enforcement authorities for planning in the event of trespassing vessels within any safety zone established for the offshore project construction activity.

The Marine Coordinator will conduct daily/weekly meetings with contractors to discuss vessel operation and deployments as appropriate for the level of marine activities scheduled.

4.2.6 *Engineering Manager*

An Engineering Manager will be assigned to direct the project's engineering team. The Engineering Manager will report to the Project Director.

The engineering team will review the TSA and BoP Contractor drawings, documents, and reports for compliance with the contract requirements. Additionally, the engineering team will undertake factory inspections and support the site project team as necessary.

4.2.7 *Construction Supervisor*

A Construction Supervisor will be assigned to the project and will be in charge of all on-site activities. The Construction Manager will be a senior staff person with previous experience in offshore wind project construction. The Construction Supervisor will report to the Project Director.

The Construction Supervisor will be responsible for the coordination of the Cape Wind site staff and construction monitors. The Construction Supervisor will serve as the primary contact to the TSA and BoP Contractors for day to day construction activities and planning.

4.2.8 *Quality Assurance Manager*

The Quality Assurance Manager will report to the Project Director and will have staff to monitor quality assurance for the project.

Primary responsibility for implementing quality assurance programs rests with the TSA and BoP Contractors. The Quality Assurance Manager shall be responsible for reviewing and confirming compliance with the specified quality assurance programs and performing inspections and tests.

The Quality Assurance Manager shall employ a team of quality assurance inspectors to review documents and perform inspections and tests.

The Quality Assurance team members will also undertake quality inspections at factories and key subcontractors facilities, especially relating to the foundation and transition piece fabrication and welding.

4.2.9 *ASSET MANAGER*

The Asset Manager will take control of the Cape Wind Project upon reaching Commercial Operation Status. The Asset Manager will be the primary CWA representative at that time.

The Asset Manager will be ultimately responsible for compliance with the lease obligations and the approved COP SMS, finances of the project, business transactions and reporting, coordination with ISO New England for power forecasts and production scheduling, and coordination with Siemens regarding the O&M of the facility.

4.2.10 *ASSISTANT ASSET MANAGER*

The Assistant Asset Manager will support the Asset Manager and will focus primarily on compliance with the SMS, along with the day to day dispatch and O&M of the Cape Wind Project. It is anticipated that the Assistant Asset Manager will be the point of contract for the Siemens O&M staff in day to day operation of the project.

4.2.11 *RESPONSIBILITIES*

CWA considers leadership in offshore activity to be of paramount importance in ensuring a “top-down” view is firmly instilled within its project team and that SMS policies and practices are made available and accessible to all management and operatives engaged on the project, and to its client, contractors, subcontractors and consultants. CWA requires a very high standard of H&S leadership principles to be adopted for this project. The responsibility for implementing the management system is a line management function. It is led by the Project Director and executed by the senior managers, line managers, engineers, supervisors and the people making up the staff of all participating contractors.

Directors, managers and supervisors need to have a keen awareness of US construction, BOEMRE, USCG, OSHA and maritime health, safety and environmental legislation in order to successfully lead on H&S matters.

CWA believes that “visible leadership” by senior management is essential to achieve full commitment by personnel and contractors at every level. Measures to demonstrate this include:

- Leadership by example – including H&S in all presentations and discussions, goal setting, review and audit, analyzing high risk, demonstrating personal engagement and responsibility, seeking H&S participation.
- Leadership by implementing effective and efficient systems, making sure competence and resources match the task, analyze incidents and ensure that learning points are identified and implemented, ensuring clear lines of responsibility, managing change, ensuring reviews are meaningful.
- Encourage a positive safety culture – decisive action when appropriate, maximize learning from industry incidents and near misses, H&S outside the workplace, promote idea that safety yields greater productivity in the long run and reduces risk from latent failures.

- Involve workforce – the projects biggest resource, tapping knowledge, champion forums, involve in system updates, and empower and encourage the workforce to raise H&S issues, such as hazard and near miss reporting schemes.

Contractors and subcontractors are encouraged to take time out for an "H&S Moment" within all agendas and forums to create an early H&S focus in any day-to-day proceeding.

4.2.12 *Senior Management Responsibilities*

The CWA Project Director will lead the project and be responsible for the implementation of the project with respect to work scope, budget, and schedule. Equally important is that the Project Director will work to ensure that the project is constructed safely, in accordance with the COP approved SMS plan, environmental permits and to proper quality standards.

The Project Director will be CWA's authorized representative during the engineering and construction period for all matters related to the project. To oversee the project and meet his responsibilities, the Project Director will organize and direct the CWA management team to manage the TSA and BoP Contracts and monitor construction activities.

The Project Director will have ultimate responsibility for administering all the contractual obligations of the Cape Wind Project as well as coordination with government authorities, first-responder emergency agencies, and coordination between contractors.

Each contractor on the Cape Wind Project will assign a project manager to coordinate directly with the CWA Project Director or his designee. The contractor's project managers will have responsibility for their own firm's SMS specific to their activities, and its integration into the overall project approved COP SMS plan as it pertains to Cape Wind's responsibilities under the lease agreement. Ultimately CWA takes overall responsibility for the implementation of the SMS.

4.2.13 *Line Management Responsibilities*

Management responsibilities and reporting specific to the Cape Wind Project have been identified above. Line management, including that of all contractors shall be knowledgeable of the Project safety management requirements and ensure that personnel working on the Project comply with the COP approved SMS.

4.2.14 *Safety Critical Roles*

All roles that are critical to safety within each contractor's scope of work will be clearly highlighted within their health and safety plans; including employee names, telephone numbers and their safety related responsibilities. This information will be collated within the project health and safety plans and procedures.

4.2.15 *Individual Responsibility*

Safety shall be the top priority of every member of the project team. Every member of the project team shall fully comply with all applicable safety programs at all times. Every member of the project team shall have a duty to notify the contractors of any observed project safety hazards and require that corrective actions be initiated in a timely manner to ensure compliance with contract and regulatory requirements. Project team members shall instill a "safety first" philosophy with each member of the Cape Wind work force that emphasizes that every worker is empowered to stop work when an unsafe act is witnessed.

4.3 POLICY PURPOSE AND OBJECTIVES

The purpose and intent of this SMS is to prevent personal injury, harm to the environment and property damage along with promoting good practice for the health, safety and well-being of all persons in the workplace and others affected by the project activities.

CWA is committed to undertaking the construction activities that will deliver an installation which has been designed and constructed safely and enables safe commissioning and operation using methods and arrangements which effectively eliminate hazards where reasonably practicable and minimize and manage any health, safety and environmental risks that remain.

The objectives of this SMS are:

- Effective identification of all hazards which may reasonably be expected to be present in any situation or operation that is carried out during the construction, and subsequent operation of the project.
- Carrying out of suitable and sufficient assessments of the risks to the H&S of anyone who may be affected by the hazards.
- Determining the control measures required to reduce to as the extent possible the risk to health, safety and the environment from any hazard that cannot be eliminated.
- To provide a safe place of work integrated with the essential engineered safety systems and necessary operating procedures. Such operating procedures shall make up a coherent safe system of work.

4.4 TARGETS AND KEY PERFORMANCE INDICATORS (KPI'S)

The following specific targets have been set by Cape Wind for the project:

- Zero OHSA reportable work related injuries or illnesses.
- Zero USCG reportable incidents.
- Zero Environmental Impact Incidences.
- Zero reportable Dangerous Occurrences.
- Zero tasks undertaken without a suitable and sufficient risk assessment in place.

The above are reactive indicators. CWA, through its Health and Safety Coordinator, will also monitor the following actions taken by the BoP / O&M Contractor:

- Number of safety walks undertaken, and the close out of actions arising from such safety walks.
- Number of behavioral audits undertaken.
- Percentage of incident investigations completed and closed out within an acceptable timeframe of occurrence.
- Number of hazard spotting, unsafe act, and near miss reports received and closed out within an acceptable timeframe of report submission.

Targets may be modified and agreed with the relevant contractor and set by the BoP / O&M Contractor in order to drive performance where appropriate.

4.5 PLANNING AND RISK MANAGEMENT

There is a planned and systematic approach to implementing the Health and Safety policy through an effective SMS. The goal is to minimize risks. Risk assessment methods are used to decide on priorities and to set objectives for eliminating hazards and reducing risks. Wherever possible, risks are eliminated through selection and design of facilities, equipment and processes. If risks cannot be eliminated, they are minimized by the use of physical controls, or as a last resort, through operating procedures and personal protective equipment.

4.6 DOCUMENTATION PLAN

The SMS is supported by a series of documents that are used throughout the project to provide additional information and provide the basis for the compliance with this SMS. This documentation will be developed during the pre-construction phase and maintained during the construction and operational phases of the project. An outline of the process and the documentation required for successful implementation can be seen in Figure 1, overleaf.

The Safety File forms a key part of the supporting documentation for the SMS, and shall be in a readily updated format, which can be copied and distributed throughout the site for easy reference by the contractors.

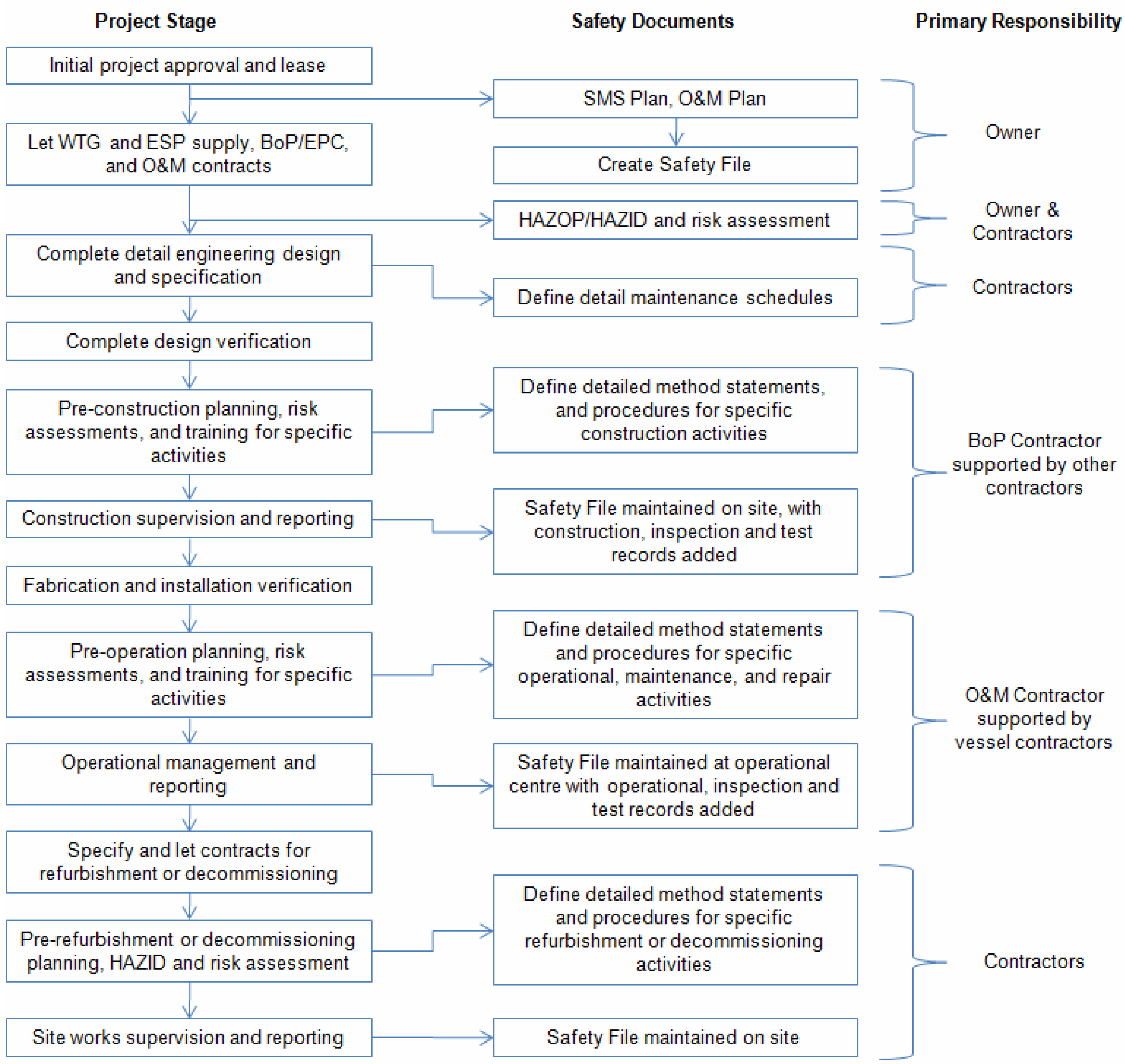


Figure 1: SMS Development Procedure

The Safety File will contain but not be limited to:

- Description of the Organizational Structure.
  - Contact information for; Owner, BoP / O&M Contractor, project coordinators and managers, Corporate and Management emergency contacts.
- Site Information:
  - Location of site.
  - H&S site specific plans.
  - First Responder and medical emergency information.
  - Emergency evacuation plans.
  - Applicable USCG logs
  - OSHA 300 Logs.
  - H&S Training records.
  - Safety System test records.
  - Contractor Records and EHS plans.
  - Regulatory Audit findings.
  - Emergency Contacts.
  - Regulatory Contacts.
  - Emergency Response and Evacuation Drill records.
  - Safety Policies and Procedures.
  - Vessel inspection records.
  - Hazard Communication, Right to Know files.
  - Visitor safety orientation records.
  - Accident investigation records.
  - Health surveillance and monitoring requirements.
  - Fire equipment and maintenance/test records.
- Work Plans:
  - Risk Assessments.
  - Training records.
  - Method Statements.
  - Operating Procedures.
  - Work Instructions.
- As-Built Documentation.
  - Jack-up footprint coordinates.
  - Subsea cable routing.
  - Vessel specifications.

    - ESP General Arrangement and egress drawings.
    - WTG General Arrangement and egress drawings.
- Plant registers, health and safety manuals, inspection and test plans and records.
- O&M information as listed in the O&M Plan.

4.7 MANAGEMENT OF CHANGE

Work arising from temporary and permanent changes to organization, personnel, systems, process, procedures, equipment, facilities, products, materials, substances, and laws and regulations will proceed only when a MOC process is completed.

CWA shall establish procedures for managing and controlling changes, with a view to minimizing any risks to project safety, health and environment. The procedure will require all contractors involved in any aspect of the project to implement a robust MOC policy to manage change and minimize risks associated with change. This policy will establish as a minimum, procedures for tracking, evaluating, implementing and documenting all changes from original design documents. A change is also considered a deviation from the specifications or practices, as specified for the process or facility, if it can be defined in one or more of the following categories:

- A **physical change** or addition made to process facilities either by type, design or specification.
- A **software** or **program change**, which impacts process controlling equipment; such as changing operating actions and / or the addition, removal, or modifications of control logic and interlocks.
- A **procedural change** that can alter process technology, process chemicals (including those used for maintenance), materials, or equipment.

Where applicable, the MOC process will include:

- A risk assessment conducted by all impacted by the change.
- Development of a work plan that clearly specifies the timescale for the change, and any control measures to be implemented regarding;
    - Equipment, facilities and process.
    - Operations, maintenance, safety and inspection procedures.
    - Training, personnel and communication.
    - Documentation.
- Authorization of the work plan by the responsible person(s), and management of change through to completion.

4.8 INSPECTIONS AND TESTS

4.8.1 INSPECTIONS

Regular Health and Safety inspections will be undertaken at intervals decided to be sufficient by the BoP / O&M Contractor. As a guide it is anticipated that these would take place generally every week. All inspections by the BoP / O&M Contractor shall be recorded and reported to the Cape Wind Health and Safety Coordinator. The format of such inspections will be tailored to suit the work in progress. Where a contractor or subcontractor working area or work procedures are unsatisfactory a “Safety Warning Notice” or “Stop Work Notice” may be served by the BoP / O&M Contractor.

Health and Safety inspections of the site will be undertaken and reports issued by the Health and Safety Coordinator. The basis of such inspections will include this SMS plan, relevant regulations and conformance to the contractor’s SMS Policy. Contractors shall fully co-operate with this activity and provide any information that may be requested. Contractors are to be given copies of reports and shall comply with any corrective actions requested in the time frame required by the inspection report.

Desktop and random physical checks will be carried out across all areas of the project that have regulatory requirements relating to routine inspections, re-certification, re-validation or re-calibration, including such areas as listed below:

- Personnel competency certification (for example, crane operators).
- Lifts and winches.
- Vessel certifications and inspections
- Fire extinguishers and first aid kits.
- Fall arrest systems, personnel harnesses and anchor points.

The results of such inspections shall be recorded on specific forms. Any resulting instructions are to be passed in writing to the relevant contractor or subcontractor and are to be complied with by the action date stated. All such reports shall be made available on site and maintained within the Safety File.

4.8.2 Testing Emergency Response Plans and Evacuation Plans

Detailed procedures for how the Emergency Response Plans and evacuation plans for the overall project will be tested will be incorporated within the project health and safety plans as well as the time schedules for undertaking these tests. Lead persons and their responsibilities with respect to these plans will also be highlighted and clearly documented. All contractors are expected to participate in any exercises or initiatives undertaken to test and validate the project’s emergency plans.

Emergency Response Plans and evacuation plans shall be prepared, implemented, maintained and regularly tested by all contractors, for all activities within their work scope. Contractor emergency response and evacuation plans shall form part of each contractor’s health and safety plan, and will interface appropriately with the overall emergency plan for the project.

Contractors shall document within their health and safety plans the details of how they will test their emergency procedures throughout their scopes of work, along with time schedules for undertaking these tests. Lead persons and their responsibilities with respect to these plans will also be highlighted and clearly documented. The contractor is responsible for ensuring their plans are adequate and meet all required US regulations, and that they interface effectively with the overall emergency plan for the project, in addition to any external organizations and emergency services that may be involved in the plans.

The tests of project and contractor emergency plans will include the simulation of typical scenarios that have been identified within the HAZOP / HAZID. These simulations will incorporate all relevant personnel, project organizations, external organizations and emergency services, and will be carried out as close to anticipated real-life events as reasonably possible, encompassing dry runs to assess response / travel times and to highlight any significant issues with current procedures. All emergency scenarios to be tested will be highlighted, and documented within the relevant health and safety plans.

Envisioned typical scenarios include:

- Emergency response relating to injured personnel within a WTG nacelle.
- Emergency response and evacuation relating to injured personnel and an ESP fire.

The results of such tests shall be recorded on specific forms. Any resulting instructions are to be passed in writing to the relevant contractor or subcontractor and are to be complied with by the action date stated. All such reports shall be made available on site and maintained within the Safety File.

4.8.3 Inspection / Test Result Integrations and Continuous Improvement

The conclusions, recommendations and actions from all inspections and test results will be fully integrated into project procedures. This information will be communicated to relevant project organizations through the creation and distribution of work orders, which will assign the required work and set a schedule for completion. Findings and actions will also be discussed verbally during the project tool box talks. All actions to be implemented will be followed up, and verified as complete during subsequent inspections, at which time the relevant work orders will be closed out.

The project will support a framework for continuous improvement, which will primarily be centered around the project tool box talks and pre-job briefings. This topic will be discussed during these regular meetings. An open forum session will also be implemented during this meeting, which will allow ad hoc improvements to current operations to be suggested by project employees. Each contractor will be responsible for fostering and managing this system within their organizations, and providing resultant contributions to the meeting for discussion. Documentation will be maintained for this, which will stipulate agendas, lists of suggestions and resultant recommendations or actions.

5 INCIDENT REPORTING AND EMERGENCIES

All contractors will be required to provide detailed information relating to accidents, near misses and injuries to the BoP / O&M Contractor and the other contractors. The timing of this and a list of injury definitions used by the BoP / O&M Contractor can be found in Section 5.4. Contractors are required to nominate a person or persons within their organization who will be responsible for the coordination of information and creation of documents in respect of accident, incident and near miss reporting. This person(s) name will be recorded in the contractors' H&S plans. Where suitable and subject to a review, the BoP / O&M Contractor may adopt contractors' accident, incident and near miss reporting forms and supporting documents. Where statutory governmental requirements are placed on persons to report injuries, incidents and dangerous occurrences, contractors will be expected to cooperate with the BoP / O&M Contractor's representative to fulfill these obligations. Incident reporting will comply with 30 CFR 285.830 – 285.833.

5.1 In the Event of an Accident

Contractors are expected to supervise their own operatives and subcontractors, and in the event of an accident the appropriate parts of the Emergency Response Plan are to be enacted depending on the type and severity of the accident.

First response first aid should be administered by trained personnel and emergency services should be contacted in line with standard first aid practice and the Emergency Response Plan.

5.2 ACCIDENT REPORTING AND INVESTIGATION PROCEDURE

Contractors shall ensure that all accidents are recorded within their own accident book following any injury to their personnel. All incidents that involve medical treatment and by OSHA definition are considered a recordable injury shall be brought immediately to the attention of the BoP / O&M Contractor. Contractors will report all accidents and incidents to the site Health and Safety Coordinator, in the first instance within 24 hours, and subsequently by formal report within 72 hours. . Any accidents or incidents directly resulting from the production activities of renewable energy on the OCS will follow the reporting requirements of 30 CFR 285.830-285.833. All accident and incidents occurring outside of jurisdiction of 30 CFR 285.830-285.833 shall comply with the applicable regulatory requirements of the USCG or OSHA. The BoP / O&M Contractor will inspect accident books on a regular basis.

The relevant contractor shall investigate accidents within his work activity scope, and a suitable accident report shall be submitted to the BoP / O&M Contractor. Investigation of all incidents involving medical treatment, injury or worse shall be performed according to the standard US methodology and regulatory requirements for investigating accidents and incidents.

Statutory report forms must be used to notify the relevant government body of accidents as required by the relevant US regulations.

All incidents, whether a near miss or an actual injury-related event, will be investigated. Near miss reporting and investigation allow for identification and control of hazards before they cause a more serious incident. Accident / incident investigations are a tool for uncovering hazards that either were missed during the hazard assessment phase or have managed to slip out of the controls planned for them. It is useful only when done with the aim of discovering every contributing factor to the accident/incident in order to prevent future occurrences. In other words, the objective is to identify root causes, not to primarily set blame.

5.3 PLAN FOR LIAISON WITH REGULATORY AGENCIES

The public authorities liaison plan will encompass routine and emergency project actions, and will comply with the provisions issued by all regulatory authorities, including but not limited to BOEMRE, USCG, OSHA, and MA State jurisdiction for onshore activities.

[Details of the public authorities liaison plan will be defined within the SMS at the pre-construction stage of the project.]

5.4 CATEGORIES OF INJURY AND EVENTS

The recording of injuries and events that occur on areas or under the rights granted by the lease will follow the requirements, and definitions of 30 CFR Part 285.830 through 833, events that occur under areas not covered by the lease with comply with 29 CFR Part 1904.

At a minimum the following injuries and events with be recorded and notifications made to the appropriate agency per reporting requirements of 30 CFR Part 285.832

- Fatalities;
- Incidents that require the evacuation of person(s) from the facility to shore or to another offshore facility;
- Fires and explosions;
- Collisions that result in property or equipment damage greater than $25,000 (Collision means the act of a moving vessel (including an aircraft) striking another vessel, or striking a stationary vessel or object. Property or equipment damage means the cost of labor and material to restore all affected items to their condition before the damage, including, but not limited to, the OCS facility, a vessel, a helicopter, or the equipment. It does not include the cost of salvage, cleaning, dry docking, or demurrage);
- Incidents involving structural damage to an OCS facility that is severe enough so that activities on the facility cannot continue until repairs are made;
- Incidents involving crane or personnel/material handling activities, if they result in a fatality, injury, structural damage, or significant environmental damage;
- Incidents that damage or disable safety systems or equipment (including firefighting systems);
- Other incidents resulting in property or equipment damage greater than $25,000; and
- Any other incidents involving significant environmental damage, or harm.

When applicable the following injuries and illnesses will be reported in compliance with 29 CFR 1904 requirements:

Recordable occupational injuries or illnesses are defined as any occupational injuries or illnesses which result in:

- Fatalities, regardless of the time between the injury and death, or the length of the illness.
- Lost workday cases, other than fatalities, that result in lost workdays.
- Nonfatal cases without lost workdays which result in transfer to another job or termination of employment, or require medical treatment (other than first aid) or involve: loss of consciousness or restriction of work or motion. This category also includes any diagnosed occupational illnesses which are reported to the BoP / O&M Contractor but are not classified as fatalities or lost workday cases.

The recording of Occupational Injuries and illness shall include the completion of the relevant OHSA forms:

- OHSA 300 - Log of Work Related Injuries and Illnesses.

- OHSA 300-A - Summary of Work Related Injuries and Illnesses.
- OHSA 301 - Injury and Illness Incident Report.

In addition to the OSHA requirements for reportable illnesses and injuries, any accident or near miss incident should be reported by the BoP / O&M Contractor to CWA to ensure prompt investigation. The urgency of reporting of these events is dependent on the severity of the event, and has been categorized as:

- Category A events - Reportable Immediately using channels specified in Emergency Response Plan.
- Category B events - Reportable Immediately to Health and Safety Coordinator and Project Director.
- Category C events - Reportable within 24 hours to Health and Safety Coordinator and Project Director.

The reportable events are described in Table 2.

Table 2: Reportable Events

Category	Event	Description
A	Fatalities	Any fatalities connected with the Cape Wind Project or fatality within one year of an incident in which the injuries were sustained. Any fatality arising out of a RTA involving vehicles or road going mechanical equipment owned by any of the contractors or subcontractors when they are within the area of control of this SMS, or engaged on business relating to the Cape Wind Project.
A	Major Injury or Multiple Injuries	Any injury suffered to an employee or contractor arising out of work being carried out as part of the Cape Wind Project which results in more than three lost workdays.
B	Injury	Any injury suffered to an employee or contractor arising out of work being carried out as part of the Cape Wind Project which results in between one and three lost workdays.
A	Accidents	An undesired event arising out of work being carried out as part of the Cape Wind Project that results in personal injury or property damage.
B	Incident	An incident is an unplanned, undesired event that adversely affects completion of a task that is part of the Cape Wind Project.

C	Near Miss	Near misses describe incidents where no property was damaged and no personal injury sustained, but where, given a slight shift in time or position, damage and/or injury easily could have occurred.

5.5 VESSEL COLLISION PLAN

The Vessel Collision Plan will be defined within the SMS following the contracts award stage and prior to start of construction of the project.

5.6 EMERGENCY RESPONSE PLAN

Details / workflow of the plan will be incorporated within the SMS following further discussions with the USCG and consulting agencies and upon final agreement with the emergency response services.

An Emergency Response Plan will be defined for the overall wind farm site. There are several types (and combinations) of emergency that may occur on the project, including:

- Fire.
- Accident to operatives.
- Search and rescue.
- MOB.
- Medical emergency
- Chemical spill.
- Stranded operative.
- Barge instability.
- Sudden unexpected storm event during personnel deployment offshore.

Emergency procedures are designed to give warning of imminent health, safety and / or environmental danger, and provide guidance on the correct actions to be carried in order to minimize risks to personnel and the environment. Each manager / supervisor is responsible for ensuring that all their employees and visitors within his area of responsibility are informed of, and are fully conversant with, emergency procedures. Each contractor on site will develop their own specific Emergency Response Plan for the area under their control, which must be appropriately communicated throughout the contractor's organization. These plans will be incorporated into the overall project plan. Contractors shall nominate a person or persons from their organization to provide the interfaces to the overall project plan. These individuals shall be identified in the contractor's health and safety plans or documents and shall be trained such that they understand and can implement the Emergency Response Plan.

Emergency Response Plans, including evacuation and rescue, are to be drilled on a regular basis. All contractors are expected to participate in the exercises or initiatives undertaken to test and validate the project's emergency plans.

A schedule of emergency response exercises are to be prepared and implemented which will cover key hazard events identified from the HAZOP / HAZID, as far as is practicable without entailing disproportionate risks in the exercises themselves. Risk assessments, method statements and procedures for such exercises are to be prepared and recorded in accordance with the SMS.

Further guidance and regulations include the following:

- Personnel requirements for marine and lifesaving operations: 46 CFR 109.
- Emergency Evacuation plans: 33 CFR 146.
- Drill - fire, abandon, and lifeboat: 46 CFR 109.
- Emergency Response 29 CFR 1910.120

5.7 EVACUATION PLAN

Details / workflow of the overall Evacuation Plan will be incorporated within the SMS prior to start of construction following BoP / vessels contract(s) award and in parallel with updating the Emergency Response Plan. The Evacuation Plan for all facilities on the OCS will be implemented to comply with 33 CFR Subchapter N 146.140

5.7.1 WTG

Emergency evacuation will be undertaken via the access and egress route through the WTG tower. In the unlikely event that this is not possible, for example if the escape route is blocked and / or very rapid evacuation is necessary, evacuation may be undertaken outside the tower. Each WTG is provided with emergency escape equipment to enable escape from the nacelle and controlled descent outside the tower to the Transition Piece (TP) platform or directly to a vessel.

[The emergency evacuation plan for the WTGs will be further developed in parallel with detailed design and specification of the plant and conducting the HAZOP].

5.7.2 ESP

[The emergency evacuation plan for the ESP will be further developed in parallel with detailed design and specification of the plant and conducting the HAZOP].

6 COMMUNICATIONS PLAN

CWA will be responsible for normal communications with regulatory authorities, but the plan will allow and encourage immediate contacts from contractors and operators should the situation warrant.

During the construction and operation phases of the project, capabilities must be maintained by the control center and staging areas to communicate with the USCG and mariners within the vicinity of the project. Communications capability shall, at a minimum, include VHF marine radio, landline and wireless for voice and data and must include the ability to communicate with private vessels, USCG vessels and aircraft while underway, and Coast Guard Sector Southeastern New England. Further guidance will be included from 33 CFR 104.245.

During construction the project is mandated to avoid use of specific radio frequencies listed in the FEIS on VHF marine radios. The project shall ensure that VHF radios used in construction are tested for output to ensure they are not inadvertently tuned to any of the restricted frequencies and to confirm they have no spurious emission within +/-50 KHz. Cape Wind will also communicate to water craft to respect a two wavelength distance from the construction cranes at the lowest frequency of interest which would be approximately 1,219.5 meters on 500KHz.

During the operation phase the control center will have the capability to monitor in real time the marine traffic within the vicinity of the Wind Farm and to monitor the status of all PATON's. Cape Wind will report any issues pertaining to PATON's to the USCG. Also the project will provide monthly reports to the USCG describing any navigational safety issues, complaints from mariner and correspondence from any other regulatory agencies regarding navigational safety issues.

Cape Wind will also be required to communicate to the public by reporting at the quarterly Southeastern Massachusetts Port Safety Forums.

6.1 WRITTEN AND VERBAL COMMUNICATIONS

The BoP / O&M Contractor and the other contractors will ensure that all verbal and written communications are in English.

6.2 ARRANGEMENTS FOR COMMUNICATION BETWEEN PARTIES

Ongoing consultation between the BoP / O&M Contractor, contractors, and subcontractors will be maintained via regular meetings. Minutes of these meetings shall be recorded and appropriately distributed.

6.3 OVERLAP WITH OTHER CONTRACTORS UNDERTAKINGS

A detailed interface matrix will be defined for the project, which will detail the responsibilities of the BoP / O&M Contractor and the contractors. Identified interfaces will be an ongoing subject of discussion at the regular meetings, with a view to mitigating any perceived risks, minimizing project delays, and maintaining expected project quality levels.

6.4 COMMUNICATION WITH THIRD PARTIES

The BoP / O&M Contractor or his representative will attend meetings as required with external authorities. The outcome of these meetings will be briefed to the contractors as necessary.

Unless instructed by the BoP / O&M Contractor or his representative, contractors and subcontractors are not permitted to liaise with any third parties.

6.5 PROJECT SAFETY MEETINGS / CONSULTATIONS

Health and Safety issues shall be reviewed at project safety & progress meetings. It will be recognized that there will be major interface issues to deal with, and these forums will provide a basis for "solving" potential conflicts before they arise.

Examples of such conflicts could include:

- Interface at port / vessel during loading / unloading.
- Transfer of personnel between vessels operated by different contractors.
- Conflicting loyalties in the event of an emergency (e.g. vessel sailing away from an occupied turbine causing stranding).
- Changes in "ownership" during lifting and landing operations.

In order to reduce the chance of conflict OSHA regulations require daily safety meetings. CWA will require contractor safety programs to include procedures for holding daily safety meetings of this type as well. Daily safety meetings are a proven practice for reducing the frequency and severity of injuries.

Because of the changeable nature of offshore wind farm work it is not possible to conduct formal classroom training in advance that will address every possible set of work environments and hazards. Instead the easiest way to comply with this requirement is to provide general training in the classroom and address specific details at the sites, each day, as they arise.

The policy for the Cape Wind Project shall include at a minimum:

- A safety meeting will be held at all work locations before the start of each shift.
- Attendance at these meetings is mandatory for all personnel on site. This includes the project manager/engineer, lead/shift engineers; other engineers, technicians, clerks and craft labor, subcontractors, and where appropriate, CWA representatives.
- Safety meetings shall be documented using a Daily Safety Log.
- The information discussed and purpose of these safety meetings shall be to:
    - Communicate information, expectations, and good work practices relating to health and safety.
    - Get feedback on conditions affecting health and safety and encourage participation in the health and safety process by employees.
    - Describe the day’s tasks and their potential hazards.
    - Coordinate activities.
    - Identify methods and precautions to prevent injuries.
    - Plan for emergencies.
    - Describe any changes in established safety plans or procedures relating to the work being performed.
- There should be an opportunity for questions and answers from site personnel at the end of the meeting.
- Leadership of the meeting should be rotated among the various site personnel in order to give everyone on the site a chance to conduct the meeting. We want to encourage ownership of this process (and safety in general) among all employees. Safety is not just the supervisor’s responsibility. Make the leadership assignment at least one day in advance to allow the leader time to prepare.
- A set of general topics on good work practices can be used as a general guideline for preparing meetings. More specific job related topics will be emphasized depending on specific site requirements.

6.6 PROJECT TOOL BOX TALKS

The BoP / O&M Contractor will prepare and issue safety briefings as appropriate but will invite and expect active contribution from contractors in their development. These briefings deliver topical safety information to contractors (e.g. lessons learnt from accident investigations or from inspection / test results). Contractors will be expected to hold tool box talks at the beginning of each day and at the commencement of a task with new risks or risk control measures. More wide ranging meetings will be arranged on a weekly basis, which will involve more in depth discussions on continuous improvement. Records of tool box talks, including attendance lists, will be maintained by the BoP / O&M Contractor.

Topics for toolbox talks should include, but are not limited to, the following dependant on program:

- Emergency procedures.
- Permit to work system.
- Working at heights.
- Lifting operations.
- Site rules.
- Correct use of PPE.
- Crew Transfers.
- Manual handling.
- Safe handling of hazardous substances.
- Working near to or over water.
- Quayside / vessel interface rules.
- Status of open safety observations and near misses.
- Audit / test result integrations.
- Continuous improvement focus / open forum / suggestions.

6.7 H&S NOTICE BOARDS

Contractors shall establish H&S notice boards at their work locations or sites. Regular checks will be undertaken to ensure that all information is current and up to date. The information presented should include as a minimum:

- Statutory H&S Notices pertinent to the location.
- Copy of the contractors' Owner liability insurance certificate.
- Safety procedures.
- Emergency Response Plan details.
- Accident and incident reporting information.
- List of first aiders.
- Project H&S policy.
- Site rules.
- Site H&S statistics.

7 REMOTE MONITORING, CONTROL AND SHUT DOWN

SCADA systems will monitor the project WTGs and all other wind farm infrastructure. The WTG SCADA will be capable of fully interfacing with the wind farm SCADA system. The systems will be capable of providing real-time information on all WTG and wind farm data and communications.

The SCADA systems will also be capable of remotely controlling and shutting down the WTGs and the wind farm, as and when required, including for health, safety and environmental purposes.

SCADA terminals will be placed on the offshore ESP and Onshore Control Center. Local control is also provided in each WTG. The project will be monitored 24/7 in the Onshore Control Room. Additionally, WTG specialists at Siemens will monitor operation of the project remotely at international control centers and can take routine and emergency control actions if needed.

The project's O&M Plan will cover normal operating procedures and emergency procedures, including emergency shutdown of the WTG and ESP if requested by regulatory authorities such as the USCG.

Project O&M staff will be fully trained in normal and emergency operations. All staff will be trained and familiar with the SMS.

8 ARRANGEMENTS FOR SECURITY AND ACCESS

8.1 SITE SECURITY AND SURVEILLANCE

CWA is currently engaged in discussions with the USCG to address a protocols identified in the Lease and other permitting documents, such as the USCG Terms & Conditions document, to mutually develop the final arrangements and plans for site security, surveillance, emergency operations, etc. From these discussions, and based on agreements reached with the USCG, a detailed plan for site security and surveillance will be prepared. The Cape Wind project will have the capabilities from the control center to monitor real time marine traffic within the vicinity of the wind farm.

8.2 SITE ACCESS AND EGRESS

All access / egress routes shall be removed or made inoperable whilst not in use in order to prevent access / egress by unauthorized persons. Adequate signage must be provided at all times. During work, the normal safety signs must be displayed. Access and Egress compliance for the various project locations will follow the applicable BOEMRE, USCG and OSHA requirements. Primary Guidance and recommendations for the Site Security Plan will utilize 33 CFR 103-106.

The following must be adhered to at all times:-

O&M Site and Construction Staging Areas:

- Where possible one way traffic systems will be implemented.
- All Entry / Exit points will be signed.
- Entry / Exit points will be clearly signed for No Parking / Obstruction.
- Car Parks will be sited away from Entry / Exit points.

- Sufficient signage will be displayed at all times to warn members of the public that the installation is private property and potentially dangerous.

Foundation or Quay Ladders:

- When quay or foundation ladders are used, it is important to be aware, that they can be slippery and at times icy, and that there can be a long distance to climb due to tidal height. Ladders can be slippery and over-grown with weed, algae or barnacles. Gloves must be worn at all times.
- When climbing Foundation ladders, self-retracting lifeline systems must be attached to person climbing / descending.
- Only one person must be on any ladder section at any one time.
- No person shall climb / descend any ladder whilst lifting/lowering operation is being carried out.

WTG Access:

- WTGs will be secured at all times when unmanned.
- WTGs shall be signed, ‘Danger No Unauthorized Entry’.
- WTG ladders will only be used for access / egress by persons wearing a harness and attached to the fall arrest safety wire.

ESP Access:

- The ESP will be secured at all times when unmanned.
- The ESP shall be signed, ‘Danger No Unauthorized Entry’.
- Any ESP ladders presenting a risk of falls from height will only be used for access / egress by persons wearing a harness and attached to fall arrest safety wires.
- Within the ESP, areas containing HV equipment shall have relevant signage displayed such as ‘Danger High Voltage”.
- Only suitably competent and authorized persons will enter any areas containing critical or high voltage electrical equipment.

Sea going Vessels:

- All persons at a minimum must wear a life vest and locator beacon when:
  - Accessing any sea going vessel.
  - Transferring from vessel to vessel.
  - Transferring from vessel to shore.

Emergency Exits:

- All emergency exits will be kept clear of any obstruction at all times.
- All emergency exits will be signed.

Only authorized persons, or those persons who are authorized and in the company of an authorized CWA employee or a person authorized on behalf of CWA, shall enter any site, staging area, offshore substation or WTG and only after receiving relevant safety orientation training.

9 CONTRACTOR'S RESPONSIBILITIES

This section describes the minimum H&S standards expected from contractors working on the site.

Where a contractor wishes to substitute its own procedures and they exceed these minimum requirements, the BoP / O&M Contractor may, subject to a review, accept them for use during the works.

9.1 PLANNING AND EXECUTION OF WORK

The contactor will co-ordinate and manage all its work activities within the site. To facilitate this process, the contractor will appoint a person to act as a point of contact with the BoP / O&M Contractor, which shall be identified in the contractor's H&S plans and method statements.

9.1.1 METHOD STATEMENTS AND RISK ASSESSMENTS

For each work activity, contractors will prepare written method statements and risk assessments for all work tasks.

Where generic method statements are used, these will be made site and work activity specific. Method statements will be submitted to the BoP / O&M Contractor or his representative for review six weeks before the planned work activity is due to commence (or as may be agreed in the contract).

Method statements will be supported where required, by attaching any risk assessments, lifting plans, diving plans, rescue plans, confined space entry arrangements, work at height assessments, safety rules and any permits required for the work activity.

A procedure for assessing and managing the risks, and hazards involved in the construction and operation process will be developed and maintained throughout the project using the following basic method:

- Identify the work activity or situation
- Identify the hazards.
- Decide who might be harmed and how.
- Evaluate the risks and decide on precautions to eliminate or mitigate those risks.
- Record findings, communicate and implement them.
- Review assessment and update if necessary.

Where;

- A **hazard** is anything that may cause harm, such as chemicals, electricity, working at height, and confined spaces.
- The **risk** is the chance that someone could be harmed by these and other hazards, together with an indication of how serious the harm could be.

The results of the risk assessment will be recorded in a common format and kept within the Safety File.

Minimum standards and key considerations for preparing method statements and performing risk assessments will be incorporated within the SMS prior to start of construction and developed during the detailed design phase.

9.1.2 Hours of Work

All work activities on the project site will be undertaken in accordance with the relevant US working time regulations.

9.1.3 Selection and Control of Subcontractors

Only subcontractors approved by contractors, and notified to the BoP / O&M Contractor or his representative, are permitted to undertake work on this project. The contractors must notify the BoP / O&M Contractor of all approved and appointed subcontractors.

9.1.4 Contractors Supervision and Coordination of their Work

Contractors are wholly responsible for the provision of an organization that will ensure that works within their scope are adequately supervised and coordinated. Details of these arrangements will be recorded in their H&S plans and / or method statements.

9.1.5 Temporary Works

Where a contractor has to undertake any “temporary works”, they shall describe these works in their method statements, together with any H&S arrangements required ensuring that the “temporary works” are undertaken without risks to personnel. Contractors shall implement sufficient control measures that ensure risks are adequately controlled. These control measures shall also be described in their method statements.

10 OFFSHORE OPERATIONS AND MANAGEMENT

The construction and operation of the project will require the contracted parties to use various vessels for the delivery of goods to the offshore site, for the installation and commissioning of equipment within the offshore site, and the subsequent maintenance of the offshore equipment.

The coordination of movements of all vessels is of paramount importance in ensuring a safe working environment for all personnel who use such vessels, or who come into contact with such vessels when carrying out their work. The BoP / O&M Contractor shall appoint a Marine Coordinator to carry out the coordination of the vessel movements. Further guidance for offshore vessel operation will be included from 33 CFR subchapters D, E, F,H,I & K.

10.1 Working from Vessels

Contractors must submit all required information to the BoP / O&M Contractor regarding any vessel intended for use on the site as part of the installation manual. All vessels must be approved for operation on the site by the BoP / O&M Contractor and subject to inspection by the USCG and, for this purpose, contractors must forward all required certificates, information and documentation before the vessel arrives at the site. The contractor will nominate the vessel to undertake specified works. The vessel details, name, owner, contracted party (if different from owner) and all relevant information required for the assessment of the vessel will be made available to the BoP / O&M Contractor. These will include, but are not limited to, type approval, insurances, operational procedures, safety procedures, communication procedures, environmental procedures and emergency procedures.

The contractor will detail the works to be undertaken by the vessel, such as transportation of personnel, transportation of goods, installation of items on site, offshore accommodation for personnel, or combinations thereof. Particular details will be given with regard to the vessel's limitations relevant to sea conditions (including, but not limited to, wave height and wind conditions). The above information should demonstrate to the BoP / O&M Contractor that the vessel is "fit for its intended purpose".

Operational procedures will be drafted and distributed to all vessel operators. [CWA is in discussions with USCG on final details].

10.2 NOTICES TO MARINERS

Cape Wind will be responsible to post Notices to Mariners. The protocol is now being discussed and finalized with USCG and a procedure will reflect the agreed upon approach with the USCG.

10.3 OFFSHORE PERSONNEL AND VESSEL TRACKING PLAN

Further details on the Offshore Personnel and Vessel Tracking Plan will be defined within the SMS following the contracts award stage and prior to start of construction of the project.

10.4 SEA FASTENINGS AND STORAGE OF MATERIALS OFFSHORE

The offshore site does not hold facilities for storage of materials and equipment. Unless authorized by the BoP / O&M Contractor, all materials and equipment will be returned to the jack-up or vessel after each working shift. Materials and equipment must not be left or stored on the seabed unless by specific agreement with the BoP / O&M Contractor in conjunction with the terms of the USCG and BOEMRE.

Where storage is approved, it is the responsibility of the contractor to ensure that any such storage is equipped with proper navigational signals, and that the items stored are properly anchored and able to resist adverse environmental conditions. CWA will be notified to ensure proper Notice to Mariner protocol has been established.

10.5 VESSEL LOADING INSPECTION

For items to be transferred to the offshore site, the BoP / O&M Contractor may carry out an inspection of the loaded vessel prior to sailing and on arrival back from work on site. The BoP / O&M Contractor's Marine Warranty Surveyor may inspect the vessel and the contractor will demonstrate how the loading of the vessel adheres to the contractor's vessel loading procedure, previously nominated and approved by the client during the vessel approval process. Movement and installation of goods should be in accordance with the approved method statements for such activities.

10.6 VESSEL TRANSPORT

Transport of persons or equipment between the onshore management site and the offshore site must be via a defined transport corridor and using the vessels approved by the BoP / O&M Contractor for the project. Personal Locator Beacons (PLB's) and tracking hardware are a mandatory requirement for all personnel and on ALL vessels. PLBs are to be used by all personnel during transfer between vessels, offshore units and offshore installations.

Where a vessel is to enter the transport corridor or the offshore site directly from a port other than the nominated port facility, the contractor in charge of the vessel must adhere to the same procedures for logging the intended sailing and have the movement identified within their project plan. Acceptance of the vessel movement within the area will be approved by the BoP / O&M Contractor in the same way as movements initiating from the nominated port facility. Contractors carrying personnel to the offshore site will allow personnel from other contractors or the BoP / O&M Contractor to travel on his vessel when there is spare capacity. The contractor will at all times cooperate with this principle and advise the BoP / O&M Contractor during site meetings when such capacity is available.

10.7 COORDINATION WITH THIRD PARTY VESSELS

The Marine Coordinator will instruct the vessel captain of their allotted time to enter and leave the port or the offshore site, such that the vessel movement will not affect the operation or movement of any third party vessel. If instruction to proceed is received from the Marine Coordinator but the captain identifies a safety risk to either his own vessel or any third party vessel by starting or continuing such movements he should take avoidance action as defined within applicable maritime law. Any potential safety hazard known by the captain must also be communicated immediately to the Marine Coordinator.

10.8 NAVIGATION

Working vessels restricted in their ability to maneuver must exhibit the correct navigation lights and shapes as prescribed in the international regulations for preventing collisions at sea (COLREGS).

Irrespective of whether they are used for the transport of persons, materials or equipment, all vessels must continuously log positions and date and time electronically. The equipment and details of logging will be approved by the site management. It is the responsibility of each contractor to ensure that each of its vessels on site is fitted with a fully functioning Class A Automatic Identification System (AIS). Such a system must be operational at all times while the contractor’s vessel is on site.

The contractor is responsible for proper navigation signals for his own working sites inside the offshore site, wherever it is required. The signaling must be in accordance with directions from the USCG, the FAA and the requirements of the lease agreement and local by-laws as applicable, and must be advised to the BoP / O&M Contractor in advance.

All anchor areas will be pre-agreed upon and proper notification given to USCG so they can decide on appropriate construction safety zone and implement a Notice to Mariners notification.

10.9 COORDINATION OF NAVIGATION

All activities involving vessels at the offshore site will be coordinated by the Marine Coordinator who will coordinate the navigation of the vessels and transport of persons to, from and within the offshore site. The contractor will plan his vessel movements and activities with respect to any possible exclusion zones surrounding any wrecks and archaeological items or similar as described in the environmental statement and archaeological protocol. The MC will inform the contractor of the agreed lines of communication to be used for the project.

10.10 AIDS TO NAVIGATION AND AVIATION LIGHTING

Temporary Aids to Navigation and aviation lighting provisions for the offshore site during construction will be defined within the SMS following the contracts award stage and prior to start of construction of the project in agreement with the USCG, along with all associated inspection and control measures.

The permanent Aids to Navigation and aviation lighting requirements are defined in the Lease and the O&M Plan. Further guidance will be included from 33 CFR subchapter C.

10.11 ANCHORAGE AND USE OF JACK-UPS

It is the contractor's responsibility to clarify potential requirements if anchorage outside the offshore site or other USCG-agreed upon anchorage areas is necessary. No anchorage will take place outside of offshore site without prior notification to CWA and approval from the proper regulatory authority. Anchorage of jack-ups, platforms or vessels inside the offshore site must only take place according to directions from the Marine Coordinator. The BoP / O&M Contractor will advise the contractor of existing cables or other items located on (or below) the sea bed. The site management should be informed by the contractor when any unknown item is discovered on the sea bed. The MC will be the focal point for information relating to items on the sea bed. The exact location of new cables installed for the project will be advised to the site management. The MC will inform contractors about how the installation of cable sections will affect their ability to conduct work. It is the responsibility of the contractor to ensure that anchors and legs from vessels and jack-ups are not positioned in such a way that they may cause damage to installed items. This requires as a minimum:

- Use of an on-board survey package to monitor vessel locations and anchor / leg drop co-ordinates.
- Use of side scan sonar - respect of indicated exclusion zones for cables and J-tubes.

The BoP / O&M Contractor will issue a plan with a clear marking of each WTG foundation, setting out the zones around the foundation in which the contractor is not allowed to jack up or drop anchor. Consequently anchor patterns and jacking locations are to be submitted to the BoP / O&M Contractor for approval prior to commencement of operations.

10.12 SAFETY VESSEL

If deemed necessary the BoP / O&M Contractor will provide a security vessel to be used only for observing vessel traffic and preventing unauthorized vessels from entering the offshore site. The MC will inform the contractors when a security vessel is in use and will instruct them of the communication procedure.

10.13 COLLISION RISK

It is expected that vessels chartered by or operated by contractors, shall adhere to:

- International Regulations for Preventing Collisions at Sea, 1972 (COLREGS).
- Federal Navigation Regulations 33 CFR Navigation Rules (International – Inland).
- USCG Navigational Rules and special restrictions imposed by the permit documents.

Lighting and warning markers must be displayed. There shall be a safe system of management of service boats. Notice to Mariners must be issued, and the relevant USCG and FAA protocols adhered to.

The BoP / O&M Contractor shall ensure that the lighting requirements for the Cape Wind Project as specified in section 12 of the Cape Wind lease agreement are complied with. Further details are given in the lease document and the O&M Plan which is included in the COP.

10.14 ADVERSE WEATHER PLAN AND WEATHER WINDOWS

An adverse weather plan along with weather window details will be developed during the detailed design phase subsequent to HAZOP and defined within the SMS following the contracts award stage and prior to start of construction of the project.

This plan will be included in the project Safety File.

10.15 ACCESSIBILITY AND EMERGENCY SHELTER

Accessibility and emergency shelter details will be developed during the detailed design phase subsequent to HAZOP and defined within the SMS following the contracts award stage and prior to start of construction of the project.

These details will be included in the project Safety File.

10.16 HELICOPTER OPERATIONS

Helicopter operation details will be developed during the detailed design phase subsequent to HAZOP and defined within the SMS following the contracts award stage and prior to start of construction of the project. Per the terms of the Lease there will be helipad located on the ESP with capabilities to land a USCG helicopter if requested to do so by the USCG.

These details will be included in the project Safety File.

10.17 COMPETENCE & TRAINING

Education and training is not an ‘add on’ to work practices, but an integral component of a person’s ability to carry out tasks in a safe and risk free manner by ensuring that individuals have the relevant information and training to ensure that they are able to perform work in a risk free environment. The BoP / O&M Contractors will continually strive to improve the competence levels of the Company’s Managers, Employees and Contractors.

These requirements will be reviewed following HAZOP / HAZID and risk assessment. This assessment will give due regard to statutory regulations and industry guidance. Specific training will be determined during detailed engineering design and specification / pre-construction planning phase by the WTG and ESP supply contractors / BoP Contractor / or the Cape Wind project’s Health and Safety Coordinator.

Details of implementation of these requirements through the construction phase are to be confirmed by the WTG and ESP supply contractors / and BoP Contractor (as applicable).

Details of the implementation of these requirements through the operational phase are to be confirmed by the O&M Contractor.

All individual employee competence will be documented through a personal employee record, which lists all education and training courses the person has completed. These records will be available in the site safety file.

10.18 QUALIFICATIONS

Contractors are required to provide the BoP / O&M Contractor or their representative with documentary evidence of their employees (or subcontracted employees) qualifications and training.

10.18.1 CONTRACTORS SELECTION AND CONTROL OF SUBCONTRACTORS

Contractors are to ensure that any subcontractors appointed by, and under their control, are appropriately competent, experienced and suitably resourced to undertake the work they are contracted to do.

The BoP / O&M Contractor or his representative will require contractors to provide written evidence that this assessment has been undertaken, before any subcontractor can be authorized to work on site.

Contractors shall ensure that the contents of their H&S plans, and any supporting plan, method statements and risk assessments are brought to the attention of their subcontractors.

10.18.2 HEALTH AND FITNESS

The contractor is required to have his own medical fitness policies in place at the site. All health and fitness policies will comply with the applicable regulatory requirements.

10.18.3 DRUGS AND ALCOHOL

The use, possession, transportation, promotion or sale of illegal drugs, controlled substances, drug paraphernalia, and the consumption of alcohol during the works is absolutely prohibited.

CWA and the BoP / O&M Contractor reserve the right to conduct random checks to confirm that persons working or seeking admission to the site are not under the effects of alcohol or drugs. Any person who in the opinion of CWA or the BoP / O&M Contractor is found to be under the influence of drugs or alcohol will not be allowed on the site.

The contractor is required to have its own drugs and alcohol policies at their work place.

10.19 TRAINING

As a minimum, persons working on the project offshore must have completed training in the areas listed below:

- Marine survival training.
- CPR and First Aid training.
- Vessel or site specific induction.
- Emergency escape training / confined space rescue training.
- Knowledge of the H&S conditions at site.
- Wind Turbine rescue from height training (if job includes WTG access).
- Turbine tower lift rescue / recovery training.
- Electrical awareness including a basic understanding of electrical safety and the electrical safety rules in place on the project.
- Fire safety awareness.

- Medical fitness certificate to the appropriate US standard.

These must be supplemented by specialist training where applicable, with respect to the job that each individual will carry out, and the areas of the project that they will be authorized to access.

Contractors must ensure that persons under their control have the relevant skills and competency for the work they are expected to undertake. These requirements will be recorded in contractor's method statements.

Confirmation certificates must be produced. Access will not be permitted to individuals who have either not completed the required training, or whose certificates have lapsed, or who cannot produce certificates.

10.19.1 SITE TRAINING

A site specific induction training package will be prepared by CWA and the BoP / O&M Contractor, and a works specific induction training package will be prepared by the contractor. The contractor will be expected to deliver both training packages to all persons working within or visiting the site. Records of all inductions must be maintained, and refreshers should be carried out where significant changes to operating procedures have occurred, such as following the takeover of the works.

Induction training on the project site must, as a minimum, consist of the following:

Visitors

- Site safety rules for moving around on the site.
- Safety equipment for moving around on the site.
- Restricted areas.
- Emergencies.

Site workers

- Site safety rules for moving around on the site.
- Safety equipment for moving on site.
- Restricted areas.
- Emergencies & associated procedures.
- Driving rules (on site and off site).
- Hazardous substances.
- Waste, dust emission and noise on site.
- Permit systems.
- Welfare arrangements.
- PPE requirements.
- Working hours.
- The importance of conformance with the H&S procedures.
- Employee's role and responsibility in general.

- Accident reporting procedure.
- Security arrangements.
- First Aid.
- Fire fighting.

Where personnel are to travel on or work on board a vessel, but are not part of the vessel crew, they shall receive a vessel safety induction which details the safety requirements and essential information for the vessel.

Where a new activity is to commence, a work pre-job briefing must be conducted and attended by all staff and field operatives involved in the activity. At the pre-job briefing, the H&S responsibilities and requirements relevant to the activity shall be explained in detail. Additional specific briefings may be required when a new field operator joins the team.

Personnel who are new to the offshore environment shall wear a high visibility over jacket with the words “New to Offshore” printed on the back in large letters. This will allow those persons requiring additional guidance and supervision to be easily identified. This over jacket should be worn until a period of at least 2 weeks of active duty has been gained offshore, or until the vessel master is confident that the person no longer requires the heightened level of supervision and care.

11 SIGNIFICANT CONSTRUCTION AND OPERATION HAZARDS

Each contractor must provide details of how they intend to manage hazards on site. The main hazards are identified below. The omission of a hazard from this section is not a declaration that the hazard will not be encountered during the project, and all contractors should carry out their own assessments and address the risks accordingly. As a minimum, all project work will be carried out according to the standards within Title 29 of the Code of Federal Regulations (29 CFR).

All risk assessments should be in line with USCG, OSHA, or other applicable regulatory requirements, and will be reviewed and approved by the BoP / O&M Contractor prior to work commencing on site. Copies of such assessments will be maintained in the Safety File by the BoP / O&M Contractor and reviewed as necessary.

The results of any such assessment shall be communicated to any affected personnel. The BoP / O&M Contractor are to ensure that full cooperation and coordination is facilitated between all relevant parties.

11.1 ELECTRICITY

Only personnel who are suitably trained, qualified and experienced, and who have been duly appointed by the BoP / O&M Contractor as an ‘authorized person’, will undertake switching activities on high voltage (HV) systems including the establishment of points of isolation and the application of circuit earths.

All works on the HV system shall be controlled by issue and receipt of a the applicable Work Permit in compliance with OSHA 1910.147, 1910.269, 1910.1377, 1910.331-335, 1926 subpart K and any legislation or applicable USCG regulation. Testing of HV systems shall be controlled by a control of hazardous energy safety document.

Access for works adjacent to live HV systems shall be controlled by a Limitation of Access document. At all times HV control, switching and work shall be in accordance with the relevant OSHA or other applicable standard.

All equipment will be required to comply with the most recent NFPA 70E and US Occupational Safety and Health Administration (OSHA) regulations related to Arc Flash compliance. CWA will require an Arc Flash Hazard Analysis (AFHA) be performed by the electric service platform (ESP) supplier for the complete project. The WTG and ESP equipment shall be capable of accommodating appropriate signage as determined by the AFHA indicating the rating in compliance with NEC section 110 and ANSI Z535.4 to identify Arc-Flash Incident Energy (AFIE) and appropriate Personal Protective Equipment classes.

Live working on electricity systems is prohibited. If situations arise where it is considered that live working or testing is unavoidable, exemption will only be sanctioned where justification under the relevant USCG or OSHA Electrical Safety-Related Work Practices Standard has been fully met, and the approval of the Senior Authorized Person is given in writing. Any sanction for live working shall be notified without delay to the site Health and Safety Coordinator.

All electrical design and installation work will comply with the relevant US regulatory electrical code, and be in line with other applicable standards identified in the COP. The contractor is responsible for ensuring that any electrical system is installed to the appropriate standards identified in the COP.

For fixed or portable electrical equipment, contractors must:

- Maintain equipment in a safe condition by carrying out regular inspection and testing.
- Promote and implement a safe system of work for maintenance, inspection and testing.
- Ensure that employees who carry out electrical work are qualified, suitably experienced (competent) and authorized to do so.
- Maintain detailed records of inspection and testing programs.

The risk of injury from electricity is strongly linked to where and how it is used. The risks are greatest in wet conditions, out of doors and in cramped spaces, and contractors must recognize and address these risks. For portable electrical equipment, contractors should use tools which operate on a grounded 110 volt supply, or preferably where possible, cordless low voltage rechargeable battery powered equipment. If a higher voltage is deemed unavoidable, contractors will undertake a risk assessment to demonstrate that suitable control measures are in place.

Portable electrical equipment and hand held tools should be tested at suitable intervals, depending on the equipment type and the environment in which it will be used, and the records of testing should be kept. Portable appliances should be marked to show they have been tested and are in a condition that is safe for use, and defective equipment should be quarantined, repaired or safely disposed of. Portable electrical equipment should only be used by personnel suitably qualified and competent to do so.

A program for conducting arc flash studies will be developed during the detailed design phase subsequent to HAZOP and defined within the SMS following the contracts award stage of the project.

11.2 CONTROL OF HAZARDOUS ENERGY (LOCK OUT/TAG OUT)

The purpose of a lockout tagout (LOTO) program is to prevent the release of hazardous energy (electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or any other form of energy) during the construction, servicing or maintaining of equipment.

Contractors will be required to implement a detailed LOTO program that includes all the elements required by USCG 33 CFR Subchapter N 142.90 for work on the OCS and 29 CFR 1910.147, 1910.269; 29 CFR 1926 subpart K for work within OSHA's jurisdiction.

The required elements of the program will include.

- Develop, implement, and enforce an energy control program.
- Providing instruction in the use of this procedure to all employees, contractors and offsite personnel as required.
- Convey the seriousness of violating the procedure will result is disciplinary action including up to removal from the site.
- Identifying the personnel who are authorized to administer the program and to request LOTO's as defined in the procedure.
- The program shall establish procedures that include specific instructions for the lockout of mechanical and electrical equipment, de-pressuring potentially dangerous systems and installing blinds where applicable. This shall also include a test start of electrical equipment, controlled from a remote station to ensure equipment may not be started.
- Lockout devices shall be attached in a manner that will hold the energy isolating devices in a "safe" or "off" position. Tagout devices shall be affixed directly to energy isolating devices in such a manner as will clearly indicate that the operation or movement of them from the "safe" or "off" position is prohibited. Where a tag cannot be affixed directly to the energy isolating device, the tag shall be located as close as safely possible to the device, in a position that will be immediately obvious to anyone attempting to operate it.
- Ensure that new or overhauled equipment is capable of being locked out.
- Use only lockout/tagout devices authorized for the particular equipment or machinery and ensure that they are durable, standardized, and substantial.
- Ensure that lockout/tagout devices identify the individual users.
- Provide effective training as mandated for all employees covered by the standard.
- Comply with the additional energy control provisions in OSHA standards when machines or equipment must be tested or repositioned, when outside contractors work at the site, in group lockout situations, and during shift or personnel changes.

11.3 WORKING AT HEIGHT

Contractors will be expected to avoid working at height where possible, but where it cannot be avoided it must be carried out in a safe manner in accordance with ANSI/ASSE 2-359.2 or any additional applicable USCG or OSHA work at height standard. A place is “at height” if a person could be injured falling from it, even if it is at or below ground level. Consideration must be given to the hierarchy of protection measures detailed in the regulations, and preference to collective means of prevention given where reasonably practicable.

Contractors will ensure that any work at height, including use of access aids or fall arrest equipment (i.e. scaffolding, mobile elevating work platforms, ladders, harnesses, etc.), is properly planned and appropriately supervised. Contractors must ensure that all equipment used for work at height is appropriately inspected (e.g. before each use) and safe for use. All personnel engaging in activities in relation to work at height must be suitability qualified and competent, and records of training must be kept up to date.

Any fall arrest equipment utilized, either temporarily or permanently installed, involving rails or steel ropes and sliders, must have passed all tests in accordance with ANSI/ASSE 2-359.2 or other applicable fall arrest standard.

As part of the planning process, suitable emergency response and rescue procedures must be put in place to evacuate personnel from a place of work at height, and rescue a person injured whilst working at height. Where a man riding basket is used for access, the contractor must demonstrate that the associated risks have been assessed and reduced to as low as reasonably practicable, and that fixed access methods such as staging or scaffolding could not be used as an alternative.

11.4 WORKING OVER WATER AND SAFETY HARNESSES

Contractors are required to carry out their own risk assessments for individual cases, to assess the PPE requirements for their personnel when working over, or near water. This will be dependent upon the nature of the work, the location, environmental conditions, daylight etc. and is likely to result in specifying that lifejackets or safety harnesses should be worn or used.

For day to day vessel operations where there is a risk of falling overboard, all personnel are required to wear lifejackets. Where appropriate thermal protective clothing should also be worn e.g. transit / transfer suits. Where safety harnesses are required, they are to be used as when working at height with the overriding principle being to prevent anyone falling, regardless of whether over water, land or the deck of a vessel. Safety harnesses with suitably positioned safety attachment points, should be provided on all vessels that provide a working platform for persons working over water, or where there is a danger of them either falling or being dragged overboard.

Where safety harnesses are provided they should meet with required standards and have leg and arm straps. The maximum free-fall distance must not exceed applicable standards. Life jackets and suitable man over board procedures should be implemented by any contractor who is required to work over water, including the provision of personal locator beacons. The following standards will apply to working over water and fall protection 33CFR Sub. N 142.45 & 144; 33CFR Sub. N 142.42; 29CFR 1910 subparts D, F, I, R; 29CFR 1915.158; 29CFR 1926.106.

11.5 OFFSHORE TRANSFERS

During transfers from the port to the WTG location, or for transfers between vessels or structures offshore, contractors’ personnel are required to wear life jackets, and where deemed necessary by risk assessment, thermal protective clothing and / or additional PPE including personal locator beacons.

All contractors will be expected to tabulate and submit to the BoP / O&M Contractor and the site Health and Safety Coordinator their own risk assessment for drowning / hypothermia / heat exhaustion / MOB capability / PPE for review prior to any work commencing. It is the responsibility of the individual contractor to establish the USCG, OSHA, marine or other applicable standards that are relevant to their specific activity, and assess risks to those standards and apply appropriate controls.

11.6 LIFTING OPERATIONS

Cranes and lifting equipment will be certified, maintained and operated in accordance with the relevant BOEMRE, USCG, OSHA, or other applicable lifting operations and lifting equipment standard, and the relevant BOEMRE, USCG, OSHA, or other applicable provision and use of work equipment standard. Records of inspections and tests will be made available to the BoP / O&M Contractor and be included within the method statement / lifting plan where such equipment is required. Lifting equipment will be color coded in accordance with the chosen scheme for the test period, and signs will be posted to show this designation.

Lifting equipment will be tested annually, or every 6 months for equipment used for man riding, and should be clearly marked with the safe working load (SWL). Where necessary, detailed lifting plans should be prepared for single lifting operations including details of lifting beams / spreader beams, strap capacity, shackles required etc. and taking into account surrounding structures and environmental limits. The contractor should provide all lifting plans to the BoP / O&M Contractor prior to undertaking lifting operations.

Where multiple lifts of a similar nature are conducted, it will be acceptable for a generic lifting plan to be prepared for the series of lifts. All contractor lifting operations will be supervised by a suitably qualified and experienced supervisor or vessel captain's designee present on site or vessel for the contractor, who has responsibility for the planning and execution of all lifting operations.

When planning and executing lifting operations, all contractors should undertake consideration of the following:

- Ensure that qualified persons are used for the planning and supervision of lifting operations, and that documented background information has been gathered. Make use of experienced crane drivers.
- Ensure personnel are fit for duty and not fatigued.
- All approved plans should be made known to the installation supervisor, vessel captain, crane operator and all others involved in the lifting operation.
- Undertake risk assessment and prepare method statement. Include detailed lifting plans presenting the full geometry of the lift (with reasonable tolerances regarding distances to foreign obstacles such as other vessels / jack-ups, and other fixed structures such as WTG foundations and towers etc), use of accurate lifting diagrams, the right lift weights and apply the relevant dynamic amplification factor.
- It is normal for a contractor to consult with the Health and Safety Coordinator on these issues and obtain some degree of consensus that the calculated contingency falls within their view of reasonable. It is the responsibility of the individual contractors to make such consultations.
- Prepare contingency plans with provisions for unpredictable circumstances, focusing, for instance, on bad weather.

- Specify and use the right lifting equipment for the job, and check that all certificates are available.
- Prepare procedures to cope for out-of-service crane loading, for example securing the boom, procedure for locking or unlocking the slew ring.
- Prepare an evacuation procedure, tested by means of evacuation drills.
- Have a good weather forecasting system available.
- Select the crane and the vessel using sound principles, and not compromise on quality.
- Ensure that the crane manufacturers' documentation is available when preparing the method statement.
- Prepare a risk assessment and check that the procedures are implemented and followed with good communication procedures.

11.7 TOOLS AND EQUIPMENT

This covers any equipment which is used by an employee at work, including things such as hand tools, power tools, machines, lifting equipment, motor vehicles and mobile cranes Contractors must ensure that all tools and equipment they provide to their employees is suitable for the intended use and has a valid test certificate. This also applies if employees provide their own equipment for use at work.

Contractors have the responsibility to ensure that all equipment is safe for use from the start of the project, and is maintained in a safe condition throughout the term of its use. This includes carrying out inspections at regular intervals, as appropriate to the type of equipment and the type of use, and any other conditions that may be a factor. Contractors should implement maintenance schedules to ensure all plant and equipment is properly maintained, cleaned and repaired as is required during the course of the project. Records should be kept and made available to the BoP / O&M Contractor on request.

Any repair and maintenance required is only to be carried out by suitably competent personnel, and must conform to risk assessments and method statements drawn up by the contractor to cover such operations. Contractors will ensure that all equipment under their control is only used by personnel who have received adequate information, instruction and training in its use. It must be operated safely with consideration to others in the vicinity and only as intended. Where necessary, contractors must provide suitable safety measures appropriate to the equipment such as warning signs, special markings and protective guards. These should be kept in good order at all times and repaired or replaced if damaged or lost.

Written risk assessments and method statement for tasks to be carried out using specific equipment should be drawn up by the contractor. They should clearly identify the measures necessary to control any potential hazards and risks which may arise. Plant operating areas and pedestrian areas will be clearly segregated by appropriate signs and barriers.

11.8 CONFINED SPACES

All work will be carried out to the relevant BOEMRE, USCG or OSHA confined spaces standards 29 CFR 1910.146, 29 CFR 1915 Subpart B, 29 CFR 1926.21, 1926.651, 1926.956. Contractors must carry out suitable and sufficient assessment of the risks for all work activities for the purpose of deciding what measures are necessary for safety for working in confined spaces. This means identifying the hazards present, assessing the risks and determining what precautions to take. The assessment should include consideration of:

- The task.
- The working environment.
- Working materials and tools.
- The suitability of those carrying out the task.
- Arrangements for emergency rescue.
- The following are key duties with regards to confined spaces:
- Avoid entry to confined spaces, i.e. do the work from outside, use remote tools and equipment where possible.
- If entry to a confined space is unavoidable, develop and follow a safe system of work. A safe system of work should include details of the appointment of a supervisor, training and experience requirements for the persons carrying out the work, isolation of equipment, cleaning before entry, ventilation, testing of air quality, provision of special tools and lighting, provision of breathing apparatus, preparation of emergency rescue arrangements, provision of rescue harnesses, communications, how to signal the alarm, and details of permit to work systems.
- Put in place adequate emergency arrangements before the work starts, including contingency plans, methods of communication, training for rescuers, and provision of appropriate rescue and resuscitation equipment.

Contractors will identify all work that requires entry into confined spaces. The BoP / O&M Contractor will require notice of any working or entry into a confined space, whether for new work or for inspection activities.

11.9 EXCAVATIONS

Where contractors are required to prepare excavations as part of their work they must ensure that precautions are taken to prevent:

- Collapse of the sides. The sides must be battered to a safe angle or supported with timber, sheeting or support systems.
- Materials falling onto people working in the excavation. Materials must not be stored close to excavations, and the edges of excavations must be protected against falling materials.
- Vehicles and people falling into the excavation. Appropriate barriers, guard rails and toe boards must be provided.
- People being struck by excavating equipment.
- Undermining / collapse of a nearby structure.
- Danger from underground services and water ingress. Contractors must consult with “Dig Safe” and utility companies for plans and information and, where necessary, dig trial pits and use locators to trace services.
- Access to the excavation by unauthorized personnel.
- Dangers posed by fumes.

Suitable access to and egress from the excavation must be provided. A competent person must supervise the installation, alteration or removal of excavation support, and must carry out regular inspections of the excavation. Work requiring excavation will comply with provisions of 29 CFR 1926 Subpart P.

11.10 HAZARDOUS SUBSTANCES

A Hazardous Substances Plan for the project will be included within the COP.

Substances and materials used may present H&S hazards requiring the contractor to carry out assessments and to introduce control measures. The contractors must comply with the relevant BOEMRE, USCG, OSHA, or other applicable standard on the control of toxic and hazardous substances. Contractors must follow the steps detailed below:

- Assess the risks – Assess the risks to health from hazardous substances used in or created by workplace activities.
- Decide what precautions are needed – contractors must not carry out work which could expose employees to hazardous substances, without first considering the risks and the necessary precautions. Task specific Job Safety Analysis will be performed to ensure compliance with the standard.
- Prevent or adequately control exposure – contractors must prevent employees being exposed to hazardous substances. Where preventing exposure is not reasonably practicable, it must be adequately controlled.
- Ensure that control measures are used and maintained properly, and that safety procedures are followed.
- Monitor the exposure of employees to hazardous substances, as necessary.
- Carry out appropriate health surveillance where hazard assessment has determined it is necessary, or where the standard sets specific requirements.
- Prepare plans and procedures to deal with accident, incidents and emergencies involving hazardous substances, where necessary.
- Ensure employees are provided with suitable and sufficient information, instruction, training and supervision.
- Comply with OSHA Hazard Communication standards 29 CFR 1910.1200

A listing of hazardous substances must be maintained by each contractor. For each hazardous substance, a material safety data sheet and risk assessment will be obtained or produced by the contractor, and be made available for easy reference. Copies of each contractor's material safety data sheets and risk assessments should be readily available for reference and reviewed as necessary.

Diesel fuel, when stored onshore, will be located in a secure bermed containment area. The bermed area will be constructed to allow safe entry and storage of a mobile tanker, and the containment berm will be capable to contain at 110% of the maximum volume of the tank. The contractors' emergency procedures must address spillage, and any other emergency presented from the storage and use of hazardous substances. No fuel storage facilities (either mobile or stationary) are to be installed at the site without prior approval from the BoP / O&M Contractor and comply with all local and state statutory requirements. All hazardous substances brought onto the site must be approved by the BoP / O&M Contractor. The contractor is required to take steps to control the emission of dust and fumes, for example by providing screens and / or using dust suppressing equipment. Where creation of dust or fumes is unavoidable, appropriate PPE must be worn.

11.11 MATERIAL HANDLING

The contractors must comply with the relevant BOEMRE, USCG, OSHA, or other applicable material handling standards. Contractors must take suitable steps to control the risks to the H&S of their employees from manual handling activities such as lifting, lowering, pushing, pulling or carrying. This will include the preparation of material handling risk assessments in consultation with all employees involved firsthand with the process. The contractors will be required to:

- Avoid the need for hazardous material handling as far as is reasonably practicable. Use handling aids or engineering solutions that eliminate material handling.
- Assess the risk of injury from any hazardous material handling that cannot be avoided. Draw up risk assessments, update them as necessary and communicate them to employees.
- Reduce the risk of injury from hazardous material handling as far as possible. Provide training in handling techniques and use of handling aids.

Contractors must ensure that their employees do the following with regard to material handling:

- Follow appropriate handling systems safety procedures.
- Make proper use of equipment provided for their safety.
- Inform the BoP / O&M Contractor if they identify hazardous handling activities.
- Take care to ensure that their activities do not put others at risk.

11.12 NOISE AND VIBRATION

All contractors must comply with the relevant BOEMRE, USCG, OSHA, or other applicable standard on noise control and mitigation. All construction work equipment and machinery are to be assessed by the contractor before use to ensure that noise levels comply with the occupational noise exposure standards (29 CFR 1910.95) and the contractor has implemented a hearing conservation program.

The contractors will be required to:

- Assess the risks to employees from noise at work.
- Take action to reduce noise exposure that produces those risks.
- Provide hearing protection to those affected if the noise exposure cannot be reduced by other means.
- Ensure the OSHA permissible noise exposure limits are not exceeded.
- Implement hearing conservation and testing policy.

Where the level of noise reaches, or exceeds, the exposure action values identified in the OSHA standard, the contractor shall implement the appropriate measures and mitigation to protect employees from excessive noise exposure.

Warning signs must be used to show where hearing protection is required, and contractors must ensure all personnel use hearing protection in these designated areas. Contractors must make hearing protection available for use in these areas and provide adequate training for the proper use of the various hearing protection available.

11.13 HOUSEKEEPING, SLIPS AND TRIPS

Working areas must be kept free of obstacles which are likely to cause trips and falls. Where necessary, walkways on vessels will be provided with non-slip surfaces to prevent falls. Suitable arrangements will also be implemented by contractors to ensure that work areas are cleared of obstacles after each shift.

Contractors' arrangements must describe the actions relating to housekeeping and the removal of waste from the work site. When work is performed, materials and tools must be kept in good order. The site must always be kept neat and free of clutter. Nothing must be positioned or dumped in a manner that will cause an inconvenience or danger. It is not permitted to store any light weight materials in places where they may be blown around or into the sea.

No waste shall be dumped at sea at any time.

11.14 BURIED, GROUND LEVEL AND OVERHEAD UTILITY SERVICES

All buried, ground level or overhead utility services in the vicinity of the onshore or offshore project works will be identified prior to any on site works commencing. All works will be carried out in accordance with OSHA or other applicable guidelines.

11.15 LOSS OF PERSONNEL AT SEA

Detailed recording procedures for vessel and personnel movement will be established. Robust marine co-ordination and 'persons on board' procedures are of great importance. Automatic identification system tracking shall be a requirement on all vessels to enable marine coordination to maintain a record of vessel tracks and positions.

11.16 SITE BOUNDARY ACCESS RESTRICTIONS / LIMITATIONS

Temporary exclusion zones will be set up during various phases of construction, and will be marked in accordance with directions and approval from the USCG and harbor authorities during cable export work near shore. Third parties would be excluded from any safety zone during the construction period.

11.17 SEA TRANSPORT

There is a requirement for risk assessment during sea transportation, and contractors should provide the BoP / O&M Contractor with documentary evidence of transport /sea fastening / shipping / loading / unloading method statements and risk assessments prior to work commencing.

11.18 HOUSEKEEPING - OFFSHORE SITE

Any item lost overboard, or left in the sea or on the seabed that may pose a danger to other vessels will be removed immediately, or if this is not possible, marked according to the relevant US shipping authority regulations. The site management must be informed immediately with date, time and coordinates. As soon as possible, the contractor must initiate measures to find and recover the item. Documentation for removal of the item must be forwarded to the site management. At each working site, the contractor will document the clearing and re-establishment of the seabed after completion of the work.

11.19 UNDERWATER HAZARDS

Detailed seabed features, obstructions and archaeological exclusion zones are described in the Final Environmental Impact Statement (FEIS), which will cover both the offshore wind farm site and the export cable route to shore.

This information along with any other relevant information will be provided to the relevant contractors and regulatory authorities.

11.20 USE OF JACK-UP VESSELS

Contractors shall ensure that jack-up vessel operators are competent to work in the specified project environment, and that the vessels are suitable for the task. Factors including tidal streams, water depth and scour will be considered when evaluating all aspects of operational risk (for example, platform leg stability).

The risks associated with jack-up vessel leg penetration due to soils instability, and the effects of scour are well documented, as well as a number of other hazards associated with the use of this type of vessel. A minimum standard for all jack-up operations on this project will be developed in consultation with the relevant contractors and the applicable Regulatory Agencies.

11.21 DIVING OPERATIONS

Every effort will be made through design and planning to eliminate diving operations from the project, and wherever practical remotely operated vehicles (ROV's) will be utilized as an alternative. However, work that will require the services of a competent diving company can arise. Anticipated tasks will be as follows:

- Assisting with vessel problems – below waterline.
- Installation of J-tubes.
- Inspection of Scour protection zone.
- Inspection of electrical cable and installation works at shore termination.
- Inspections of foundations, substructures, or burying of electrical cables.
- Recovery of dropped objects.
- Other Ad-hoc duties.

The works will as a minimum standard be carried out to meet the requirements of OSHA "Commercial Diving Operations" 29 CFR 1910 subpart T, USCG Commercial Diving Operations 46 CFR Part 197 Subpart B.

There shall be no diving operations carried out if pile installation (specifically hammering) is in progress.

In accordance with the regulatory requirements, adequate and easily accessible diving platforms shall be provided at all diving locations.

A minimum of two escape means must be in place for the diver under all dive operations.

A standby diver must be available at all times during a dive. It is not acceptable for a second diver to act as the standby diver.

All operatives engaged in the diving / confined space operation, and rescue procedure, must be “single-tasked”

The Contractor will provide to the BoP / O&M contractor Dive Plans, Risk Assessments, Emergency Plans and Rescue Procedures before any diving can be performed at site.

11.22 DIRECTIONAL DRILLING ACTIVITIES

A competent and experienced horizontal directional drilling (HDD) contractor shall be engaged to undertake the cable installation works. HDD activities shall be adequately supervised, and suitable protection shall be afforded against hazards associated with the HDD drilling process. The HDD contractor will provide the BoP contractor with method statements, risk assessment and emergency mitigation plans.

11.23 NO WEAPONS ON SITE

No firearms, knives, or any weapons of any kind are permitted in the project areas.

11.24 HEALTH RISKS

The project policy requires zero health incidents, which means the control of issues that could give rise to short and long term health problems. These issues will be considered within risk assessments for each activity.

11.24.1 WORKING WITH IONIZING RADIATION

Arrangements will be put in place to ensure the availability of competent people to adequately assess the risks and ensure appropriate control measures are put in place regarding activities such as x-ray welding or non destructive testing.

11.24.2 ENVIRONMENTAL POLLUTION

The Cape Wind project’s Environmental Coordinator shall confirm that during offshore construction activities contractors shall apply the requirements of the USCG including the implementation of spill controls, containment berms, appropriate stowage and sea fastening, and the minimization of substances carried. During operations contractors shall be trained to properly address spills in accordance with Cape Wind’s Oil Spill Response Plan (OSRP).

Contractors shall have plans for preparedness for environmental pollution emergencies.

11.24.3 SMOKING

Smoking will only be permitted in designated areas that are clearly designated as such. All other external areas, and all enclosed spaces within the project site will be designated as no smoking areas. Contractors are required to enforce these requirements within the scope of their working responsibility.

12 FIRE SYSTEM

12.1 FIRE PREVENTION

Fire prevention is of paramount concern at the wind farm site. The use of flammable materials, chemicals, and other hazardous materials calls for increasingly sophisticated procedures. CWA will require that all contractor supervisor / leads and employees are well trained in fire prevention/practices and emergency procedures.

The site safety procedures will address specific fire protection and prevention requirements so that sites are adequately protected. The basic methods of fire prevention are similar regardless of type, size or nature of operation of site facilities. The methods used will involve a combination of engineering, education, and enforcement:

- Engineering provides built-in safeguards that help prevent and limit the spread of fires.
- Education keeps employees informed about the danger of fires and how to prevent them.
- Enforcement is used as a last resort to administer fire safety guidelines.
- Housekeeping.
- Adhering to the requirements of the Hot Work procedure.
- Location of flammables, combustibles, and potential sources of ignition, and means for control.

The BoP Contractor / O&M Contractor are responsible for the development and implementation of a site fire plan; this shall be communicated to all employees through training, inductions, signage, and through inclusion in the Safety File. The fire plan will include the following:

- Plant procedures on fire, notification, inspection, alarms and evacuation.
- Location of extinguishers, fire hoses or other equipment.
- Fire watch procedures during Hot Work.
- Fire equipment requirements and fire protection requirements for specific work assignments, and locations.
- Proper storage of combustible materials and flammable products.
- Familiarization with the classes of fires, extinguishers and instructions on what to do in the event of a fire.
- Fire Safety Checklist.
- Designation of specific zones, including smoking and non-smoking areas, hot work areas requiring a hot work permit and areas not requiring a permit. These zones will be subject to routine inspections.

The fire plan will make reference to applicable US standards for fire prevention and protection including:

- 29 CFR 1926.24 (Fire Protection and Prevention).
- 29 CFR 1926 Subpart F (Fire Protection and Prevention).
- 29 CFR 1910 Subpart L (Fire Protection).
- 33 CFR Part 145 Firefighting Equipment.
- NFPA 1, 10, 12, 13, 17, 30 & 72 or any other applicable standard.

12.2 HOT WORK

A hot work permit will be required for any process that can be a source of ignition when flammable material is present, or can be a fire hazard regardless of the presence of flammable material in the workplace. This includes welding, soldering, cutting and brazing, and also grinding and drilling where flammable material is present, and any works that have the possibility of leaving hot slag in the work area.

The definitions and recommendations for hot work in the following standards will be complied with:

- 29 CFR 1915.14 (Hot Work).
- 29 CFR 1910.252 (welding, cutting, brazing, General Requirements)
- 29 CFR 1917.152 (Welding, cutting and heating (hot work)).
- 29 CFR 1917.23 (Hazardous atmospheres and substances).
- 29 CFR 1926 Subpart J (Welding and Cutting).
- 33 CFR Part 142 Subchapter N - Workplace Safety and Health
- 33 CFR Part 145 Subchapter N– Fire Fighting Equipment

The BoP / O&M Contractor will develop a process for controlling hot works as part of the fire plan and the work permit system. This process will as a minimum ensure;

- Compliance with and use of the hot work procedures by all contractors and subcontractors on the site where hot work is to be carried out.
- Correct training in fire prevention for all personnel engaged in hot work.
- Where normal fire prevention precautions are not sufficient, additional personnel shall be assigned to guard against fire during hot work and for a sufficient time after completion of the work to ensure that no fire hazard remains.
- Appropriate fire suppression equipment is available prior to starting any hot work.
- Welding shields or screens are available when other personnel in the area may be exposed to flash burns.
- Combustibles shall be controlled within a suitable radius of the hot source, with particular attention paid to areas below the work area.

12.3 FIRE BOUNDARIES AND SEPARATION

The ESP Superstructure is to be designed to provide support, protection and access to all of the installed equipment. The layout of the ESP structure and spaces shall be configured to provide fire boundaries between major electrical equipment or plant rooms, storage areas, and occupancy areas. This purpose should be to enhance life safety and minimize damage and impact to long-term operation of the wind project should a fire or other significant event be experienced

Areas with equipment feeding the two export cables shall be physically segregated to minimize the threat of a fire damaging equipment/connections for both export cables. Likewise, equipment receiving power from the array cabling areas shall be segregated to minimize the threat of a fire disabling a large quantity of WTG's.

The superstructure shall be totally enclosed with metal panels and shall include all ventilation openings, access doors, vents etc.

12.4 FIRE DETECTION SYSTEMS

The ESP and WTGs will have a fire detection system fitted; this will include a local audible alarm and be tied into the SCADA system to provide remote notification of an alarm, and automatic shutdown and isolation.

The WTG smoke detection system and location and type of fire extinguishers are detailed in the Siemens specification sheet Fire Protection, SWT-3.6-107, [to be] included in the Safety File.

The Fire Detection, Alarm, Actuation and Signaling System for the ESP shall be designed and constructed in accordance with NFPA 72. The alarm and detection system shall be zoned and coded and shall utilize Class A circuits exclusively. Loss of signal in the fire detection system shall initiate a trouble alarm. All fire and trouble alarms shall be transmitted to the remote onshore operations center via the central control system and SCADA connection. Automatic Fire Detection shall be provided in various areas. Manual alarm boxes shall be installed at critical points and along escape routes. Detectors shall also be provided for actuation and/or alarm for the Suppression Systems on the ESP. Upon detection of fire or initiation by manual alarm, the fire alarm and detection panel shall automatically shut by failsafe logic all intakes and exhaust ventilation dampers of the affected zone.

12.5 FIRE SUPPRESSION

The following rules pertaining to portable fire extinguishers shall be followed:

- Fire extinguishers must be recharged immediately after use.
- Any fire extinguisher removed from service shall be replaced immediately with a spare unit.
- A certified fire protection contractor shall complete an annual inspection of all portable fire extinguishers per NFPA 10 standard.
- A portable fire extinguisher preventative maintenance shall be completed at each visit to the WTG not to exceed interval greater than [X] months to:
    - Determine that all portable extinguishers are in their designated places, have not been activated, and have no apparent physical damage or corrosion.
    - Replace any damaged or depleted fire extinguisher with a proper model.

Portable fire extinguishers and fire blankets will be located within the WTGs, ESP, the vessels and the onshore site as per 33 CFR 145 Subchapter N and NFPA 10 standards. The locations of portable fire extinguishers and fire blankets will be clearly indentified within each of the project structures and vessels, and will be included in a master inspection document.

A fire risk evaluation will be conducted with the contractor and insurance underwriter as the ESP design is finalized and the recommendations will be addressed in the FDR. Areas with oils, flammable liquids, storage locker and areas, electrical equipment rooms, and cable spreading rooms will be considered for fixed fire suppression systems. Egress, separation, fire barriers, emergency power system, etc. will be also considered within the fire risk evaluation.

All fixed fire suppression systems required on the ESP will utilize guidance from IEEE 979-1994 (R2004) Guide for substation fire protection and the applicable NFPA standards.

- NFPA 11 Standard for low, medium and high expansion foam systems
- NFPA 12 Carbon Dioxide extinguishing systems
- NFPA 15 Fixed water extinguishing systems
- NFPA 16 Installation of Foam water sprinkler and spray systems
- NFPA 20 Installation for stationary pumps for fire protection.
- NFPA 22 Standards for water storage tanks
- NFPA 30 Flammable and Combustible Liquids
- NFPA 70 & 70E National Electric Code and electrical safety in the work place
- NFPA 72 National Fire Alarm Code

Smoke detectors and alarms will be installed within the WTGs, ESP, and the onshore site as per NFPA standards and local fire codes.

All structures on site will be designed and installed with a focus on passive fire prevention, will a view to minimizing the possibility of a fire starting, and increasing in intensity and also spreading.

Further details on fire suppression will be developed during the detailed design phase subsequent to HAZOP and defined within the SMS following the contracts award stage and prior to start of construction of the project.

12.6 FIRE FIGHTING

12.6.1 TRAINING PROJECT STAFF

Wind Farm personnel will receive annual training on the Fire Protection Program. Training shall include the function and proper use of fire extinguishers. New employees, upon initial assignment, shall be trained in those parts of the fire prevention plan that the employee must know to protect the employee in the event of an emergency. Personnel responsible for inspections and / or maintenance of fire suppression systems must be trained initially and annually on proper inspection and maintenance procedures.

Associated training includes:

- Hazard Communication Training: Site personnel are apprised of the fire hazards associated with the materials and processes with which they are involved.
- Emergency Response Training: Site personnel will be trained on the Emergency Response Procedures.
- Fire extinguisher training.

12.6.2 EXTERNAL RESOURCE

Details of external fire fighting resource will be defined within the SMS on development of the Emergency Response Plan and at the pre-construction stage of the project.

12.6.3 *MARINE VESSEL FIRE FIGHTING CAPABILITY*

Marine vessel fire fighting capability details will be defined within the SMS following the contracts award stage of the project.

13 OTHER SITE SAFETY PROVISIONS

13.1 FIRST AID

Appropriate first aid facilities and provisions shall be available within each WTG structure, and within onshore and offshore project infrastructures, as is reasonable, and in accordance with relevant US standards.

Contractors working on site shall provide their own first aid facilities and provisions in accordance with the relevant US standards, including their own first aid trained personnel.

Details of first aid facilities and provisions provided by contractors shall be included in the contractor's method statements and risk assessments, or within their H&S plans for the project.

Contractors must advise the BoP / O&M Contractor of any trained first aid personnel working within the site, with a view to these skills being utilized in the event of an emergency.

The first aid facilities and provisions on site shall be regularly inspected and maintained in a fit for purpose condition, with provisions replenished to stipulated requirements as necessary.

13.2 PERSONAL PROTECTION EQUIPMENT

Where possible, a working hazard will be eliminated through design, engineering, or through changes to work practices and procedures. The provision of Personal Protection Equipment (PPE) is always the least preferred course of action.

Modern PPE can be extremely effective, but usually requires a high level of supervision, information, instruction and training in use, and a degree of self-discipline. It only provides protection for those wearing it.

The minimum project requirements for the use of PPE when undertaking certain tasks are described in the matrix in Table 3. This matrix shall be used as a guide to identify appropriate PPE requirements throughout the site. It will be the requirement of Cape Wind that contractors comply with the more stringent BOEMRE, USCG or OSHA standard.

Table 3: Personal Protective Equipment		
Item	**Use**	**Standards**
Safety Boots	To be worn on construction sites, or where there is a mandatory sign displayed.	33CFR Sub. N 142.33 (ANSI Z41) 29CFR 1910.136 29CFR 1926.96 29CFR 1915.156 29CFR 1918.104
Hard Hats	To be worn on all construction sites, or where there is a	33CFR Sub. N 142.30 (ANSI Z89) 29CFR 1910.135

	mandatory sign displayed. Also to be worn where there is a risk of striking of falling objects.	29CFR 1926.100 29CFR 1918.103 29CFR 1915.155
Hi Vis	To be worn on OCS construction sites	33 CFR Sub N 146.20
Safety Harness	To be worn when persons are working at height and likely to fall, or where a risk assessment identifies the need.	ANSI/ASSE Z359 33CFR Sub. N 142.42 29CFR 1910 subparts D, F, I, R 29CFR 1926 subparts E & M
Life Jacket	To be worn when working over water or where there is a risk of falling into water. Where appropriate life jackets will be fitted with personal locator beacons.	33CFR Sub. N 142.45 & 144 29CFR 1926.106(a) 29CFR 1915.158
Survival Suit	To be worn on vessel transfers, and where persons work over water and there is no Fast Rescue Craft on standby.	33CFR Sub N 144.20 & 144.30
Hearing Protection	To be worn in noisy environments (when using road breakers, drills, generation equipment, pile hammering operations or where there is a mandatory sign displayed).	29CFR 1910.95 29CFR 1926.101 & 52
Safety Goggles / Glasses	To be worn where there is a hazard from airborne dust and flying particles, or where a mandatory sign is displayed. Goggles should also be worn where there is a risk of eye contact with chemicals.	33CFR Sub. N 142.27, (ANSI Z87) 29CFR 1910.133 29CFR 1926.102 & 103 29CFR 1915.153
		Same as above
Sun Screen	To be used on exposed skin.	OSH Act General Duty Clause 5(a)(1)
Bump Cap	To be worn on all occasions where accidental head strikes on fixed objects may occur. For example tight spaces on vessels, wind turbines and substations.	33CFR Sub. N142.30 (ANSI Z89) 29CFR 1910.135 29CFR 1926.100 29CFR 1918.103 29CFR 1915.155
Chemical Resistant Nitrile	To be used when or where there is a risk of acid or caustic	29CFR 1910.132-138 29CFR 1910.138

Gloves	soda splashing. These gloves should also be used where there is a risk of oil splash.	29CFR 1915.156
General Purpose / Riggers Gloves	These gloves are to be used where there is a risk of the hands being cut or receiving abrasions. They also offer limited flame and heat protection.	29CFR 1910.132-138 29CFR 1910.138 29CFR 1915.156
Dust Masks	A dust mask is to be worn in dusty atmospheres, where a mandatory sign is displayed, or where there is a risk of inhalation of oil mist, paints etc. There are many types of dust masks available, so it is important that the correct dust mask is selected.	33CFR Sub. N 142.39 29CFR 1910.134 29CFR 1926.103 29CFR 1915.154 29CFR 1918.102

Table 4: Electrical Safety PPE & Equipment		
Item	**Use**	**Testing and Standard**
Nonconductive Head protection	Protection against head injury from electric shock, burns or objects	29 CFR 1910.135 Subpart I 33CFR Sub. N142.30 (ANSI Z89) Most recent ANSI Z89.1 Class E or Class G standard
Protective Clothing	Arc flash protection, non-melting garments	NFPA 70E 33 CFR Subchapter N 142.36 29 CFR 1910 Subpart S Manufacturers recommendations
Rubber Insulating Gloves	Electrical Switching	OSHA CFR 29 1910.137(a)(b) ASTM D 120-87, ASTM F 496 Before each use and every 6

		months thereafter.
Sleeves	Electrical Switching	OSHA CFR 29 1910.137(a)(b) ASTM D 1051, ASTM F 496 Before each use and every 12 months thereafter.
Rubber Blankets & Matting	Insulating Switching maintenance	OSHA CFR 29 1910.137(a)(b) ASTM D 1048-93, (blanket) ASTM D 178-93, (matting) Before each use and every 6 months thereafter.
Hot Stick	Voltage testing	IEEE 978-1984 Before each use and every 24 months thereafter.

In addition to these requirements, contractors shall have in place their own H&S manuals that include procedures and arrangements that relate to the selection, use and replacement of PPE that comply with the requirements of the relevant US standards.

Contractors shall assess their work activities and select appropriate items of PPE in accordance with these standards. The contractors and their nominated subcontractors are responsible for ensuring that all employees and visitors to the site are provided with the correct PPE.

The PPE equipment shall be appropriately certified, and regularly inspected and maintained in good condition or routinely replaced, and shall be worn on all relevant occasions as indicated by notices, instructions and good practice. Failure to wear mandatory PPE could result in disciplinary action or individuals being removed from the site.

14 ENVIRONMENTAL PLANS

14.1 OIL SPILL RESPONSE PLAN

The Cape Wind project Oil Spill Response Plan (OSRP) has been prepared in accordance with the Department of the Interior Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) regulations at 30 CFR 254, "Oil Spill Response Requirements for Facilities Located Seaward of the Coastline." These regulations require owners/operators of oil handling, storage, or transportation facilities located seaward of the coastline to submit a spill response plan to BOEMRE for approval prior to facility operation.

In accordance with the requirements of 30 CFR 254, the OSRP demonstrates that Cape Wind can respond quickly and effectively in the unlikely event that oil is discharged from the facility. As recommended by the BOEMRE, this OSRP is consistent with BOEMRE Notice to Lessee No. 2002-G09, dated October 1, 2002, which includes the Guidelines for Preparing Regional and Subregional Oil Spill Response Plans.

The Cape Wind facility will be in the lowest potential worst-case discharge rating (Rating A: 0 to 1,000 barrels as defined in the regulations at 30 CFR 254 and associated Guidelines). In the event of a release of oil to the ocean, CWA employees, its contractors, and its responders will refer to the OSRP to ensure that the appropriate spill response actions are taken in a timely manner to prevent impacts to sensitive receptors.

The OSRP for the project is included as an appendix to the Cape Wind project COP. Details of the OSRP will be incorporated within the SMS following BOEMRE's approval of the COP.

14.2 MATERIALS MANAGEMENT AND DISPOSAL PLAN

The Materials Management and Disposal Plan has been prepared to provide a basic inventory of materials that may be used on Cape Wind project site during construction and operation. In addition, the Plan serves as the guidance document for standard operating procedures associated with the safe management and disposal of anticipated waste streams for the Project. The Materials Management and Disposal Plan describes procedures that CWA and its subcontractors will employ at the site of the Project to ensure that all non-hazardous and hazardous materials used on site are controlled, maintained and disposed of in an environmentally compliant manner.

The Materials Management and Disposal Plan for the project is included as an appendix to Cape Wind project COP. Details of the Plan will be incorporated within the SMS following BOEMRE's approval of the COP.

Appendix F

Storm Water Pollution Prevention Plan

Stormwater Pollution Prevention Plan

CAPE WIND ENERGY PROJECT
BARNSTABLE AND YARMOUTH, MASSACHUSETTS

PREPARED FOR

Cape Wind Associates, LLC
75 Arlington Street, Suite 704
Boston, MA 02116

PREPARED BY

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482

Project No. E159-000

February 4, 2011

www.essgroup.com

ESS Group Inc.

STORMWATER POLLUTION PREVENTION PLAN
Cape Wind Energy Project
Barnstable and Yarmouth, Massachusetts

Owner:

Cape Wind Associates, LLC
75 Arlington Street, Suite 704
Boston, MA 02116

Prepared By:

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, MA 02482

ESS Project No. E159-000

SWPPP Preparation Date:
February 4, 2011

TABLE OF CONTENTS

SECTION **PAGE**

TABLE OF CONTENTS (Continued)

FIGURES

ATTACHMENTS

EPA Notice of Intent Form

This Form Replaces Form 3510-9 (8-98)
Refer to the Following Pages for Instructions

Form Approved OMB Nos. 2040-0188 and 2040-0211

NPDES FORM

EPA

United States Environmental Protection Agency
Washington, DC 20460

Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity Under an NPDES General Permit

Submission of this Notice of Intent (NOI) constitutes notice that the party identified in Section II of this form requests authorization to discharge pursuant to the NPDES Construction General Permit (CGP) permit number identified in Section I of this form. Submission of this NOI also constitutes notice that the party identified in Section II of this form meets the eligibility requirements of the CGP for the project identified in Section III of this form. Permit coverage is required prior to commencement of construction activity until you are eligible to terminate coverage as detailed in the CGP. To obtain authorization, you must submit a complete and accurate NOI form. Refer to the instructions at the end of this form.

I. Permit Number

II. Operator Information

Name: Cape Wind Associates, LLC

IRS Employer Identification Number (EIN): –

Mailing Address:

Street: 78 Arlington Street, Suite 704

City: Boston State: MA Zip Code: 02116 -

Phone: 617 - 904 - 3100 Fax (optional): - -

E-mail:

III. Project/Site Information

Project/Site Name: Cape Wind

Project Street/Location: New Hampshire Ave, NSTAR ROW

City: Yarmouth and Barnstable State: MA Zip Code: -

County or similar government subdivision: Barnstable

Latitude/Longitude (Use one of three possible formats, and specify method)

Latitude
1. __ __° __ __′ __ __″ N (degrees, minutes, seconds)
2. __ __° __ __. __ __′ N (degrees, minutes, decimal)
3. 41 . 6862 ° N (degrees decimal)

Longitude
1. __ __ __° __ __′ __ __″ W (degrees, minutes, seconds)
2. __ __ __° __ __. __ __′ W (degrees, minutes, decimal)
3. 70 . 2839 ° W (degrees decimal)

Method: ☑ U.S.G.S. topographic map ☐ EPA web site ☐ GPS ☐ Other:

If you used a U.S.G.S. topographic map, what was the scale? __________

Project located in Indian Country? ☐ YES ☑ NO

If yes, name of reservation, or if not part of a reservation, put "Not Applicable:" __________

Estimated Project Start Date: __ / __ / 2011 (Month / Day / Year)

Estimated Project Completion Date: __ / __ / 2016 (Month / Day / Year)

Estimated Area to be Disturbed (to the nearest quarter acre): 5.00

IV. SWPPP Information

Has the SWPPP been prepared in advance of filing this NOI? ☑ YES ☐ NO

Location of SWPP for Viewing: ☐ Address in Section II ☐ Address in Section III ☐ Other

If other:

SWPPP Street: To Be Determined

City: State: Zip Code: -

SWPPP Contact Information (if different than that in Section II):

Name:

Phone: - - Fax (optional): - -

E-mail:

V. Discharge Information

Identify the name(s) of waterbodies to which you discharge. Lewis Bay

Is this discharge consistent with the assumptions and requirements of applicable EPA approved or established TMDL(s)? ☐ YES ☑ NO

VI. Endangered Species Protection

Under which criterion of the permit have you satisfied your ESA eligibility obligations?

☐ A ☐ B ☑ C ☐ D ☐ E ☐ F

If you select criterion F, provide permit tracking number of operator under which you are certifying eligibility:

VII. Certification Information

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name:

Title:

Signature: Date:

E-mail:

NOI Preparer (Complete if NOI was prepared by someone other than the certifier)

Prepared by:

Organization:

Phone: - - Ext. E-mail:

Project Narrative

1.0 INTRODUCTION

Section 402 of the Clean Water Act requires permits for stormwater discharges associated with construction activities under the National Pollutant Discharge Elimination System (NPDES) program or by an equivalent state permit program. Pursuant to the Environmental Protection Agency's (EPA) NPDES program, a Construction General Permit (CGP) is required for any construction activity that disturbs one or more acres of land. The CGP authorizes the discharge of stormwater pollution from construction activities, in accordance with the terms and conditions of the general permit, and has been included in Attachment 1. The general permit includes provisions for the development of a Stormwater Pollution Prevention Plan (SWPPP) to maximize the potential benefits of pollution prevention and sediment and erosion control measures at construction sites.

The Cape Wind Energy Project activity subject to the jurisdiction of the CGP is the installation of the upland transmission cable system. The NPDES CGP regulations are not applicable to underwater work (installation of submarine cable, WTG's, and ESP) because there can be no stormwater discharges underwater. All underwater work will be performed using Best Management Practices (BMPs) to reduce impacts to the affected marine environment.

A SWPPP is a comprehensive guide which is designed to prevent stormwater pollution impacts to wetlands and surface water resources from construction activities. The SWPPP will:

- Define the characteristics of the site and the type of construction which will be occurring;
- Describe the site plan for the facilities/structures to be constructed;
- Describe the practices that will be implemented to control erosion and the release of pollutants in stormwater;
- Provide certification and notification of the SWPPP by an authorized representative;
- Create an implementation schedule to ensure that the practices described in this SWPPP are, in fact, implemented, and provide a means to evaluate the plan's effectiveness in reducing erosion, sediment, and pollutant levels in stormwater discharged from the subject activities; and
- Describe the final stabilization/termination design to minimize erosion and prevent stormwater impacts after construction is complete.

1.1 SWPPP Content

This SWPPP has been prepared in accordance with the CGP and includes the following items:

- Identification of the SWPPP coordinator with a description of this person's duties;
- Identification of the stormwater pollution prevention team that will assist in implementation of the SWPPP during construction;
- Description of the existing site conditions, including existing land use and soil types at the site, as well as the location of surface waters which are located on or next to the site (wetlands, streams, rivers, lakes, ponds, etc.);

Barnstable for approximately 4,000 feet and then cross back into Yarmouth within coastal waters. The submarine cable system in Barnstable will enter Lewis Bay from Nantucket Sound between the existing Federal shipping channel and Egg Island. The transmission cable system will make landfall in the Town of Yarmouth at New Hampshire Avenue. From this landfall, an upland transmission cable system will be installed in an underground conduit within existing roadway layouts until it intersects with an existing NSTAR Electric Right-of-Way (ROW) located east of Willow Street in Yarmouth. The upland transmission cable system will then continue within the currently cleared and maintained portions of the NSTAR Electric ROW through Yarmouth and will cross into Barnstable to extend to its terminus at the Barnstable Switching Station. Refer to Figure 1 for a Site Locus.

3.2 Existing Land Use

The proposed Project will be located in residential areas of Yarmouth and Barnstable, Massachusetts and will cross one category of land use. The land use category is briefly defined below.

- **Commercial/Residential Land** – Includes land currently used in a residential or commercial capacity. For the proposed project, the underground cable is located within existing roadways in residential and commercial areas as well as existing cleared and maintained transmission line right of way.

3.3 Soil Types

Soil characterization for the site has been conducted using the MassGIS Soil Survey Datalayer for Barnstable County, Massachusetts. The Soils datalayer has been automated from 1:25,000 published soils surveys as provided on various media by the United States Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS). All soils data released by MassGIS have been "SSURGO-certified," which means they have been reviewed and approved by the NRCS and meet all standards and requirements for inclusion in the national release of county-level digital soils data. The soil types present in the roadway and cross country portions of the project area include the following:

- **Barnstable-Plymouth complex, rolling (BcC)** – These undulating and rolling, very deep, excessively drained and well drained soils are on side slopes and hills in glacial moraine areas. Slopes range from 3-15%. The soil substrate typically consists of loamy coarse sand in the upper portions and gravelly loamy coarse sand at lower depths. Permeability is moderately rapid to rapid. Depth to seasonal high water is greater than 6 feet.

- **Carver Coarse Sand (CdA, CdB)** – These very deep, excessively drained soils occur in broad areas of outwash plains. Surface slopes range from 0-3% for CdA mapping units and 3-8% for CdB units. Permeability is very rapid in the subsoil and substratum. Depth to seasonal high water table is more than 6 feet.

- **Plymouth-Barnstable complex, rolling, very bouldery, (PvC)** - These very deep, excessively drained and well drained soils are formed on side slopes of moraines. Stones and boulders cover 1-3% of the surface and slopes range from 3-15%. Permeability is moderately rapid to rapid in the subsoil of the Plymouth and Barnstable soil. Permeability in the substratum is generally very rapid. Depth to seasonally high water table is generally more than 6 feet.

- **Plymouth-Barnstable complex, hilly, very bouldery (PvD)** - These hilly and steep, very deep, excessively drained and well drained soils are on hills and ridges on moraines. Stones and boulders cover 1-3% of the surface and slopes range from 15-35%. The soil typically consists of light brownish gray, loose gravelly coarse sand in the lower part. Permeability ranges from moderately rapid to very rapid. Depth to seasonal high water is greater than 6 feet.

- **Plymouth-Barnstable-Nantucket complex, hilly, very bouldery (Pyd)** - These hilly and very steep, and very deep, excessively drained and well drained soils are on hills and ridges on moraines. Stones and boulders cover 1-3% of the surface and slopes range from 15-35%. The soil typically consists of loamy coarse sand in the surface and becomes gravelly coarse sand at lower depths. Depth to seasonal high water is more than 6 feet; however, a perched water table may occur at a depth of 2.0-2.5 feet in early spring.

These soils are characterized within Hydrologic Soil Group "A" or "B" in the Barnstable County Soil Survey. Soils within Hydrologic Group A and B generally have a moderate to high infiltration rate when thoroughly wet. The cable installation will not cross any areas with slow infiltration or areas that have high runoff potential. Refer to Figure 2 for a site soils map.

3.4 Surface Water Bodies and Wetlands

3.4.1 Yarmouth

The proposed upland transmission cable system route begins at the landfall at New Hampshire Avenue in Yarmouth and extends north for approximately four miles within the existing roadway layouts of Berry Avenue, Higgins Crowell Road, and Willow Street. The route then leaves the existing roadway layout west of Willow Street to follow within the currently cleared and maintained portions of the NSTAR Electric ROW until it leaves Yarmouth and enters Barnstable along the NSTAR Electric ROW in a westerly direction to the existing Barnstable Switching Station.

Two coastal and six freshwater wetland systems were identified within approximately 100 feet of the proposed upland transmission cable system route in Yarmouth. Figure 3, Sheets A – G depicts an overview of the wetlands present along the upland cable route. The following are descriptions of those wetland resource areas identified within 100 feet of the upland transmission cable system route.

- **Salt Marsh 1** is located approximately 200 feet west of the proposed landfall, between Lewis Bay and Shore Road in Yarmouth. This salt marsh is vegetated with poison ivy (*Toxicodendron radicans*), salt meadow cordgrass (*Spartina patens*), rushes (*Juncus* spp.), and seaside goldenrod (*Solidago sempervirens*). This salt marsh is positioned between the residences at 43 and 37 Shore Drive.

- **Salt Marsh 2** is located approximately 95 to 120 feet west of the proposed transmission line route on New Hampshire Avenue. It is bordered by residences to the east and west, Shore Road to the south, and Broadway to the north. Salt Marsh 2 is vegetated by high tide bush (*Iva frutescens*), bayberry (*Morella caroliniensis*), poison ivy, salt meadow cordgrass, rushes, and seaside goldenrod. A defined channel is visible in the center of the salt marsh.

- **Wetland 1 and 1A, Isolated Vegetated Wetland** is an Atlantic white cedar (Chamaecyparis thyoides) swamp located on the east and west sides of Higgins Crowell Road in Yarmouth. The wetland is within approximately 60 feet of the road, and is located at a well-defined break in slope. On the east side of the road, the wetland is relatively undisturbed and consists of a mixed cedar, tupelo (*Nyssa sylvatica*), and red maple (*Acer rubrum*) canopy, and a shrub layer with highbush blueberry (*Vaccinium corymbosum*), sweet pepperbush (*Clethra alnifolia*), green briar (*Smilax rotundifolia*), fetterbush (*Leucothoe racemosa*), and swamp azalea (*Rhododendron viscosum*). On the west side of the road, the majority of the mature Atlantic white cedars are dead or in decline. Vegetation includes several live Atlantic white cedar saplings, red maple, tupelo, inkberry (*Ilex glabra*), sweet pepperbush, green briar, highbush blueberry, water willow (*Decodon verticillatus*), and wool grass (*Scirpus cyperinus*). Since the cable will be installed within existing roadway, there will be no direct impact to Wetland 1.

- **Wetland 2, BVW, BANK, LUWW, Waters of the U.S.** consists of Jabinettes Pond on the east side of Higgins Crowell Road, and Thornton Brook, located on both the east and west side of the road. A vegetated wetland abutting Jabinettes Pond is located within 100 feet of the proposed upland transmission cable system route. Jabinettes Pond discharges into Thornton Brook, which appears to flow west and crosses beneath Higgins Crowell Road via a buried culvert. Thornton Brook is mapped as a perennial stream on the current USGS map. However, the stream channel was observed completely dry during the field reviews in October 2001 and December 2002. Since the cable will be installed within existing roadway, there will be no direct impact to Wetland 2.

- **Wetland 3, BVW, BANK, Waters of the U.S.** is a forested wetland located approximately 50 feet west of Higgins Crowell Road in Yarmouth. An intermittent stream channel flows west through the wetland and into Little Sandy Pond, located approximately 700 feet west of Higgins Crowell Road. The intermittent stream channel was observed dry in areas in the vicinity of the wetland delineation in December 2002. Since the cable will be installed within existing roadway, there will be no direct impact to Wetland 3.

- **Wetland 4, IVW, Waters of the U.S.** is a large forested swamp located approximately 30 feet east of Higgins Crowell Road in Yarmouth. The wetland has an open understory and canopy and is vegetated with red maple, sweet pepperbush, highbush blueberry and *Sphagnum* mosses. The wetland is defined by an obvious topographic break in slope. A headwall with a partially-buried culvert is located on the wetland's edge, adjacent to the roadway, but does not appear to be functioning. Since the cable will be installed within existing roadway, there will be no direct impact to Wetland 4.

- **Wetland 5, BVW, BANK, Waters of the U.S.** is located on the west side of Higgins Crowell Road in Yarmouth and is separated from the road by a strip of upland dominated by pitch pine and sheep laurel (*Kalmia angustifolia*). A manmade intermittent channel on the west side of the wetland flows west into Hawes Run. Both the wetland and intermittent channel were dry at the time of inspection in December 2002. However, observations of the area during non-drought periods indicate that it does not meet the definition of Pond under the WPA (310 CMR 10.04) or the Yarmouth Wetlands Protection Regulations (Section 1.04). Since the cable will be installed within existing roadway, there will be no direct impact to Wetland 5.

- **Wetland 6, BVW, BANK, LUW, Waters of the U.S.** (federal, state, and local jurisdiction) consists of Long Pond, which is situated on the northern edge of the ROW just west of Willow Street. The pond contains open water, surrounded by a fringe of emergent marsh and shrub swamp dominated by highbush blueberry, sweet pepperbush, swamp azalea, and leatherleaf (*Chamaedaphne calyculata*). The wetland is located at the base of a steep slope; however, many of the wetland plants, including swamp azalea and sweet pepperbush, are growing significantly upslope. Therefore, the boundary of the wetland was delineated using evidence of hydrology and hydric soils, under criteria established by the MADEP.

3.4.2 Barnstable

There are no state- or locally-regulated freshwater wetland resource areas, Riverfront Area, or Buffer Zones located within the limits of work associated with the Barnstable portion of the upland transmission cable system route.

3.5 Federally Endangered Species

The U.S. Fish and Wildlife Service (USFWS) completed its review of the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) (formerly Mineral Management Service), proposed issuance of a lease or easement to Cape Wind Associates, LLC to construct, operate, maintain and decommission the Cape Wind Project in November 2008. The USFWS transmitted a biological opinion (BO) on the effect on the threatened piping plover (*Charadris melodus*) and endangered roseate tern (*Sterna dougalli dougalli*) in accordance with Section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 et seq.). According to the USFWS BO, the upland cable installation will not have an adverse impact on these species.

The National Marine Fisheries Service (NMFS) issued a revised BO for the Project on December 30, 2010. The NMFS BO only concerned species of whales and turtles with habitats located offshore, thus the revised BO does not impact the conclusion that the upland cable installation will not have an adverse impact on federally endangered species.

3.6 Historic Properties

There will be no impacts to historic properties from the installation of the upland cable since the route is within roadway or maintained NSTAR Electric ROWs.

3.7 Construction Details

The following sections will present detailed descriptions of the proposed work activities. For purposes of this SWPPP the submarine cable system is not described since there are no stormwater discharges associated with underwater work. The landfall transition and the upland transmission cable system and their associated construction activities are described below.

3.7.1 Landfall Transition

The transition of the interconnecting 115 kV submarine transmission lines from water to land will be accomplished through the use of Horizontal Directional Drill (HDD) methodology in order to minimize disturbance within the intertidal zone and near shore area. The HDD will be staged at the upland landfall area and will drill boreholes from land toward the offshore exit point. Conduits will be installed through the boreholes and the transmission lines will be pulled through the conduits from the seaward end toward the land. Two parallel transition manhole/transmission line splicing vaults will be installed using conventional excavation equipment (backhoe) at the upland transition point where the submarine and land transmission lines will be connected.

Four 18-inch High Density Polyethylene (HDPE) conduit pipes (one for each three-conductor 115 kV cable and fiber optic cable set) will be installed from the onshore transition vaults to beyond the mean low water level. The offshore end will terminate in a pre-excavated pit where the jet plow cable burial machine will start. The four conduits will have approximately 10 feet of separation within the pre-excavation area. The four boreholes will be approximately 200 feet long (the borehole diameters will be slightly larger than the conduit diameter to allow the conduit to be inserted in the boreholes).

A drill rig will be set up onshore behind a bentonite pit where a 40-foot length of drill pipe will be set in place to begin the horizontal drilling. A bentonite and freshwater slurry will then fill the pit, in which the bentonite will form a hard shell lining of the tunnel wall during the drilling process. After each 40 feet of drill pipe installation, an additional length of drill pipe will be added. When the drill bit emerges in the pre-excavated pit, the bit will be replaced with a series of reamers to widen the borehole, followed by a pulling head on the end of the pipe. The drill pipe will then be used to pull back the conduit into the bored hole from the offshore end. As with the drill process, freshwater will be utilized to the maximum extent practicable as the reaming process nears the pre-excavated pit.

The HDD operation will include an upland based HDD drilling rig system, drilling fluid recirculation systems, residuals management systems, and associated support equipment. The HDD drilling material handling equipment will be located on New Hampshire Avenue. Drilling will take place from the upland site towards Lewis Bay. Excavated soils will be temporarily stored near the HDD drill rig during construction, and will then be reused onsite or removed and disposed of as required.

To further facilitate the HDD operation, a temporary cofferdam will be constructed at the end of the boreholes (see Landfall Details Sheet CD-6 in the Project Plans). The cofferdam will be approximately 65 feet wide and 45 feet long and will be open at the seaward end to allow for manipulation of the HDD conduits. The area enclosed by the cofferdam will be approximately 2,925 square feet. The cofferdam will be constructed using steel sheet piles driven from a barge-mounted crane. The top of the sheet piles will be cut off approximately five feet above mean high water. This will serve to contain any turbidity associated with the dredging and subsequent jet plow embedment operations and to provide a visual reference to its location for mariners. While the cofferdams will be located outside of areas normally subject to vessel traffic, the location of the cofferdam will be appropriately marked to warn vessels of the temporary cofferdam's presence.

The area inside the cofferdam will be excavated to expose the seaward end of the borehole. Sediment inside the cofferdam will be excavated to expose the area where the HDD borehole will end at an elevation of approximately -10 feet MLLW, with a 1-foot allowable overdredge. A 20 foot long level area will be created at the closed end of the cofferdam at this elevation. From that point, the bottom of the excavated area will be sloped at 3H:1V until it meets the existing seafloor bottom contour. Approximately 840 cubic yards of sediment will be excavated from the cofferdam. The cofferdam excavation will be backfilled, rather than allowed to in-fill over time. The dredged material will be temporarily placed on a barge for storage, and then the dredged area of the cofferdam will be backfilled with the dredged material. If necessary, the dredged backfill material will be supplemented with imported clean sandy backfill material to restore the seafloor to preconstruction grade. No removal of sediment outside of the cofferdam will be required.

The HDD operation will be designed to include a drilling fluid fracture or overburden breakout monitoring program to minimize the potential of drilling fluid breakout into the waters of Lewis Bay. It is expected that the HDD conduit systems will be drilled through sediment overburden at the landfall location. However, it is anticipated that drilling depths in the overburden will be sufficiently deep to avoid pressure-induced breakout of drilling fluids through the seafloor bottom, based primarily on estimates of overburden thickness and porosity. Nevertheless, a visual and operational monitoring program will be implemented during the HDD operation to detect fluid loss. This monitoring will include:

- Visual monitoring of surface waters in the adjacent Lewis Bay by drilling operation monitoring personnel on a daily basis to observe potential drilling fluid breakout points;
- Drilling fluid volume monitoring by technicians on a daily basis throughout the drilling and reaming operations for each HDD conduit system;
- Development and implementation of a fluid loss response plan and protocol by the drill operator in the event that a fluid loss occurs. The response plan will include drill stem adjustments, injection of loss circulation additives such as Benseal that can be mixed in with drilling fluids at the mud tanks, and other mitigation measures as appropriate; and
- Use of appropriate bentonite drilling fluids that will gel or coagulate upon contact with sea water.

In the unlikely event of an unexpected drilling fluid release, the bentonite fluid density and composition will cause it to remain as a cohesive mass on the seafloor in a localized slurry pile similar to the consistency of gelatin. This cohesive mass can be quickly cleaned up and removed by divers and appropriate diver-operated vacuum equipment.

It is anticipated that the installation of the borehole and conduit by HDD techniques will take approximately two to four weeks. Upon completion of the installation of the conduit pipes and submarine cable system, the HDD equipment will be removed and New Hampshire Avenue will be restored to its pre-construction grades and conditions. Standard stormwater erosion and sedimentation controls will be installed on the site prior to the initiation of construction activities, and will be inspected and maintained throughout construction operations. Once construction is completed, all equipment and construction materials will be removed from the site and the area will be returned to its original condition.

3.7.2 Upland Transmission Cable Route

Once the 115 kV submarine transmission lines make landfall at the proposed location on New Hampshire Avenue, the transmission lines will be interconnected with a 115 kV upland transmission line system within two parallel below-grade landfall transition vaults with interior dimensions of approximately 7'0" W x 34'0" L x 7'6" H, containing one circuit each. The proposed upland cables will be jointed to the submarine cables at the landfall in Yarmouth. The upland transmission line system will utilize 12 single-conductor 115 kV cables. The 12 cables are expected to be segregated into two circuits, each composed of two cables per phase. The cables will run in a concrete encased duct bank.

The upland transmission line will enter the NSTAR Electric ROW and make the physical connection to the Barnstable Switching Station by continuing with two new underground transmission lines in the existing NSTAR Electric ROW. The new lines will be approximately 1.9 miles in length and will be routed from the point where the new upland transmission line intersects the existing ROW in Yarmouth to the Barnstable Switching Station.

The upland transmission cable system will be installed within existing roadway layouts in Yarmouth from the landfall location to the NSTAR Electric ROW, just east of Willow Street. Construction of the upland transmission line will occur in two phases. The first phase will consist of installing the ductbanks, conduits, and vaults. The second phase will consist of the installation of the upland 115 kV transmission lines, including splices and terminations. Phase I is anticipated to take approximately five months to complete. Phase II is also anticipated to take approximately five months. Portions of these two phases may overlap. The installation of the upland components will occur outside of the summer tourist season.

The upland transmission line installation, from the transition vault at the landfall to the Barnstable Switching Station, will involve installation of the transmission line in the underground splice vaults and ductbanks within existing public ways and ROWs. Most excavation will be performed with typical construction equipment, including excavators and backhoes, with the exception of four railroad/state highway intersection crossings which may involve using trenchless techniques. All work will be performed in accordance with local, state, and federal safety standards.

Underground upland transition vaults will be constructed approximately every 500–1,700 feet (152.4–518 meters) (the approximate length of transmission line that can be effectively transported by truck and pulled within the manufacturer's tension specifications). These vaults will accommodate cable splicing and cross-bonding of cable metallic sheaths.

The transmission lines will be installed within a ductbank consisting of PVC conduits for the transmission lines spaced approximately 8 inches apart (on center) encased in concrete (minimum of 2,000 psi, or 13.790 kilopascals) which is backfilled with native material or suitable backfill to original grade. The trench opening will be a minimum of 10 feet wide within the roadways and a minimum of 8 feet wide within the ROW and will be supported by temporary trench boxes.

On any given day, approximately 150 feet of cable alignment will be disturbed. This phased approach will aid in limiting the potential for erosion and sedimentation during construction activities. Excavated soil from the trench and vaults will be temporarily stored adjacent to the worksite or transported off-site if on-site storage is not possible. Where soil is stored at the site, it will be stabilized with erosion and sedimentation controls. Following the completion of the installation of the transmission line, the excavation will be backfilled and repaved to Town of Yarmouth standards. Stormwater erosion and sedimentation controls will be in place prior to the initiation of construction activities. Once construction is completed, all equipment and construction debris will be removed from the site and the area will be returned to its original condition.

To minimize the potential for erosion during construction, mitigation measures, such as hay bales and silt fences will be placed, as appropriate, around disturbed areas and any stockpiled soils. Prior to commencing construction activities, erosion control devices will be installed between the work areas and downslope water bodies and wetlands to reduce the risk of soil erosion and siltation. Erosion control measures will also be installed downslope of any temporarily stockpiled soils in the vicinity of waterbodies and wetlands. These mitigation measures will incorporate applicable BMPs for erosion control and stormwater management during construction. It is possible that dewatering of the excavated trench or vault locations close to the transition point will be required because of high groundwater.

Along New Hampshire Avenue, any necessary dewatering will be done by using a frac tank. Water from the trench will be pumped into a frac tank, where any sediment will be filtered. The sediment free water will then be discharged by gravity onto the boat ramp next to Englewood Beach.

4.0 ASSESSMENT OF IMPACTS

4.1 Activities

The following site preparation and construction activities have the potential to affect stormwater runoff quality.

- Grading and topsoil segregation;

- Trenching;
- Direction drilling;
- Installation; and
- Backfilling and rough grading.

Site preparation activities will be designed utilizing best practical measures to prevent erosion and control sediment to avoid adverse effects on adjacent resource areas and surface water bodies.

4.2 Materials

The following materials have the potential to affect stormwater runoff quality:

- Bentonite from directional drilling;
- Oil;
- Construction equipment;
- Soil piles; and
- Other construction materials.

4.3 Potential Impacts

There will be no impacts to inland resource areas from the installation of the upland cable since the route is within roadway or maintained NSTAR Electric ROWs.

In roadway ROWs, erosion and sedimentation controls will be installed to prevent construction-related impacts to down gradient wetlands.

The proposed transmission line route within the maintained NSTAR Electric ROW will not result in any impacts to wetland resource areas. Erosion and sedimentation controls will be installed to prevent indirect impacts to down gradient wetland resource areas, as described in Section 5.0 below.

5.0 STORMWATER CONTROL AND CONSTRUCTION MITIGATION MEASURES

Measures will be taken to prevent impacts from stormwater runoff generated by the project during construction. These measures will include implementing BMPs, reducing potential sources of contamination, implementing stormwater management controls, developing an inspection and maintenance plan, and sequencing activities appropriately to reduce impacts.

During construction, the SWPPP coordinator will be responsible for ensuring compliance with the precautionary measures provided in the design documents, and that construction activities are conducted in such a manner as to prevent damage or impairment to the environment. It will be the SWPPP coordinator's responsibility not to undertake, at any time or in any particular area, more than that magnitude of work that can be safely and adequately controlled by the methods at the SWPPP coordinator's disposal. The SWPPP coordinator's approach will emphasize the control of erosion before it occurs.

To minimize the potential for erosion during construction, erosion and sedimentation control procedures will be implemented prior to and during construction activities. Erosion and sedimentation control measures implemented will include, at a minimum, a temporary cofferdam at the landfall transition, silt fence and hay bale barriers on the upgradient side of resource areas and catch basin inlet protection along the upland cable system route.

In general, no storage or refueling of machines and equipment will occur within wetland resource areas. Areas of exposed soil will be kept to a minimum, and a permanent vegetative cover or other form of stabilization will be established along the upland transmission cable route as soon as possible. If dewatering is required, sedimentation basins or other appropriate measures will be implemented.

5.1 Erosion Control Barriers

Prior to commencing construction activities, erosion control barriers will be installed between the work areas and adjacent waterbodies and wetlands to reduce the risk of soil erosion and siltation. Erosion control measures will also be installed down-slope of any temporarily stockpiled soils in the vicinity of waterbodies and wetlands. The erosion control barriers will consist of toed-in silt fence and staked hay bales. Hay bale/silt fence barriers will be maintained in functioning condition and repaired or replaced as necessary, and will remain in place until all upgradient areas have been stabilized.

5.2 Catch Basin Inlet Protection

Existing catch basins downgradient and within the limits of the proposed work will be protected from sediment inflow through the installation of SiltSacks, or by surrounding them with a barrier of hay bales and installing filter fabric beneath the grates. These sedimentation controls will be regularly maintained until the drainage area tributary to the catch basin has been stabilized.

5.3 De-Watering Measures

Construction in New Hampshire Avenue near Englewood Beach is likely to require dewatering from the construction trench. A frac tank and pumping system will be used to maintain a channel for safe working conditions. Excess water from the trench will be pumped into the frac tank where the water will be filtered so that sediment free water leaves the tank. The tank and its discharge hose will be placed on the concrete boat ramp and allowed to enter the ocean. The discharge hose will be discharged into a line of haybales. See the frac tank detail on the Dewatering Plan Sheet CD-8 in the Project Plans.

5.4 Source Control and Stockpile Locations

Proper site management during construction will decrease the risk of sediment loading during construction. If it becomes necessary to stockpile materials, stockpiles will be protected and covered when necessary with erosion and sediment controls installed around the perimeter. Stockpiles will be placed in a properly graded area so as not to be affected by, or contribute to, potential runoff areas.

Waste materials will be placed in large roll-off containers (or dumpsters) and removed by a contract hauler to a properly licensed landfill. The roll-off containers will be covered with a properly secured tarp before the hauler exits the site.

5.5 Construction Vehicle Refueling Operations

Mobile equipment such as dump trucks will be fueled at off-site locations.

5.6 Dust Control

A combination of the following dust control measures will be implemented to reduce surface and air movement of dust from exposed soil surfaces.

- Construction activities will be scheduled in such a manner so that the least area of disturbed surface is exposed at any one time.
- The site will be sprinkled with water until the surface is wet, as required.

5.7 Spill Prevention, Control, and Countermeasure Plan

40 CFR 112.3 requires the owner or operator of a subject facility to prepare in writing and implement a Spill Prevention Control and Countermeasure (SPCC) Plan in accordance with 40 CFR 112.7. A Tier 1 qualified facility is a facility that has had no single discharge exceeding 1,000 gallons, or no two discharges each exceeding 42 gallons, since becoming subject, and has no individual aboveground oil storage container with a capacity greater than 5,000 gallons. Tier 1 qualified facilities can self-certify their SPCC Plan, pursuant to 40 CFR 112.6.

The Cape Wind project qualifies as a Tier 1 qualified facility. The following SPCC Plan for the construction activities described in this SWPPP has been prepared in accordance with 40 CFR 112.7. The self-certification for the SPCC Plan has been provided in Section 8.0 of this document.

The material or substances listed below are expected to be present in varying quantities during construction.

- Asphalt
- Concrete products
- Steel and steel fabrication materials
- Acids
- Petroleum products and lubricants
- Adhesives
- Detergents
- Packaging materials
- Miscellaneous chemical additives
- Rubber and plastic products
- Cement

- Gravel and sand
- Wood products
- Sanitary wastes
- Glass products
- Paints
- Solvents
- Paper products

5.7.1 Spill Prevention Measures

The following material management practices will be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff during the construction activities described in Section 3.0 of this document:

1. Only enough products required to complete the job will be stored on-site.
2. All materials stored on site will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
3. Materials will be kept in their original containers with the original manufacturer's label.
4. Substances will not be mixed with one another, unless recommended by the manufacturer.
5. Manufacturer's recommendations for proper use and disposal will be followed.
6. The SWPPP coordinator will perform inspections to ensure the proper storage, use and disposal of materials.
7. Whenever possible, all of the hazardous material will be used before disposing of the container.
8. On-site vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the chance of leakage.
9. Petroleum products will be stored in tightly sealed containers that are clearly labeled.
10. Asphalt substances used on-site will be applied according to manufacturer's recommendations.
11. All containers will be tightly sealed and stored when not in use. Excess paint will be properly disposed of according to the manufacturer's instructions or state and local regulations.

The SWPPP coordinator will be responsible for preventing spills in accordance with the project specifications and applicable federal, state and local regulations and will identify an appropriately trained site employee involved with the day-to-day site operations to be the spill prevention and cleanup coordinator. The name(s) of the responsible spill personnel will be posted in the material storage area(s) and the on-site office. Each employee will be instructed that all spills are to be reported to the spill prevention and cleanup coordinator.

5.7.2 Inspections

Cape Wind will conduct inspections to assure that all equipment is in good working order to provide early detection of equipment leaks or degradation, ensure consistent compliance with the SPCC regulations, and ensure the effectiveness of the SPCC Plan. These inspections are described below. Sample inspection forms and guidelines are provided in Attachment 8.

The SWPPP coordinator will be responsible for ensuring that all inspections are conducted. The inspections will be conducted by site personnel on a regular basis The inspections will include:

- Inspecting exterior surfaces of tanks, pipes, valves, 55-gallon drums, and other equipment for leaks.
- Identifying cracks, areas of wear, corrosion, poor maintenance and operating practices, and, malfunctioning equipment.
- Inspecting all overfill protection systems and tank gauges on any aboveground storage tanks.

Any potential issues will be noted in the inspection report and corrective action will be taken. All corrective actions will be recorded in the inspection report.

5.7.3 Repairs

Construction personnel will be instructed to report any leaks or deficiencies to any containers or equipment to the SWPPP coordinator as soon as possible. The SWPPP coordinator will be responsible for immediately addressing any leak or deficiency and repairs will be made as soon as possible and/or the container will be replaced, as appropriate.

5.7.4 Record Keeping

The following recordkeeping procedures will be maintained to meet the requirement of the SPCC regulations:

1. A copy of this Plan will be maintained at the site at all times.
2. Reports for each inspection will be maintained and, upon request, made available for review. The reports will include the following information:
    - Identification of equipment inspected
    - Date of inspection
    - Results of inspection including a report on the need for repair
    - Name of the inspector

5.7.5 Personnel Training

Employee training will be conducted by Cape Wind to assure adequate understanding of the SPCC Plan. Personnel will be trained as appropriate for their job duties, on proper operation and maintenance of equipment, discharge procedure protocols, applicable laws, rules, and regulations, general facility operations, and SPCC Plan contents. The purpose of the training will be to ensure that discharges are prevented.

The SWPPP coordinator will be responsible for ensuring that affected facility personnel have received appropriate training. All training will be documented on the form provided in Attachment 9, or an equivalent form.

5.7.6 Security

Cape Wind will maintain security measures to minimize the possibility of vandalism or oil release. Contract personnel will be informed of site emergency procedures including whom to contact in the event of an environmental emergency. The site will be secured during non-operating hours.

5.7.7 Emergency Response

Spill Response Equipment

Spill control/containment equipment will be stored locally in the area of construction. Materials and equipment necessary for spill cleanup will be kept in the on-site material storage area. Equipment and materials will include, but not be limited to, absorbent booms or mats, brooms, dust pans, mops, rags, gloves, goggles, sand, and plastic and metal trash containers, specifically for this purpose. It is the responsibility of the SWPPP coordinator to ensure the inventory will be readily accessible and maintained.

Spills will be contained with granular sorbent materials, sand, sorbent pads, booms, or all of the above to prevent spreading. Spill clean up will be completed by trained, certified clean-up contractors. Manufacturers' recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies.

Management of Spill Debris

Any materials or wastes generated from response actions will be managed in accordance with applicable regulations. Such requirements will include:

- Using proper containers.
- Providing secondary containment.
- Marking and labeling storage containers and areas.
- Complying with requirements for offsite shipment, including manifesting, U.S. Department of Transportation requirements, and land disposal restrictions.

- Proper on-site management.
- Using transporters and treatment/disposal facilities with appropriate licenses.

Notifications

Following a spill of oil or hazardous material the SWPPP coordinator will fill out a spill report form. The spill report form is included in Attachment 2. Emergency contact information is provided in Attachment 3. Upon completion of clean-up, spill reports and appropriate completion forms shall be provided to the proper authorities.

5.7.8 Plan Amendments, Certifications, and Approvals

Plan Review by the Facility

The SPCC Plan reviews will be undertaken as follows:

- If the Plan is shown to be deficient in controlling spills.
- To revise spill control measures whenever the Plan is found to be deficient.
- When there is a change in site design, construction, operation, or maintenance that materially affects the facility's potential to discharge oil or pollutants into or upon waters of the state.

The Plan will be updated as needed to include more effective prevention and control technologies, if the technology has been field proven at the time of the review and will significantly reduce the likelihood of a discharge. Each review will be documented in the log provided in Attachment 7, or an equivalent form, regardless of whether amendments to the Plan are necessary.

Management Approval

This SPCC Plan and its implementation have full approval of the management of Cape Wind. This approval is documented in Section 8.0 of this document.

5.8 Inspection and Maintenance Program

The SWPPP coordinator will be responsible for inspecting the sediment and erosion controls on a regular basis to note any escape of sediments. These inspections will include disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, structural control measures, and locations where vehicles enter or exit the site. Where discharge points are accessible, they will be inspected to ascertain whether erosion control measures are effective in preventing impacts to receiving waters.

Inspections will be completed by qualified personnel at least once every seven calendar days and within 24 hours of any storm event of 0.5 inches or greater. The EPA also recommends that permittees perform a "walk through" inspection of the construction site before anticipated storm events that could possibly yield a significant amount of runoff. Where sites have been finally or temporarily stabilized, or runoff is unlikely due to winter conditions, such inspections will be conducted at least once every month.

A report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, and major observations relating to the implementation of the SWPPP will be made and retained as part of the SWPPP for at least three years from the date that the site is finally stabilized. Major observations will include: the location(s) of discharges of sediment or other pollutants from the site; location(s) of BMPs that need to be maintained; location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location; and location(s) where additional BMPs are needed that did not exist at the time of inspection. The maintenance inspection report will be made after each inspection. A copy of the report form to be completed by the SWPPP coordinator is provided in Attachment 4 of this SWPPP. Completed forms will be maintained on-site during the entire construction project.

The inspection report will be signed in accordance with the certification language in the General Permit, namely:

> *I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*

6.0 RECORD KEEPING AND UPDATING OF SWPPP

The following records will be maintained and attached to the SWPPP by the SWPPP coordinator:

- Dates when major grading activities occur;
- Dates when construction activities temporarily or permanently cease on a portion of the site; and
- Dates when stabilization measures are initiated.

Inspection reports will be retained as part of the SWPPP for at least three years from the date that the site is finally stabilized. Such reports will identify any incidents of non-compliance. Where a report does not identify any incidents of non-compliance, the report will contain a certification that the facility complies with the SWPPP and the General Permit.

The SWPPP coordinator will have a copy of the SWPPP available at a central location on-site for the use of all equipment operators and those identified as having responsibilities under the SWPPP whenever they are on the construction site. This SWPPP will be updated as necessary to remain consistent with any changes applicable to protecting surface water resources in sediment erosion site plans or site permits.

- Identification of the body of water(s) which will receive runoff from the construction site, including the ultimate body of water that receives the stormwater;
- Identification of potential stormwater contaminants;
- Description of stormwater management controls and various BMPs necessary to reduce erosion, sediment, and pollutants in stormwater discharge;
- A Spill Prevention, Control, and Countermeasure Plan to minimize the potential for releases of materials and to mitigate their potential impacts during construction activities;
- Description of the facility monitoring plan and how controls will be coordinated with construction activities; and
- Description of the implementation schedule and provisions for amendment of the plan.

2.0 SWPPP COORDINATOR AND DUTIES

The construction site SWPPP coordinator for the facility will be Matthew Palmer (phone number: 508-685-2406) for Cape Wind Associates, LLC, which intends to construct the proposed project. The duties of the construction site SWPPP coordinator for the project will include the following:

- Implement the SWPPP plan with the aid of the SWPPP team;
- Oversee maintenance practices identified as BMPs in the SWPPP;
- Implement and oversee employee training;
- Conduct or provide for inspection and monitoring activities;
- Identify other potential pollutant sources and make sure they are added to the plan;
- Identify any deficiencies in the SWPPP and make sure they are corrected; and
- Ensure that any changes in construction plans are addressed in the SWPPP.

3.0 PROJECT DESCRIPTION

The overall project purpose for the Cape Wind Energy Project is to install, operate and maintain a commercial-scale renewable energy facility that will serve Massachusetts and New England regional energy needs via interconnection with the New England electric transmission and distribution grid. The Cape Wind Energy Project will serve to meet the demonstrated need for new regionally-significant renewable energy production by installing and operating a wind-powered electric generating facility comprised of 130 offshore wind turbine generators (WTGs), a centrally located Electrical Service Platform (ESP) and an associated transmission cable system.

3.1 Site Location

Two 115 kilovolt (kV) alternating current (AC) submarine cable circuits (the transmission cable system) will enter Barnstable within coastal waters from the Town of Yarmouth and travel through

7.0 TERMINATION OF SWPPP

Cape Wind will submit a completed Notice of Termination (NOT) when stormwater discharges associated with construction activity have been eliminated (i.e., regulated discharges of stormwater are being terminated or final stabilization has been completed) or it is no longer an owner and/or operator at the site.

8.0 CERTIFICATION OF SWPPP & SPCC

8.1 Certification by a Responsible Corporate Officer

I certify under penalty of law that this Stormwater Pollution Prevention Plan, Spill Prevention, Control, and Countermeasure Plan, and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Furthermore:

- I am familiar with the applicable regulatory requirements;
- These Plans were prepared in accordance with accepted and sound industry practices and standards;
- Procedures for required inspections and testing have been established in accordance with industry standards or recommended practices;
- I will fully implement the Plans;
- These Plans do not deviate from any applicable regulatory requirement;
- These Plans and individual(s) responsible for implementing them have the full approval of management and I have committed the necessary resources to fully implement them;
- I understand my obligation to report any discharges to navigable waters or adjoining shorelines to the appropriate authorities;
- I understand my obligation to review and amend these Plans whenever there is a material change to the site that effects the potential for an oil discharge;

Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: ____________________

Name (Printed) CM OLMSTED

Title: VICE PRESIDENT

Company: CAPE WIND ASSOCIATES/ENERGY MANAGEMENT INC.

Date: 3 FEB 2011

8.2 Certification for Construction Activities

I, being the primary officer for all on-site construction activities associated with the Cape Wind Energy Project, have reviewed the Stormwater Pollution Prevention Plan and Spill Prevention, Control, and Countermeasure Plan and assume responsibility for the daily implementation of the Plans by all contractors working under the direction of Cape Wind Associates, LLC on the project site. I certify under penalty of law that I understand the terms and conditions of the general NPDES permit that authorizes the stormwater discharges from the construction site as part of this certification.

Signature: Matthew A. Palmer

Name (Printed) Matthew A. Palmer

Title: Project Manager - Engineering

Company: Cape Wind Associates

Date: February 3, 2011

Figures

J:/E159/DEIS_DEIR_DRI/Figures/Figure 3-22.ppt

Engineers
Scientists
Consultants

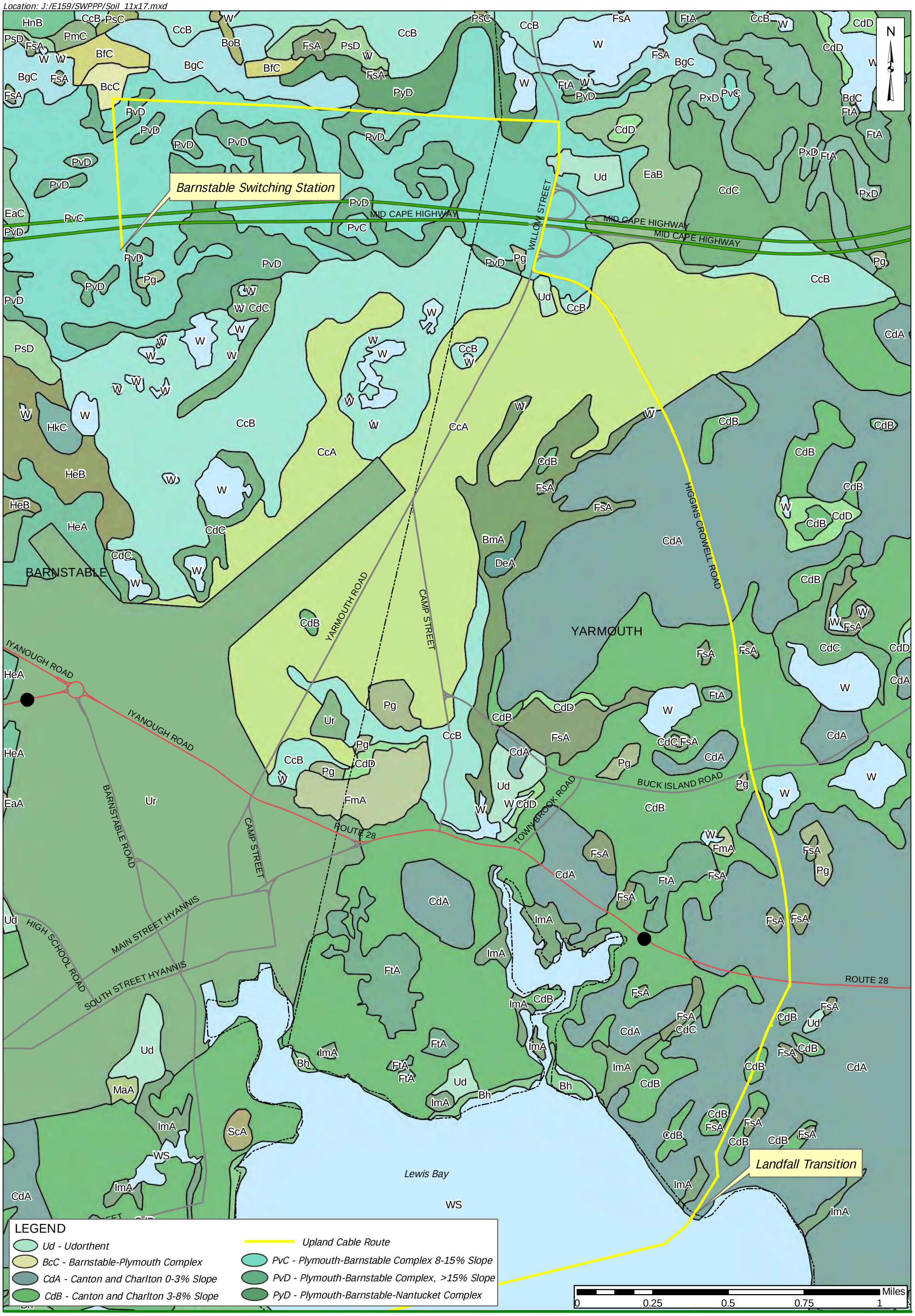
Cape Wind Project

New Hampshire Avenue Landfall and
Upland Transmission Cable System Route
Yarmouth, Massachusetts

Source: USGS Topographic Maps on CD-ROM – Northeastern USA
Scale: As Shown

Figure
1

Location: J:/E159/SWPPP/Soil_11x17.mxd



CAPE WIND PROJECT
Yarmouth and Barnstable, Massachusetts

Upland Cable Route
Soils Information

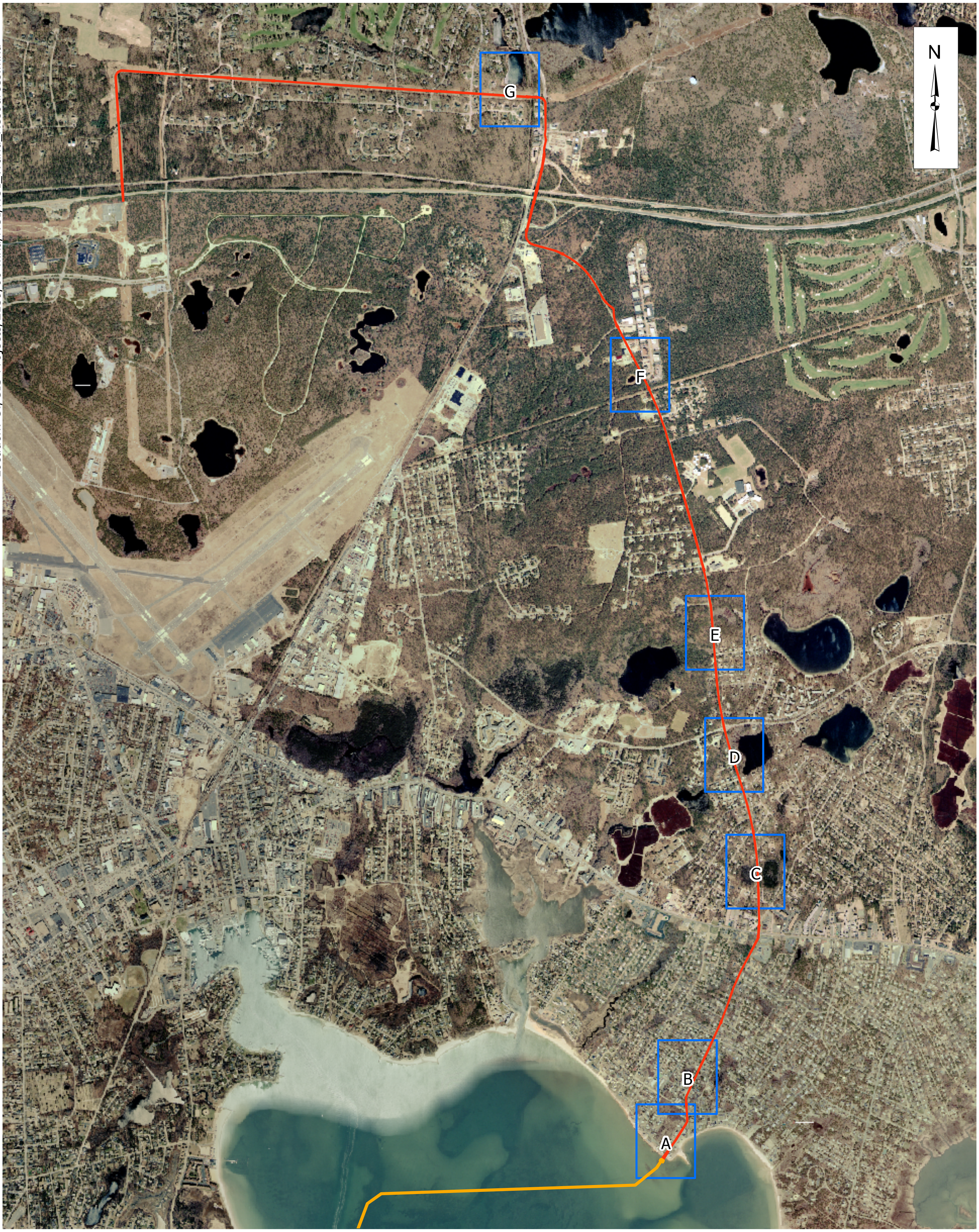
ESS Group, Inc.
Engineers
Scientists
Consultants

Scale: 1:19,000

Source: 1) MassGIS, USGS DRG, 1989 2) ESS, Upland Cable Route, 2006
3) MassGIS, SSURGO Soil Datalayer for Barnstable County, 2005

Figure
2

Location: G:/GIS-Projects/E159/00-mxd/NOI/NOI_Wtlnd_Resources.mxd



ESS Group, Inc.

Engineers
Scientists
Consultants

CAPE WIND ENERGY PROJECT
Barnstable & Yarmouth, Massachusetts

Scale: 1" = 2500'

Source: 1) MassGIS, Half-Meter Resolution
Color Orthophotography, 2001
2) MassGIS, FEMA FIRM Map, 1997
3) ESS, Cable Route, 2007

Wetland Resource Areas - Index Map

Submarine cable

Upland Cable

Figure 3

Location: G:/GIS-Projects/E159/00-mxd/NOI/NOI_Wtlnd_Resources.mxd

ESS Group, Inc.

Engineers
Scientists
Consultants

CAPE WIND ENERGY PROJECT
Barnstable & Yarmouth, Massachusetts

Wetland Resource Areas

Scale: 1" = 150'

Source: 1) MassGIS, Half-Meter Resolution Color Orthophotography, 2001
2) MassGIS, FEMA FIRM Map, 1997
3) ESS, Cable Route, 2007

Submarine cable
Upland Cable
Land Subject to Coastal Storm Flowage
Wetland
Coastal Bank
Coastal Beach

Figure
3A

Location: G:/GIS-Projects/E159/00-mxd/NOI/NOI_Wtlnd_Resources.mxd

ESS Group, Inc.

Engineers
Scientists
Consultants

CAPE WIND ENERGY PROJECT
Barnstable & Yarmouth, Massachusetts

Scale: 1" = 150'

Source: 1) MassGIS, Half-Meter Resolution Color Orthophotography, 2001
2) MassGIS, FEMA FIRM Map, 1997
3) ESS, Cable Route, 2007

Wetland Resource Areas

Upland Cable
Wetland
Land Subject to Coastal Storm Flowage

Figure 3B

Location: G:/GIS-Projects/E159/00-mxd/NOI/NOI_Wtlnd_Resources.mxd

ESS Group, Inc.

Engineers
Scientists
Consultants

CAPE WIND ENERGY PROJECT
Barnstable & Yarmouth, Massachusetts

Scale: 1" = 150'

Source: 1) MassGIS, Half-Meter Resolution Color Orthophotography, 2001
2) MassGIS, FEMA FIRM Map, 1997
3) ESS, Cable Route, 2007

Upland Cable
Wetland

Wetland Resource Areas

Figure 3C

Location: G:/GIS-Projects/E159/00-mxd/NOI/NOI_Wtlnd_Resources.mxd

ESS Group, Inc.

Engineers
Scientists
Consultants

CAPE WIND ENERGY PROJECT
Barnstable & Yarmouth, Massachusetts

Scale: 1" = 150'

Source: 1) MassGIS, Half-Meter Resolution Color Orthophotography, 2001
2) MassGIS, FEMA FIRM Map, 1997
3) ESS, Cable Route, 2007

Upland Cable
Wetland

Wetland Resource Areas

Figure 3D

Location: G:/GIS-Projects/E159/00-mxd/NOI/NOI_Wtlnd_Resources.mxd

ESS Group, Inc.

Engineers
Scientists
Consultants

CAPE WIND ENERGY PROJECT
Barnstable & Yarmouth, Massachusetts

Wetland Resource Areas

Scale: 1" = 150'

Source: 1) MassGIS, Half-Meter Resolution Color Orthophotography, 2001
2) MassGIS, FEMA FIRM Map, 1997
3) ESS, Cable Route, 2007

Upland Cable
Wetland

Figure 3E

ESS Group, Inc.

Engineers
Scientists
Consultants

CAPE WIND ENERGY PROJECT
Barnstable & Yarmouth, Massachusetts

Scale: 1" = 150'

Source: 1) MassGIS, Half-Meter Resolution Color Orthophotography, 2001
2) MassGIS, FEMA FIRM Map, 1997
3) ESS, Cable Route, 2007

Upland Cable
Wetland

Wetland Resource Areas

Figure 3F

ESS Group, Inc.
Engineers
Scientists
Consultants

CAPE WIND ENERGY PROJECT
Barnstable & Yarmouth, Massachusetts

Scale: 1" = 150'

Source: 1) MassGIS, Half-Meter Resolution Color Orthophotography, 2001
2) MassGIS, FEMA FIRM Map, 1997
3) ESS, Cable Route, 2007

Upland Cable
Wetland

Wetland Resource Areas

Figure 3G

Attachment 1

EPA Construction General Permit

NPDES General Permit for Stormwater Discharges From Construction Activities

As modified effective January 8, 2009

Table of Contents

National Pollutant Discharge Elimination System
General Permit for Discharges from
Large and Small Construction Activities

In compliance with the provisions of the Clean Water Act, 33 U.S.C. §1251 et. seq., (hereafter CWA or the Act), as amended by the Water Quality Act of 1987, P.L. 100-4, operators of large and small construction activities that are described in Part 1.3 of this National Pollutant Discharge Elimination System (NPDES) general permit, except for those activities excluded from authorization of discharge in Part 1.3.C of this permit are authorized to discharge pollutants to waters of the United States in accordance with the conditions and requirements set forth herein. Permit coverage is required from the "commencement of construction activities" until "final stabilization" as defined in Appendix A.

This permit shall become effective on June 30, 2008.

This permit and the authorization to discharge shall expire at midnight, June 30, 2010.

Signed:

Stephen S. Perkins, Director, Office of Ecosystem Protection
EPA Region 1

Barbara Finazzo, Director, Division of Environmental Planning and Protection
EPA Region 2

Carl-Axel P. Soderberg, Division Director, Caribbean Environmental Protection Division
EPA Region 2

Jon M. Capacasa, Director, Water Protection Division
EPA Region 3

Tinka Hyde, Director, Water Division
EPA Region 5

Miguel I. Flores, Director, Water Quality Protection Division
EPA Region 6

William A. Spratlin, Director, Water, Wetlands and Pesticides Division
EPA Region 7

Stephen S. Tuber, Assistant Regional Administrator, Office of Partnerships & Regulatory Assistance
EPA Region 8

Alexis Strauss, Director, Water Division
EPA Region 9

Michael Gearheard, Director, Office of Water and Watersheds
EPA Region 10

The signatures are for the permit conditions in Parts 1 through 10 and Appendices A through G, and for any additional conditions which apply to facilities located in the corresponding state, Indian country, or other area.

PART 1: COVERAGE UNDER THIS PERMIT

1.1 Introduction

This Construction General Permit (CGP) authorizes stormwater discharges from large and small construction activities that result in a total land disturbance of equal to or greater than one acre, where those discharges enter surface waters of the United States or a municipal separate storm sewer system (MS4) leading to surface waters of the United States subject to the conditions set forth in this permit. This permit also authorizes stormwater discharges from any other construction activity designated by EPA where EPA makes that designation based on the potential for contribution to an excursion of a water quality standard or for significant contribution of pollutants to waters of the United States. This permit replaces the permit issued in 2003 (68 FR 39087, July 1, 2003), including the modification made to that permit in 2004 (69 FR 76743, December 22, 2004).

This permit is presented in a reader-friendly, plain language format. This permit uses the terms “you” and “your” to identify the person(s) who owns or operates a “facility” or “activity” as defined in Appendix A and who must comply with the conditions of this permit. This format should allow you, the permittee and operator of a large or small construction activity, to easily locate and understand applicable requirements.

The goal of this permit is to minimize the discharge of stormwater pollutants from construction activity.

1.2 Permit Area

If your large or small construction activity is located within the areas listed in Appendix B, you may be eligible to obtain coverage under this permit. Permit coverage is actually provided by legally separate and distinctly numbered permits covering each of the areas listed in Appendix B.

1.3 Eligibility

Permit eligibility is limited to discharges from “large” and “small” construction activity, and to “new projects” and “unpermitted ongoing projects,” as defined in Appendix A or as otherwise designated by EPA. This general permit contains eligibility restrictions, as well as permit conditions and requirements. You may have to take certain actions to be eligible for coverage under this permit. In such cases, you must continue to satisfy those eligibility provisions to maintain permit authorization. If you do not meet the requirements that are a pre-condition to eligibility, then resulting discharges constitute unpermitted discharges. By contrast, if you eligible for coverage under this permit and do not comply with the requirements of the general permit, you may be in violation of the general permit for your otherwise eligible discharges.

A. Allowable Stormwater Discharges

Subject to compliance with the terms and conditions of this permit, you are authorized to discharge pollutants in:

1. Stormwater discharges associated with large and small construction activity from "new projects" and "unpermitted ongoing projects" as defined in Appendix A;
2. Stormwater discharges designated by EPA as needing a stormwater permit under 40 CFR §122.26(a)(1)(v) or §122.26(b)(15)(ii);
3. Discharges from support activities (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) provided:
   a. The support activity is directly related to the construction site required to have NPDES permit coverage for discharges of stormwater associated with construction activity;
   b. The support activity is not a commercial operation serving multiple unrelated construction projects by different operators, and does not operate beyond the completion of the construction activity at the last construction project it supports; and
   c. Pollutant discharges from support activity areas are minimized in compliance with Part 3.1.G; and
4. Discharges composed of allowable discharges listed in 1.3.A and 1.3.B commingled with a discharge authorized by a different NPDES permit and/or a discharge that does not require NPDES permit authorization.

B. Allowable Non-Stormwater Discharges

You are authorized for the following non-stormwater discharges, provided the non-stormwater component of the discharge is in compliance with Part 5.4 (Non-Stormwater Discharges):

1. Discharges from fire-fighting activities;
2. Fire hydrant flushings;
3. Waters used to wash vehicles where detergents are not used;
4. Water used to control dust in accordance with Part 3.1.B;
5. Potable water including uncontaminated water line flushings;
6. Routine external building wash down that does not use detergents;
7. Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used;
8. Uncontaminated air conditioning or compressor condensate;
9. Uncontaminated ground water or spring water;
10. Foundation or footing drains where flows are not contaminated with process materials such as solvents;
11. Uncontaminated excavation dewatering;
12. Landscape irrigation.

C. Limitations on Coverage

1. This permit does not authorize post-construction discharges that originate from the site after construction activities have been completed and the site has achieved final stabilization, including any temporary support activity. Post-construction

stormwater discharges from industrial sites may need to be covered by a separate NPDES permit.

2. This permit does not authorize discharges mixed with non-stormwater. This exclusion does not apply to discharges identified in Part 1.3.B, provided the discharges are in compliance with Part 5.4 (Non-Stormwater Discharges).
3. This permit does not authorize stormwater discharges associated with construction activity that have been covered under an individual permit or required to obtain coverage under an alternative general permit in accordance with Part 2.6.
4. This permit does not authorize discharges that EPA, prior to authorization under this permit, determines will cause, have the reasonable potential to cause, or contribute to an excursion above any applicable water quality standard. Where such a determination is made prior to authorization, EPA may notify you that an individual permit application is necessary in accordance with Part 2.6. However, EPA may authorize your coverage under this permit after you have included appropriate controls and implementation procedures in your permit designed to bring your discharge into compliance with water quality standards.
5. *Discharging into Receiving Waters With an Approved or Established Total Maximum Daily Load Analysis*
   a. You are not eligible for coverage under this permit for discharges of pollutants of concern to waters for which there is a total maximum daily load (TMDL) established or approved by EPA unless implement measures or controls that are consistent with the assumptions and requirements of such TMDL. To be eligible for coverage under this general permit, you must implement conditions applicable to your discharges necessary for consistency with the assumptions and requirements of such TMDL. If a specific wasteload allocation has been established that would apply to your discharge, you must implement necessary steps to meet that allocation.
   b. In a situation where an EPA-approved or established TMDL has specified a general wasteload allocation applicable to construction stormwater discharges, but no specific requirements for construction sites have been identified in the TMDL**,** you should consult with the State or Federal TMDL authority to confirm that meeting the effluent limits in Part 3 of this permit will be consistent with the approved TMDL. Where an EPA-approved or established TMDL has not specified a wasteload allocation applicable to construction stormwater discharges, but has not specifically excluded these discharges, compliance with the effluent limits in Part 3 of this permit will generally be assumed to be consistent with the approved TMDL. If the EPA-approved or established TMDL specifically precludes such discharges, the operator is not eligible for coverage under the CGP.
6. *Endangered and Threatened Species and Critical Habitat Protection*
   a. Coverage under this permit is available only if your stormwater discharges, allowable non-stormwater discharges, and stormwater discharge-related activities, as defined in Appendix A, are not likely to jeopardize the continued existence of any species that are federally-listed as endangered or threatened ("listed") under the Endangered Species Act (ESA) or result in the adverse

modification or destruction of habitat that is federally-designated as critical under the ESA ("critical habitat").

b. You are not eligible to discharge if the stormwater discharges, allowable non-stormwater discharges, or stormwater discharge-related activities would cause a prohibited "take" of federally-listed endangered or threatened species (as defined under section 3 of the ESA and 50 CFR 17.3), unless such takes are authorized under sections 7 or 10 of the ESA.
c. Determining Eligibility: You must use the process in Appendix C (ESA Review Procedures) to determine eligibility *PRIOR* to submittal of the Notice of Intent (NOI). You must meet one or more of the following six criteria (A-F) for the entire term of coverage under the permit:

Criterion A. No federally-listed threatened or endangered species or their designated critical habitat are in the project area as defined in Appendix C; or

Criterion B. Formal consultation with the Fish and Wildlife Service and/or the National Marine Fisheries Service under section 7 of the ESA has been concluded and that consultation:

i. Addressed the effects of the project's stormwater discharges, allowable non-stormwater discharges, and stormwater discharge-related activities on federally-listed threatened or endangered species and federally-designated critical habitat, and
ii. The consultation resulted in either:
    a. Biological opinion finding no jeopardy to federally-listed species or destruction/adverse modification of federally-designated critical habitat, or
    b. Written concurrence from the Service(s) with a finding that the stormwater discharges, allowable non-stormwater discharges, and stormwater discharge-related activities are not likely to adversely affect federally-listed species or federally-designated critical habitat; or

Criterion C. Informal consultation with the Fish and Wildlife Service and/or the National Marine Fisheries Service under section 7 of the ESA has been concluded and that consultation:

i. Addressed the effects of the project's stormwater discharges, allowable non-stormwater discharges, and stormwater discharge-related activities on federally-listed threatened or endangered species and federally-designated critical habitat, and
ii. The consultation resulted in either:
    a. Biological opinion finding no jeopardy to federally-listed species or destruction/adverse modification of federally-designated critical habitat, or
    b. Written concurrence from the Service(s) with a finding that the stormwater discharges, allowable non-stormwater discharges, and stormwater discharge-related activities are

not likely to adversely affect federally-listed species or federally-designated critical habitat; or

Criterion D. The construction activities are authorized through the issuance of a permit under section 10 of the ESA, and that authorization addresses the effects of the stormwater discharges, allowable non-stormwater discharges, and stormwater discharge-related activities on federally-listed species and federally-designated critical habitat; or

Criterion E. Stormwater discharges, allowable non-stormwater discharges, and stormwater discharge-related activities are not likely to adversely affect any federally-listed threatened or endangered species or result in the destruction or adverse modification of federally-designated critical habitat; or

Criterion F. The project's stormwater discharges, allowable non-stormwater discharges, and stormwater discharge-related activities were already addressed in another operator's valid certification of eligibility under Criteria A-E which included your construction activities and there is no reason to believe that federally-listed species or federally-designated critical habitat not considered in the prior certification may be present or located in the project area. By certifying eligibility under this criterion, you agree to comply with any measures or controls upon which the other operator's certification was based.

You must comply with any applicable terms, conditions, or other requirements developed in the process of meeting the eligibility requirements of the criteria in this section to remain eligible for coverage under this permit.

7. *Historic Properties*

   [Reserved]

   You are reminded that you must comply with applicable state, tribal and local laws concerning the protection of historic properties and places.

1.4 Waivers for Certain Small Construction Activities

Three scenarios exist under which small construction activities (see definition in Appendix A) may be waived from the NPDES permitting requirements detailed in this general permit. These exemptions are predicated on certain criteria being met and proper notification procedures being followed. Details of the waiver options and procedures for requesting a waiver are provided in Appendix D.

PART 2: AUTHORIZATION FOR DISCHARGES OF STORMWATER FROM CONSTRUCTION ACTIVITY

2.1 How to Obtain Authorization

To obtain coverage under this general permit, you, the operator, must prepare and submit a complete and accurate Notice of Intent (NOI), as described in this Part. Discharges are not authorized if your NOI is incomplete or inaccurate or if you were never eligible for permit coverage.

2.2 How to Submit Your NOI

You must either use EPA's electronic NOI system (accessible at www.epa.gov/npdes/eNOI or use a paper form (included in Appendix E) and then submit that paper form to:

For Regular U.S. Mail Delivery:
EPA Stormwater Notice Processing Center
Mail Code 4203M
U.S. EPA
1200 Pennsylvania Avenue, NW
Washington, DC 20460

For Overnight/Express Mail Delivery:
EPA Stormwater Notice Processing Center
Room 7420
U.S. EPA
1201 Constitution Avenue, NW
Washington, DC 20004

2.3 Authorization to Discharge Date

You are authorized to discharge stormwater from construction activities under the terms and conditions of this permit seven (7) calendar days after acknowledgment of receipt of your complete NOI is posted on EPA's NPDES website http://www.epa.gov/npdes/stormwater/cgp. The exception to this 7-day timeframe is if EPA delays your authorization based on eligibility considerations of Part 1.3 (e.g., ESA concerns). Under this circumstance, you are not authorized for coverage under this permit until you receive notice from EPA of your eligibility.

2.4 Submission Deadlines

A. *New Projects:* To obtain coverage under this permit, you must submit a complete and accurate NOI and be authorized consistent with Part 2.3 prior to your commencement of construction activities.

B. *Permitted Ongoing Projects:* Permitted ongoing projects are not eligible for coverage under this permit. If you previously received authorization to discharge for your project under the 2003 CGP, your authorization will be automatically continued under that permit until the expiration of this permit and the issuance of a new CGP, or the termination of coverage by you under the 2003 CGP, whichever is earlier. Note: If you are an operator of a permitted ongoing project and you transfer ownership of the project, or a portion thereof, to a different operator, that operator will be required to submit a complete and accurate NOI for a new project in accordance with Part 2.2.

C. *Unpermitted Ongoing Projects:* If you previously did not receive authorization to discharge for your project under the 2003 CGP and you wish to obtain coverage under this permit, you must submit an NOI within 90 days of the issuance date of this permit.

D. *Late Notifications:* Operators are not prohibited from submitting NOIs after initiating clearing, grading, excavation activities, or other construction activities. When a late NOI is submitted, authorization for discharges occurs consistent with Part 2.3. The Agency reserves the right to take enforcement action for any unpermitted discharges that occur between the commencement of construction and discharge authorization.

2.5 Continuation of the Expired General Permit

If this permit is not reissued or replaced prior to the expiration date, it will be administratively continued in accordance with the Administrative Procedure Act and remain in force and effect. If you were granted permit coverage prior to the expiration date, you will automatically remain covered by the continued permit until the earliest of:

A. Reissuance or replacement of this permit, at which time you must comply with the conditions of the new permit to maintain authorization to discharge; or

B. Your submittal of a Notice of Termination; or

C. Issuance of an individual permit for the project's discharges; or

D. A formal permit decision by EPA to not reissue this general permit, at which time you must seek coverage under an alternative general permit or an individual permit.

2.6 Requiring Coverage Under an Individual Permit or an Alternative General Permit

A. EPA may require you to apply for and/or obtain either an individual NPDES permit or coverage under an alternative NPDES general permit. Any interested person may petition EPA to take action under this paragraph. If EPA requires you to apply for an individual NPDES permit, EPA will notify you in writing that a permit application is required. This notification will include a brief statement of the reasons for this decision and an application form. In addition, if you are an existing permittee covered under this permit, the notice will set a deadline to file the application, and will include a statement that on the effective date of issuance or denial of the individual NPDES permit or the coverage or denial of coverage under the alternative general permit as it applies to you, coverage under this general permit will automatically terminate. Applications must be submitted to EPA at the applicable EPA Regional offices listed in Appendix B of this permit. EPA may grant additional time to submit the application upon your request. If you are covered under this permit and you fail to submit in a timely manner an individual NPDES permit application as required by EPA, then the applicability of this permit to you is automatically terminated at the end of the day specified by EPA as the deadline for application submittal.

B. You may request to be excluded from coverage under this general permit by applying for an individual permit. In such a case, you must submit an individual application in accordance with the requirements of 40 CFR §122.26(c)(1)(ii), with reasons supporting the request, to EPA at the applicable EPA Regional office listed in

Appendix B of this permit. The request may be granted by issuance of an individual permit or coverage under an alternative general permit if your reasons are adequate to support the request.

C. When an individual NPDES permit is issued to you (as an entity that is otherwise subject to this permit), or you are authorized to discharge under an alternative NPDES general permit, the applicability of this permit to you is automatically terminated on the effective date of the individual permit or the date of authorization of coverage under the alternative general permit, whichever the case may be. If you (as an entity that is otherwise subject to this permit) are denied an individual NPDES permit or an alternative NPDES general permit, the applicability of this permit to you is automatically terminated on the date of such denial, unless otherwise specified by EPA.

PART 3: EFFLUENT LIMITS

This section includes technology-based and water quality-based effluent limits that apply to all dischargers, unless otherwise specified. You must select, install, and maintain control measures (e.g., Best Management Practices ("BMPs"), controls, practices, etc.) for each major construction activity, identified in your Part 5 project description, to meet these effluent limits. All control measures must be properly selected, installed, and maintained in accordance with any relevant manufacturer specifications and good engineering practices. You must implement the control measures from commencement of construction activity until final stabilization is complete.

The term "minimize" as used in Part 3 means reduce and/or eliminate to the extent achievable using control measures that are technologically available and economically practicable and achievable in light of best industry practice.

3.1 Effluent Limits to Reduce Pollutants in Stormwater Discharges

You must implement control measures to minimize pollutants in stormwater discharges.

A. ***Sediment Controls:*** You must implement the following, where applicable:

1. Sediment Basins: For common drainage locations that serve an area with 10 or more acres disturbed at one time, a temporary (or permanent) sediment basin that provides storage for a calculated volume of runoff from the drainage area from a 2-year, 24-hour storm, or equivalent control measures, must be provided where attainable until final stabilization of the site. Where no such calculation has been performed, a temporary (or permanent) sediment basin providing 3,600 cubic feet of storage per acre drained, or equivalent control measures, must be provided where attainable until final stabilization of the site. When computing the number of acres draining into a common location, it is not necessary to include flows from offsite areas and flows from on-site areas that are either undisturbed or have undergone final stabilization where such flows are diverted around both the disturbed area and the sediment basin. In determining whether installing a sediment basin is attainable, the operator may consider factors such as site soils,

slope, available area on-site, etc. In any event, the operator must consider public safety, especially as it relates to children, as a design factor for the sediment basin, and alternative sediment controls must be used where site limitations would preclude a safe design.

2. For drainage locations which serve 10 or more disturbed acres at one time and where a temporary sediment basin or equivalent controls is not attainable, smaller sediment basins and/or sediment traps should be used. At a minimum, silt fences, vegetative buffer strips, or equivalent sediment controls are required for all down slope boundaries (and for those side slope boundaries deemed appropriate as dictated by individual site conditions).

3. For drainage locations serving less than 10 acres, smaller sediment basins and/or sediment traps should be used. At a minimum, silt fences, vegetative buffer strips, or equivalent sediment controls are required for all down slope boundaries (and for those side slope boundaries deemed appropriate as dictated by individual site conditions) of the construction area unless a sediment basin providing storage for a calculated volume of runoff from a 2-year, 24-hour storm or 3,600 cubic feet of storage per acre drained is provided.

B. ***Off-Site Sediment Tracking and Dust Control:*** You must minimize off-site vehicle tracking of sediments onto paved surfaces and the generation of dust. If sediment escapes the construction site, off-site accumulations of sediment must be removed at a frequency sufficient to minimize off-site impacts.

C. ***Runoff Management:*** You must divert flows from exposed soils, retain/detain flows or otherwise minimize runoff and the discharge of pollutants from exposed areas of the site. You must avoid placement of structural practices in floodplains to the degree technologically and economically practicable and achievable.

D. ***Erosive Velocity Control:*** You must place velocity dissipation devices at discharge locations and along the length of any outfall channel to provide a non-erosive flow velocity from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g., no significant changes in the hydrological regime of the receiving water).

E. ***Post-Construction Stormwater Management:*** You must comply with any applicable federal, local, state, or tribal requirements regarding the design and installation of post-construction stormwater controls. Structural measures should be placed on upland soils to the degree practicable and achievable.

F. ***Construction and Waste Materials:*** You must:
1. Prevent the discharge of solid materials, including building materials, to waters of the United States, except as authorized by a permit issued under section 404 of the CWA;

2. Minimize exposure of construction and waste materials to stormwater, and the occurrence of spills, through the use of storage practices, prevention and response practices, and other controls;
3. Prevent litter, construction debris, and construction chemicals (e.g., diesel fuel, hydraulic fluids, and other petroleum products) that could be exposed to stormwater from becoming a pollutant source in stormwater discharges.

G. ***Non-Construction Wastes:*** You must minimize pollutant discharges from areas other than construction (including stormwater discharges from dedicated asphalt plants and dedicated concrete plants).

H. ***Erosion Control and Stabilization:***

1. ***General Requirements:*** You must stabilize the site. You must ensure that existing vegetation is preserved where possible and that disturbed portions of the site are stabilized. You should avoid using impervious surfaces for stabilization.
2. ***Initiation Deadlines:*** You must initiate stabilization measures, except as provided below, as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased.
   i. Where stabilization by the 14th day is precluded by snow cover or frozen ground conditions, stabilization measures must be initiated as soon as practicable.
   ii. Where construction activity on a portion of the site is temporarily ceased, and earth disturbing activities will be resumed within 14 days, temporary stabilization measures do not have to be initiated on that portion of the site.
   iii. In arid, semiarid, and drought-stricken areas where initiating perennial vegetative stabilization measures is not possible within 14 days after construction activity has temporarily or permanently ceased, final vegetative stabilization measures must be initiated as soon as practicable.

I. ***Spills / Releases in Excess of Reportable Quantities:*** You are not authorized to discharge hazardous substances or oil resulting from an on-site spill. This permit does not relieve you of the federal reporting requirements of 40 CFR Part 110, 40 CFR Part 117 and 40 CFR Part 302 relating to spills or other releases of oils or hazardous substances.

Where a release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117 or 40 CFR Part 302, occurs during a 24-hour period:

- you must provide notice to the National Response Center (NRC) (800–424–8802; in the Washington, DC, metropolitan area call 202–267–2675) in accordance with the requirements of 40 CFR Part 110, 40 CFR Part 117 and 40 CFR Part 302 as soon as site staff have knowledge of the discharge; and

- you must, within 7 calendar days of knowledge of the release, provide a description of the release, the circumstances leading to the release, and the date of the release. You must also implement measures to prevent the reoccurrence of such releases and to respond to such releases.

3.2 Effluent Limits to Reduce Pollutants in Non-Stormwater Discharges

You must minimize any non-stormwater discharges authorized by this permit.

3.3 Effluent Limits Related to Endangered Species

You must protect federally-listed endangered or threatened species, or federally-designated critical habitat to maintain eligibility under Part 1.3.C.6.

3.4 Attainment of Water Quality Standards

A. You must select, install, implement and maintain control measures at your construction site that minimize pollutants in the discharge as necessary to meet applicable water quality standards. In general, except in situations explained in Part 3.4.B below, your stormwater controls developed, implemented, and updated consistent with the other provisions of Part 3 are considered as stringent as necessary to ensure that your discharges do not cause or contribute to an excursion above any applicable water quality standard.

B. At any time after authorization, EPA may determine that your stormwater discharges may cause, have reasonable potential to cause, or contribute to an excursion above any applicable water quality standard. If such a determination is made, EPA will require you to:

   i. Modify your stormwater controls in accordance with Part 3.6 to address adequately the identified water quality concerns;
   ii. Submit valid and verifiable data and information that are representative of ambient conditions and indicate that the receiving water is attaining water quality standards; or
   iii. Cease discharges of pollutants from construction activity and submit an individual permit application according to Part 2.6.

All written responses required under this part must include a signed certification consistent with Appendix G, Section 11.

3.5 Consistency with Total Maximum Daily Loads

If you are discharging into a water with an EPA established or approved TMDL, you must implement measures to ensure that your discharge of pollutants from the site is consistent with the assumptions and requirements of the EPA-established or approved TMDL, including any specific wasteload allocation that has been established that would apply to your discharge. See Part 1.3.C.5 for further information on determining permit eligibility related to TMDLs.

3.6 Maintenance of Control Measures

A. You must maintain all control measures and other protective measures in effective operating condition. If site inspections required by Part 4 identify BMPs that are not operating effectively, you must perform maintenance as soon as possible and before the next storm event whenever practicable to maintain the continued effectiveness of stormwater controls.

B. If existing BMPs need to be modified or if additional BMPs are necessary for any reason, you must complete implementation before the next storm event whenever practicable. If implementation before the next storm event is impracticable, you must implement alternative BMPs as soon as possible.

C. You must remove sediment from sediment traps or sedimentation ponds when design capacity has been reduced by 50 percent.

D. You must remove trapped sediment from a silt fence before the deposit reaches 50 percent of the above-ground fence height (or before it reaches a lower height based on manufacturer's specifications).

3.7 Training of Employees

You must train employees and subcontractors as necessary to make them aware of the applicable control measures implemented at the site so that they follow applicable procedures.

3.8 Applicable State, Tribal, or Local Programs

You must ensure that the stormwater controls implemented at your site are consistent with all applicable federal, state, tribal, or local requirements for soil and erosion control and stormwater management.

PART 4: INSPECTIONS

A. ***Inspection Frequency:*** You must conduct inspections in accordance with one of the two schedules listed below. You must specify in your SWPPP which schedule you will be following.
   1. At least once every 7 calendar days, OR
   2. At least once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater.

B. ***Case-by-Case Reductions in Inspection Frequency:*** You may reduce your inspection frequency to at least once every month if:
   1. The entire site is temporarily stabilized,
   2. Runoff is unlikely due to winter conditions (e.g., site is covered with snow, ice, or the ground is frozen), or
   3. Construction is occurring during seasonal arid periods in arid areas and semi-arid areas.

C. ***Inspection Waiver for Frozen Conditions:*** A waiver of the inspection requirements is available until one month before thawing conditions are expected to result in a discharge if all of the following requirements are met:
   1. The project is located in an area where frozen conditions are anticipated to continue for extended periods of time (i.e., more than one month);
   2. Land disturbance activities have been suspended; and
   3. The beginning and ending dates of the waiver period are documented in the SWPPP.

D. ***Qualified Personnel:*** Inspections must be conducted by qualified personnel (provided by the operator or cooperatively by multiple operators). "Qualified personnel" means a person knowledgeable in the principles and practice of erosion and sediment controls who possesses the skills to assess conditions at the construction site that could impact stormwater quality and to assess the effectiveness of any sediment and erosion control measures selected to control the quality of stormwater discharges from the construction activity.

E. ***Scope of Inspections:*** Inspections must include all areas of the site disturbed by construction activity and areas used for storage of materials that are exposed to precipitation. Inspectors must look for evidence of, or the potential for, pollutants entering the stormwater conveyance system. Sedimentation and erosion control measures must be observed to ensure proper operation. Discharge locations must be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to waters of the United States, where accessible. Where discharge locations are inaccessible, nearby downstream locations must be inspected to the extent that such inspections are practicable. Locations where vehicles enter or exit the site must be inspected for evidence of off-site sediment tracking.

F. ***Reductions in Scope of Inspections for Stabilized Areas:*** Once a definable area has been finally stabilized, no further inspection requirements apply to that portion of the site (e.g., earth-disturbing activities around one of three buildings in a complex are done and the area is finally stabilized, one mile of a roadway or pipeline project is done and finally stabilized, etc).

G. ***Utility Line Inspections:*** Utility line installation, pipeline construction, and other examples of long, narrow, linear construction activities may limit the access of inspection personnel to the areas described in Part 4.E above. Inspection of these areas could require that vehicles compromise temporarily or even permanently stabilized areas, cause additional disturbance of soils, and increase the potential for erosion. In these circumstances, controls must be inspected on the same frequencies as other construction projects, but representative inspections may be performed. For representative inspections, personnel must inspect controls along the construction site for 0.25 mile above and below each access point where a roadway, undisturbed right-of-way, or other similar feature intersects the construction site and allows access to the areas described above. The conditions of the controls along each inspected 0.25 mile segment may be considered as representative of the condition of controls along that reach extending from the end of the 0.25 mile segment to either the end of the next 0.25 mile inspected segment, or to the end of the project, whichever occurs first.

H. ***Inspection Report:*** For each inspection required above, you must complete an inspection report. At a minimum, the inspection report must include:
1. The inspection date;
2. Names, titles, and qualifications of personnel making the inspection;
3. Weather information for the period since the last inspection (or since commencement of construction activity if the first inspection) including a best estimate of the beginning of each storm event, duration of each storm event, approximate amount of rainfall for each storm event (in inches), and whether any discharges occurred;
4. Weather information and a description of any discharges occurring at the time of the inspection;
5. Location(s) of discharges of sediment or other pollutants from the site;
6. Location(s) of BMPs that need to be maintained;
7. Location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location;
8. Location(s) where additional BMPs are needed that did not exist at the time of inspection; and
9. Corrective action required including implementation dates.

The inspection report must be signed in accordance with Appendix G, Section 11 of this permit.

PART 5: STORMWATER POLLUTION PREVETNION PLANS (SWPPPs)

5.1 Stormwater Pollution Prevention Plan Framework

You must prepare a SWPPP before submitting your Notice of Intent (NOI) for permit coverage. At least one SWPPP must be developed for each construction project covered by this permit and the stormwater controls implemented at your site must be documented in the SWPPP. If you prepared a SWPPP for coverage under a previous NPDES permit, you must review and update the SWPPP prior to submitting your NOI.

The SWPPP does not contain effluent limitations; the technology and water quality-based effluent limitations are contained in Part 3 of this permit. The SWPPP is intended to document the selection, design, installation, and implementation of control measures that are being used to comply with the effluent limitations set forth in Part 3.

The SWPPP must:
1. Identify all potential sources of pollutants that may reasonably be expected to affect the quality of stormwater discharges from the construction site; and
2. Describe control measures to be used to meet the effluent limits set forth in Part 3.

5.2 SWPPP Contents: Site and Activity Description

A. ***Construction Site Operators:*** The SWPPP must identify all operators for the project site, and the areas of the site over which each operator has control.

B. ***Nature of Construction Activity:*** The SWPPP briefly must describe the nature of the construction activity, including:
   1. The function of the project (e.g., low density residential, shopping mall, highway, etc.);
   2. The intended sequence and timing of activities that disturb soils at the site;
   3. Estimates of the total area expected to be disturbed by excavation, grading, or other construction activities, including dedicated off-site borrow and fill areas; and
   4. A general location map (e.g., USGS quadrangle map, a portion of a city or county map, or other map) with enough detail to identify the location of the construction site and waters of the United States within one mile of the site.

C. ***Site Map:*** The SWPPP must contain a legible site map, showing the entire site, identifying:
   1. Direction(s) of stormwater flow and approximate slopes anticipated after grading activities;
   2. Areas of soil disturbance and areas that will not be disturbed (or a statement that all areas of the site will be disturbed unless otherwise noted);
   3. Locations of major structural and nonstructural BMPs identified in the SWPPP;
   4. Locations where stabilization practices are expected to occur;
   5. Locations of off-site material, waste, borrow or equipment storage areas;
   6. Locations of all waters of the United States (including wetlands);
   7. Locations where stormwater discharges to a surface water; and
   8. Areas where final stabilization has been accomplished and no further construction-phase permit requirements apply.

D. ***Construction and Waste Materials:*** The SWPPP must include a description of construction and waste materials expected to be stored on-site with updates as appropriate.

E. ***Locations of Other Industrial Stormwater Discharges:*** The SWPPP must describe and identify the location and description of any stormwater discharge associated with industrial activity other than construction at the site. This includes stormwater discharges from dedicated asphalt plants and dedicated concrete plants that are covered by this permit.

5.3 Description of Control Measures to Reduce Pollutant Discharges

A. ***Control Measures:*** The SWPPP must include a description of all control measures that will be implemented to meet the effluent limits in Part 3. For each major activity identified in the project description the SWPPP must clearly document appropriate control measures, the general sequence during the construction process in which the measures will be implemented, and which operator is responsible for the control measure's implementation.

B. ***Stabilization:*** The SWPPP must include a description of interim and permanent stabilization practices for the site, including a schedule of when the practices will be implemented.

C. ***Post-Authorization Records:*** The following records must be maintained with the SWPPP following authorization under this permit:
   1. Dates when grading activities occur;
   2. Dates when construction activities temporarily or permanently cease on a portion of the site; and
   3. Dates when stabilization measures are initiated.

5.4 Non-Stormwater Discharges
The SWPPP must identify all allowable sources of non-stormwater discharges listed in Part 1.3.B of this permit, except for flows from fire fighting activities that are combined with stormwater discharges associated with construction activity at the site. The SWPPP must also describe the pollution prevention measures used to eliminate or reduce non-stormwater discharges consistent with Part 3.2.

5.5 Documentation of Permit Eligibility Related to Endangered Species
The SWPPP must include documentation supporting a determination of permit eligibility with regard to Endangered Species, including:

A. Information on whether federally-listed endangered or threatened species, or federally-designated critical habitat may be in the project area;

B. Whether such species or critical habitat may be adversely affected by stormwater discharges or stormwater discharge-related activities from the project;

C. Results of the Appendix C listed species and critical habitat screening determinations;

D. Confirmation of delivery of NOI to EPA or to EPA's electronic NOI system. This may include an overnight, express or registered mail receipt acknowledgment; or electronic acknowledgment from EPA's electronic NOI system;

E. Any correspondence for any stage of project planning between the U.S. Fish and Wildlife Service (FWS), EPA, the U.S. National Marine Fisheries Service (NMFS), or others and you regarding listed species and critical habitat, including any notification that delays your authorization to discharge under this permit; and

F. A description of measures necessary to protect federally-listed endangered or threatened species, or federally-designated critical habitat.

5.6 Documentation of Permit Eligibility Related to Total Maximum Daily Loads

The SWPPP must include documentation supporting a determination of permit eligibility with regard to waters that have an EPA-established or approved TMDL, including:

A. Identification of whether your discharge is identified, either specifically or generally, in an EPA-established or approved TMDL and any associated allocations, requirements, and assumptions identified for your discharge;

B. Summaries of consultation with State or Federal TMDL authorities on consistency of SWPPP conditions with the approved TMDL, and

C. Measures taken by you to ensure that your discharge of pollutants from the site is consistent with the assumptions and requirements of the EPA-established or approved TMDL, including any specific wasteload allocation that has been established that would apply to your discharge.

See Part 1.3.C.5 for further information on determining permit eligibility related to TMDLs.

5.7 Copy of Permit Requirements

Copies of this permit and of the signed and certified NOI form that was submitted to EPA must be included in the SWPPP. Also, upon receipt, a copy of the letter from the EPA Stormwater Notice Processing Center notifying you of their receipt of your administratively complete NOI must also be included as a component of the SWPPP.

5.8 Applicable State, Tribal, or Local Programs

The SWPPP must be updated as necessary to reflect any revisions to applicable federal, state, tribal, or local requirements that affect the stormwater controls you implement at your site.

5.9 Inspections

A record of each inspection and of any actions taken in accordance with Part 4 must be retained with the SWPPP for at least three years from the date that permit coverage expires or is terminated. The inspection reports must identify any incidents of non-compliance with the permit conditions. Where a report does not identify any incidents of non-compliance, the report must contain a certification that the construction project or site is in compliance with this permit.

5.10 Maintaining an Updated Plan

The SWPPP must be modified:

A. To reflect modifications to stormwater control measures made in response to a change in design, construction, operation, or maintenance at the construction site that has or could have a significant effect on the discharge of pollutants to the waters of the United States that has not been previously addressed in the SWPPP.

B. If during inspections or investigations by site staff, or by local, state, tribal or federal officials, it is determined that the existing stormwater controls are ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the construction site.

C. Based on the results of an inspection, as necessary to properly document additional or modified BMPs designed to correct problems identified. Revisions to the SWPPP must be completed within seven (7) calendar days following the inspection.

5.11 Signature, Plan Review and Making Plans Available

A. ***Retention of SWPPP:*** A copy of the SWPPP (including a copy of the permit), NOI, and acknowledgement letter from EPA must be retained at the construction site (or other location easily accessible during normal business hours to EPA, a state, tribal or local agency approving sediment and erosion plans, grading plans, or stormwater management plans; local government officials; the operator of a municipal separate storm sewer receiving discharges from the site; and representatives of the U.S. Fish and Wildlife Service or the National Marine Fisheries Service) from the date of commencement of construction activities to the date of final stabilization. If you have day-to-day operational control over SWPPP implementation, you must have a copy of the SWPPP available at a central location on-site for the use of all those identified as having responsibilities under the SWPPP whenever they are on the construction site. If an on-site location is unavailable to store the SWPPP when no personnel are present, notice of the plan's location must be posted near the main entrance at the construction site.

B. ***Main Entrance Signage:*** A sign or other notice must be posted conspicuously near the main entrance of the construction site. If displaying near the main entrance is infeasible, the notice can be posted in a local public building such as the town hall or public library. The sign or other notice must contain the following information:
   1. A copy of the completed Notice of Intent as submitted to the EPA Stormwater Notice Processing Center; and
   2. If the location of the SWPPP or the name and telephone number of the contact person for scheduling SWPPP viewing times has changed (i.e., is different than that submitted to EPA in the NOI), the current location of the SWPPP and name and telephone number of a contact person for scheduling viewing times.

   For linear projects, the sign or other notice must be posted at a publicly accessible location near the active part of the construction project (e.g., where a pipeline project crosses a public road).

C. ***Availability of SWPPP:*** SWPPPs must be made available upon request by EPA; a state, tribal or local agency approving sediment and erosion plans, grading plans, or stormwater management plans; local government officials; the operator of a municipal separate storm sewer receiving discharges from the site; and representatives of the U.S. Fish and Wildlife Service or the National Marine Fisheries Service to the requestor. The copy of the SWPPP that is required to be kept on-site or locally available must be made available, in its entirety, to the EPA staff for review and copying at the time of an on-site inspection.

D. ***Signature and Certification:*** All SWPPPs must be signed and certified in accordance with Appendix G, Section 11.

5.12 Requirements for Different Types of Operators

You may meet one or both of the operational control components in the definition of operator found in Appendix A. Part 5.12.C applies to all permittees having control over only a portion of a construction site.

A. If you have operational control over construction plans and specifications, you must ensure that:
   1. The project specifications meet the minimum requirements of this Part and all other applicable permit conditions;
   2. The SWPPP indicates the areas of the project where the operator has operational control over project specifications, including the ability to make modifications in specifications;
   3. All other permittees implementing portions of the SWPPP (or their own SWPPP) who may be impacted by a change to the construction plan are notified of such changes in a timely manner; and
   4. The SWPPP indicates the name of the party(ies) with day-to-day operational control of those activities necessary to ensure compliance with the SWPPP or other permit conditions.

B. If you have operational control over day-to-day activities, you must ensure that:
   1. The SWPPP meets the minimum requirements of this Part and identifies the parties responsible for implementation of control measures identified in the plan;
   2. The SWPPP indicates areas of the project where you have operational control over day-to-day activities;
   3. The SWPPP indicates the name of the party(ies) with operational control over project specifications (including the ability to make modifications in specifications).

C. If you have operational control over only a portion of a larger project (e.g., one of four homebuilders in a subdivision), you are responsible for compliance with all applicable effluent limits, terms, and conditions of this permit as it relates to your activities on your portion of the construction site, including protection of endangered species, critical habitat, and historic properties, and implementation of control measures described in the SWPPP. You must ensure either directly or through coordination with other permittees, that your activities do not render another party's pollutant discharge controls ineffective. You must either implement your portion of a common SWPPP or develop and implement your own SWPPP.

   For more effective coordination of BMPs and opportunities for cost sharing, a cooperative effort by the different operators at a site to prepare and participate in a comprehensive SWPPP is encouraged. Individual operators at a site may, but are not required to, develop separate SWPPPs that cover only their portion of the project provided reference is made to other operators at the site. In instances where there is more than one SWPPP for a site, cooperation between the permittees is encouraged to ensure the stormwater discharge control measures are consistent with one another (e.g., provisions to protect listed species and critical habitat).

PART 6: TERMINATION OF COVERAGE

6.1 Submitting a Notice of Termination

Submit a complete and accurate Notice of Termination (NOT) either electronically (strongly encouraged) at www.epa.gov/npdes/eNOI or by completing the paper Notice of Termination form included in Appendix F of this permit and submitting that form to the address listed in Part 2.2.

6.2 When to Submit a Notice of Termination

You may only submit a Notice of Termination (NOT) after one or more of the following conditions have been met:

A. Final stabilization has been achieved on all portions of the site for which you are responsible;

B. Another operator has assumed control according to Appendix G, Section 11.C over all areas of the site that have not been finally stabilized;

C. Coverage under an individual or alternative general NPDES permit has been obtained; or

D. For residential construction only, temporary stabilization has been completed and the residence has been transferred to the homeowner.

The NOT must be submitted within 30 days of one of the above conditions being met. Authorization to discharge terminates at midnight of the day the NOT is signed.

PART 7: RETENTION OF RECORDS

Copies of the SWPPP and all documentation required by this permit, including records of all data used to complete the NOI to be covered by this permit, must be retained for at least three years from the date that permit coverage expires or is terminated. This period may be extended by request of EPA at any time.

PART 8: REOPENER CLAUSE

8.1 Procedures for Modification or Revocation

Permit modification or revocation will be conducted according to 40 CFR §122.62, §122.63, §122.64 and §124.5.

8.2 Water Quality Protection

If there is evidence indicating that the stormwater discharges authorized by this permit cause, have the reasonable potential to cause or contribute to an excursion above any applicable water quality standard, you may be required to obtain an individual permit in accordance with Part 2.6 of this permit, or the permit may be modified to include different limitations and/or requirements.

8.3 Timing of Permit Modification

EPA may elect to modify the permit prior to its expiration (rather than waiting for the new permit cycle) to comply with any new statutory or regulatory requirements, such as for effluent limitation guidelines that may be promulgated in the course of the current permit cycle.

PART 9: STANDARD PERMIT CONDITIONS

The federal regulations require that the Standard Conditions provisioned at 40 CFR §122.41 be applied to all NPDES permits. You are required to comply with those Standard Conditions, details of which are provided in Appendix G.

PART 10: PERMIT CONDITIONS APPLICABLE TO SPECIFIC STATES, INDIAN COUNTRY, OR TERRITORIES

The provisions of this Part provide modifications or additions to the applicable conditions of this permit to reflect specific additional conditions required as part of the state or tribal CWA Section 401 certification process, or the Coastal Zone Management Act (CZMA) certification process, or as otherwise established by the permitting authority. The specific additional revisions and requirements only apply to activities in those specific states, Indian country, and federal facilities. States, Indian country, and federal facilities not included in this Part do not have any modifications or additions to the applicable conditions of this permit.

A. Region 1

1. MAR100000: Commonwealth of Massachusetts, except Indian country
   a. State Water Quality Statutes, Regulations, and Policies:
      i. You must comply with the Massachusetts Clean Waters Act (Ch. 21, ss. 26-53).
      ii. You must comply with the conditions in 314 CMR 4.00 - Surface Water Quality Standards.
      iii. You must comply with the conditions in 314 CMR 3.00 - Surface Water Discharge Permit Program.
      iv. You must comply with the Wetlands Protection Act, Ch. 131, s. 40 and its regulations, 310 CMR 10.00 and any order of Conditions issued by a Conservation Commission or a Superseding Order of Conditions issued by the Massachusetts Department of Environmental Protection.

b. Department of Environmental Protection Storm Water Management Policy:

   i. You must comply with the Massachusetts Storm Water Management Policy, and applicable Storm Water Performance Standards, as prescribed by state regulations promulgated under the authority of the Massachusetts Clean Waters Act, MGL Ch. 21, ss. 26-53 and the Wetlands Protection Act Ch. 131, s. 40.

c. Other State Environmental Laws, Regulations, Policies:

   i. You must comply with the Massachusetts Endangered Species Act [MESA] (MGL Ch. 313A and regulations at 321 CMR 10.00) and any actions undertaken to comply with this storm water permit, shall not result in non-compliance with the MESA.

   ii. You must not conduct activities under this permit that will interfere with implementation of mosquito control work conducted in accordance with Chapter 252 including, s. 5A thereunder and MassDEP Guideline Number BRP G01-02, West Nile Virus Application of Pesticides to Wetland Resource Areas and Buffer Zones, and Public Water Systems.

d. Other Department Directives:

   i. The Department may require you to perform water quality monitoring during the permit term if monitoring is necessary for the protection of public health or the environment as designated under the authority at 314 CMR 3.00.

   ii. The Department may require you to provide measurable verification of the effectiveness of BMPs and other control measures in your management program, including water quality monitoring.

   iii. The Department has determined that compliance with this permit does not protect you from enforcement actions deemed necessary by the Department under its associated regulations to address an imminent threat to the public health or a significant adverse environmental impact which results in a violation of the Massachusetts Clean Waters Act, Ch. 21, ss. 26-53.

   iv. The Department reserves the right to modify the 401 Water Quality Certification if any changes, modifications or deletions are made to the general permit. In addition, the Department reserves the right to add and/or alter the terms and conditions of its 401 Water Quality Certification to carry out its responsibilities during the term of this permit with respect to water quality, including any revisions to 314 CMR 4.00, Surface Water Quality Standards.

e. Permit Compliance

   i. Should any violation of the Massachusetts Surface Water Quality Standards (314 CMR 4.00) or the conditions of this certification occur, the Department will direct you to correct the violations(s). The Department has the right to take any action as authorized by the General Laws of the Commonwealth to address the violation of this permit or the MA Clean Waters Act and the regulations promulgated thereunder. Substantial civil and criminal penalties are authorized under MGL Ch. 21, s. 42 for discharging into Massachusetts' waters in violation of an order or permit issued by this Department. This certification does not relieve you of the duty to comply with other applicable Massachusetts statutes and regulations.

2. NHR100000: State of New Hampshire
   a. If you disturb 100,000 square feet or more of contiguous area, you must also apply for a “Significant Alteration of the Terrain Permit from DES pursuant to RSA 485-A:17 and Env-Ws 415. This requirement applies to the disturbances of only 50,000 square feet when construction occurs within the protected shoreline (see RSA 483-B and Env-Ws 1400).
   b. You must determine that any excavation dewatering discharges are not contaminated before they will be authorized as an allowable non-storm water discharge under this permit (see Subpart 1.3.B). The water is considered uncontaminated if there is no groundwater contamination within 1,000 feet of the discharge. Information on groundwater contamination can be generated over the Internet via the NHDES web site http://www.des.state.nh.us (One Stop Data Retrieval, Onestop Master Site Table). The web site also provides E-mail access to an NHDES Site Remediation Contact to answer questions about using the Web site.
   c. You must treat any uncontaminated excavation dewatering discharges as necessary to remove suspended solids and turbidity. The discharges must be sampled at a location prior to mixing with storm water at least once per week during weeks when discharges occur. The samples must be analyzed for total suspended solids (TSS) and must meet monthly average and maximum daily TSS limitations of 50 milligrams per liter (mg/L) and 100 mg/L, respectively. TSS (a.k.a. Residue, Nonfilterable) analysis and sampling must be performed in accordance with Tables IB (parameter, units and method) and II (required containers, preservation techniques and holding times) in 40 CFR 136.3 (see: http://www.access.gpo.gov/nara/cfr/waisidx_02/40cfr136_02.html). Records of any sampling and analysis must be maintained and kept with the SWPPP for at least three years after final site stabilization.
   d. During site design and preparation of the storm water pollution prevention plan (SWPPP), you must consider opportunities for groundwater recharge using on-site infiltration. The SWPPP must include a description of any on-site infiltration that will be installed as a post construction storm water management measure (see Subpart 3.4.E) or reasons for not employing such measures. For design considerations for infiltration measures see the September 2001 DES publication titled “Managing Storm Water as a Valuable Resource” which is available online at: http://www.des.state.nh.us/StormWater/construction.htm. Loss of annual recharge to groundwater should be minimized through the use of infiltration measures wherever feasible.

B. Region 2 – No additional requirements.

C. Region 5

1. MNR100000: Indian Country within the State of Minnesota

a. *Fond du Lac Band of Lake Superior Chippewa*

i. A copy of the Storm Water Pollution Prevention Plan must be submitted to the following office at least thirty (30) days in advance of sending the Notice of Intent (NOI) to EPA:

Fond du Lac Reservation
Office of Water Protection
1720 Big Lake Road
Cloquet, MN 55720

CGP applicants are encouraged to work with the FDL Office of Water Protection in the identification of all proposed receiving waters.

ii. Copies of the NOI and the Notice of Termination (NOT) must be sent to the Fond du Lac Office of Water Protection at the same time they are submitted to EPA.

iii. This certification does not pertain to any new discharge to Outstanding Reservation Resource Waters (ORRW) as described in §105 b.3 of the Fond du Lac Water Quality Standards (Ordinance #12/98). Although additional waters may be designated in the future, currently Perch Lake, Rice Portage Lake, Miller Lake, Deadfish Lake and Jaskari Lake are designated as ORRWs. New dischargers wishing to discharge to an ORRW must obtain an individual permit for stormwater discharges from large and small construction activities.

iv. All work shall be carried out in such a manner as will prevent violations of water quality criteria as stated in the Water Quality Standards of the Fond du Lac Reservation, Ordinance 12/98 as amended. This includes, but is not limited to, the prevention of any discharge that causes a condition in which visible solids, bottom deposits, or turbidity impairs the usefulness of water of the Fond du Lac Reservation for any of the uses designated in the Water Quality Standards of the Fond du Lac Reservation. These uses include wildlife, aquatic life, warm and cold water fisheries, subsistence fishing (netting), primary contact recreation, cultural, wild rice areas, aesthetic waters, agriculture, navigation and commercial.

v. Appropriate steps shall be taken to ensure that petroleum products or other chemical pollutants are prevented from entering waters of the Fond du Lac Reservation. All spills must be reported to the appropriate emergency management agency, and measures shall be taken immediately to prevent the pollution of waters of the Fond du Lac reservation, including groundwater.

vi. This certification does not authorize impacts to cultural, historical, or archeological features or sites, or properties that may be eligible for such listing.

b. *Grand Portage Band of Lake Superior Chippewa* **[Coverage not yet available]**

2. WIR100000: Indian Country within the State of Wisconsin, except the Sokaogon Chippewa Community.

   a. No additional requirements

Note: Facilities within the Sokaogon Chippewa Community are not eligible for stormwater discharge coverage under this permit. Contact the Region 5 office for an individual permit application.

D. Region 6

1. NMR100000: The State of New Mexico, except Indian country
   a. In addition to all other provisions of this permit, operators who intend to obtain authorization under this permit for all new stormwater discharges must satisfy the conditions in Part 10.C.1.b., unless a TMDL has been established for the receiving stream which specifies a waste load allocation (WLA) for construction stormwater discharges or the receiving stream is a Tier 3 water, in which case Part 10.C.1.c. applies.
   b. The SWPPP must include site-specific interim and permanent stabilization, managerial, and structural solids, erosion, and sediment control best management practices (BMPs) and/or other controls that are designed to prevent to the maximum extent practicable an increase in the sediment yield and flow velocity from pre-construction, pre-development conditions to assure that applicable standards in 20.6.4 NMAC, including the antidegradation policy, or WLAs are met. This requirement applies to discharges both during construction and after construction operations have been completed. The SWPPP must identify, and document the rationale for selecting these BMPs and/or other controls. The SWPPP must also describe design specifications, construction specifications, maintenance schedules (including a long term maintenance plan), criteria for inspections, as well as expected performance and longevity of these BMPs. BMP selection must be made based on the use of appropriate soil loss prediction models (such as SEDCAD 4.0, RUSLE, SEDIMOT II, MULTISED, etc.), or equivalent, generally accepted (by professional erosion control specialists), soil loss prediction tools. The operator(s) must demonstrate, and include documentation in the SWPPP, that implementation of the site-specific practices will assure that the applicable standards or WLAs are met, and will result in sediment yields and flow velocities that, to the maximum extent practicable, will not be greater than the sediment yield levels and flow velocities from pre-construction, pre-development conditions. The SWPPP must be prepared in accordance with good engineering practices by qualified (e.g., CPESC certified, engineers with appropriate training, etc.) erosion control specialists familiar with the use of soil loss prediction models and design of erosion and sediment control systems based on these models (or equivalent soil loss prediction tools). The operator(s) must design, implement, and maintain BMPs in the manner specified in the SWPPP.
   c. Operators are not eligible to obtain authorization under this permit for all new stormwater discharges to outstanding national resource waters (ONRWs) (also referred to as “Tier 3: waters). According to the Antidegradation Policy at Paragraph 3 of Subsection A of 20.6.4.8 NMAC, in part, “ONRWs may include, but are not limited to, surface waters of the state within national and state monuments, parks, wildlife refuges, waters of exceptional recreational or

ecological significance, and waters identified under the Wild and Scenic Rivers Act." No ONRWs exist at the time this permit is being finalized; however, during the term of the permit, if a receiving water is designated as an ONRW, the operator must obtain an individual permit for stormwater discharges from large and small construction activities.

d. Stormwater discharges associated with construction activity that the State has determined to be or may reasonably be expected to be contributing to a violation of an applicable standard, including the antidegradation policy, are not authorized by this permit. *Note: Upon receipt of this determination, NMED anticipates that, within a reasonable period of time, EPA will notify the general permittee to apply for and obtain an individual NPDES permit for these discharges per 40 CFR Part 122.28(b)(3).*

e. Inspections required under Part 4 must be conducted at least once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater. The option for inspections at least once per 7 calendar days is not available. The Inspection Waivers provided in Part 4.B and C still apply.

f. Permittees can use temporary erosion controls as described in item 3 of the Appendix A definition of "Final Stabilization" as a method for final stabilization under the permit only under the following conditions:

If this option is selected, you must notify SWQB at the address listed in item g. below at the time the NOT is submitted to EPA. The information to be submitted includes:

- A copy of the NOT;
- Contact information, including individual name or title, address, and phone number for the qualified (see CGP Part 4.10.D) party responsible for implementing the final stabilization measures; and
- The date that the temporary erosion control practice was implemented (this is always prior to, and sometimes significantly prior to, submission of an NOT) and the projected timeframe that the 70% native vegetative cover requirements are expected to be met. (Note that if more than three years is required to establish 70 percent of the natural vegetative cover, this technique cannot be used or cited for fulfillment of the final stabilization requirement – you remain responsible for establishment of final stabilization)

SWQB also requires that you periodically (minimum once/year) inspect and properly maintain the area until the criteria for final stabilization, as defined in Appendix A, item 3 of the CGP, have been met. You must prepare an inspection report documenting the findings of these inspections and signed in accordance with Appendix G, Section 11 of the CGP. This inspection record must be retained along with the SWPPP for three years after the NOT is submitted for the site and additionally submitted to SWQB at the address listed in item g. below. The inspections must at a minimum include the following:

- Observations of all areas of the site disturbed by construction activity;

- Best Management Practices (BMPs)/post-construction storm water controls must be observed to ensure they are effective;
- An assessment of the status of vegetative re-establishment; and
- Corrective actions required to ensure vegetative success within three years, and control of pollutants in storm water runoff from the site, including implementation dates.

  Signed copies of discharge monitoring reports, individual permit applications, and all other reports required by the permit to be submitted, shall also be sent to:

  Program Manager
  Point Source Regulation Section
  Surface Water Quality Bureau
  New Mexico Environment Department
  P.O. Box 26110
  Santa Fe, NM 87502

2. NMR10000I: Indian country within the State of New Mexico, except Navajo Reservation Lands that are covered under Arizona permit AZR10000I and Ute Mountain Reservation Lands that are covered under Colorado permit COR10000I
   a. *Pueblo of Acoma.* The following conditions apply only to facilities on or bordering the Pueblo of Acoma with discharges into or flowing into waters of the Pueblo.
      i. A copy of the Notice of Intent and Notice of Termination must be submitted to the Haaku Water Office at the address below at the same time they are submitted to EPA. A copy of the storm water pollution prevention plan must be provided to the Haaku Water Office upon request.
      ii. HAAKU WATER OFFICE

          PO Box 309

          Pueblo of Acoma, NM 87034
   b. *Pueblo of Isleta.* The following conditions apply only to discharges on the Pueblo of Isleta.
      i. Subpart 1.3.C.4, (Eligibility, Limitations on Coverage) first sentence, is revised to read: “This permit does not authorize discharges that EPA or the Pueblo of Isleta, prior to authorization under this permit, determines will cause, have the reasonable potential to cause, or contribute to an excursion above any applicable water quality standard or impairment of a designated use of receiving waters.”
      ii. Subpart 2.2. (How to Submit) is amended to require: Copies of all Notices of Intent submitted to EPA must also be sent concurrently to the Pueblo of Isleta at the following address. Discharges are not authorized by this permit unless an accurate and complete Notice of Intent has been submitted to the Pueblo of Isleta.

          <u>Regular U.S. Mail Delivery</u>
          Natural Resources Department
          Pueblo of Isleta

P.O. Box 1270
Isleta, NM 87022

<u>Overnight/Express Mail Delivery</u>
Natural Resources Department
Building L
11000 Broadway, SE
Albuquerque, NM 87105

iii. Part 2 (Authorizations for Discharges of Storm Water from Construction Activity), second sentence, is amended to read: "Discharges are not authorized if your NOI is incomplete or inaccurate, if you failed to submit a copy of the NOI to the Pueblo of Isleta, or if you were never eligible for permit coverage.

iv. Subpart 5.3 (Description of Control Measures to Reduce Pollutant Discharges), section A, last sentence, is amended to read: "For each major activity identified in the project description the SWPPP must clearly describe appropriate control measures, the general sequence during the construction process in which the measures will be implemented, and which operator is responsible for the control measure's implementation and maintenance."

v. Subpart 5.7 (Copy of Permit Requirements), first sentence, is revised to read "Copies of this permit and of the signed and certified NOI form that was submitted to the Pueblo of Isleta and EPA must be included in the SWPPP."

vi. Subpart 4. (Inspections), section A is revised to read "Inspections must be conducted at least once every 7 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater."

vii. Subpart 4. (Inspections), section H, last paragraph, is amended to add: "Copies of inspection reports that identify incidents of noncompliance shall be sent to Pueblo of Isleta at the address listed in Subpart 2.2." (See above)

viii. Subpart 5.11. (Signature, Plan Review and Making Plans Available), section A, first sentence is amended to read:

> "A copy of the SWPPP (including a copy of the permit), NOI, and acknowledgement letter from EPA must be retained at the construction site (or other location easily accessible during normal business hours to the Pueblo of Isleta's Natural Resources Department, EPA, a state, tribal or local agency approving sediment and erosion plans, grading plans, or storm water management plans; local government officials; the operator of a municipal separate storm sewer receiving discharges from the site; and representatives of the U.S. Fish and Wildlife Service or the National Marine Fisheries Service) from the date of commencement of construction activities to the date of final stabilization."

ix. Subpart 5.11. (Signature, Plan Review and Making Plans Available), section C. is amended to read: "SWPPPs must be made available upon request by EPA; representatives of the Pueblo of Isleta Natural Resources Department, a state, tribal or local agency approving sediment and erosion plans, grading plans, or storm water management plans; local government officials; the operator of a municipal separate storm sewer receiving discharges from the site; and representatives of the U.S. Fish and Wildlife Service or the National Marine Fisheries Service to the requestor. The copy of the SWPPP that is required to be kept on-site or locally available must be made available, in its entirety, to the EPA staff and the Pueblo of Isleta's Natural Resources Department staff for review and copying at the time of an on-site inspection.

x. Subpart 3.1.A (Sediment Controls), is amended to add: "Erosion and sediment controls shall be designed to retain sediment on-site."

xi. Subpart 3.1.I (Spills/Releases in Excess of Reportable Quantities), first bullet is amended to read: "you must provide notice to the Pueblo of Isleta Natural Resources Department (505-869-5748) and the National Response Center (NRC) (800–424–8802; in the Washington, DC, metropolitan area call 202–426– 2675) in accordance with the requirements of 40 CFR Part 110, 40 CFR Part 117 and 40 CFR Part 302 as soon as site staff have knowledge of the discharge; and"

xii. Subpart 3.4.B (Attainment of Water Quality Standards After Authorization), is amended to add: "You must provide the Pueblo of Isleta, at the address listed in Subpart 2.2, with a copy of the EPA notification, modifications to your storm water controls, data and certification required by EPA."

xiii. Subpart 6.1. (Submitting a Notice of Termination) is amended to add: Copies of all Notices of Termination submitted to EPA must also be sent concurrently to the Pueblo of Isleta at the following address in Subpart 2.2.

xiv. Any correspondence, other than NOIs and NOTs, with the Pueblo of Isleta concerning storm water discharges authorized by this permit shall sent one of the addresses in Subpart 2.2.

xv. Appendix G, Section 9, first sentence is amended to read: "You must allow the Pueblo of Isleta's Natural Resources Department, EPA, or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon presentation of credentials and other documents as may be required by law, to:…"

xvi. Appendix G, Section 12, subsections A- H are amended to require that when you must notify EPA of an event (e.g., planned changes, anticipated noncompliance, transfers, required reporting due to potential adverse effects or environmental impacts or other noncompliance matters), the Pueblo of Isleta must also be notified.

xvii. Parties wishing to apply for an Equivalent Analysis Waiver (see Appendix D, Section C) must provide a copy of the waiver analysis to the Pueblo of Isleta at the address specified in Subpart 2.2 at the time it is submitted to EPA.

c. *Ohkay Owingeh (San Juan Pueblo).* The following conditions apply only to discharges on Ohkay Owinegeh.

i. Copies of the Notice of Intent (NOI) and Notice of Termination (NOT) must be provided to the Pueblo at the time it is provided to the Environmental Protection Agency, at the following address. A copy of the Storm Water Pollution Prevention Plan must be provided to the Pueblo upon request.

Office of Environmental Affairs
P.O. Box 717
Ohkay Owingeh, NM 87566

ii. Appendix G, Section 10 (Monitoring and records), item D is amended to add: “All monitoring must be conducted in accordance with the Pueblo of San Juan’s Quality Assurance Project Plan.”

d. *Pueblo of Nambé.* The following conditions apply only to discharges on the Pueblo of Nambé.

i. Copies of the Notice of Intent (NOI), Notice of Termination (NOT), and any analytical data must be provided to the Nambé Pueblo Department of Environment and Natural Resources (DENR) at the time it is provided to the Environmental Protection Agency, at the following address. A copy of the Storm Water Pollution Prevention Plan must be provided to the Pueblo upon request.

ii. All correspondence chall be sent to:

Pueblo of Nambé
Department of Environment and Natural Resources
Rt. 1 Box 117-BB
Santa Fe, NM 87506
505-455-2036 ext. 120 fax: 505-455-8873

e. *Pueblo of Picuris.* The following conditions apply only to discharges on the Pueblo of Picuris.

i. Copies of the Notice of Intent (NOI), Notice of Termination (NOT), and any analytical data (e.g. Discharge Monitoring Reports, etc.) or any other reports must be provided to the Pueblo at the time it is provided to the Environmental Protection Agency. A copy of the Storm Water Pollution Prevention Plan must be provided to the Pueblo upon request.

ii. All correspondence shall be sent to:

Cordell Arellano
Director, Environment Department
Pueblo of Picuris
PO Box 158
Penasco, NM 87553

f. *Pueblo of Pojoaque.* The following conditions apply only to discharges on the Pueblo of Pojoaque.

i. Copies of the Notice of Intent (NOI), Notice of Termination (NOT), and any analytical data (e.g. Discharge Monitoring Reports, etc.) or any other reports must be provided to the Pueblo at the time it is provided to the Environmental Protection Agency. A copy of documents related to the

Storm Water Pollution Prevention Plan must be provided to the Pueblo upon request.

ii. All correspondence shall be sent to:

Luke Mario Duran
Director, Environment Department
Pueblo of Pojoaque
5 West Gutierrez, Suite 2b
Santa Fe, NM 87506

g. *Pueblo of Taos.* The following conditions apply only to discharges on the Pueblo of Taos.

i. Copies of the Notice of Intent (NOI) and Notice of Termination (NOT) must be provided to the Taos Pueblo Governor's Office and the Taos Pueblo Environmental Office at the same time as or prior to submission to the Environmental Protection Agency. A copy of the Storm Water Pollution Prevention Plan must be provided to Pueblo environmental personnel upon request.

ii. All correspondence for both the Taos Pueblo Governor's Office and the Taos Pueblo Environmental Office (same address) shall be sent to:

Governor/ Taos Pueblo Environmental Office (as applicable)
Taos Pueblo
PO Box 1846
Taos, NM 87571

h. *Pueblo of Sandia*. The following conditions apply only to discharges on the Pueblo of Sandia.

i. A copy of the Notice of Intent (NOI) must be provided to the Pueblo at the same, (or prior to) the time it is submitted to the Environmental Protection Agency.

ii. The Pueblo of Sandia objects to use of Low Rainfall Erosivity Waivers (see Appendix D, Part A) for any small construction activities on the Pueblo, so this waiver will not be available for construction projects on the Pueblo. Permittees wishing to apply for all other waivers (see Appendix D) must provide a copy of the waiver certification or analysis to the Pueblo of Sandia Environment Department.

iii. The Storm Water Pollution Prevention Plan (SWPPP) must be available to the Pueblo of Sandia either electronically or hard copy upon request for review. The SWPPP must be made available at least fourteen (14) days before construction begins. The fourteen (14) day period will give Tribal staff time to become familiar with the project site, prepare for construction inspections, and determine compliance with the Pueblo of Sandia Water Quality Standards. Failure to provide a SWPPP to the Pueblo of Sandia may result in denial of the discharge or construction delay.

iv. Discharges are not authorized by this permit unless and until:

a. An accurate and complete NOI has been submitted to the Pueblo; AND

b. An “Authorization to Proceed Letter” with any site specific mitigation requirements has been received from the Pueblo of Sandia following their review of the NOI and SWPPP and the permittee complies with all applicable requirements therein.

v. Before submitting a Notice of Termination (NOT), permittees must clearly demonstrate to the Pueblo of Sandia Environment Department though a site visit or documentation that requirements for site stabilization have been met and any temporary erosion control structures have been removed (or operational control is being passed to another operator). A short letter concurring that conditions for submittal of an NOT have met will be sent to the permittee by the Pueblo. Upon receipt of this letter, and provided the all other applicable requirements of the permit are met, the permittee will be eligible to submit and NOT.

vi. You must telephone the Pueblo of Sandia Environment Department at (505) 867-4533 of any noncompliance that may endanger human health or the environment within ten (10) hours of becoming aware of the circumstance.

vii. All corresondance shall be sent to:

Scott Bulgrin, Water Quality Manager
Pueblo of Sandia
481 Sandia Loop
Bernalillo, NM 87004

i. *Santa Clara Pueblo*. The following conditions apply only to discharges on the Santa Clara Pueblo.

i. Copies of the Notice of Intent (NOI) and Notice of Termination (NOT) must be provided to the Pueblo of Santa Clara Office of Environmental Affairs when they are submitted to the Environmental Protection Agency.

ii. A copy of the storm water pollution prevention plan must be made available to the Pueblo of Santa Clara Office of Environmental Affairs upon request.

iii. Construction site operators must notify the Pueblo of Santa Clara Office of Environmental Affairs by telephone at (505) 753-7326 of any non-compliance discharges that may endanger human health or the environment within twenty-fout (24) hours of becoming aware of the discharge.

iv. All correspondence shall be sent to:

Santa Clara Office of Environmental Affairs Taos Pueblo
One Kee Street
PO Box 580
Espanola, NM 87532
505-753-7326 Tel
505-747-2728 Fax

j. *Pueblo of Tesuque*. The following conditions apply only to discharges on the Pueblo of Tesuque.

i. Copies of the Notice of Intent (NOI), Notice of Termination (NOT), and any analytical data (e.g. Discharge Monitoring Reports, etc.) or any other reports must be provided to the Pueblo at the time it is provided to the Environmental Protection Agency.

ii. A copy of documents related to the Storm Water Pollution Prevention Plan must be provided to the Pueblo upon request.

iii. All correspondence shall be sent to:

Ryan Swazo-Hinds
Sr. Envirionmental Technician
Pueblo of Tesuque
Environment Department
Rt. 42, Box 360-T
Santa Fe, NM 87506

3. OKR10000F: Discharges in the State of Oklahoma that are not under the authority of the Oklahoma Department of Environmental Quality, including activities associated with oil and gas exploration, drilling, operations, and pipelines (includes SIC Groups 13 and 46, and SIC codes 492 and 5171), and point source discharges associated with agricultural production, services, and silviculture (includes SIC Groups 01, 02, 07, 08, 09).
   a. In accordance with Oklahoma's Water Quality Standards (OAC 785:45-5-25), Subpart 1.3.C. (Limitations on Coverage) is modified to add paragraphs 8 and 9 as follows:

      "8. For activities located within the watershed of any Oklahoma Scenic River, including the Illinois River, Flint Creek, Barren Fork Creek, Upper Mountain Fork, Little Lee Creek, and Big Lee Creek or any water or watershed designated "ORW" (Outstanding Resource Water) in Oklahoma's Water Quality Standards, this permit may only be used to authorize discharges from temporary construction activities. Discharges from any on-going activities such as sand and gravel mining or any other mineral mining are not authorized.

      9. For activities located within the watershed of any Oklahoma Scenic River, including the Illinois River, Flint Creek, Barren Fork Creek, Upper Mountain Fork, Little Lee Creek, and Big Lee Creek or any water or watershed designated "ORW" (Outstanding Resource Water) in Oklahoma's Water Quality Standards, this permit may not be used to authorize discharges from support activities, including concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, or borrow areas."
4. OKR10000I: Indian country within the State of Oklahoma.
   a. In order to protect downstream waters subject to the state of Oklahoma's Water Quality Standards (OAC 785:45-5-25) where receiving waters flow from Indian Country to State waters, Subpart 1.3.C. (Limitations on Coverage) is modified to add paragraphs 8 and 9 as follows:

      "8. For activities located within the watershed of any Oklahoma Scenic River, including the Illinois River, Flint Creek, Barren Fork Creek, Upper Mountain Fork, Little Lee Creek, and Big Lee Creek or any water or watershed designated

"ORW" (Outstanding Resource Water) in Oklahoma's Water Quality Standards, this permit may only be used to authorize discharges from temporary construction activities. Discharges from any on-going activities such as sand and gravel mining or any other mineral mining are not authorized.

9. For activities located within the watershed of any Oklahoma Scenic River, including the Illinois River, Flint Creek, Barren Fork Creek, Upper Mountain Fork, Little Lee Creek, and Big Lee Creek or any water or watershed designated "ORW" (Outstanding Resource Water) in Oklahoma's Water Quality Standards, this permit may not be used to authorize discharges from support activities, including concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, or borrow areas."

b. *Pawnee Nation of Oklahoma*. The following conditions apply only to discharges on the Pawnee Nation of Oklahoma.
    i. Copies of the Notice of Intent (NOI) and Notice of Termination (NOT) must be provided to the Pawnee Nation at the same time they are submitted to the Environmental Protection Agency.
    ii. A copy of the storm water pollution prevention plan must be made available to Pawnee Nation Department of Environmental Conservation and Safety upon request.
    iii. Construction site operators must notify the Pawnee Nation Department of Environmental Conservation and Safety by telephone at (918) 762-3655 immediately of any non-compliance with any provision of the permit conditions.
    iv. All correspondence shall be sent to:

Pawnee Nation
Department of Environmental Conservation and Safety
PO Box 470
Pawnee, OK 74058

5. TXR10000F: Discharges in the State of Texas that are not under the authority of the Texas Commission on Environmental Quality, including activities associated with the exploration, development, or production of oil or gas or geothermal resources, including transportation of crude oil or natural gas by pipeline.

NOTE: This permit does not create an obligation to obtain a permit where such obligation does not already exist under federal statute or regulation. For more information on the Clean Water Act §§ 402(l)(2) permitting exemption for uncontaminated discharges of storm water from oil and gas exploration, production, processing, or treatment operations or transmission facilities, visit: http://cfpub.epa.gov/npdes/stormwater/oilgas.cfm

D. Region 8

1. MTR10000I:

a. Confederated Salish and Kootenai Tribes. The following conditions only apply for projects on the Flathead Indian Reservation:

i. Permittees must send a Stormwater Pollution Prevention Plan (SWPPP) to the Tribe at least 30 days before construction starts;
ii. Before submitting a Notice of Termination (NOT), permittees must clearly demonstrate to an appointed tribal staff person during an on-site inspection that requirements for site stabilization have been met;
iii. Permittees submitting electronic Notices of Intents (eNOI's) to USEPA must cc a copy to NRD-EPD@cskt.org; and
iv. Written NOIs, SWPPPs, and NOTs shall be mailed to:

Confederated Salish and Kootenai Tribes
National Resources Department
Department Head
P.O. Box 278
Pablo, MT 59855

Permittees may also submit their SWPPP and NOT to NRD-EPD@cskt.org

b. Fort Peck Tribes. The following conditions only apply for projects on the Fort Peck Indian Reservation:
i. The permittee must send a copy of the Notice of Intent (NOI) and the Notice of Termination (NOT) to the Tribes at the same time that the NOI and NOT is submitted to EPA. Copies of the NOI and NOT shall be accepted either electronically or hard copy format and should be sent to:

Deb Madison
Environmental Programs Manager
Fort Peck Assiniboine & Sioux Tribes
P.O. Box 1027
Poplar, MT 59255
Tel: 406.768.2389 Fax: 406.768.5606
E-mail: 2horses@nemont.net

ii. A copy of the proposed SWPPP at the time of NOI/NOT submissions must be sent to the Tribes to ensure that upon closure of the site and/or activities all environmental commitments have been met.

c. Northern Cheyenne Reservation. The following conditions only apply for projects on the Northern Cheyenne Indian Reservation:
i. Permittees must contact the Northern Cheyenne Environmental Protection Department at (406) 477-6506 prior to authorization to discharge under the general permit;
ii. The Tribe shall review and approve SWPPPs prior to approval; and
iii. The Tribe shall review and improve BMPs on site to ensure that Tribal water quality standards are protected.

E. Region 9

1. ASR100000: The Island of American Samoa
   a. Discharges authorized by the general permit shall meet all applicable American Samoa water quality standards.
   b. Permittees discharging under the general permit shall comply with all conditions of the permit.

3. AZR10000I: Indian country lands within the State of Arizona, including Navajo Reservation lands in New Mexico and Utah
   a. White Mountain Apache Tribe. The following condition applies only for projects on the White Mountain Apache Reservation: All NOIs for proposed stormwater discharge coverage shall be provided to the following address:

      Tribal Environmental Planning Office
      P.O. Box 2109
      Whiteriver, AZ 85941

   b. Hoopa Valley Tribe. The following conditions apply only for projects on the Hoopa Valley Reservation:
      i. All notices of intent submitted for stormwater discharges under the general permit in Hoopa Valley Indian Reservation (HVIR) shall be submitted to the Tribal Environmental Protection Agency (TEPA); and
      ii. All pollution prevention plans for stormwater discharge in HVIR shall be submitted to TEPA for review and approval.
   c. 29 Palms Band of Mission Indians. The following conditions apply only for projects on the 29 Palms Band of Mission Indians Reservation:
      i. The 29 Palms Tribal EPA is informed of any future changes made to the proposed CGP;
      ii. For each permitted activity, the U.S. EPA will ensure that all terms and conditions of the proposed CGP are complied with;
      iii Notices of intent must be submitted to the 29 Palms Tribal EPA for review, comment and tracking;
      iv. Copies of stormwater pollution prevention plans (SWPPPs) and supporting Best Management Practices (BMPs) must be submitted to the 29 Palms Tribal EPA for review and compliance;
      v. Copies of all monitoring reports must be provided to the 29 Palms Tribal EPA;
      vi. Depending on the permitted activity, the 29 Palms Tribal EPA reserves the right to stipulate additional monitoring requirements; and
      vii. In order to meet the requirements of Tribal law, including water quality standards, each of the conditions cited in the proposed CGP and the Twenty-Nine Palms Band of Mission Indians certification shall not be made any less stringent.

d. Hualapai Tribe. The following conditions apply only for projects on the Hualapai Reservation:

   i. All notices of intent for proposed stormwater discharges under the CGP and all pollution prevention plans for stormwater discharges on Hualapai Tribal lands shall be submitted to the Water Resource Program through the Tribal Chairman for review and approval, P.O. Box 179, Peach Springs, AZ 86434.

e. Pyramid Lake Paiute Tribe. The following conditions apply only for projects on the Pyramid Lake Paiute Reservation:

   i. All notices of intent (NOIs) must be submitted to the Tribe for review, comments and tracking;

   ii. copies of all Stormwater Pollution Prevention Plan (SWPPPs) and supporting Best Management Practices (BMPs) must be submitted to the Pyramid Lake Paiute Tribe for review and concurrence;

   iii. copies of the criteria for Effluent Limitations Guidelines (ELGs) and the criteria for proposed Qualifying Local Programs (QLPs) to be used for sediment and erosion control pursuant to 40 CFR 122.44(s) be provided to the Pyramid Lake Paiute Tribe; and

   iv. copies of all monitoring reports must be provided to the Pyramid Lake Paiute Tribe.

4. MPR100000: Commonwealth of the Northern Mariana Islands (CNMI)

a. An Earthmoving and Erosion Control Permit shall be obtained from the CNMI DEQ prior to any construction activity covered under the NPDES general permit.

b. All conditions and requirements set forth in the USEPA NPDES general permit for discharges from large and small construction must be complied with.

c. A SWPPP for storm water discharges from construction activity must be approved by the Director of the CNMI DEQ prior to the submission of the NOI to USEPA. The CNMI address for the submittal of the SWPPP for approval is:

   Commonwealth of the Northern Mariana Islands
   Office of the Governor
   Director, Division of Environmental Quality (DEQ)
   P.O. Box 501304 C.K.
   Saipan, MP 96950-1304

d. An NOI to be covered by the general permit for discharges from large and small construction sites must be submitted to CNMI DEQ (use above address) and USEPA, Region 9, in the form prescribed by USEPA, accompanied by a SWPPP approval letter from CNMI DEQ.

e. The NOI must be postmarked seven (7) calendar days prior to any storm water discharges and a copy must be submitted to the Director of CNMI DEQ (use above address) no later than seven (7) calendar days prior to any stormwater discharges.

f. Copies of all monitoring reports required by the NPDES general permit must be submitted to CNMI DEQ (use above address).

g. In accordance with section 10.3(h) and (i) of the CNMI water quality standards, CNMI DEQ reserves the right to deny coverage under the general permit and to require submittal of an application for an individual NPDES permit based on a review of the NOI or other information made available to the Director.

F. Region 10

1. AKR100000: The State of Alaska, except Indian country

a. For Storm Water Pollution Prevention Plans

i. Operators of construction projects disturbing at least one acre of land but less than five acres of land shall submit a copy of the Notice of Intent (NOI) to the Alaska Department of Environmental Conservation (ADEC) at the same time it is submitted to the EPA. Submittals to ADEC shall be made to the following address

Alaska Department of Environmental Conservation
Wastewater Discharge/Storm Water
555 Cordova St.
Anchorage, AK 99501

ii. Operators of construction projects that disturb five or more acres of land and that are located outside the areas of the local governments described in numbers iii, iv, v, or vi below, shall submit a copy of the Storm Water Pollution Prevention Plan (SWPPP) and a copy of the NOI to ADEC for review. The SWPPP shall be accompanied by the state-required plan review fee (see 18 AAC 72.955).

iii. Within the Municipality of Anchorage

(1) Operators of construction projects disturbing one or more acres of land shall submit a copy of the SWPPP to either ADEC or the Municipality based on the project type and operator as shown in the following table

Project Type	Submit SWPPP to
Government (federal, state, municipal) road projects and other government transportation projects such as ports, railroads or airports	ADEC
Utility projects for which the utility is initiating the work	Municipality
Work that requires a Building Permit	Municipality
Non-publicly funded transportation projects	Municipality

(2) Submittal of the SWPPP to the Municipality should be made before or at the same time the NOI is submitted to the EPA and ADEC and shall be accompanied by any Municipality-required fee. Copies of the SWPPP shall be submitted to the Municipality at the following address

Municipality of Anchorage
Office of Planning Development and Public Works
4700 South Elmore Rd.
PO Box 196650
Anchorage, AK 99519-6650

(3) Submittals to ADEC shall include a copy of the SWPPP and a copy of the NOI for review and shall be accompanied by the state-required plan review fee (see 18 AAC 72.995).

iv. Within the urbanized area boundary of the Fairbanks North Star Borough check with the Borough for the latest requirements.

Fairbanks North Star Borough
Department of Public Works
PO Box 71267
Fairbanks, AK 99707

v. Within the urbanized area boundary of the City of Fairbanks

(1) Operators of privately-funded construction projects disturbing one or more acres of land shall submit a copy of the SWPPP to the City of Fairbanks.

(2) Submittal of the SWPPP to the City of Fairbanks should be made before or at the same time the NOI is submitted to the EPA and ADEC and shall be accompanied by any City-required fee. Copies of the SWPPP shall be submitted to the City of Fairbanks at the following address

City of Fairbanks
Engineering Division
800 Cushman St
Fairbanks, AK 99701

(3) Operators of publicly-funded projects disturbing one or more acres of land shall submit a copy of the SWPPP and a copy of the NOI to ADEC for review, and shall be accompanied by the state-required plan review fee (see 18 AAC 72.995).

vi. Within the urbanized area boundary of the City of North Pole

(1) Operators of privately-funded construction projects disturbing one or more acres of land shall submit a copy of the SWPPP to the City of North Pole.

(2) Submittal of the SWPPP to the City of North Pole should be made before or at the same time the NOI is submitted to the EPA and ADEC and shall be accompanied by any City-required fee. Copies of the SWPPP shall be submitted to the City of North Pole at the following address

City of North Pole
Department of Public Works
125 Snowman Lane
North Pole, AK 99705

(3) Operators of publicly-funded projects disturbing one or more acres of land shall submit a copy of the SWPPP and a copy of the NOI to ADEC for review, and shall be accompanied by the state-required plan review fee (see 18 AAC 72.995).

vii. For hardrock mines that are designed to process 500 or more tons per day and intend to file a Notice of Intent to begin construction under this permit

(1) The operator shall submit their SWPPP to ADEC for review at least 90 days before the start of construction,

(2) Representatives of the operator and the prime site construction contractor shall meet with ADEC representatives in a pre-construction conference at least 20 days before the start of construction to discuss the details of the SWPPP and stormwater management during construction,

(3) The operator shall submit to ADEC addendums to the SWPPP that address any planned physical alterations, additions to the permitted facility, or unanticipated conditions that arise during planned construction that could significantly change the nature, or increase the quantity, of pollutants discharged from the facility, and

(4) The operator shall have at least one person on-site during construction who is qualified and trained in the principles and practices of erosion and sediment control and has the authority to direct the maintenance of storm water best management practices.

b. For Post-Construction (Permanent) Storm Water Control Measures (Section 3.1.E *[Post-Construction Stormwater Management]* of the CGP)

   i. Operators of construction projects who construct, alter, install, modify, or operate any part of a storm water treatment system and are located outside the Municipality of Anchorage, shall submit a copy of the engineering plans to ADEC for review at the address given above (see 18 AAC 72.600).

   ii. Operators of construction projects who construct, alter, install, modify, or operate any part of a storm water treatment system and are located inside the Municipality of Anchorage, shall submit a copy of the engineering plans to the respective government agency based on project type, as indicated in the table in a.iii.*(1)* above, for review at the addresses given in a.i. or a.iii.*(2)* above.

2. IDR100000: The State of Idaho, except Indian country

a. *303(d)-listed Water Bodies with Approved TMDLs.*
Discharges of storm water will be consistent with load allocations established by the applicable TMDL.

b. *303(d)-listed Water Bodies without Approved TMDLs (High Priority)*
If a TMDL has not been established for a high priority 303(d)-listed water body, then discharges of storm water may not cause an increase in the total load of listed pollutant(s) in the receiving water body.

c. *303(d)-listed Water Bodies without Approved TMDLs (Medium or Low Priority)*
If a TMDL has not been established for a medium or low priority 303(d)-listed water body, then best management practices shall be employed as necessary to prohibit further impairment of the designated or existing beneficial uses in the receiving water body.

d. *Best Management Practices (BMPs)*
BMPs must be designed, implemented, and maintained by the permittee to fully protect and maintain the beneficial uses of the receiving water body. The permittee should select appropriate BMPs that are either authorized by the

appropriate designated agency as defined in Idaho Water Quality Standards (IDAPA 58.01.02), recommended in IDEQ's *Catalog of Stormwater BMPs for Idaho Cities and Counties*, or recommended by other local government entities or guidance documents.

e. *Equivalent Analysis Waiver* - Use of the "Equivalent Analysis Waiver" in Appendix D of the permit is not authorized.

f. Operators may contact the Idaho Department of Environmental Quality regional office nearest the construction activity for more information about impaired waterways:

Boise Regional Office:
1445 N. Orchard
Boise ID 83706-2239
Tel: (208)373-0550
Fax: (208)373-0287

Grangeville Satellite Office:
300 W. Main
Grangeville ID 83530
Tel: (208)983-0808
Fax: (208)983-2873

Pocatello Regional Office:
444 Hospital Way #300
Pocatello ID 83201
Tel: (208)236-6160
Fax: (208)236-6168

McCall Satellite Office:
502 N. 3rd Street #9A
P.O. Box 4654
McCall, ID 83638
Tel: (208)634-4900
Fax: (208)634-9405

Idaho Falls Regional Office:
900 N. Skyline, Suite B
Idaho Falls, ID 83402
Tel: (208)528-2650
Fax: (208)528-2695

Twin Falls Regional Office:
1363 Fillmore
Twin Falls, ID 83301
Tel: (208)736-2190
Fax: (208)736-2194

<u>Coeur d'Alene Regional Office</u>:
2110 Ironwood Parkway
Coeur d'Alene ID 83814
Tel: (208)769-1422
Fax: (208)769-1404

<u>Lewiston Regional Office</u>:
1118 "F" Street
Lewiston, ID 83501
Tel: (208)799-4370
Toll Free: 1-877-541-3304
Fax: (208)799-3451

3. ORR10000I: Indian country within the State of Oregon, except Fort McDermitt Reservation lands (see Region 9):

a. Confederated Tribes of the Umatilla Indian Reservation.
The following conditions apply only for projects within the exterior boundaries of the Umatilla Indian Reservation:
   i. The operator shall be responsible for achieving compliance with the Confederated Tribes of the Umatilla Indian Reservation's (CTUIR) Water Quality Standards.
   ii. The operator must submit all Storm Water Pollution Prevention Plans required under this general permit to the CTUIR Water Resources Program for review and determination that the SWPPP is sufficient to meet Tribal Water Quality Standards prior to the beginning of any discharge activities taking place.
   iii. The operator must submit a copy of the Notice of Intent (NOI) to be covered by this general permit to the CTUIR Water Resources Program at the address below, at the same time it is submitted to EPA.
   iv. The operator shall be responsible for reporting an exceedance of Tribal Water Quality Standards to the CTUIR Water Resources Program at the same time it is reported to EPA.
      Confederated Tribes of the Umatilla Indian Reservation
      Water Resources Program
      P.O. Box 638
      Pendleton, OR 97801
      (541) 966-2420
   v. At least 45 days prior to beginning any discharge activities, the operator must submit a copy of the Notice of Intent to be covered under this general permit and an assessment of whether the undertaking has the potential to affect historic properties to CTUIR Tribal Historic Preservation Office (THPO) at the address below. If the project has potential to affect historic properties, the operator must define the area of potential effect (APE). The operator must provide the THPO at least 30 days to comment on the APE as defined.

vi. If the project is an undertaking, the operator must conduct a cultural resource investigation. All fieldwork must be conducted by qualified personnel (as outlined by the Secretary of the Interior's Standards and Guidelines found at http://www.nps.gov/history/local-law/arch_stnds_0.htm). All fieldwork must be documented using Oregon Reporting Standards (as outlined at http://egov.oregon.gov/OPRD/HCD/ARCH/arch_pubsandlinks.shtml). The resulting report must be submitted to the THPO for concurrence before any ground disturbing work can occur. The operator must provide the THPO at least 30 days to review and respond to all reports.
The operator must obtain THPO concurrence in writing. If historic properties are present, this written concurrence will outline measures to be taken to prevent or mitigate effects to historic properties.

Confederated Tribes of the Umatilla Indian Reservation
Cultural Resources Protection Program
Tribal Historic Preservation Office
P.O. Box 638
Pendleton, OR 97801
(541) 966-2340

b. Confederated Tribes of Warm Springs.
The following conditions apply only for projects on the Warm Springs Indian Reservation:
   i. All activities covered by this NPDES general permit occurring within a designated riparian buffer zone as established in Ordinance 74 (Integrated Resource Management Plan or IRMP) must be reviewed, approved and permitted through the Tribe's Hydraulic Permit Application process, including payment of any applicable fees.
   ii. All activities covered by this NPDES general permit must follow all applicable land management and resource conservation requirements specified in the IRMP.
   iii. Operators of activities covered by this NPDES general permit must submit a Storm Water Pollution Prevention Plan to the Tribe's Water Control Board at the following address for approval at least 30 days prior to beginning construction activity:

Chair, Warm Springs Water Control Board
P.O. Box C
Warm Springs, Oregon 97761

4. WAR10000F: Federal Facilities in the State of Washington, except those located on Indian Country

a. Discharges shall not cause or contribute to a violation of surface water quality standards (Chapter 173-201A WAC), ground water quality standards (Chapter 173-200 WAC), sediment management standards (Chapter 173-204 WAC), and human health-based criteria in the National Toxics Rule (40 CFR Part 131.36). Discharges that are not in compliance with these standards are not authorized.

b. Prior to the discharge of stormwater and non-stormwater to waters of the state, the Permittee shall apply all known, available, and reasonable methods of prevention, control, and treatment (AKART). This includes the preparation and implementation of an adequate Stormwater Pollution Prevention Plan (SWPPP), with all appropriate best management practices (BMPs) installed and maintained in accordance with the SWPPP and the terms and conditions of this permit.

c. Sampling & Numeric Effluent Limitations – For Sites Discharging to Certain Waterbodies on the 303(d) List or with an Applicable TMDL

i. Permittees that discharge to water bodies listed as impaired by the State of Washington under Section 303(d) of the Clean Water Act for turbidity, fine sediment, high pH or phosphorus, shall conduct water quality sampling according to the requirements of this section.

(1) The operator must retain all monitoring results required by this section as part of the SWPPP. All data and related monitoring records must be provided to EPA or the Washington Department of Ecology upon request.

(2) The operator must notify EPA when the discharge turbidity or discharge pH exceeds the water quality standards as defined in Parts 10.F.4.d.ii and e.ii below, in accordance with the reporting requirements of Part G.12.F of this permit. All reports must be submitted to EPA at the following address:
U.S EPA Region 10
NPDES Compliance Unit - Attn: Federal Facilities Compliance Officer
1200 6th Avenue, Suite 900
OCE-133
Seattle, WA 98101
(206) 553-1846

ii. All references and requirements associated with Section 303(d) of the Clean Water Act mean the most current listing by Ecology of impaired waters that exists on November 16, 2005, or the date when the operator's complete NOI is received by EPA, whichever is later.

Parameter identified in 303(d) listing	Parameter/Units	Analytical Method	Sampling Frequency	Water Quality Standard
Turbidity Fine Sediment Phosphorus	Turbidity/NTU	SM2130 or EPA180.1	Weekly, if discharging	If background is 50 NTU or less: 5 NTU over background; or If background is more than 50 NTU: 10% over background
High pH	pH/Standard Units	pH meter	Weekly, if discharging	In the range of 6.5 – 8.5

d. Discharges to waterbodies on the 303(d) list for turbidity, fine sediment, or phosphorus

i. Permittees which discharge to waterbodies on the 303(d) list for turbidity, fine sediment, or phosphorus shall conduct turbidity sampling at the following locations to evaluate compliance with the water quality standard for turbidity:

(1) Background turbidity shall be measured in the 303(d) listed receiving water immediately upstream (upgradient) or outside the area of influence of the discharge; and

(2) Discharge turbidity shall be measured at the point of discharge into the 303(d) listed receiving waterbody, inside the area of influence of the discharge; **or**

Alternatively, discharge turbidity may be measured at the point where the discharge leaves the construction site, rather than in the receiving waterbody.

ii. Based on sampling, if the discharge turbidity ever exceeds the water quality standard for turbidity (more than 5 NTU over background turbidity when the background turbidity is 50 NTU or less, or more than a 10% increase in turbidity when the background turbidity is more than 50 NTU), all future discharges shall comply with a numeric effluent limit which is equal to the water quality standard for turbidity. If a future discharge exceeds the water quality standard for turbidity, the permittee shall:

(1) Review the SWPPP for compliance with the permit and make appropriate revisions within 7 days of the discharge that exceeded the standard;

(2) Fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible, but no later than 10 days of the discharge that exceeded the standard;

(3) Document BMP implementation and maintenance in the site log book;

(4) Continue to sample daily until discharge turbidity meets the water quality standard for turbidity.

e. Discharges to waterbodies on the 303(d) list for High pH

i. Permittees which discharge to waterbodies on the 303(d) list for high pH shall conduct sampling at one of the following locations to evaluate compliance with the water quality standard for pH (in the range of 6.5 – 8.5):

(1) pH shall be measured at the point of discharge into the 303(d) listed waterbody, inside the area of influence of the discharge; or

(2) Alternatively, pH may be measured at the point where the discharge leaves the construction site, rather than in the receiving water.

ii. Based on the sampling set forth above, if the pH ever exceeds the water quality standard for pH (in the range of 6.5 – 8.5), all future discharges shall comply with a numeric effluent limit which is equal to the water quality standard for pH. If a future discharge exceeds the water quality standard for pH, the permittee shall:

(1) Review the SWPPP for compliance with the permit and make appropriate revisions within 7 days of the discharge;

(2) Fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible, but no later than 10 days of the discharge that exceeded the standards;
(3) Document BMP implementation and maintenance in the site log book;
(4) Continue to sample daily until discharge meets the water quality standard for pH (in the range of 6.5 – 8.5).

f. Sampling & Limitations – For Sites Discharging to TMDLs

i. Discharges to waterbodies subject to an applicable Total Maximum Daily Load (TMDL) for turbidity, fine sediment, high pH, or phosphorus, shall be consistent with the assumptions and requirements of the TMDL.

(1) Where an applicable TMDL sets specific waste load allocations or requirements for discharges covered by this permit, discharges shall be consistent with any specific waste load allocations or requirements established by the applicable TMDL.

a. Discharges shall be sampled weekly, or as otherwise specified by the TMDL, to evaluate compliance with the specific waste load allocations or requirements.

b. Analytical methods used to meet the monitoring requirements shall conform to the latest revision of the Guidelines Establishing Test Procedures for the Analysis of Pollutants contained in 40 CFR Part 136.

(2) Where an applicable TMDL has established a general waste load allocation for construction stormwater discharges, but no specific requirements have been identified, compliance with this permit will be assumed to be consistent with the approved TMDL.

(3) Where an applicable TMDL has not specified a waste load allocation for construction stormwater discharges, but has not excluded these discharges, compliance with this permit will be assumed to be consistent with the approved TMDL.

(4) Where an applicable TMDL specifically precludes or prohibits discharges from construction activity, the operator is not eligible for coverage under this permit.

ii. Applicable TMDL means a TMDL for turbidity, fine sediment, high pH, or phosphorus, which has been completed and approved by EPA prior to November 16, 2005, or prior to the date the operator's complete NOI is received by EPA, whichever is later.
Information on impaired waterways is available from the Department of Ecology website at:
http://www.ecy.wa.gov/programs/wq/stormwater/construction/impaired.html
or by phone: 360-407-6460.

5. WAR10000I: Indian country within the State of Washington

a. Kalispel Tribe.

The following conditions apply only for projects on the Kalispel Reservation:

i. The permittee shall be responsible for achieving compliance with the Kalispel Tribe's Water Quality Standards.
ii. The permittee shall submit a copy of the Notice of Intent (NOI) to be covered by the general permit to the Kalispel Tribe Natural Resources Department at the same time as it submitted to the U.S. EPA
iii. The permittee shall submit all Storm Water Prevention Plans (SWPP) to the Kalispel Tribe Natural Resources Department thirty (30) days prior to beginning any discharge activities for review.
iv. Prior to any land disturbing activities on the Kalispel Indian Reservation and its dependent communities, the permittee shall obtain a cultural resource clearance letter from the Kalispel Natural Resource Department.
v. All tribal correspondence pertaining to the general permit for discharges of construction stormwater shall be sent to:

Kalispel Tribe Natural Resources Department
PO Box 39
Usk, WA 99180

b. Lummi Nation

The following conditions apply only for projects on the Lummi Reservation:

i. Pursuant to Lummi Code of Laws (LCL) 17.05.020(a), the operator must obtain a land use permit from the Lummi Planning Department as provided in Title 15 of the Lummi Code of Laws and regulations adopted thereunder.
ii. Pursuant to LCL 17.05.020(a), each operator shall develop and submit a Storm Water Pollution Prevention Plan to the Lummi Water Resources Division for review and approval by the Water Resources Manager prior to beginning any discharge activities.
iii. Pursuant to LCL Title 17, each operator shall be responsible for achieving compliance with the Water Quality Standards for Surface Waters of the Lummi Indian Reservation (Lummi Administrative Regulations [LAR] 17 LAR 07.010 through 17 LAR 07.210).
iv. Each operator shall submit a copy of the Notice of Intent to the Lummi Water Resources Division at the same time it is submitted to the Environmental Protection Agency (EPA).
v. Storm Water Pollution Prevention Plans and Notices of Intent shall be submitted to:

Lummi Natural Resources Department
ATTN: Water Resources Manager
2616 Kwina Road
Bellingham, WA 98226

vi. Refer to the Lummi Nation website at *http://www.lummi-nsn.gov* to review a copy of Title 17 of the Lummi Code of Laws and the references upon which the conditions identified above are based.

c. Makah Tribe

The following conditions apply only for projects on the Makah Reservation:

i. The operator shall be responsible for achieving compliance with the Makah Tribe's Water Quality Standards.
ii. The operator shall submit a Storm Water Pollution Prevention Plan to the

Makah Tribe Water Quality Program and Makah Fisheries Habitat Division for review and approval at least thirty (30) days prior to beginning any discharge activities.

iii. The operator shall submit a copy of the Notice of Intent to the Makah Tribe Water Quality Program and Makah Fisheries Habitat Division at the same time it is submitted to EPA.

iv. Storm Water Pollution Prevention Plans and Notices of Intent shall be submitted to:

Makah Fisheries Water Quality and Habitat Division
PO Box 115
Neah Bay, WA 98357

d. Puyallup Tribe of Indians.
The following conditions apply only to stormwater discharges from large and small construction activities that result in a total land disturbance of equal to or greater than one acre, where those discharges enter surface waters of the Puyallup Tribe:

i. Each permittee shall be responsible for achieving compliance with the Puyallup Tribe's Water Quality Standards, including antidegradation provisions. The Puyallup Natural Resources Department will conduct an antidegradation review for permitted activities that have the potential to affect water quality. The antidegradation review will be consistent with the Tribe's Antidegradation Implementation Procedures.

ii. The permittee shall be responsible for meeting any additional permit requirements imposed by EPA necessary to comply with the Puyallup Tribe's antidegradation policies if the discharge point is located within 1 linear mile upstream of waters designated by the Tribe.

iii. Each permittee shall submit a copy of the Notice of Intent (NOI) to be covered by the general permit to the Puyallup Tribal Natural Resources Department at the address listed below at the same time it is submitted to EPA.

Puyallup Tribe of Indians
3009 E. Portland Avenue
Tacoma, WA 98404
ATTN: Natural Resources Department

iv. All supporting documentation and certifications in the NOI related to coverage under the general permit for Endangered Species Act purposes shall be submitted to the Puyallup Tribal Natural Resources Department for review.

v. If EPA requires coverage under an individual or alternative permit, the permittee shall submit a copy of the permit to the Puyallup Tribal Natural Resources Department at the address listed above.

vi. The permittee shall submit all stormwater pollution prevention plans to the Puyallup Tribal Natural Resources Department for review and approval prior to beginning any activities resulting in a discharge to tribal waters.

Appendix A - Definitions and Acronyms

Definitions

"Arid Areas" means areas with an average annual rainfall of 0 to 10 inches.

"Best Management Practices" (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the United States. BMPs also include treatment requirements, operating procedures, and practice to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

"Commencement of Construction Activities" means the initial disturbance of soils associated with clearing, grading, or excavating activities or other construction-related activities (e.g., stockpiling of fill material).

"Control Measure" as used in this permit, refers to any BMP or other method used to prevent or reduce the discharge of pollutants to waters of the United States.

"CWA" means the Clean Water Act or the Federal Water Pollution Control Act, 33 U.S.C. section 1251 et seq.

"Discharge" when used without qualification means the "discharge of a pollutant."

"Discharge of Stormwater Associated with Construction Activity" as used in this permit, refers to a discharge of pollutants in stormwater from areas where soil disturbing activities (e.g., clearing, grading, or excavation), construction materials or equipment storage or maintenance (e.g., fill piles, borrow area, concrete truck chute washdown, fueling), or other industrial stormwater directly related to the construction process (e.g., concrete or asphalt batch plants) are located.

"Eligible" means qualified for authorization to discharge stormwater under this general permit.

"Facility" or "Activity" means any "point source" or any other facility or activity (including land or appurtenances thereto) that is subject to regulation under the NPDES program.

"Federal Facility" means any buildings, installations, structures, land, public works, equipment, aircraft, vessels, and other vehicles and property, owned by, or constructed or manufactured for the purpose of leasing to, the Federal government.

"Final Stabilization" means that:

1. All soil disturbing activities at the site have been completed and either of the two following criteria are met:
   a. a uniform (e.g,, evenly distributed, without large bare areas) perennial vegetative cover with a density of 70 percent of the native background

vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or

   b. equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.

2. When background native vegetation will cover less than 100 percent of the ground (e.g., arid areas, beaches), the 70 percent coverage criteria is adjusted as follows: if the native vegetation covers 50 percent of the ground, 70 percent of 50 percent (0.70 X 0.50 = 0.35) would require 35 percent total cover for final stabilization. On a beach with no natural vegetation, no stabilization is required.
3. In arid and semi-arid areas only, all soil disturbing activities at the site have been completed and both of the following criteria have been met:
   a. Temporary erosion control measures (e.g., degradable rolled erosion control product) are selected, designed, and installed along with an appropriate seed base to provide erosion control for at least three years without active maintenance by you,
   b. The temporary erosion control measures are selected, designed, and installed to achieve 70 percent vegetative coverage within three years.
4. For individual lots in residential construction, final stabilization means that either:
   a. The homebuilder has completed final stabilization as specified above, or
   b. The homebuilder has established temporary stabilization including perimeter controls for an individual lot prior to occupation of the home by the homeowner and informing the homeowner of the need for, and benefits of, final stabilization.
5. For construction projects on land used for agricultural purposes (e.g., pipelines across crop or range land, staging areas for highway construction, etc.), final stabilization may be accomplished by returning the disturbed land to its preconstruction agricultural use. Areas disturbed that were not previously used for agricultural activities, such as buffer strips immediately adjacent to ‘‘water of the United States,’’ and areas which are not being returned to their preconstruction agricultural use must meet the final stabilization criteria (1) or (2) or (3) above.

“Indian country” is defined at 40 CFR §122.2 to mean:

1. All land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation;
2. All dependent Indian communities with the borders of the United States whether within the originally or subsequently acquired territory thereof, and whether within or without the limits of a state; and
3. All Indian allotments, the Indian titles to which have not been extinguished, including rights-of-ways running through the same.

“Large Construction Activity” is defined at 40 CFR §122.26(b)(14)(x) and incorporated here by reference. A large construction activity includes clearing, grading, and excavating resulting in a land disturbance that will disturb equal to or greater than five acres of land or will disturb less than five acres of total land area but is part of a larger common plan of development or sale that will ultimately disturb equal to or greater than five acres. Large construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the site.

"Municipal Separate Storm Sewer System" or "MS4" is defined at 40 CFR §122.26(b)(8) to mean a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

1. Owned and operated by a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States;
2. Designed or used for collecting or conveying stormwater;
3. Which is not a combined sewer; and
4. Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR §122.2.

"New Project" means the "commencement of construction activities" occurs after the effective date of this permit.

"Ongoing Project" means the "commencement of construction activities" occurs before the effective date of this permit.

"Operator" for the purpose of this permit and in the context of stormwater associated with construction activity, means any party associated with a construction project that meets either of the following two criteria:

1. The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or
2. The party has day-to-day operational control of those activities at a project which are necessary to ensure compliance with a SWPPP for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the SWPPP or comply with other permit conditions). This definition is provided to inform permittees of EPA's interpretation of how the regulatory definitions of "owner or operator" and "facility or activity" are applied to discharges of stormwater associated with construction activity.

"Owner or operator" means the owner or operator of any ''facility or activity'' subject to regulation under the NPDES program.

"Permitting Authority" means the United States Environmental Protection Agency, EPA, a Regional Administrator of the Environmental Protection Agency or an authorized representative.

"Point Source" means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural stormwater runoff.

"Pollutant" is defined at 40 CFR §122.2. A partial listing from this definition includes: dredged spoil, solid waste, sewage, garbage, sewage sludge, chemical wastes, biological materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial or municipal waste.

"Project Area" means:
− The areas on the construction site where stormwater discharges originate and flow toward the point of discharge into the receiving waters (including areas where excavation, site development, or other ground disturbance activities occur) and the immediate vicinity. (Example: 1. Where bald eagles nest in a tree that is on or bordering a construction site and could be disturbed by the construction activity or where grading causes stormwater to flow into a small wetland or other habitat that is on the site that contains listed species.)
− The areas where stormwater discharges flow from the construction site to the point of discharge into receiving waters. (Example: Where stormwater flows into a ditch, swale, or gully that leads to receiving waters and where listed species (such as amphibians) are found in the ditch, swale, or gully.)
− The areas where stormwater from construction activities discharge into receiving waters and the areas in the immediate vicinity of the point of discharge. (Example: Where stormwater from construction activities discharges into a stream segment that is known to harbor listed aquatic species.)
− The areas where stormwater BMPs will be constructed and operated, including any areas where stormwater flows to and from BMPs. (Example: Where a stormwater retention pond would be built.)
− The areas upstream and /or downstream from construction activities discharges into a stream segment that may be affected by the said discharges. (Example: Where sediment discharged to a receiving stream settles downstream and impacts a breeding area of a listed aquatic species.)

"Receiving water" means the "Water of the United States" as defined in 40 CFR §122.2 into which the regulated stormwater discharges.

"Runoff coefficient" means the fraction of total rainfall that will appear at the conveyance as runoff.

"Semi-Arid Areas" means areas with an average annual rainfall of 10 to 20 inches.

"Site" means the land or water area where any "facility or activity" is physically located or conducted, including adjacent land used in connection with the facility or activity.

“Small Construction Activity” is defined at 40 CFR §122.26(b)(15) and incorporated here by reference. A small construction activity includes clearing, grading, and excavating resulting in a land disturbance that will disturb equal to or greater than one (1) acre and less than five (5) acres of land or will disturb less than one (1) acre of total land area but is part of a larger common plan of development or sale that will ultimately disturb equal to or greater than one (1) acre and less than five (5) acres. Small construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the site.

“Stormwater” means stormwater runoff, snow melt runoff, and surface runoff and drainage.

“Stormwater Discharge-Related Activities” as used in this permit, include: activities that cause, contribute to, or result in stormwater point source pollutant discharges, including but not limited to: excavation, site development, grading and other surface disturbance activities; and measures to control stormwater including the siting, construction and operation of BMPs to control, reduce or prevent stormwater pollution.

“Total Maximum Daily Load” or “TMDL” means the sum of the individual wasteload allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and natural background. If a receiving water has only one point source discharger, the TMDL is the sum of that point source WLA plus the LAs for any nonpoint sources of pollution and natural background sources, tributaries, or adjacent segments. TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure.

“Waters of the United States” is as defined at 40 CFR §122.2.

“Wetland” means those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

ACRONYMS

BMP - Best Management Practices
CGP - Construction General Permit
CFR - Code of Federal Regulations
CWA - Clean Water Act
EPA - United States Environmental Protection Agency
ESA - Endangered Species Act
FWS - United States Fish and Wildlife Service
MS4 - Municipal Separate Storm Sewer System
MSGP - Multi-Sector General Permit
NHPA - National Historic Preservation Act
NMFS - United States National Marine Fisheries Service
NOI - Notice of Intent

NOT - Notice of Termination
NPDES - National Pollutant Discharge Elimination System
POTW - Publicly Owned Treatment Works
SHPO - State Historic Preservation Officer
SWPPP - Stormwater Pollution Prevention Plan
THPO - Tribal Historic Preservation Officer
TMDL - Total Maximum Daily Load
WQS - Water Quality Standard

Appendix B - Permit Areas Eligible for Coverage

Permit coverage for stormwater discharges from construction activity occurring within the following areas is provided by legally separate and distinctly numbered permits:

1. EPA Region 1: CT, MA, ME, NH, RI, VT

US EPA, Region 01
Office of Ecosystem Protection
NPDES Stormwater Program
1 Congress St, Suite 1100 (CMU)
Boston, MA 02114-2023

The States of Connecticut, Maine, Rhode Island, and Vermont are the NPDES Permitting Authority for the majority of discharges within their respective states.

Permit No.	Areas of Coverage/Where EPA is Permitting Authority
MAR100000	Commonwealth of Massachusetts (except Indian country)
MAR10000I	Indian country within the State of Massachusetts
CTR10000I	Indian country within the State of Connecticut
NHR100000	State of New Hampshire
RIR10000I	Indian country within the State of Rhode Island
VTR10000F	Federal Facilities in the State of Vermont

2. EPA Region 2: NJ, NY, PR, VI

For NJ, NY, and VI:
US EPA, Region 02
NPDES Stormwater Program
290 Broadway, 24th Floor
New York, NY 10007-1866

For PR:
US EPA, Region 02
Caribbean Environmental Protection Division
NPDES Stormwater Program
1492 Ponce de Leon Ave
Central Europa Building, Suite 417
San Juan, PR 00907-4127

The State of New York is the NPDES Permitting Authority for the majority of discharges within its state. The State of New Jersey and the Virgin Islands are the NPDES Permitting Authority for all discharges within their respective states.

Permit No.	**Areas of Coverage/Where EPA is Permitting Authority**
NYR10000I	Indian country within the State of New York
PRR100000	The Commonwealth of Puerto Rico

3. EPA Region 3: DE, DC, MD, PA, VA, WV

US EPA, Region 03
NPDES Stormwater Program
1650 Arch St
Philadelphia, PA 19103

The State of Delaware is the NPDES Permitting Authority for the majority of discharges within its state. Maryland, Pennsylvania, Virginia, and West Virginia are the NPDES Permitting Authority for all discharges within their respective states.

Permit No.	**Areas of Coverage/Where EPA is Permitting Authority**
DCR100000	The District of Columbia
DER10000F	Federal Facilities in the State of Delaware

4. EPA Region 4: AL, FL, GA, KY, MS, NC, SC, TN

US EPA, Region 04
Water Management Division
NPDES Stormwater Program
61 Forsyth St SW
Atlanta, GA 30303-3104

Coverage Not Available. Construction activities in Region 4 must obtain permit coverage under an alternative permit.

5. EPA Region 5: IL, IN, MI, MN, OH, WI

US EPA, Region 05
NPDES & Technical Support
NPDES Stormwater Program
77 W Jackson Blvd
(WN-16J)
Chicago, IL 60604-3507

The States of Michigan, Minnesota, and Wisconsin are the NPDES Permitting Authority for the majority of discharges within their respective states. The States of Illinois, Indiana, and Ohio are the NPDES Permitting Authorities for all discharges within their respective states.

Permit No.	Areas of coverage/where EPA is Permitting Authority
MIR10000I	Indian country within the State of Michigan
MNR10000I	Indian country within the State of Minnesota, except the Grand Portage Band of Chippewa
WIR10000I	Indian country within the State of Wisconsin, except the Sokaogon Chippewa (Mole Lake) Community.

6. EPA Region 6: AR, LA, OK, TX, NM (except see Region 9 for Navajo lands, and see Region 8 for Ute Mountain Reservation lands)

US EPA, Region 06
NPDES Stormwater Program
1445 Ross Ave, Suite 1200
Dallas, TX 75202-2733

The States of Louisiana, Oklahoma, and Texas are the NPDES Permitting Authority for the majority of discharges within their respective state. The State of Arkansas is the NPDES Permitting Authority for all discharges within its respective state.

Permit No.	Areas of coverage/where EPA is Permitting Authority
LAR10000I	Indian country within the State of Louisiana
NMR100000	The State of New Mexico, except Indian country
NMR10000I	Indian country within the State of New Mexico, except Navajo Reservation Lands that are covered under Arizona permit AZR10000I and Ute Mountain Reservation Lands that are covered under Colorado permit COR10000I.
OKR10000I	Indian country within the State of Oklahoma
OKR10000F	Discharges in the State of Oklahoma that are not under the authority of the Oklahoma Department of Environmental Quality, including activities associated with oil and gas exploration, drilling, operations, and pipelines (includes SIC Groups 13 and 46, and SIC codes 492 and 5171), and point source discharges associated with agricultural production, services, and silviculture (includes SIC Groups 01, 02, 07, 08, 09).
TXR10000F	Discharges in the State of Texas that are not under the authority of the Texas Commission on Environmental Quality (formerly TNRCC), including activities associated with the exploration, development, or production of oil or gas or geothermal resources, including transportation of crude oil or natural gas by pipeline.
TXR10000I	Indian country within the State of Texas.

7. EPA Region 7: IA, KS, MO, NE (except see Region 8 for Pine Ridge Reservation Lands)

US EPA, Region 07
NPDES Stormwater Program
901 N 5th St
Kansas City, KS 66101

The States of Iowa, Kansas, and Nebraska are the NPDES Permitting Authority for the majority of discharges within their respective states. The State of Missouri is the NPDES Permitting Authority for all discharges within its state.

Permit No.	Areas of coverage/where EPA is Permitting Authority
IAR10000I	Indian country within the State of Iowa
KSR10000I	Indian country within the State of Kansas
NER10000I	Indian country within the State of Nebraska, except Pine Ridge Reservation lands (see Region 8)

8. EPA Region 8: CO, MT, ND, SD, WY, UT (except see Region 9 for Goshute Reservation and Navajo Reservation Lands), the Ute Mountain Reservation in NM, and the Pine Ridge Reservation in NE.

US EPA, Region 08
NPDES Stormwater Program
999 18th St, Suite 300
(EPR-EP)
Denver, CO 80202-2466

The States of Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming are the NPDES Permitting Authority for the majority of discharges within their respective states.

Permit No.	Areas of coverage/where EPA is Permitting Authority
COR10000F	Federal Facilities in the State of Colorado, except those located on Indian country
COR10000I	Indian country within the State of Colorado, as well as the portion of the Ute Mountain Reservation located in New Mexico
MTR10000I	Indian country within the State of Montana
NDR10000I	Indian country within the State of North Dakota, as well as that portion of the Standing Rock Reservation located in South Dakota (except for the portion of the lands within the former boundaries of the Lake Traverse Reservation which is covered under South Dakota permit SDR10000I listed below)
SDR10000I	Indian country within the State of South Dakota, as well as the portion of the Pine Ridge Reservation located in Nebraska and the portion of the lands within the former boundaries of the Lake

	Traverse Reservation located in North Dakota (except for the Standing Rock Reservation which is covered under North Dakota permit NDR10000I listed above)
UTR10000I	Indian country within the State of Utah, except Goshute and Navajo Reservation lands (see Region 9)
WYR10000I	Indian country within the State of Wyoming

9. EPA Region 9: CA, HI, NV, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, the Goshute Reservation in UT and NV, the Navajo Reservation in UT, NM, and AZ, the Duck Valley Reservation in ID, and the Fort McDermitt Reservation in OR.

US EPA, Region 09
NPDES Stormwater Program
75 Hawthorne St
San Francisco, CA 94105-3901

The States of Arizona, California and Nevada are the NPDES Permitting Authority for the majority of discharges within their respective states. The State of Hawaii is the NPDES Permitting Authority for all discharges within its state.

Permit No.	**Areas of coverage/where EPA is Permitting Authority**
ASR100000	The Island of American Samoa
AZR10000I	Indian country within the State of Arizona, as well as Navajo Reservation lands in New Mexico and Utah
CAR10000I	Indian country within the State of California
GUR100000	The Island of Guam
JAR100000	Johnston Atoll
MWR100000	Midway Island and Wake Island
MPR100000	Commonwealth of the Northern Mariana Islands
NVR10000I	Indian country within the State of Nevada, as well as the Duck Valley Reservation in Idaho, the Fort McDermitt Reservation in Oregon and the Goshute Reservation in Utah

10. EPA Region 10: AK, WA, ID (except see Region 9 for Duck Valley Reservation Lands), and OR (except see Region 9 for Fort McDermitt Reservation).

US EPA, Region 10
NPDES Stormwater Program
1200 6th Ave (OW-130)
Seattle, WA 98101-1128
Phone: (206) 553-6650

The States of Oregon and Washington are the NPDES Permitting Authority for the majority of discharges within their respective states.

Permit No.	Areas of coverage/where EPA is Permitting Authority
AKR100000	The State of Alaska, except Indian country
AKR10000I	Indian country within the state of Alaska
IDR100000	The State of Idaho, except Indian country
IDR10000I	Indian country within the State of Idaho, except Duck Valley Reservation lands (see Region 9)
ORR10000I	Indian country within the State of Oregon, except Fort McDermitt Reservation lands (see Region 9)
WAR10000F	Federal Facilities in the State of Washington, except those located on Indian country
WAR10000I	Indian country within the State of Washington

Appendix C - Endangered Species Act Review Procedures

You must meet at least one of the six criteria in Part 1.3.C.6 to be eligible for coverage under this permit. You must follow the procedures in this Appendix to assess the potential effects of stormwater discharges and stormwater discharge-related activities on listed species and their critical habitat. When evaluating these potential effects, operators must evaluate the entire project area.

For purposes of this Appendix, the term “project area” is inclusive of the term “Action Area.” Action area is defined in 50 CFR §402.02 as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action.

This includes areas beyond the footprint of the construction area that may be affected by stormwater discharges and stormwater discharge related activities. “Project area” is defined in Appendix A.

(Operators who are eligible and able to certify eligibility under Criterion B, C, D, or F of Part 1.3.C.6 because of a previously issued ESA section 10 permit, a previously completed ESA section 7 consultation, or because the operator’s activities were already addressed in another operator’s certification of eligibility may proceed directly to Step Four.)

Step One: Determine if Listed Threatened or Endangered Species are Present On or Near Your Project Area

You must determine, to the best of your knowledge, whether listed species are located on or near your project area. To make this determination, you should:

- Determine if listed species are in your county or township. The local offices of the U.S. Fish and Wildlife Service (FWS), National Marine Fisheries Service (NMFS), and State or Tribal Heritage Centers often maintain lists of federally listed endangered or threatened species on their internet sites. Visit http://www.epa.gov/npdes/stormwater/cgp to find the appropriate site for your state or check with your local office. In most cases, these lists allow you to determine if there are listed species in your county or township.
- If there are listed species in your county or township, check to see if critical habitat has been designated and if that area overlaps or is near your project area.
- Contact your local FWS, NMFS, or State or Tribal Heritage Center to determine if the listed species could be found on or near your project area and if any critical habitat areas have been designated that overlap or are near your project area. Critical habitat areas maybe designated independently from the listed species for your county, so even if there are no listed species in your county or township, you must still contact one of the agencies mentioned above to determine if there are any critical habitat areas on or near your project area.

You can also find critical habitat designations and associated requirements at 50 CFR Parts 17 and 226. http://www.access.gpo.gov.

- If there are no listed species in your county or township, no critical habitat areas on or near your project area, or if your local FWS, NMFS, or State or Tribal Heritage Center indicates that listed species are not a concern in your part of the county or township, you may check box A on the Notice of Intent Form.
- If there are listed species and if your local FWS, NMFS, or State or Tribal Heritage Center indicates that these species could exist on or near your project area, you will need to do one or more of the following:
  - Conduct visual inspections: This method may be particularly suitable for construction sites that are smaller in size or located in non-natural settings such as highly urbanized areas or industrial parks where there is little or no natural habitat, or for construction activities that discharge directly into municipal stormwater collection systems.
  - Conduct a formal biological survey. In some cases, particularly for larger construction sites with extensive stormwater discharges, biological surveys may be an appropriate way to assess whether species are located on or near the project area and whether there are likely adverse effects to such species. Biological surveys are frequently performed by environmental consulting firms. A biological survey may in some cases be useful in conjunction with Steps Two, Three, or Four of these instructions.
  - Conduct an environmental assessment under the National Environmental Policy Act (NEPA). Such reviews may indicate if listed species are in proximity to the project area. Coverage under the CGP does not trigger such a review because the CGP does not regulate new sources (that is, dischargers subject to New Source Performance Standards under section 306 of the Clean Water Act), and is thus statutorily exempted from NEPA. See CWA section 511(c). However, some construction activities might require review under NEPA for other reasons such as federal funding or other federal involvement in the project.
  - If listed threatened or endangered species or critical habitat are present in the project area, you must look at impacts to species and/or habitat when following Steps Two through Four. Note that many but not all measures imposed to protect listed species under these steps will also protect critical habitat. Thus, meeting the eligibility requirements of this CGP may require measures to protect critical habitat that are separate from those to protect listed species.

Step Two: Determine if the Construction Activity's Stormwater Discharges or Stormwater Discharge- Related Activities Are Likely to Adversely Affect Listed Threatened or Endangered Species or Designated Critical Habitat

To receive CGP coverage, you must assess whether your stormwater discharges or stormwater discharge related activities is likely to adversely affect listed threatened or endangered species or designated critical habitat that are present on or near your project area.

Potential adverse effects from stormwater discharges and stormwater discharge-related activities include:

- *Hydrological.* Stormwater discharges may cause siltation, sedimentation or induce other changes in receiving waters such as temperature, salinity or pH. These effects will vary with the amount of stormwater discharged and the volume and condition of the receiving water. Where a stormwater discharge constitutes a minute portion of the total volume of the receiving water, adverse hydrological effects are less likely. Construction activity itself may also alter drainage patterns on a site where construction occurs that can impact listed species or critical habitat.
- *Habitat.* Excavation, site development, grading, and other surface disturbance activities from construction activities, including the installation or placement of stormwater BMPs, may adversely affect listed species or their habitat. Stormwater may drain or inundate listed species habitat.
- *Toxicity.* In some cases, pollutants in stormwater may have toxic effects on listed species.

The scope of effects to consider will vary with each site. If you are having difficulty determining whether your project is likely to adversely affect listed species or critical habitat, or one of the Services has already raised concerns to you, you must contact the appropriate office of the FWS, NMFS or Natural Heritage Center for assistance. If adverse effects are not likely, then you may check box E on the NOI form and apply for coverage under the CGP. If the discharge may adversely effect listed species or critical habitat, you must follow Step Three.

Step Three: Determine if Measures Can Be Implemented to Avoid Adverse Effects
If you make a preliminary determination that adverse effects are likely to occur, you can still receive coverage under Criterion E of Part 1.3.C.6 of the CGP if appropriate measures are undertaken to avoid or eliminate the likelihood of adverse effects prior to applying for CGP coverage. These measures may involve relatively simple changes to construction activities such as re-routing a stormwater discharge to bypass an area where species are located, relocating BMPs, or by changing the “footprint” of the construction activity. You should contact the FWS and/or NMFS to see what appropriate measures might be suitable to avoid or eliminate the likelihood of adverse impacts to listed species and/or critical habitat. (See 50 CFR §402.13(b)). This can entail the initiation of informal consultation with the FWS and/or NMFS (described in more detail in Step Four).

If you adopt measures to avoid or eliminate adverse affects, you must continue to abide by those measures for the duration of the construction project and coverage under the CGP. These measures must be described in the SWPPP and are enforceable CGP conditions and/or conditions for meeting the eligibility criteria in Part 1.3. If appropriate measures to avoid the likelihood of adverse effects are not available, you must follow Step Four.

Step Four: Determine if the Eligibility Requirements of Criterion B, C, D, or F of Part 1.3.C.6 Can Be Met
Where adverse effects are likely, you must contact the FWS and/or NMFS. You may still be eligible for CGP coverage if any likely adverse effects can be addressed through meeting Criterion B, C, D, or F of Part 1.3.C.6 of the CGP. These criteria are as follows:

1. *An ESA Section 7 Consultation Is Performed for Your Activity (See Criterion B or C of Part 1.3.C.6 of the CGP).*

Formal or informal ESA section 7 consultation is performed with the FWS and/or NMFS that addresses the effects of your stormwater discharges and stormwater discharge-related activities on federally-listed and threatened species and designated critical habitat. FWS and/or NMFS may request that consultation take place if any actions are identified that may affect listed species or critical habitat. In order to be eligible for coverage under this permit, consultation must result in a “no jeopardy opinion” or a written concurrence by the Service(s) on a finding that your stormwater discharge(s) and stormwater discharge-related activities are not likely to adversely affect listed species or critical habitat (For more information on consultation, see 50 CFR §402). If you receive a “jeopardy opinion,” you may continue to work with the FWS and/or NMFS and your permitting authority to modify your project so that it will not jeopardize listed species or designated critical habitat.

Most consultations are accomplished through informal consultation. By the terms of this CGP, EPA has automatically designated operators as non-federal representatives for the purpose of conducting informal consultations. See Part 1.3.C.6 and 50 CFR §402.08 and §402.13. When conducting informal ESA section 7 consultation as a non-federal representative, you must follow the procedures found in 50 CFR Part 402 of the ESA regulations. You must notify FWS and/or NMFS of your intention and agreement to conduct consultation as a non-federal representative.

Consultation may occur in the context of another federal action at the construction site (e.g., where ESA section 7 consultation was performed for issuance of a wetlands dredge and fill permit for the project or where a NEPA review is performed for the project that incorporates a section 7 consultation). Any terms and conditions developed through consultations to protect listed species and critical habitat must be incorporated into the SWPPP. As noted above, operators may, if they wish, initiate consultation with the Services at Step Four.

Whether ESA section 7 consultation must be performed with either the FWS, NMFS or both Services depends on the listed species that may be affected by the operator’s activity. In general, NMFS has jurisdiction over marine, estuaries, and anadromous species. Operators should also be aware that while formal section 7 consultation provides protection from incidental takings liability, informal consultation does not.

2. *An Incidental Taking Permit Under Section 10 of the ESA is Issued for the Operators Activity (See Criterion D of Part 1.3.C.6 of the CGP).*

Your construction activities are authorized through the issuance of a permit under section 10 of the ESA and that authorization addresses the effects of your stormwater discharge(s) and stormwater discharge-related activities on federally-listed species and designated critical habitat. You must follow FWS and/or NMFS procedures when applying for an ESA Section 10 permit (see 50 CFR §17.22(b)(1) for FWS and §222.22

for NMFS). Application instructions for section 10 permits for FWS and NMFS can be obtained by accessing the FWS and NMFS websites (http://www.fws.gov and http://www.nmfs.noaa.gov) or by contacting the appropriate FWS and NMFS regional office.

3. *You are Covered Under the Eligibility Certification of Another Operator for the Project Area (See Criterion F of Part 1.3.C.6 of the CGP).*

Your stormwater discharges and stormwater discharge-related activities were already addressed in another operator's certification of eligibility under Criteria A through E of Part 1.3.C.6 which also included your project area. For example, a general contractor or developer may have completed and filed an NOI for the entire project area with the necessary Endangered Species Act certifications (criteria A-E), subcontractors may then rely upon that certification and must comply with any conditions resulting from that process. By certifying eligibility under Criterion F of Part 1.3.C.6, you agree to comply with any measures or controls upon which the other operator's certification under Criterion B, C, or D of Part 1.3.C.6 was based. Certification under Criterion F of Part 1.3.C.6 is discussed in more detail in the Fact Sheet that accompanies this permit.

You must comply with any terms and conditions imposed under the eligibility requirements of Criterion A through F to ensure that your stormwater discharges and stormwater discharge-related activities are protective of listed species and/or critical habitat. Such terms and conditions must be incorporated in the project's SWPPP. If the eligibility requirements of Part 1.3.C.6 cannot be met, then you are not eligible for coverage under the CGP. In these instances, you may consider applying to EPA for an individual permit.

Appendix D - Small Construction Waivers and Instructions

These waivers are only available to stormwater discharges associated with small construction activities (i.e., 1-5 acres). As the operator of a small construction activity, you may be able to qualify for a waiver in lieu of needing to obtain coverage under this general permit based on: (A) a low rainfall erosivity factor, (B) a TMDL analysis, or (C) an equivalent analysis that determines allocations for small construction sites are not needed. Each operator, otherwise needing permit coverage, must notify EPA of its intention for a waiver. It is the responsibility of those individuals wishing to obtain a waiver from coverage under this general permit to submit a complete and accurate waiver certification as described below. Where the operator changes or another is added during the construction project, the new operator must also submit a waiver certification to be waived.

A. Rainfall Erosivity Waiver

Under this scenario the small construction project's rainfall erosivity factor calculation ("R" in the Revised Universal Soil Loss Equation) is less than 5 during the period of construction activity. The operator must certify to the EPA that construction activity will occur only when the rainfall erosivity factor is less than 5. The period of construction activity begins at initial earth disturbance and ends with final stabilization. Where vegetation will be used for final stabilization, the date of installation of a stabilization practice that will provide interim non-vegetative stabilization can be used for the end of the construction period, provided the operator commits (as a condition of waiver eligibility) to periodically inspect and properly maintain the area until the criteria for final stabilization as defined in the construction general permit have been met. If use of this interim stabilization eligibility condition was relied on to qualify for the waiver, signature on the waiver with its certification statement constitutes acceptance of and commitment to complete the final stabilization process. The operator must submit a waiver certification to EPA prior to commencing construction activities.

> *Note: The rainfall erosivity factor "R" is determined in accordance with Chapter 2 of Agriculture Handbook Number 703, Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE), pages 21–64, dated January 1997; United States Department of Agriculture (USDA), Agricultural Research Service.*

EPA has developed an online rainfall erosivity calculator to help small construction sites determine potential eligibility for the rainfall erosivity waiver.You can access the calculator from EPA's website at: www.epa.gov/npdes/stormwater/lew. The R factor can easily be calculated by using the construction site latitude/longitude or address and estimated start and end dates of construction. This calculator may also be useful in determining the time periods during which construction activity could be waived from permit coverage. You may find that moving your construction activity by a few weeks or expediting site stabilization will allow you to qualify for the waiver. Use this online calculator or the Construction Rainfall Erosivity Waiver Fact Sheet (www.epa.gov/npdes/pubs/fact3-1.pdf) to assist in determining the R Factor for your small construction site.

If you are the operator of the construction activity and eligible for a waiver based on low erosivity potential, you may submit a rainfall erosivity waiver electronically via EPA's eNOI system (www.epa.gov/npdes/eNOI) or provide the following information on the waiver certification form in order to be waived from permitting requirements:

1. Name, address and telephone number of the construction site operators;
2. Name (or other identifier), address, county or similar governmental subdivision, and latitude/longitude of the construction project or site;
3. Estimated construction start and completion (i.e., final stabilization) dates, and total acreage (to the nearest quarter acre) to be disturbed;
4. The rainfall erosivity factor calculation that applies to the active construction phase at your project site; and
5. A statement, signed and dated by an authorized representative as provided in Appendix G, Subsection 11, that certifies that the construction activity will take place during a period when the value of the rainfall erosivity factor is less than five.

You can access the waiver certification form from EPA's website at: (http://www.epa.gov/npdes/pubs/construction_waiver_form.pdf). Paper copies of the form must be sent to one of the addresses listed in Part D of this section.

Note: If the R factor is 5 or greater, you cannot apply for the rainfall erosivity waiver, and must apply for permit coverage as per Subpart 2.1 of the construction general permit, unless you qualify for the Water Quality Waiver as described below.

If your small construction project continues beyond the projected completion date given on the waiver certification, you must recalculate the rainfall erosivity factor for the new project duration. If the R factor is below five (5), you must update all applicable information on the waiver certification and retain a copy of the revised waiver as part of the site SWPPP. The new waiver certification must be submitted prior to the projected completion date listed on the original waiver form to assure your exemption from permitting requirements is uninterrupted. If the new R factor is five (5) or above, you must submit an NOI as per Part 2.

B. TMDL Waiver

This waiver is available if EPA has established or approved a TMDL that addresses the pollutant(s) of concern and has determined that controls on stormwater discharges from small construction activity are not needed to protect water quality. The pollutant(s) of concern include sediment (such as total suspended solids, turbidity or siltation) and any other pollutant that has been identified as a cause of impairment of any water body that will receive a discharge from the construction activity. Information on TMDLs that have been established or approved by EPA is available from EPA online at http://www.epa.gov/owow/tmdl/ and from state and tribal water quality agencies.

If you are the operator of the construction activity and eligible for a waiver based on compliance with an EPA established or approved TMDL, you must provide the following information on the Waiver Certification form in order to be waived from permitting requirements:

1. Name, address and telephone number of the construction site operator(s);
2. Name (or other identifier), address, county or similar governmental subdivision, and latitude/longitude of the construction project or site;
3. Estimated construction start and completion (i.e., final stabilization) dates, and total acreage (to the nearest quarter acre) to be disturbed;
4. The name of the water body(s) that would be receiving stormwater discharges from your construction project;
5. The name and approval date of the TMDL;
6. A statement, signed and dated by an authorized representative as provided in Appendix G, Subsection 11, that certifies that the construction activity will take place and that the stormwater discharges will occur, within the drainage area addressed by the TMDL.

C. Equivalent Analysis Waiver

This waiver is available for non-impaired waters only. The operator can develop an equivalent analysis that determines allocations for his small construction site for the pollutant(s) of concern or determines that such allocations are not needed to protect water quality. This waiver requires a small construction operator to develop an equivalent analysis based on existing in-stream concentrations, expected growth in pollutant concentrations from all sources, and a margin of safety.

If you are a construction operator who wants to use this waiver, you must develop your equivalent analysis and provide the following information to be waived from permitting requirements:

1. Name, address and telephone number of the construction site operator(s);
2. Name (or other identifier), address, county or similar governmental subdivision, and latitude/longitude of the construction project or site;
3. Estimated construction start and completion (i.e., final stabilization) dates, and total acreage (to the nearest quarter acre) to be disturbed;
4. The name of the water bodies that would be receiving stormwater discharges from your construction project;
5. Your equivalent analysis;
6. A statement, signed and dated by an authorized representative as provided in Appendix G, Subsection 11, that certifies that the construction activity will take place and that the stormwater discharges will occur, within the drainage area addressed by the equivalent analysis.

D. Waiver Deadlines and Submissions

1. Waiver certifications must be submitted prior to commencement of construction activities.
2. If you submit a TMDL or equivalent analysis waiver request, you are not waived until EPA approves your request. As such, you may not commence construction activities until receipt of approval from EPA.
3. Late Notifications: Operators are not prohibited from submitting waiver certifications after initiating clearing, grading, excavation activities, or other construction activities. The Agency reserves the right to take enforcement for any unpermitted discharges that occur between the time construction commenced and waiver authorization is granted.

Submittal of a waiver certification is an optional alternative to obtaining permit coverage for discharges of stormwater associated with small construction activity, provided you qualify for the waiver. Any discharge of stormwater associated with small construction activity not covered by either a permit or a waiver may be considered an unpermitted discharge under the Clean Water Act. As mentioned above, EPA reserves the right to take enforcement for any unpermitted discharges that occur between the time construction commenced and either discharge authorization is granted or a complete and accurate waiver certification is submitted. EPA may notify any operator covered by a waiver that they must apply for a permit. EPA may notify any operator who has been in non-compliance with a waiver that they may no longer use the waiver for future projects. Any member of the public may petition EPA to take action under this provision by submitting written notice along with supporting justification.

Complete and accurate Rainfall Erosivity waiver certifications not otherwise submitted electronically via EPA’s eNOI system (www.epa.gov/npdes/eNOI) must be sent to one of the following addresses:

Regular U.S. Mail Delivery
EPA Stormwater Notice Processing Center
Mail Code 4203M
U.S. EPA
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Overnight/Express Mail Delivery
EPA Stormwater Notice Processing Center
Room 7420
U.S. EPA
1201Constitution Avenue, NW
Washington, DC 20004

Complete and accurate TMDL or equivalent analysis waiver requests must be sent to the applicable EPA Region office specified in Appendix B.

Appendix E - Notice of Intent Form and Instructions

From the effective date of this permit, operators are to use the Notice of Intent Form contained in this Appendix to obtain permit coverage.

This Form Replaces Form 3510-9 (8-98)
Refer to the Following Pages for Instructions

Form Approved OMB Nos. 2040-0188 and 2040-0211

NPDES FORM

EPA

United States Environmental Protection Agency
Washington, DC 20460

Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity Under an NPDES General Permit

Submission of this Notice of Intent (NOI) constitutes notice that the party identified in Section II of this form requests authorization to discharge pursuant to the NPDES Construction General Permit (CGP) permit number identified in Section I of this form. Submission of this NOI also constitutes notice that the party identified in Section II of this form meets the eligibility requirements of the CGP for the project identified in Section III of this form. Permit coverage is required prior to commencement of construction activity until you are eligible to terminate coverage as detailed in the CGP. To obtain authorization, you must submit a complete and accurate NOI form. Refer to the instructions at the end of this form.

I. Permit Number

II. Operator Information

Name:

IRS Employer Identification Number (EIN): –

Mailing Address:

Street:

City: State: Zip Code: -

Phone: - - Fax (optional): - -

E-mail:

III. Project/Site Information

Project/Site Name:

Project Street/Location:

City: State: Zip Code: -

County or similar government subdivision:

Latitude/Longitude (Use one of three possible formats, and specify method)

Latitude 1. __ __° __ __′ __ __″ N (degrees, minutes, seconds)
2. __ __° __ __. __ __′ N (degrees, minutes, decimal)
3. __ __. __ __ __ __° N (degrees decimal)

Longitude 1. __ __ __° __ __′ __ __″ W (degrees, minutes, seconds)
2. __ __ __° __ __. __ __′ W (degrees, minutes, decimal)
3. __ __ __. __ __ __ __° W (degrees decimal)

Method: ☐ U.S.G.S. topographic map ☐ EPA web site ☐ GPS ☐ Other:

If you used a U.S.G.S. topographic map, what was the scale? ____________________

Project located in Indian Country? ☐ YES ☐ NO

If yes, name of reservation, or if not part of a reservation, put “Not Applicable:” ____________________

Estimated Project Start Date: / /
Month Day Year

Estimated Project Completion Date: / /
Month Day Year

Estimated Area to be Disturbed (to the nearest quarter acre): .

IV. SWPPP Information

Has the SWPPP been prepared in advance of filing this NOI? ☐ YES ☐ NO

Location of SWPP for Viewing: ☐ Address in Section II ☐ Address in Section III ☐ Other
If other:

SWPPP Street:

City: State: Zip Code: -

SWPPP Contact Information (if different than that in Section II):

Name:

Phone: - - Fax (optional): - -

E-mail:

V. Discharge Information

Identify the name(s) of waterbodies to which you discharge. ______________________________

____

Is this discharge consistent with the assumptions and requirements of applicable EPA approved or established TMDL(s)? ☐ YES ☐ NO

VI. Endangered Species Protection

Under which criterion of the permit have you satisfied your ESA eligibility obligations?

☐ A ☐ B ☐ C ☐ D ☐ E ☐ F

If you select criterion F, provide permit tracking number of operator under which you are certifying eligibility:

VII. Certification Information

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name:

Title:

Signature: ______________________________ Date:

E-mail: ______________________________

NOI Preparer (Complete if NOI was prepared by someone other than the certifier)

Prepared by:

Organization:

Phone: - - Ext. E-mail: ______________________________

Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity Under an NPDES General Permit

NPDES Form Date | This Form Replaces Form 3510-9 (8/98) | Form Approved OMB Nos. 2040-0188 and 2040-0211

Who Must File an NOI Form

Under the provisions of the Clean Water Act, as amended (33 U.S.C. 1251 et. seq.; the Act), federal law prohibits storm water discharges from certain construction activities to waters of the U.S. unless that discharge is covered under a National Pollutant Discharge Elimination System (NPDES) Permit. Operator(s) of construction sites where one or more acres are disturbed, smaller sites that are part of a larger common plan of development or sale where there is a cumulative disturbance of at least one acre, or any other site specifically designated by the Director, must submit an NOI to obtain coverage under an NPDES general permit. Each person, firm, public organization, or any other entity that meets either of the following criteria must file this form: (1) they have operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or (2) they have day-to-day operational control of those activities at the project necessary to ensure compliance with SWPPP requirements or other permit conditions. If you have questions about whether you need an NPDES storm water permit, or if you need information to determine whether EPA or your state agency is the permitting authority, refer to *www.epa.gov/npdes/stormwater/cgp* or telephone the Storm Water Notice Processing Center at (866) 352-7755.

Where to File NOI Form

See the applicable CGP for information on where to send your completed NOI form.

Completing the Form

Obtain and read a copy of the appropriate EPA Storm Water Construction General Permit for your area. To complete this form, type or print uppercase letters, in the appropriate areas only. Please place each character between the marks (abbreviate if necessary to stay within the number of characters allowed for each item). Use one space for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions on this form, refer to *www.epa.gov/npdes/stormwater/cgp* or telephone the Storm Water Notice Processing Center at (866) 352-7755. Please submit original document with signature in ink . do not send a photocopied signature.

Section I. Permit Number

Provide the number of the permit under which you are applying for coverage (see Appendix B of the general permit for the list of eligible permit numbers).

Section II. Operator Information

Provide the legal name of the person, firm, public organization, or any other entity that operates the project described in this application. An operator of a project is a legal entity that controls at least a portion of site operations and is not necessarily the site manager. Provide the employer identification number (EIN from the Internal Revenue Service; IRS), also commonly referred to as your taxpayer ID. If the applicant does not have an EIN enter "NA" in the space provided. Also provide the operator's mailing address, telephone number, fax number (optional) and e-mail address (to be notified via e-mail of NOI approval when available). Correspondence for the NOI will be sent to this address.

Section III. Project/Site Information

Enter the official or legal name and complete street address, including city, state, zip code, and county or similar government subdivision of the project or site. If the project or site lacks a street address, indicate the general location of the site (e.g., Intersection of State Highways 61 and 34). Complete site information must be provided for permit coverage to be granted.

The applicant must also provide the latitude and longitude of the facility either in degrees, minutes, seconds; degrees, minutes, decimal; or decimal format. The latitude and longitude of your facility can be determined in several different ways, including through the use of global positioning system (GPS) receivers, U.S. Geological Survey (U.S.G.S.) topographic or quadrangle maps, and EPA's web-based siting tools, among others. Refer to *www.epa.gov/npdes/stormwater/cgp* for further guidance on the use of these methodologies. For consistency, EPA requests that measurements be taken from the approximate center of the construction site. Applicants must specify which method they used to determine latitude and longitude. If a U.S.G.S. topographic map is used, applicants are required to specify the scale of the map used.

Indicate whether the project is in Indian country, and if so, provide the name of the Reservation. If the project is in Indian Country Lands that are not part of a Reservation, indicate "not applicable" in the space provided.

Enter the estimated construction start and completion dates using four digits for the year (i.e., 05/27/1998). Enter the estimated area to be disturbed including but not limited to: grubbing, excavation, grading, and utilities and infrastructure installation. Indicate to the nearest quarter acre. Note: 1 acre = 43,560 sq. ft.

Section IV. SWPPP Information

Indicate whether or not the SWPPP was prepared in advance of filing the NOI form. Check the appropriate box for the location where the SWPPP may be viewed. Provide the name, fax number (optional), and e-mail address of the contact person if different than that listed in Section II of the NOI form.

Section V. Discharge Information

Enter the name(s) of receiving waterbodies to which the project's storm water will discharge. These should be the first bodies of water that the discharge will reach. (Note: If you discharge to more than one waterbody, please indicate all such waters in the space provided and attach a separate sheet if necessary.) For example, if the discharge leaves your site and travels through a roadside swale or a storm sewer and then enters a stream that flows to a river, the stream would be the receiving waterbody. Waters of the U.S. include lakes, streams, creeks, rivers, wetlands, impoundments, estuaries, bays, oceans, and other surface bodies of water within the confines of the U.S. and U.S. coastal waters. Waters of the U.S. do not include man-made structures created solely for the purpose of wastewater treatment. U.S. Geological Survey topographical maps may be used to make this determination. If the map does not provide a name, use a format such as "unnamed tributary to Cross Creek". If you discharge into a municipal separate storm sewer system (MS4), you must identify the waterbody into which that portion of the storm sewer discharges. That information should be readily available from the operator of the MS4.

Indicate whether your storm water discharges from construction activities will be consistent with the assumptions and requirements of applicable EPA approved or established TMDL(s). To answer this question, refer to *www.epa.gov/npdes/stormwater/cgp* for state- and regional-specific TMDL information related to the construction general permit. You may also have to contact your EPA regional office or state agency. If there are no applicable TMDLs or no related requirements, please check the "yes" box in the NOI form.

Section VI. Endangered Species Information
Indicate for which criterion (i.e., A, B, C, D, E, or F) of the permit the applicant is eligible with regard to protection of federally listed endangered and threatened species, and designated critical habitat. See Part 1.3.C.6 and Appendix C of the permit. If you select criterion F, provide the permit tracking number of the operator under which you are certifying eligibility. The permit tracking number is the number assigned to the operator by the Storm Water Notice Processing Center after EPA acceptance of a complete NOI.

Section VII. Certification Information
All applications, including NOIs, must be signed as follows: *For a corporation:* By a responsible corporate officer. For the purpose of this Section, a responsible corporate officer means:

(i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

For a partnership or sole proprietorship: By a general partner or the proprietor, respectively; or

For a municipality, state, federal, or other public agency: By either a principal executive officer or ranking elected official. For purposes of this Part, a principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

Include the name, title, and email address of the person signing the form and the date of signing. An unsigned or undated NOI form will not be considered eligible for permit coverage. If the NOI was prepared by someone other than the certifier (for example, if the NOI was prepared by the facility SWPPP contact or a consultant for the certifier's signature), include the name, organization, phone number and email address of the NOI preparer.

Paperwork Reduction Act Notice
Public reporting burden for this application is estimated to average 3.7 hours. This estimate includes time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Send comments regarding the burden estimate, any other aspect of the collection of information, or suggestions for improving this form, including any suggestions which may increase or reduce this burden to: Chief, Information Policy Branch 2136, U.S. Environmental Protection, Agency, 1200 Pennsylvania Avenue, NW, Washington, D.C. 20460. Include the OMB control number on any correspondence. Do not send the completed form to this address.

Visit this website for mailing instructions:
www.epa.gov/npdes/stormwater/mail

Visit this website for instructions on how to submit electronically:
www.epa.gov/npdes/stormwater/enoi

Appendix F - Notice of Termination Form and Instructions

From the effective date of this permit, operators are to use the Notice of Termination Form contained in this Appendix to terminate permit coverage.

This Form Replaces Form 3517-7 (8-98)
Refer to the Following Page for Instructions

Form Approved OMB Nos. 2040-0086 and 2040-0211

NPDES FORM

EPA

United States Environmental Protection Agency
Washington, DC 20460

Notice of Termination (NOT) of Coverage Under an NPDES General Permit for Stormwater Discharges Associated with Construction Activity

Submission of this Notice of Termination constitutes notice that the party identified in Section II of this form is no longer authorized to discharge stormwater associated with construction activity under the NPDES program from the site identified in Section III of this form. All necessary information must be included on this form. Refer to the instructions at the end of this form.

I. Permit Information

NPDES Stormwater General Permit Tracking Number: ☐☐☐☐☐☐☐☐☐

Reason for Termination (Check only one):

☐ Final stabilization has been achieved on all portions of the site for which you are responsible.

☐ Another operator has assumed control, according to Appendix G, Section 11.C of the CGP, over all areas of the site that have not been finally stabilized.

☐ Coverage under an alternative NPDES permit has been obtained.

☐ For residential construction only, temporary stabilization has been completed and the residence has been transferred to the homeowner.

II. Operator Information

Name:

IRS Employer Identification Number (EIN): ☐☐ – ☐☐☐☐☐☐☐

Mailing Address:

Street:

City: State: Zip Code: -

Phone: - - Fax (optional): - -

E-mail:

III. Project/Site Information

Project/Site Name:

Project Street/Location:

City: State: Zip Code: -

County or similar government subdivision:

IV. Certification Information

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name: ______________________________

Print Title: ______________________________

Email: ______________________________

Signature: ______________________________

Date: ______________________________

Instructions for Completing EPA Form 3510-13

Notice of Termination (NOT) of Coverage Under an NPDES General Permit for Stormwater Discharges Associated with Construction Activity

NPDES Form — This Form Replaces Form 3517-7 (8-98) — Form Approved OMB Nos. 2040-0086 and 2040-0211

Who May File an NOT Form
Permittees who are presently covered under the EPA-issued National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction Activity may submit an NOT form when final stabilization has been achieved on all portions of the site for which you are responsible; another operator has assumed control in accordance with Appendix G, Section 11.C of the General Permit over all areas of the site that have not been finally stabilized; coverage under an alternative NPDES permit has been obtained; or for residential construction only, temporary stabilization has been completed and the residence has been transferred to the homeowner.

"Final stabilization" means that all soil disturbing activities at the site have been completed and that a uniform perennial vegetative cover with a density of at least 70% of the native background vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed. See "final stabilization" definition in Appendix A of the Construction General Permit for further guidance where background native vegetation covers less than 100 percent of the ground, in arid or semi-arid areas, for individual lots in residential construction, and for construction projects on land used for agricultural purposes.

Completing the Form
Type or print, using uppercase letters, in the appropriate areas only. Please place each character between the marks. Abbreviate if necessary to stay within the number of characters allowed for each item. Use only one space for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions about this form, refer to *www.epa.gov/npdes/stormwater/cgp* or telephone the Stormwater Notice Processing Center at (866) 352-7755. Please submit original document with signature in ink - do not send a photocopied signature.

Section I. Permit Number
Enter the existing NPDES Stormwater General Permit Tracking Number assigned to the project by EPA's Stormwater Notice Processing Center. If you do not know the permit tracking number, refer to *www.epa.gov/npdes/stormwater/cgp* or contact the Stormwater Notice Processing Center at (866) 352-7755.

Indicate your reason for submitting this Notice of Termination by checking the appropriate box. Check only one:

> *Final stabilization has been achieved on all portions of the site for which you are responsible.*
>
> *Another operator has assumed control according to Appendix G, Section 11.C over all areas of the site that have not been finally stabilized.*
>
> *Coverage under an alternative NPDES permit has been obtained.*
>
> *For residential construction only, if temporary stabilization has been completed and the residence has been transferred to the homeowner.*

Section II. Operator Information
Provide the legal name of the person, firm, public organization, or any other entity that operates the project described in this application and is covered by the permit tracking number identified in Section I. The operator of the project is the legal entity that controls the site operation, rather than the site manager. Provide the employer identification number (EIN from the Internal Revenue Service; IRS). If the applicant does not have an EIN enter "NA" in the space provided. Enter the complete mailing address, telephone number, and email address of the operator. Optional: enter the fax number of the operator.

Section III. Project/Site Information
Enter the official or legal name and complete street address, including city, state, zip code, and county or similar government subdivision of the project or site. If the project or site lacks a street address, indicate the general location of the site (e.g., Intersection of State Highways 61 and 34). Complete site information must be provided for termination of permit coverage to be valid.

Section IV. Certification Information
All applications, including NOIs, must be signed as follows:
For a corporation: By a responsible corporate officer. For the purpose of this Part, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy-or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

For a partnership or sole proprietorship: By a general partner or the proprietor, respectively; or

For a municipality, state, federal, or other public agency: By either a principal executive officer or ranking elected official. For purposes of this Part, a principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

Include the name, title, and email address of the person signing the form and the date of signing. An unsigned or undated NOT form will not be considered valid termination of permit coverage.

Paperwork Reduction Act Notice
Public reporting burden for this application is estimated to average 0.5 hours per notice, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Send comments regarding the burden estimate, any other aspect of the collection of information, or suggestions for improving this form including any suggestions which may increase or reduce this burden to: Chief, Information Policy Branch, 2136, U.S. Environmental Protection Agency, 1200 Pennsylvania Avenue, NW, Washington, DC 20460. Include the OMB number on any correspondence. Do not send the completed form to this address.

Visit this website for mailing instruction:
www.epa.gov/npdes/stormwater/mail

Visit this website for instructions on how to submit electronically:
www.epa.gov/npdes/stormwater/enoi

Appendix G - Standard Permit Conditions
STANDARD PERMIT CONDITIONS
1. Duty To Comply

You must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

A. You must comply with effluent standards or prohibitions established under section 307(a) of the Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement.

B. The Clean Water Act provides that any person who violates section 301, 302, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any such sections in a permit issued under section 402, or any requirement imposed in a pretreatment program approved under sections 402(a)(3) or 402(b)(8) of the Act, is subject to a civil penalty not to exceed the maximum amounts authorized by Section 309(d) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. §2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. §3701 note) (currently $27,500 per day for each violation).

   The Clean Water Act provides that any person who negligently violates sections 301, 302, 306, 307, 308, 318, or 405 of the Act, or any condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, or any requirement imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act, is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation, or by imprisonment of not more than 2 years, or both. Any person who knowingly violates such sections, or such conditions or limitations is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than 6 years, or both. Any person who knowingly violates section 301, 302, 303, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than $250,000 or imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than $500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in section 309(c)(3)(B)(iii) of the CWA, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions.

C. Any person may be assessed an administrative penalty by the Administrator for violating section 301, 302, 306, 307, 308, 318 or 405 of this Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Pursuant to 40 CFR Part 19 and the Act, administrative penalties for Class I violations are not to exceed the maximum amounts authorized by Section 309(g)(2)(A) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. §2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. §3701 note) (currently $11,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $27,500). Pursuant to 40 CFR Part 19 and the Act, penalties for Class II violations are not to exceed the maximum amounts authorized by Section 309(g)(2)(B) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. §2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. §3701 note) (currently $11,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $137,500).

2. Duty to Reapply

If you wish to continue an activity regulated by this permit after the expiration date of this permit, you must apply for and obtain a new permit.

3. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for you in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

4. Duty to Mitigate

You must take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

5. Proper Operation and Maintenance

You must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by you to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems which are installed by you only when the operation is necessary to achieve compliance with the conditions of this permit.

6. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. Your filing of a request for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

7. Property Rights

This permit does not convey any property rights of any sort, or any exclusive privileges.

8. Duty to Provide Information

You must furnish to EPA, within a reasonable time, any information which EPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. You must also furnish to EPA upon request, copies of records required to be kept by this permit.

9. Inspection and Entry

You must allow EPA, or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon presentation of credentials and other documents as may be required by law, to:

A. Enter upon your premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

B. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

C. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

D. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

10. Monitoring and Records

A. Samples and measurements taken for the purpose of monitoring must be representative of the monitored activity.

B. You must retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of EPA at any time.

C. Records of monitoring information must include:

1. The date, exact place, and time of sampling or measurements;
2. The individual(s) who performed the sampling or measurements;
3. The date(s) analyses were performed
4. The individual(s) who performed the analyses;
5. The analytical techniques or methods used; and
6. The results of such analyses.

D. Monitoring results must be conducted according to test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, unless other test procedures have been specified in the permit.

E. The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

11. Signatory Requirements

A. All applications, including NOIs, must be signed as follows:

1. For a corporation: By a responsible corporate officer. For the purpose of this Part, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any

other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

2. For a partnership or sole proprietorship: By a general partner or the proprietor, respectively; or
3. For a municipality, state, federal, or other public agency: By either a principal executive officer or ranking elected official. For purposes of this Part, a principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

B. All reports required by this permit, including SWPPPs, must be signed by a person described in Appendix G, Subsection 11.A above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
1. The authorization is made in writing by a person described in Appendix G, Subsection 11.A;
2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
3. The signed and dated written authorization is included in the SWPPP. A copy must be submitted to EPA, if requested.

C. Changes to Authorization. If an authorization under Part 2.1 is no longer accurate because a different operator has responsibility for the overall operation of the construction site, a new NOI satisfying the requirements of Part 2.1 must be submitted to EPA prior to or together with any reports, information, or applications to be signed by an authorized representative. The change in authorization must be submitted within the time frame specified in Part 2.4, and sent to the address specified in Part 2.2.

D. Any person signing documents required under the terms of this permit must include the following certification:
"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons

directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

E. The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

12. Reporting Requirements

A. Planned changes. You must give notice to EPA as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:
   1. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR §122.29(b); or
   2. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR §122.42(a)(1).

B. Anticipated noncompliance. You must give advance notice to EPA of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

C. Transfers. This permit is not transferable to any person except after notice to EPA. EPA may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Clean Water Act. (See 40 CFR §122.61; in some cases, modification or revocation and reissuance is mandatory.)

D. Monitoring reports. Monitoring results must be reported at the intervals specified elsewhere in this permit.
   1. Monitoring results must be reported on a Discharge Monitoring Report (DMR) or forms provided or specified by EPA for reporting results of monitoring of sludge use or disposal practices.
   2. If you monitor any pollutant more frequently than required by the permit using test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, or as specified in the permit, the results of this monitoring must be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by EPA.
   3. Calculations for all limitations which require averaging of measurements must use an arithmetic mean.

E. Compliance schedules. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit must be submitted no later than 14 days following each schedule date.

F. Twenty-four hour reporting.

1. You must report any noncompliance which may endanger health or the environment. Any information must be provided orally within 24 hours from the time you become aware of the circumstances. A written submission must also be provided within five days of the time you become aware of the circumstances. The written submission must contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.
2. The following shall be included as information which must be reported within 24 hours under this paragraph.
   a. Any unanticipated bypass which exceeds any effluent limitation in the permit. (See 40 CFR §122.41(g).)
   b. Any upset which exceeds any effluent limitation in the permit
   c. Violation of a maximum daily discharge limitation for any of the pollutants listed by EPA in the permit to be reported within 24 hours. (See 40 CFR §122.44(g).)
13. EPA may waive the written report on a case-by-case basis for reports under Appendix G, Subsection 12.F.2 if the oral report has been received within 24 hours.

G. Other noncompliance. You must report all instances of noncompliance not reported under Appendix G, Subsections 12.D, 12.E, and 12.F, at the time monitoring reports are submitted. The reports must contain the information listed in Appendix G, Subsection 12.F.

H. Other information. Where you become aware that you failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Permitting Authority, you must promptly submit such facts or information.

13. Bypass

A. Definitions.
1. Bypass means the intentional diversion of waste streams from any portion of a treatment facility
2. Severe property damage means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

B. Bypass not exceeding limitations. You may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Appendix G, Subsections 13.C and 13.D.

C. Notice–
1. Anticipated bypass. If you know in advance of the need for a bypass, you must submit prior notice, if possible at least ten days before the date of the bypass.
2. Unanticipated bypass. You must submit notice of an unanticipated bypass as required in Appendix G, Subsection 12.F (24-hour notice).

D. Prohibition of bypass.
   1. Bypass is prohibited, and EPA may take enforcement action against you for bypass, unless:
      a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
      b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
      c. You submitted notices as required under Appendix G, Subsection 13.C.
   2. EPA may approve an anticipated bypass, after considering its adverse effects, if EPA determines that it will meet the three conditions listed above in Appendix G, Subsection 13.D.1.

14. Upset

A. Definition. Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond your reasonable control. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

B. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of Appendix G, Subsection 14.C are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

C. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset must demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
   1. An upset occurred and that you can identify the cause(s) of the upset;
   2. The permitted facility was at the time being properly operated; and
   3. You submitted notice of the upset as required in Appendix G, Subsection 12.F.2.b(24 hour notice).
   4. You complied with any remedial measures required under Appendix G, Section 4.

D. Burden of proof. In any enforcement proceeding, you, as the one seeking to establish the occurrence of an upset, has the burden of proof.

Attachment 2

Spill Report Form

CAPE WIND PROJECT
Yarmouth and Barnstable, Massachusetts
Storm Water Pollution Prevention Plan

SPILL REPORT FORM

Observer: ________________________________ Date: ____________________________

Type of Material: ________________________________ Quantity: ________________________

Description of Release:
____
____
____
____
____
____
____

Circumstances Leading to Release:
____
____
____
____
____
____
____

Location of Release:
____
____
____
____
____
____
____

Response Actions:
____
____
____
____
____
____
____

Attach documentation of notification and corrective measures implemented to prevent reoccurrence.

CAPE WIND PROJECT
Yarmouth and Barnstable, Massachusetts
Storm Water Pollution Prevention Plan

SPILL CLEAN-UP REPORT

Start Date and Time: ________________ Finish Date and Time: ______________

Clean-up Contractor Name: ____

Street Address:
____

City: ______________________ State: __________________ Zip Code: ________________

Spill Type and Description:
____
____
____
____

Amount of Material(s) Removed:
____
____
____
____

Material Disposal Location:
____
____
____
____

Street Address:
____

City: ______________________ State: __________________ Zip Code: ________________

I certify that the clean up was performed and completed on the above listed dates in accordance with the applicable state laws and regulations and if required the appropriate state agencies were contacted and notified of a spill.

Site Operator Signature: __________________________________ Date: _____________

Attachment 3

Emergency Contact Information

EMERGENCY NOTIFICATION PHONE NUMBERS

1. PROJECT SUPERINTENDANT
   NAME: __ ________________ CELL: ___________________________
   OFFICE: _________________ HOME PHONE: _ __________________

   PROJECT MANAGER:
   NAME: _ _________________ Cell: _ ____________________________
   OFFICE: _ _________________ HOME PHONE: _ __________________

   GENERAL SUPERINTENDANT:
   NAME: _ _________________ Cell: _ ____________________________
   OFFICE: ( ) _______________ HOME PHONE: ( ) ___ __________________

2. YARMOUTH FIRE DEPARTMENT
   GENERAL NUMBER: 911/ (508) 398-2211

3. BARNSTABLE FIRE DEPARTMENT
   GENERAL NUMBER: 911/ (508) 362-3312

4. MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
   SPILL REPORT: (617) 556-1000
   SOUTHEAST REGION: (508) 946-2718

5. NATIONAL RESPONSE CENTER
   PHONE: (800) 424-8802

   ALTERNATE: U.S. ENVIRONMENTAL PROTECTION AGENCY
   EMERGENCY: (617) 223-7265
   BUSINESS: (617) 860-4300

6. YARMOUTH CONSERVATION COMMISSION
   PHONE: (508) 398-2231, Ext. 288

7. YARMOUTH DEPARTMENT OF PUBLIC WORKS
   PHONE: (508) 398-2231 Ext. Ext. 290

8. BARNSTABLE CONSERVATION COMMISSION
   PHONE: (508) 862-4093

Attachment 4

Inspection and Maintenance Form

CAPE WIND PROJECT
Yarmouth and Barnstable, Massachusetts
Storm Water Pollution Prevention Plan

INSPECTION AND MAINTENANCE REPORT FORM

To be completed every 7 days and within 24 hours of a rainfall event of 0.5 inches or more.

Inspector: ____________________________ Date: ______________________

Days since last rainfall: _________________ Amount of last rainfall: ____ inches

Stabilization Measures

Date Since Last Disturbance	Date of Next Disturbance	Stabilized (Yes/No)	Stabilized With	Condition

Stabilization required:

To be preformed by: _____________________ On or before: ________________

CAPE WIND PROJECT
Yarmouth and Barnstable, Massachusetts
Storm Water Pollution Prevention Plan

INSPECTION AND MAINTENANCE REPORT FORM

Sediment Basins

Depth of Sediment Basin	Condition of Basin Side Slopes	Any Evidence of Overtopping of the Embankment	Condition of Outfall from Sediment Basin

Maintenance required for sediment basin:

To be preformed by: ______________________ On or before: _______________

Other Controls
Stabilized Construction Entrance

Does Much Sediment Get Tracked on to Road?	Is the Gravel Clean or is it Filled with Sediment?	Does all Traffic use the Stabilized Entrance to Leave the Site?

Maintenance required for stabilized construction entrance:

To be preformed by: ______________________ On or before: _______________

CAPE WIND PROJECT
Yarmouth and Barnstable, Massachusetts
Storm Water Pollution Prevention Plan

INSPECTION AND MAINTENANCE REPORT FORM

Perimeter Structural Controls

Date: ___________________________

Silt Fence and Haybales

Has Silt Reached 1/3 of Fence Height?	Is Fence Properly Secured?	Is There Evidence of Washout or Over-topping?

Maintenance required for silt fence and hay bales:

To be preformed by: ______________________ On or before: ______________

CAPE WIND PROJECT
Yarmouth and Barnstable, Massachusetts
Storm Water Pollution Prevention Plan

INSPECTION AND MAINTENANCE REPORT FORM

Stormwater Structural Controls

Date: ___________________________

Stormwater Conveyance Channels

Are the Rocks in Place?	Is the Grass Damaged?	Is Woody Vegetation or Weeds a Problem?

Maintenance required for stormwater conveyance channels:

To be preformed by: ______________________ On or before: _______________

Temporary Earth Berms or Diversions

Depth of Berm/Diversion	Condition of Side Slopes	Is it Stabilized?	Condition of Outfall to Sediment Basin

Maintenance required for temporary earth berms or diversions:

To be preformed by: ______________________ On or before: _______________

INSPECTION AND MAINTENANCE REPORT FORM

Changes required to the pollution prevention plan:

Reasons for changes:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: ______________________________ Date: ____________________

Attachment 5

SWPPP Amendment Log

CAPE WIND PROJECT
Yarmouth and Barnstable, Massachusetts
Storm Water Pollution Prevention Plan

SWPPP AMENDMENT LOG

SWPPP Contact:

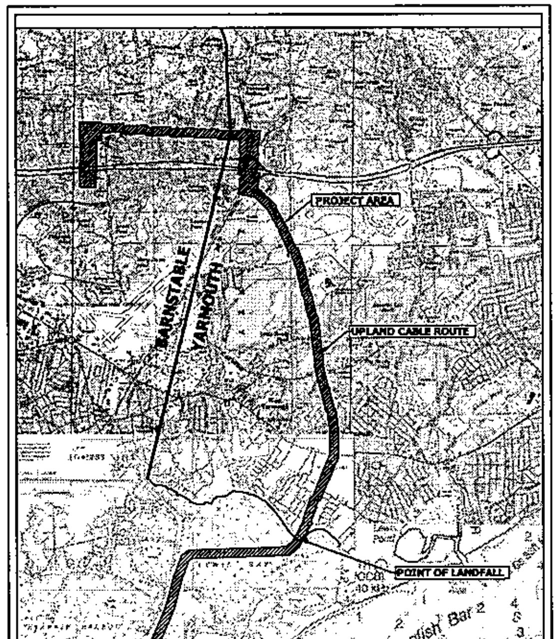
Amendment No.	Description of the Amendment	Date of Amendment	Amendment Prepared by [Name(s) and Title]

Attachment 6

Project Plan Set

COMPILED PLANS OF THE
UPLAND 115kV TRANSMISSION CABLE ROUTE CAPE WIND PROJECT

YARMOUTH & BARNSTABLE, MASSACHUSETTS
MARCH 1, 2010



LOCATION MAP

SCALE: 1"=3000'±
SOURCE: MASS GIS

PREPARED FOR:

CAPE WIND ASSOCIATES, LLC.
75 ARLINGTON STREET
BOSTON, MASSACHUSETTS 02116

INDEX OF DRAWINGS

DWG No.	DESCRIPTION
	COVER SHEET
N-1	NOTES AND LEGEND
KP-1	KEY PLAN
Y-1 TO Y-12	UPLAND CABLE ROUTE PLANS - YARMOUTH
B-1 TO B-6	UPLAND CABLE ROUTE PLANS - BARNSTABLE
PR-1 TO PR-4	UPLAND CABLE ROUTE PROFILES
CD-1 TO CD-17	UPLAND CABLE ROUTE DETAIL SHEETS

Cape Wind™
Energy for Life.

PREPARED BY:

ESS Group, Inc.

Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

FOR PERMITTING PURPOSES ONLY

Cape Wind
Energy for Life.

GENERAL NOTES:

1. EXISTING GROUND FEATURES AND TOPOGRAPHY WERE TAKEN FROM THE FOLLOWING SOURCES:

   A. TOWN OF BARNSTABLE GEOGRAPHIC INFORMATION SYSTEMS UNIT.
   B. TOWN OF YARMOUTH GEOGRAPHIC INFORMATION SYSTEMS UNIT.

   AND DO NOT REPRESENT THE RESULTS OF ACTUAL "ON-GROUND" PHYSICAL SURVEY AND THEREFORE ARE ONLY APPROXIMATE.

2. EXISTING GROUND FEATURES AND TOPOGRAPHY FOR PORTIONS OF HIGGINS CROWELL ROAD AND ROUTE 6/WILLOW STREET INTERCHANGE WERE TAKEN FROM THE FOLLOWING PLANS:

   A. "TOWN OF YARMOUTH DEPARTMENT OF PUBLIC WORKS PLAN AND PROFILE OF HIGGINS CROWELL ROAD IN THE TOWN OF YARMOUTH, MASSACHUSETTS, BARNSTABLE COUNTY" (NOT DATED) BY M.S. TRANSPORTATION SYSTEMS, INC."
   B. "THE COMMONWEALTH OF MASSACHUSETTS HIGHWAY DEPARTMENT PLAN AND PROFILE OF WILLOW STREET IN THE TOWN OF YARMOUTH, MASSACHUSETTS, BARNSTABLE COUNTY, 25% REVIEW" DATED APRIL 2000, BY M.S TRANSPORTATION SYSTEMS, INC.
   C. "THE TOWN OF YARMOUTH DEPARTMENT OF PUBLIC WORKS PLAN AND PROFILE OF RELOCATED HIGGINS CROWELL ROAD IN THE TOWN OF YARMOUTH, MASSACHUSETTS, BARNSTABLE COUNTY (UNDATED)" BY M.S. TRANSPORTATION SYSTEMS, INC.
   D. THE NANTUCKET SOUND AND APPROACHES AREA REFERENCES ARE TAKEN FROM NOAA CHART #13237, DATED 39TH EDITION, MAY '03. THE LEWIS BAY REFERENCES ARE TAKEN FROM NOAA CHART #13229, DATED COPYRIGHT 1999.

3. EXISTING GROUND FEATURES AND TOPOGRAPHY AT THE NEW HAMPSHIRE AVENUE LANDFALL WERE TAKEN FROM A PLAN ENTITLED "AS-BUILT SITE PLAN OF LAND IN (WEST) YARMOUTH, MA PREPARED FOR ENERGY MANAGEMENT, INC. #43 SHORE ROAD AND NEW HAMPSHIRE AVE." DATED 11/02/01, PREPARED BY DOWN CAPE ENGINEERING, INC.

4. PROPERTY LINE AND RIGHT-OF-WAY INFORMATION WAS COMPILED FROM TOWN OF BARNSTABLE AND TOWN OF YARMOUTH ASSESSOR'S MAPS AND ARE ONLY APPROXIMATE.

5. ABUTTER INFORMATION (NOW OR FORMERLY) WERE TAKEN FROM INFORMATION PROVIDED TO ESS GROUP, INC. BY THE TOWN OF YARMOUTH GIS.

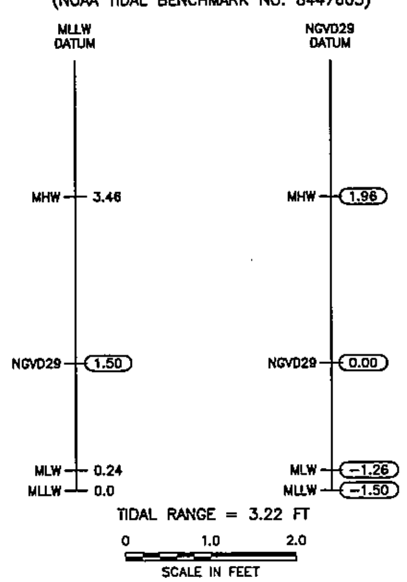
6. PORTIONS OF THE PROJECT LIMITS ARE LOCATED WITHIN FLOOD HAZARD ZONES A12 AND V15 WITH 100-YEAR FLOOD ELEVATIONS VARYING FROM ELEV. 10 TO ELEV. 13 FEET-NGVD OF 1929. REFERENCE: FEDERAL EMERGENCY MANAGEMENT AGENCY FLOOD INSURANCE RATE MAP FOR THE TOWN OF YARMOUTH, MASSACHUSETTS, BARNSTABLE COUNTY, COMMUNITY PANEL NUMBER 250015 0005D, MAP REVISED JULY 2, 1992.

7. VERTICAL DATUM REFERS TO NATIONAL GEODETIC VERTICAL DATUM (NGVD) OF 1929, UNLESS OTHERWISE NOTED.

8. EXISTING UTILITIES SHOWN ON THESE PLANS WERE COMPILED FROM RECORD DRAWINGS, FIELD SURVEYS, AND/OR PREVIOUS CONSTRUCTION DRAWINGS. THIS PLAN DOES NOT NECESSARILY DEPICT THE EXACT LOCATIONS OF ALL UTILITIES, WHICH MAY EXIST AT THIS TIME WITHIN THE PROJECT LIMITS. THERE MAY BE EXISTING LINES OTHER THAN THOSE INDICATED. THE LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES SHALL BE CONSIDERED APPROXIMATE AND MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO ANY UTILITY CONNECTIONS OR CROSSINGS OF PROPOSED OR EXISTING UTILITIES.
   THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER.
   THE CONTRACTOR SHALL CONTACT THE RESPECTIVE UTILITY COMPANIES RELATIVE TO THE LOCATIONS AND ELEVATIONS OF THESE LINES. NO SEPARATE OR ADDITIONAL COMPENSATION WILL BE ALLOWED TO THE CONTRACTOR DUE TO ANY VARIANCE BETWEEN THE DATA SHOWN ON THE PLANS AND ACTUAL FIELD CONDITIONS ENCOUNTERED.
   THE CONTRACTOR IS RESPONSIBLE FOR HIS/HER OWN DETERMINATION AS TO THE TYPE AND LOCATION OF THE EXISTING UTILITIES AS MAY BE NECESSARY TO AVOID THEIR DAMAGE AND TO FACILITATE THE PROPOSED CONNECTION(S).

9. PLANS ARE NOT INTENDED FOR CONSTRUCTION. ENGINEER'S CERTIFICATION IS FOR PERMITTING PURPOSES ONLY.

VERTICAL DATUM RELATIONSHIPS IN FEET
(HYANNIS HARBOR – HYANNISPORT)
(NOAA TIDAL BENCHMARK NO. 8447605)



NOTE:
NO ACCEPTED REFERENCE BETWEEN MLLW AND NGVD29 EXISTS AT THIS LOCATION. RELATIONSHIPS ESTIMATED BASED ON OTHER CAPE COD LOCATIONS. ENCIRCLED NUMBERS ARE ESTIMATED.

CONSTRUCTION NOTES:

1. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE APPROXIMATE. PRIOR TO ANY EXCAVATION THE CONTRACTOR SHALL MAKE THE REQUIRED 72-HOUR NOTIFICATION TO DIG-SAFE (1-888-344-7233) AND ANY OTHER UTILITIES WHICH MAY HAVE CABLE, PIPE, OR EQUIPMENT WITHIN THE CONSTRUCTION AREAS FOR VERIFICATION OF LOCATIONS.

2. THE CONTRACTOR SHALL NOTIFY ALL APPROPRIATE AGENCIES AND UTILITY COMPANIES, IN WRITING, 72-HOURS PRIOR TO ANY CONSTRUCTION.

3. WORK WITHIN PUBLIC WAYS SHALL COMPLY WITH APPLICABLE MUNICIPAL AND STATE REQUIREMENTS.

4. PRIOR TO COMMENCING CONSTRUCTION, THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR MAKING ALL NECESSARY ARRANGEMENTS AND FOR PERFORMING ANY NECESSARY WORK INVOLVED IN CONNECTION WITH THE DISCONTINUANCE OR JURISDICTION OF THE UTILITY COMPANIES, SUCH AS ELECTRICITY, TELEPHONE, WATER AND ANY SYSTEM OR SYSTEMS WHICH WILL BE AFFECTED BY THE WORK TO BE PERFORMED UNDER THIS CONTRACT.

5. UNLESS OTHERWISE NOTED OR APPROVED BY THE ENGINEER, THE CONTRACTOR SHALL MAINTAIN ALL EXISTING UTILITIES.

6. THE CONTRACTOR SHALL EXERCISE EXTREME CARE WHEN EXCAVATING AND BACKFILLING IN THE VICINITY OF EXISTING UTILITIES, INCLUDING BUT NOT LIMITED TO SHORING AND THE USE OF HAND EXCAVATION WHERE APPROPRIATE.

7. ALL EXISTING PIPING AND STRUCTURES EXPOSED DURING EXCAVATION SHALL BE ADEQUATELY SUPPORTED, BRACED, OR OTHERWISE PROTECTED DURING CONSTRUCTION ACTIVITIES IN ACCORDANCE WITH THE REQUIREMENTS OF ALL GOVERNING CODES AND REGULATIONS.

8. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.

9. NO CHANGES ARE TO BE MADE UNLESS AUTHORIZED BY THE DESIGN ENGINEER.

10. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL SAFETY CODES, REGULATIONS, LEGAL REQUIREMENTS, PERMIT CONDITIONS, ETC.

11. CONSTRUCTION SEQUENCE SHALL BE COORDINATED TO MINIMIZE DISTURBANCE OF EXISTING CONDITIONS.

12. IF REQUIRED BY THE CONTRACTOR, OVERHEAD LINES SHALL BE RELOCATED BY THE UTILITY COMPANY AT THE CONTRACTOR'S EXPENSE.

13. THE CONTRACTOR SHALL TAKE ADEQUATE PRECAUTIONS TO PROTECT THE EXISTING RAILROAD TRACKS, ALL RETAINING WALLS, WALKS, STREETS, PAVEMENTS, HIGHWAY GUARDS, CURBING, EDGING, TREES AND PLANTINGS ON OR OFF THE PREMISES, AND SHALL REPAIR AND REPLACE OR OTHERWISE MAKE GOOD AT HIS/HER OWN EXPENSE ANY ITEMS DAMAGED AS A RESULT OF THE CONTRACTOR'S WORK.

14. THE CONTRACTOR SHALL REMOVE FROM THE PROJECT SITE ALL STUMPS, RUBBISH AND DEBRIS FOUND THEREON. STORAGE OF SUCH MATERIALS ON THE PROJECT SITE WILL NOT BE PERMITTED. ALL MATERIALS TO BE REMOVED AND DISPOSED SHALL BE DISPOSED IN ACCORDANCE WITH ALL APPLICABLE CODES AND REGULATIONS. THE CONTRACTOR SHALL LEAVE THE PROJECT SITE IN SAFE, CLEAN AND LEVEL CONDITION UPON COMPLETION OF THE SITE CLEARANCE WORK.

15. ALL SURFACES DISTURBED BY THIS WORK SHALL BE RESTORED TO THEIR ORIGINAL CONDITION AS DETAILED OR AS SPECIFIED BY THE ENGINEER.

16. ALL VAULT STRUCTURES IN PAVED AREAS SHALL HAVE THEIR RIMS SET TO FINISHED GRADE REGARDLESS OF ANY ELEVATIONS OTHERWISE SHOWN, UNLESS OTHERWISE APPROVED BY THE ENGINEER.

17. ALL WORK SHALL COMPLY WITH THE PROJECT'S REGULATORY PERMITS AND AGREEMENTS.

18. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SPECIFYING HOW TO "REPAIR, REPLACE, PROTECT, AND MAINTAIN" ALL EXISTING ABOVE GROUND AND UNDERGROUND UTILITIES DURING CONSTRUCTION. THIS SHALL INCLUDE SHOP DRAWING SUBMITTALS TO THE PROJECT ENGINEER.

19. UTILITY TRENCHES THAT REQUIRE REPAIRS AND/OR REPLACEMENT OF EXPOSED UNDERGROUND UTILITIES MAY NOT BE BACKFILLED UNTIL THE COMPLETED UTILITY WORK HAS BEEN INSPECTED AND APPROVED BY THE APPROPRIATE UTILITY INSPECTOR.

COMPILED PLAN REFERENCES:

1. YARMOUTH NOTICE OF INTENT PLANS SUBMARINE AND UPLAND 115kV TRANSMISSION CABLE ROUTE CAPE WIND PROJECT.
   REVISED PER JUNE 13, 2008.
   PREPARED FOR: CAPEWIND ASSOCIATES, LLC., 75 ARLINGTON STREET, BOSTON, MASSACHUSETTS 02116.

2. YARMOUTH ROAD OPENING PERMIT UPLAND 115kV TRANSMISSION CABLE ROUTE CAPE WIND PROJECT.
   REVISED PER JUNE 13, 2008.
   PREPARED FOR: CAPE WIND ASSOCIATES, LLC., 75 ARLINGTON STREET, BOSTON, MASSACHUSETTS 02116.

3. BARNSTABLE ROAD OPENING PERMIT UPLAND 115kV TRANSMISSION CABLE ROUTE CAPE WIND PROJECT.
   DATED OCTOBER 31, 2007.
   PREPARED FOR: CAPE WIND ASSOCIATES, LLC., 75 ARLINGTON STREET, BOSTON, MASSACHUSETTS 02116.

4. PRELIMINARY ENGINEERIING PLANS SUBMARINE AND UPLAND 115kV TRANSMISSION CABLE ROUTE CAPE WIND PROJECT.
   REVISED PER APRIL 13, 2007.
   PREPARED FOR: CAPE WIND ASSOCIATES, LLC., 75 ARLINGTON STREET, BOSTON, MASSACHUSETTS 02116.

5. STATE HIGHWAY ACCESS PERMIT PLANS UPLAND 115kV TRANSMISSION CABLE ROUTE CAPE WIND PROJECT FOR 3 LOCATIONS IN YARMOUTH & BARNSTABLE, MASSACHUSETTS.
   REVISED PER JUNE 13, 2008.
   PREPARED FOR: CAPE WIND ASSOCIATES, LLC., 75 ARLINGTON STREET, BOSTON, MASSACHUSETTS 02116.

6. EXECUTIVE OFFICE OF TRANSPORTATION (EOT) BAY COLONY RAILROAD CROSSING FOR UPLAND 115kV TRANSMISSION CABLE ROUTE CAPE WIND PROJECT IN YARMOUTH, MASSACHUSETTS.
   DATED OCTOBER 31, 2007.
   PREPARED FOR: CAPE WIND ASSOCIATES, LLC., 75 ARLINGTON STREET, BOSTON, MASSACHUSETTS 02116.

SEDIMENTATION & EROSION CONTROL NOTES:

1. THE CONTRACTOR SHALL PROVIDE EROSION CONTROL MEASURES, AS SPECIFIED ON THE DRAWINGS AND AS DIRECTED BY THE ENGINEER.

2. ALL SOIL AND EROSION CONTROLS SHALL BE PLACED PRIOR TO ANY CONSTRUCTION ACTIVITIES. ALL SOIL AND EROSION CONTROLS SHALL BE CHECKED AND REPAIRED AS NECESSARY.

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING EROSION CONTROL MEASURES IN ORDER TO PREVENT OFF-SITE TRACKING OF EARTH, SEDIMENT AND DEBRIS.

4. AREAS REMAINING UNSTABILIZED FOR A PERIOD OF MORE THAN 30 DAYS SHALL BE TEMPORARILY SEEDED AND MULCHED.

5. ALL DISTURBED AREAS NOT OCCUPIED BY PAVEMENT, SIDEWALK OR RIPRAP SHALL BE COVERED WITH 4" (MIN.) OF LOAM AND SEED.

6. PERMANENT SEEDING SHALL OCCUR BETWEEN MARCH 1 AND JUNE 15, OR BETWEEN AUGUST 15 AND OCTOBER 15.

7. SOILS TO BE STOCKPILED FOR A PERIOD OF MORE THAN 30 DAYS SHALL BE SURROUNDED BY EROSION CONTROL BARRIERS AND TEMPORARILY SEEDED AND MULCHED.

8. ALL LOAM STOCKPILE AREAS SHALL BE SURROUNDED BY EROSION CONTROL BARRIERS UNTIL SUCH TIME AS THE LOAM IS RESPREAD AND STABILIZED.

9. TEMPORARY STORAGE OF MATERIALS ON-SITE IS TO BE LOCATED GREATER THAN 100 FEET FROM WETLAND AREAS, AND AS APPROVED BY THE ENGINEER. THERE IS TO BE NO LONG TERM STORAGE OF MATERIAL ON-SITE. MATERIAL NOT USED ON-SITE IS TO BE TRUCKED TO AN ACCEPTABLE OFF-SITE DISPOSAL LOCATION.

10. EROSION CONTROL MEASURES SHALL BE INSPECTED EVERY WEEK, AND DURING AND AFTER EVERY RAIN EVENT GREATER THAN 0.5 INCHES. ANY NECESSARY REPLACEMENT OR REPAIR SHALL BE PERFORMED PROMPTLY BY THE CONTRACTOR.

11. EROSION CONTROL BLANKETS SHALL BE PLACED IN ALL SWALES AND ON ALL SLOPES 2:1 OR STEEPER, AS SHOWN ON THE PLANS AND IN ACCORDANCE WITH THE DETAILS.

12. DUST SHALL BE CONTROLLED AS NECESSARY THROUGH THE USE OF WATER. THE USE OF CALCIUM CHLORIDE FOR DUST CONTROL IS NOT ALLOWED, UNLESS OTHERWISE APPROVED BY THE ENGINEER.

13. THE CONTRACTOR SHALL PHASE CONSTRUCTION TO MINIMIZE THE AREA OF DISTURBED EARTH OPEN TO THE ELEMENTS AT ANY GIVEN TIME. THIS SHALL BE ACHIEVED BY THE FOLLOWING METHODS OR OTHER BEST MANAGEMENT PRACTICES (BMP'S):

    A. LOAMING AND SEEDING CUT SLOPES IMMEDIATELY UPON COMPLETION OF SUBGRADE PREPARATION.
    B. PLACING AND COMPACTING PAVEMENT GRAVEL BASE AND SUBBASE IMMEDIATELY UPON COMPLETION OF SUBGRADE PREPARATION.
    C. LIMITING STRIPPING AND STOCKPILING OF LOAM TO AREAS SLATED FOR IMMEDIATE CONSTRUCTION AND STABILIZATION (I.E., PLACEMENT OF GRAVELS, LOAM AND SEED, EROSION CONTROL MATTING, ETC.).

14. THE CONTRACTOR SHALL ADHERE TO ALL REQUIREMENTS OF THE ORDERS OF CONDITIONS ISSUED BY THE TOWN OF YARMOUTH CONSERVATION COMMISSION AND THE TOWN OF BARNSTABLE CONSERVATION COMMISSION.

NATURAL HERITAGE (NHESP) HABITAT KEY:

EH 821	NHESP ESTIMATED HABITATS OF RARE WILDLIFE
PH 1232	NHESP PRIORITY HABITATS OF RARE SPECIES
	APPROXIMATE HABITAT BOUNDARY

RESOURCE AREA LEGEND:

	EDGE OF BORDERING VEGETATED WETLANDS
OFW2a-1	WETLAND FLAG
	TRENCH LIMITS
	35' VEGETATED BUFFER
	50' NO-BUILD ZONE
	100' BUFFER ZONE
	PROPOSED HAYBALES AND SILT FENCE

ABBREVIATIONS:

L.O.W.	LIMIT OF WORK
SHLO	STATE HIGHWAY LAYOUT
R.O.W.	RIGHT OF WAY
N/F	NOW OR FORMERLY
LSCSF	LAND SUBJECT TO COASTAL STORM FLOWAGE
NHESP	NATURAL HERITAGE & ENDANGERED SPECIES PROGRAM

FOR PERMITTING PURPOSES ONLY

ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

DRAWN BY: KCW | CHECKED BY: PRW
DESIGNED BY: RAH | APPROVED BY:

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

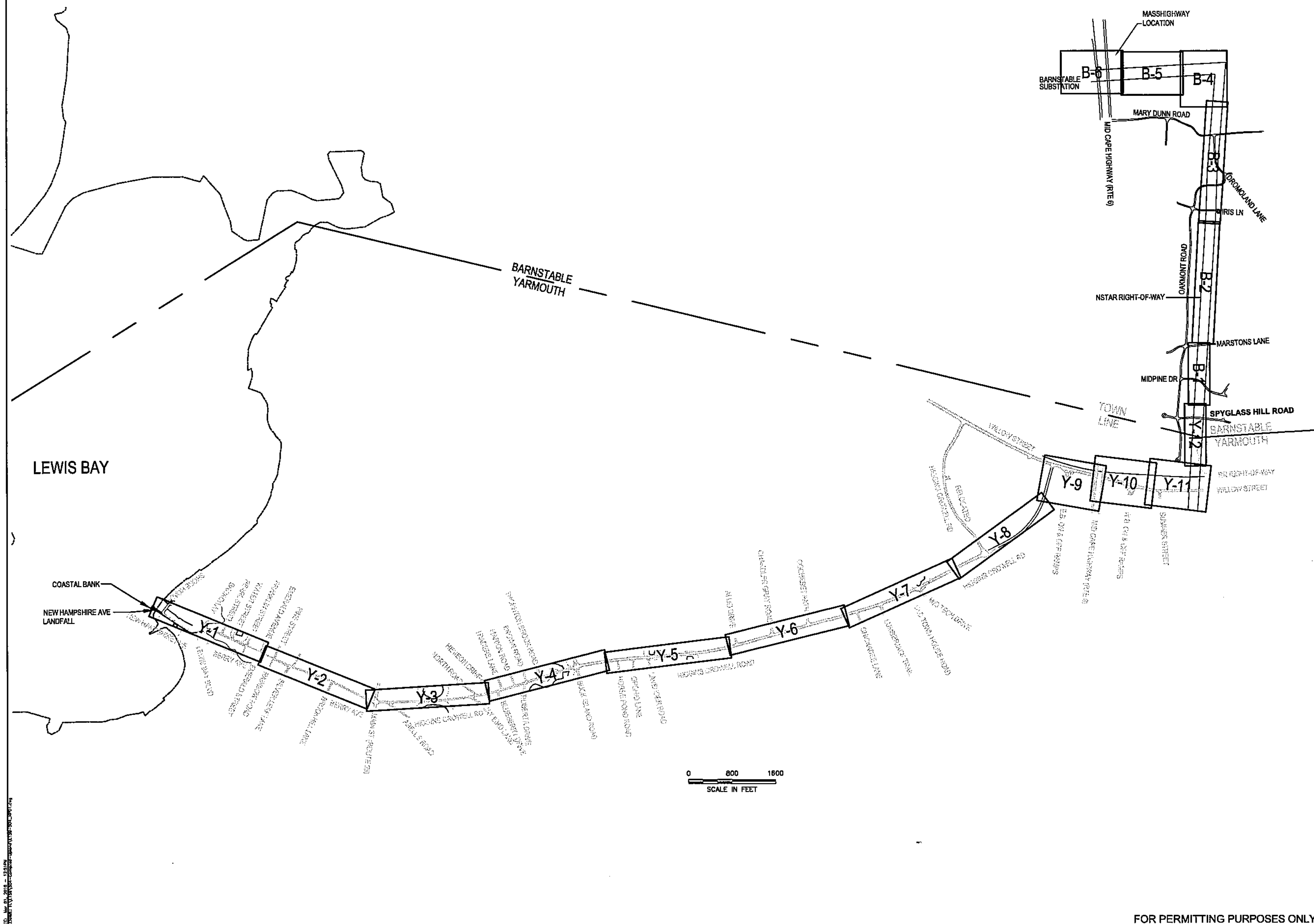
COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

NOTES & LEGEND

PROJECT No.: E159-504.10
DATE OF ISSUE: 02/26/10
SHEET No.:
SCALE: 1"=40'
DRAWING No. N-1

Cape Wind
Energy for Life.



ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

DRAWN BY: KCW | CHECKED BY: PRW
DESIGNED BY: RAH | APPROVED BY:

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

COMPILED PLAN SET OF
THE UPLAND 115kV
TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

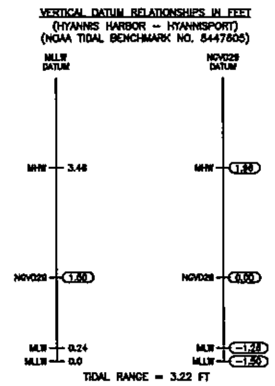
KEY PLAN

PROJECT No.: E159-504.10
DATE OF ISSUE: 02/26/10
SHEET No.:
SCALE: 1"=40'

DRAWING No.
KP-1

FOR PERMITTING PURPOSES ONLY

Cape Wind™
Energy for Life.



NOTE:
NO ACCEPTED REFERENCE BETWEEN MLLW AND NGVD29 EXISTS AT THIS LOCATION. RELATIONSHIPS ESTIMATED BASED ON OTHER CAPE COD LOCATIONS. ENCIRCLED NUMBERS ARE ESTIMATED.

WORK AREAS ON THIS SHEET UNDER MWPA JURISDICTION
LEWIS BAY
STA. 0+00 TO STA. 10+33

0 40 80
SCALE IN FEET

ESS Group Inc.
Engineers
Scientists
Consultants
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

DRAWN BY: KCW	CHECKED BY: PRW
DESIGNED BY: RAH	APPROVED BY:

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

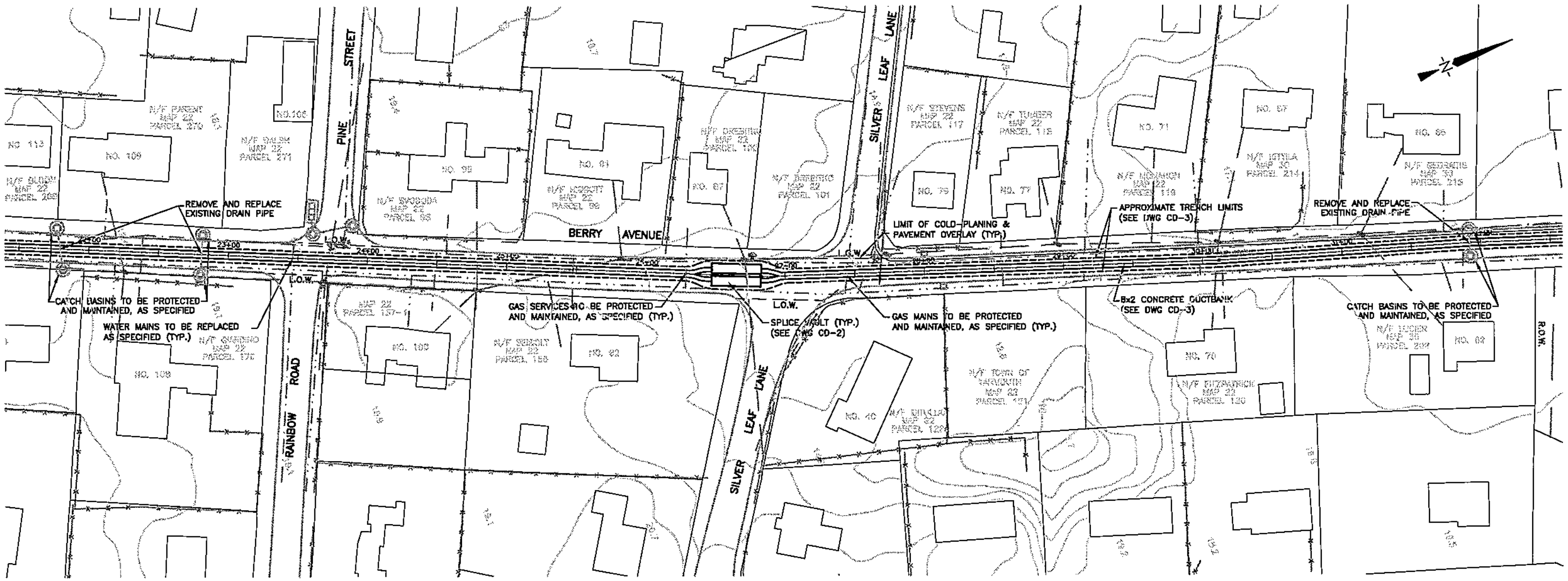
COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

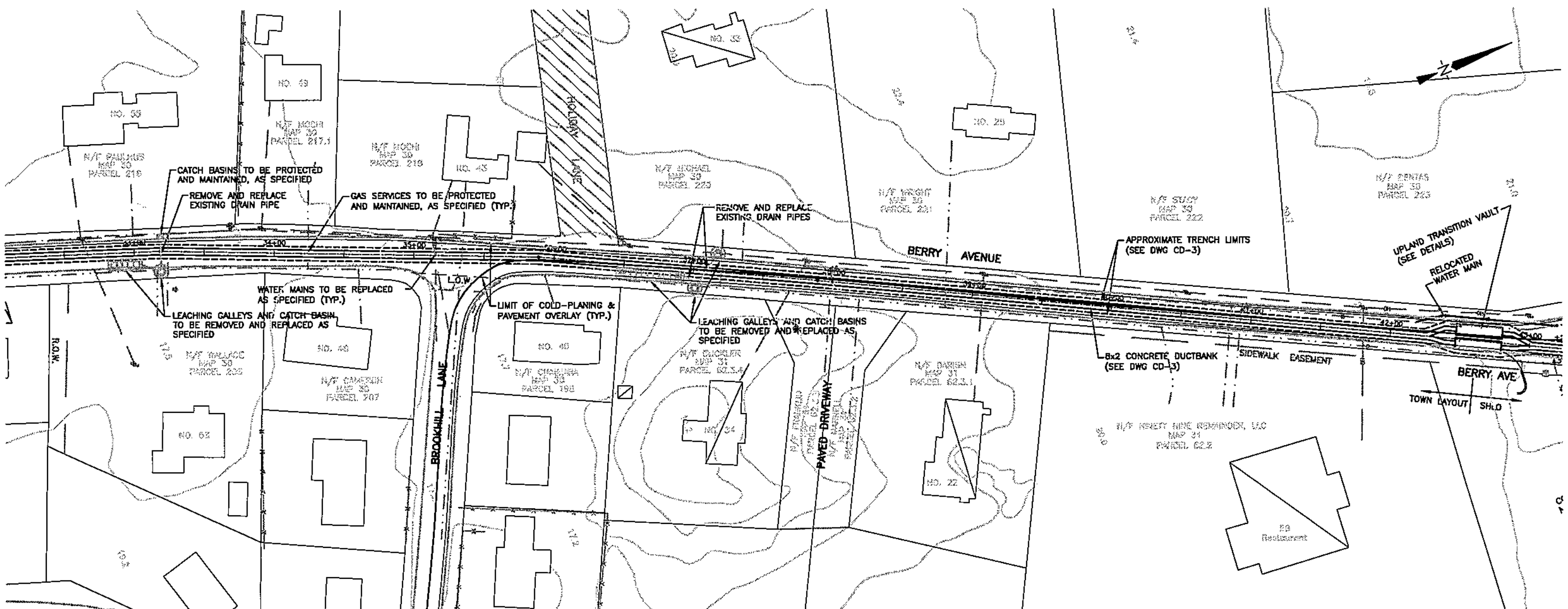
UPLAND CABLE ROUTE PLAN (YARMOUTH, MA)

PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	Y-1
SHEET No.:	
SCALE: 1"=40'	

FOR PERMITTING PURPOSES ONLY



0 40 80
SCALE IN FEET



ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

DRAWN BY: KCW | CHECKED BY: PRW
DESIGNED BY: RAH | APPROVED BY:

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

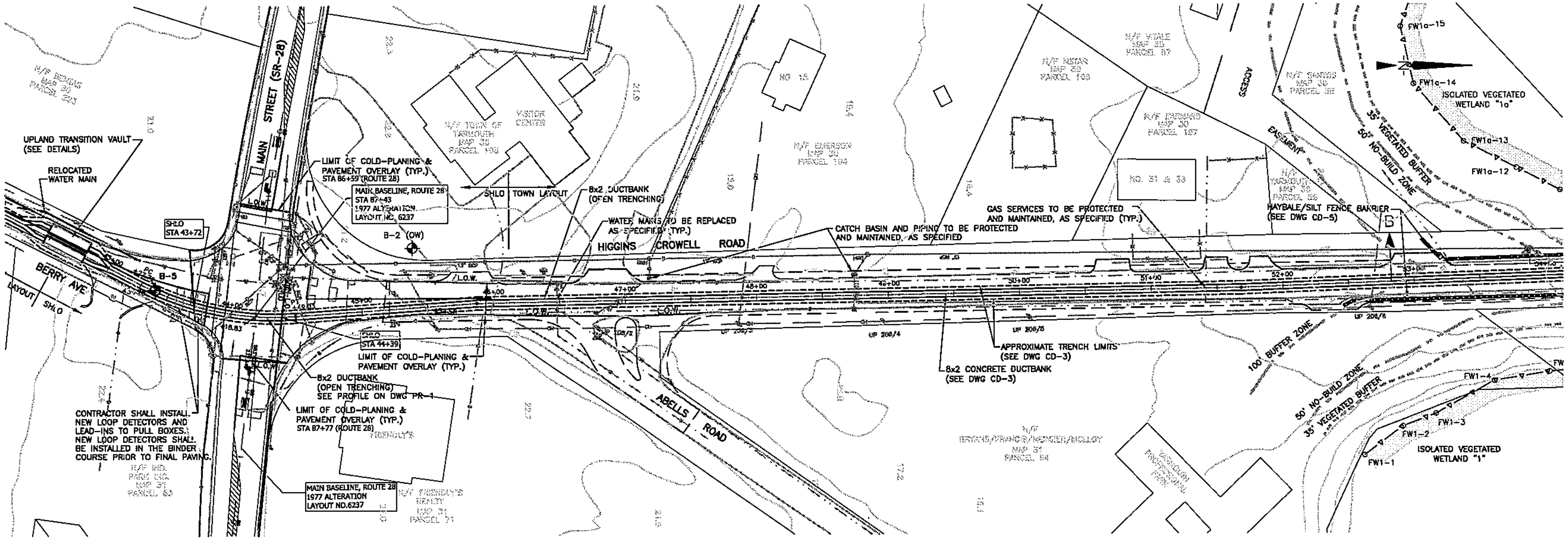
COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

UPLAND CABLE ROUTE PLAN (YARMOUTH, MA)

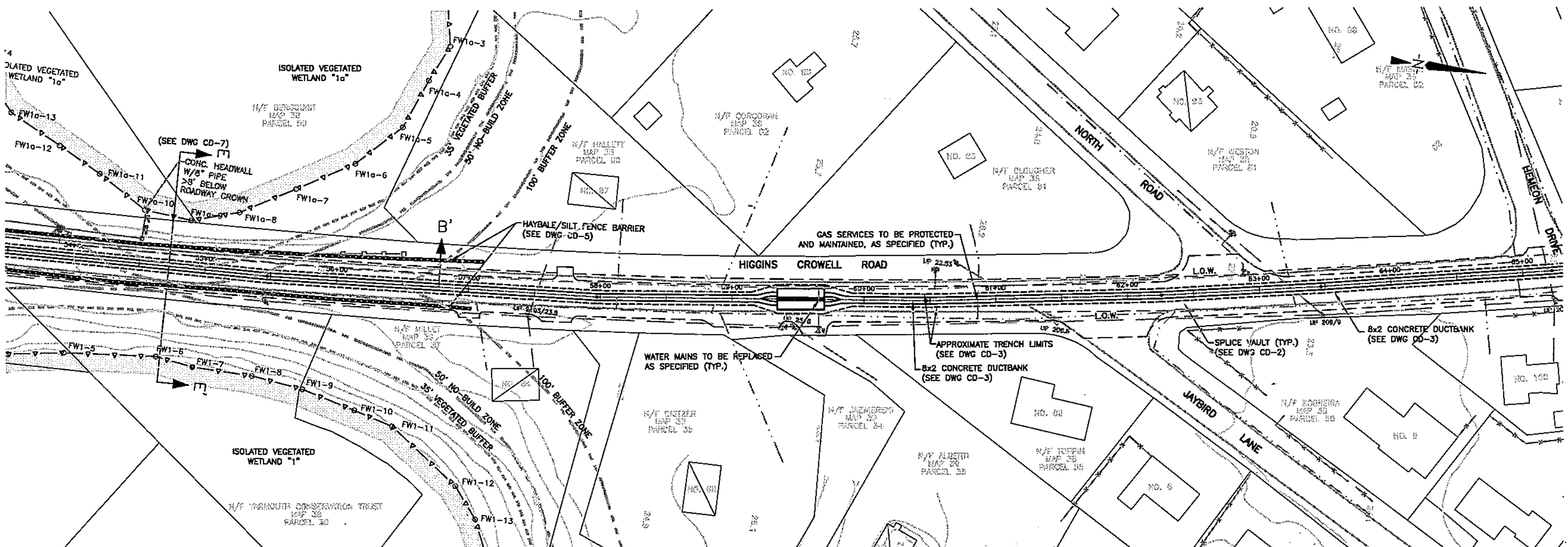
PROJECT No.: E159-504.10
DATE OF ISSUE: 02/26/10
SHEET No.:
SCALE: 1"=40'
DRAWING No. Y-2

FOR PERMITTING PURPOSES ONLY



WORK AREAS ON THIS SHEET UNDER MWPA JURISDICTION
STA. 52+87 TO STA. 58+47

0 40 80
SCALE IN FEET



Cape Wind™
Energy for Life.

ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW		CHECKED BY: PRW	
DESIGNED BY: RAH		APPROVED BY:	

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

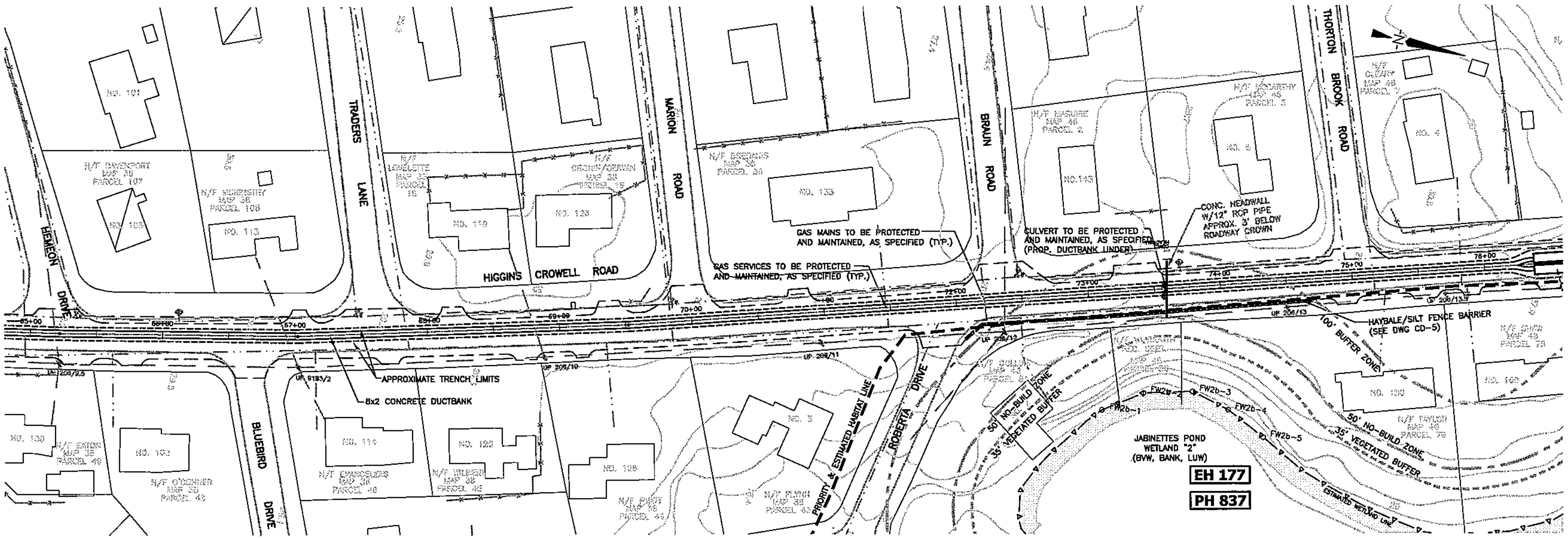
YARMOUTH & BARNSTABLE, MA.

UPLAND CABLE ROUTE PLAN (YARMOUTH, MA)

PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	Y-3
SHEET No.:	
SCALE: 1"=40'	

FOR PERMITTING PURPOSES ONLY

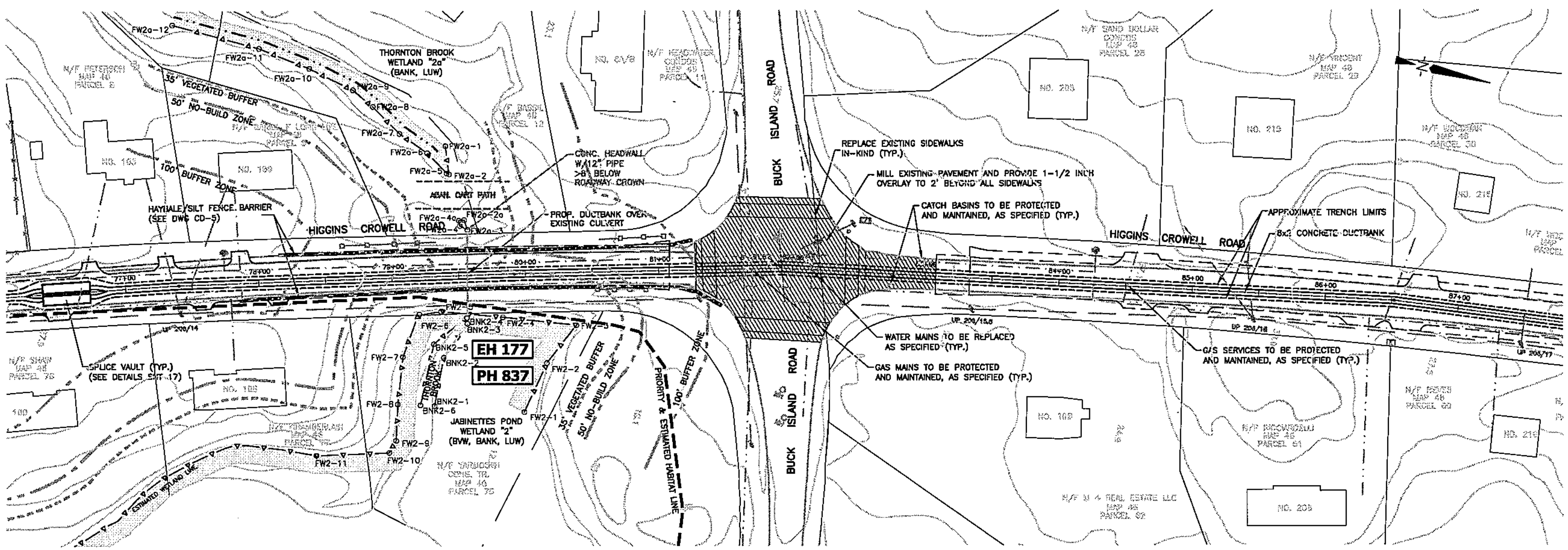
Cape Wind™
Energy for Life.



NOTE:
CONTRACTOR TO MAINTAIN TWO LANES (MINIMUM) OF TRAFFIC (ONE IN EACH DIRECTION) ON BUCK ISLAND ROAD THOUGHOUT CONSTRUCTION.

WORK AREAS ON THIS SHEET UNDER MWPA JURISDICTION
STA. 72+55 TO STA. 74+40
STA. 78+17 TO STA. 81+23

0 40 80
SCALE IN FEET



FOR PERMITTING PURPOSES ONLY

ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW	CHECKED BY: PRW		
DESIGNED BY: RAH	APPROVED BY:		

CAPE WIND ASSOCIATES, LLC

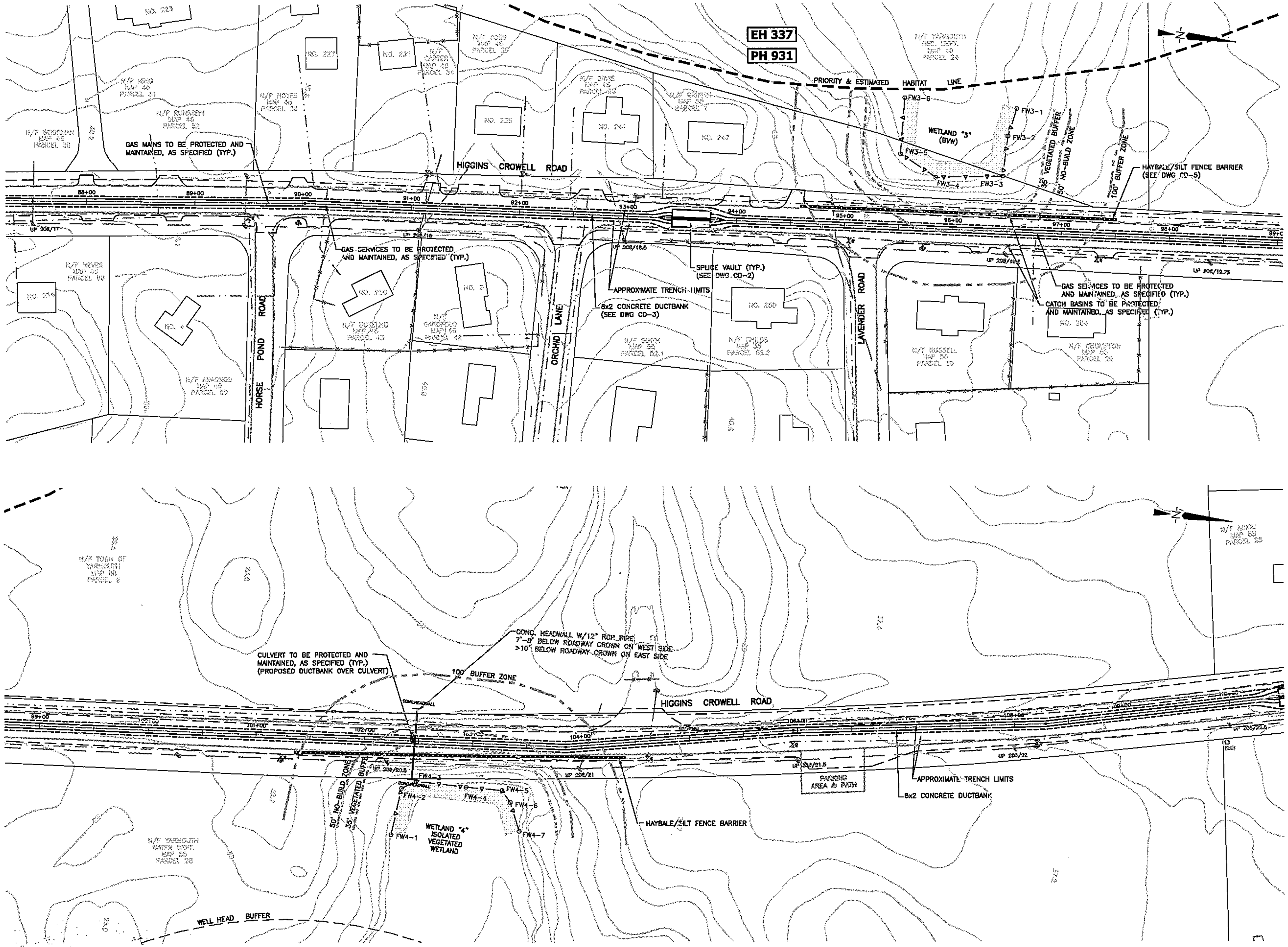
CAPE WIND PROJECT

COMPILED PLAN SET OF THE UPLAND 115KV TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

UPLAND CABLE ROUTE PLAN (YARMOUTH, MA)

PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	Y-4
SHEET No.:	
SCALE: 1"=40'	



Cape Wind™
Energy for Life.

ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

NO.	REVISION	DATE	APP BY
DRAWN BY: KCW		CHECKED BY: PRW	
DESIGNED BY: RAH		APPROVED BY:	

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

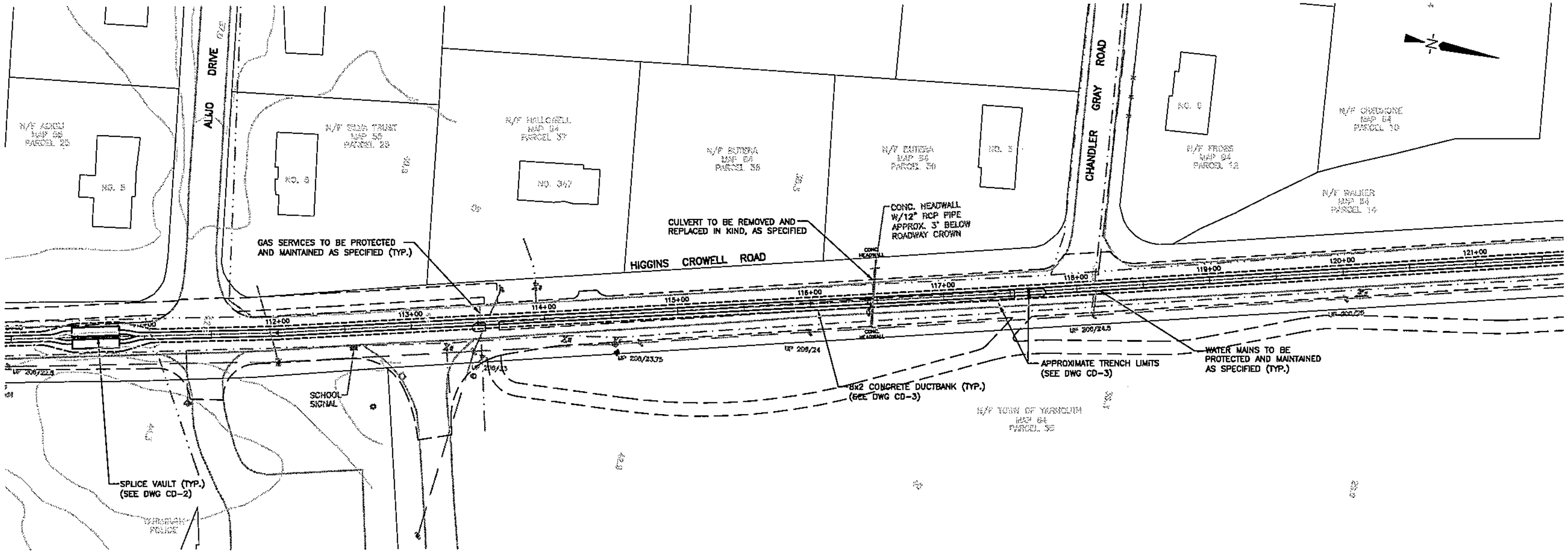
YARMOUTH & BARNSTABLE, MA.

UPLAND CABLE ROUTE PLAN (YARMOUTH, MA)

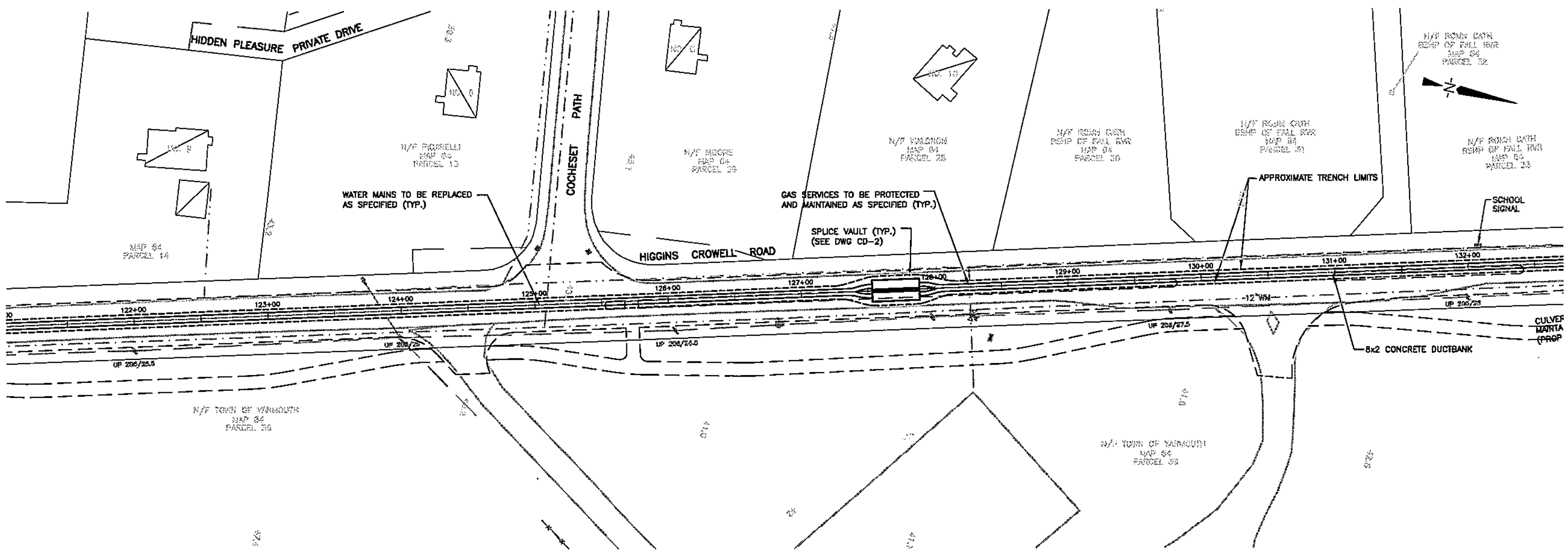
PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	Y-5
SHEET No.:	
SCALE: 1"=40'	

FOR PERMITTING PURPOSES ONLY

Cape Wind
Energy for Life.



0 40 80
SCALE IN FEET



ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

DRAWN BY: KCW	CHECKED BY: PRW
DESIGNED BY: RAH	APPROVED BY:

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

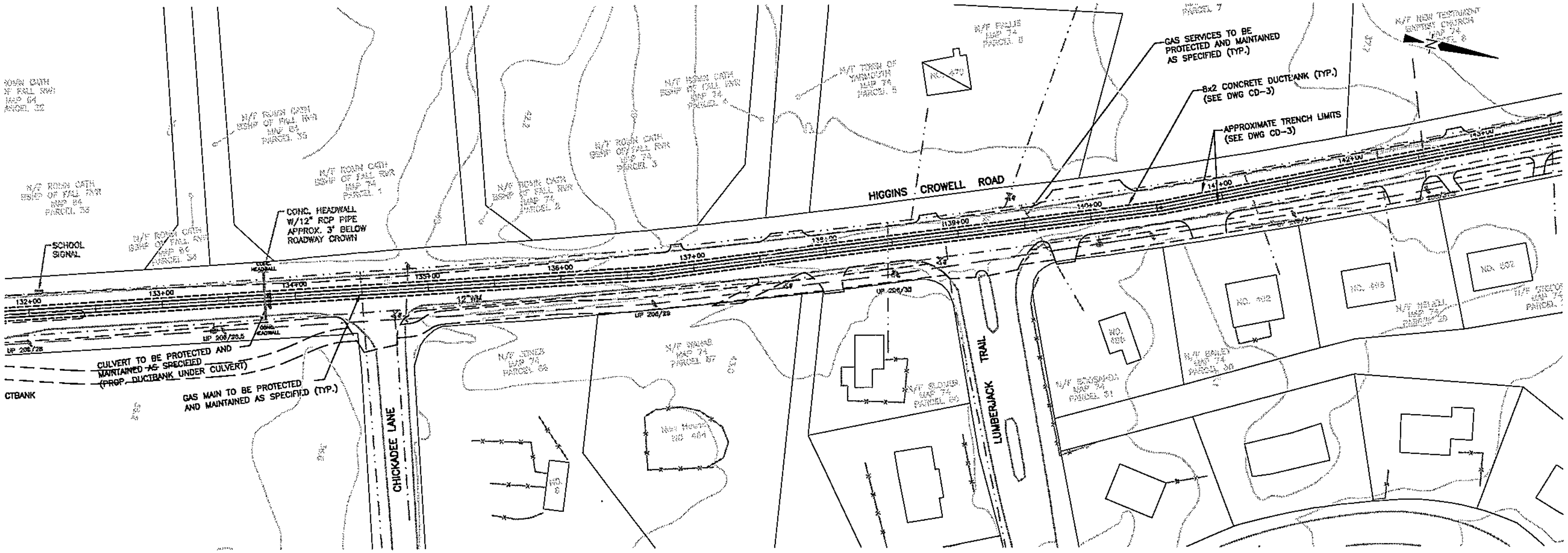
COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

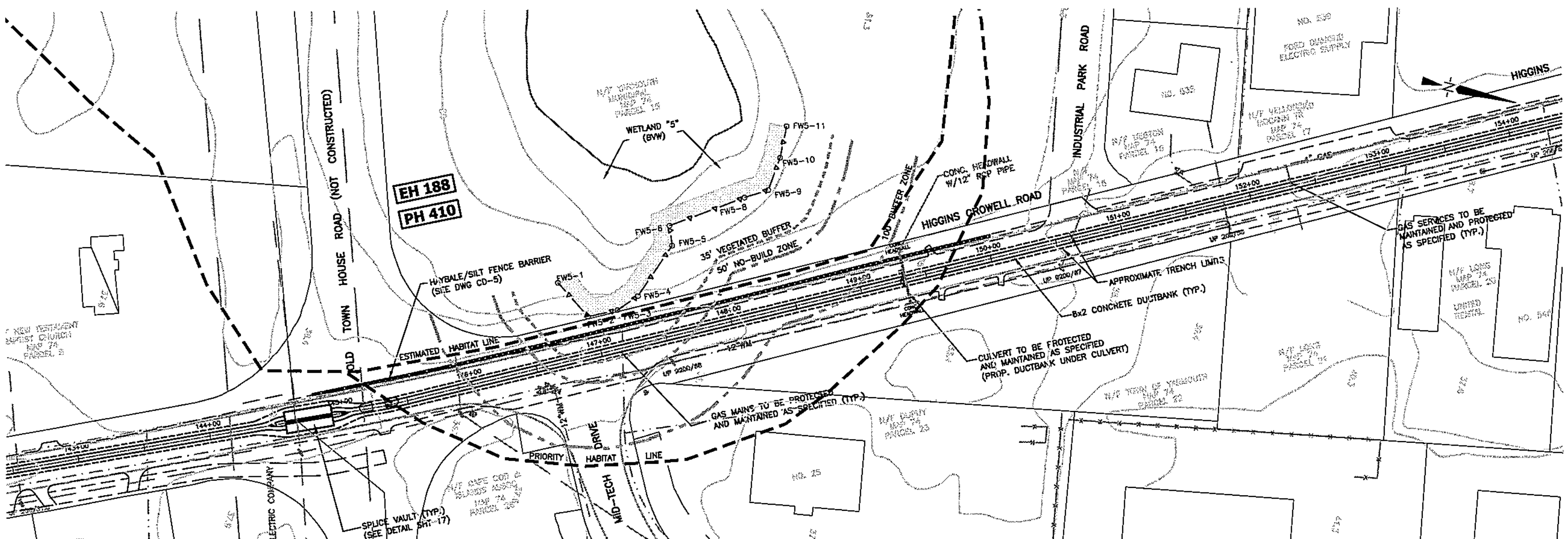
YARMOUTH & BARNSTABLE, MA.

UPLAND CABLE ROUTE PLAN (YARMOUTH, MA)

PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	Y-6
SHEET No.:	
SCALE: 1"=40'	

FOR PERMITTING PURPOSES ONLY





Cape Wind™
Energy for Life.

0 40 80
SCALE IN FEET

ESS Group Inc.
Engineers
Scientists
Consultants
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW		CHECKED BY: PRW	
DESIGNED BY: RAH		APPROVED BY:	

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

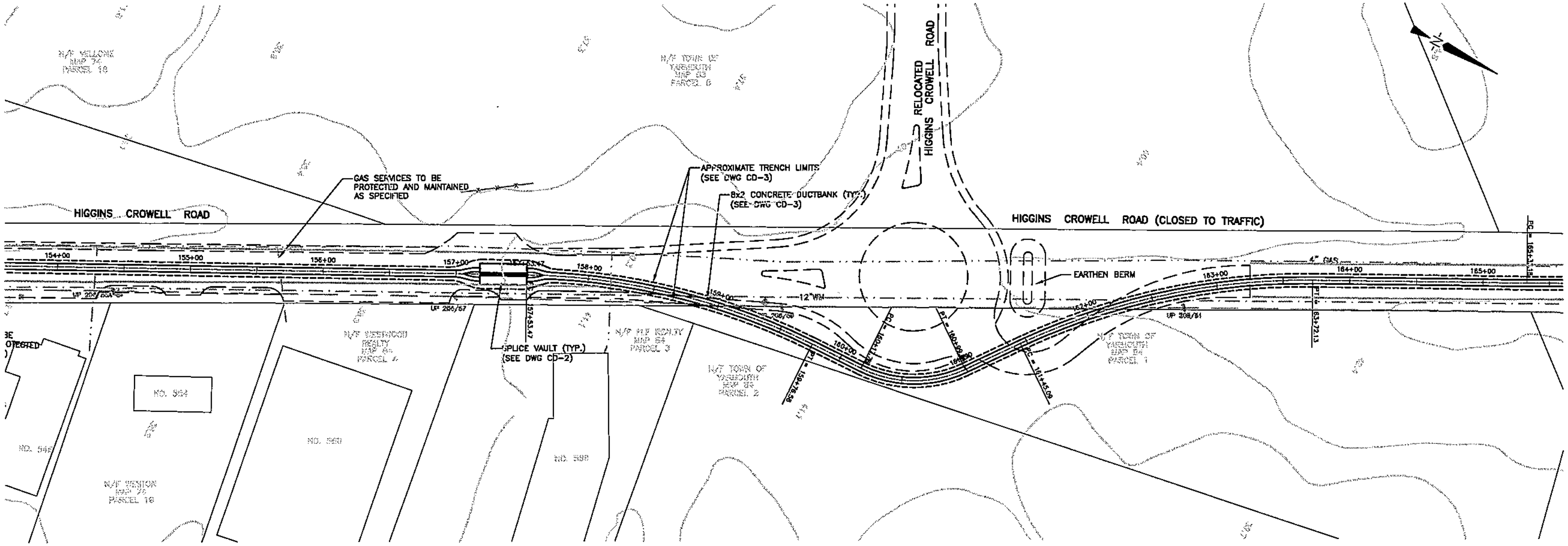
COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

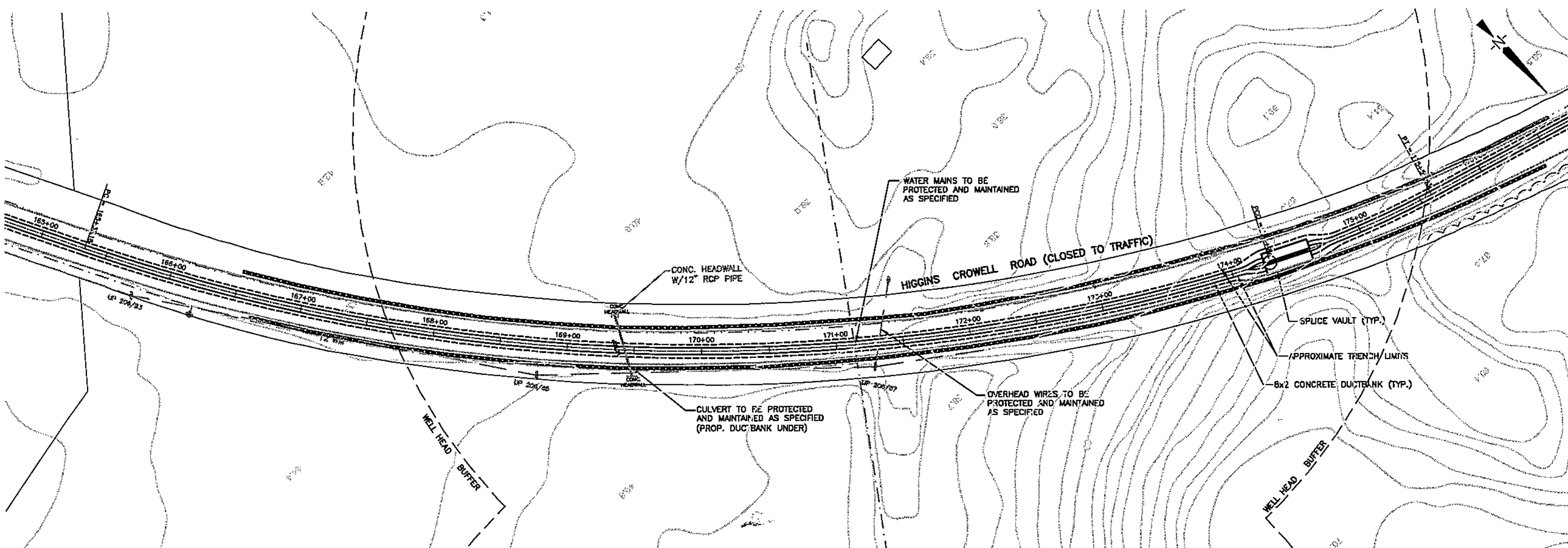
YARMOUTH & BARNSTABLE, MA.

UPLAND CABLE ROUTE PLAN (YARMOUTH, MA)

PROJECT No.: E159-504.10
DATE OF ISSUE: 02/26/10
SHEET No.:
SCALE: 1"=40'
DRAWING No. Y-7

FOR PERMITTING PURPOSES ONLY





Cape Wind
Energy for Life.

0 40 80
SCALE IN FEET

ESS Group Inc.

Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW	CHECKED BY: PRW		
DESIGNED BY: RAH	APPROVED BY:		

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

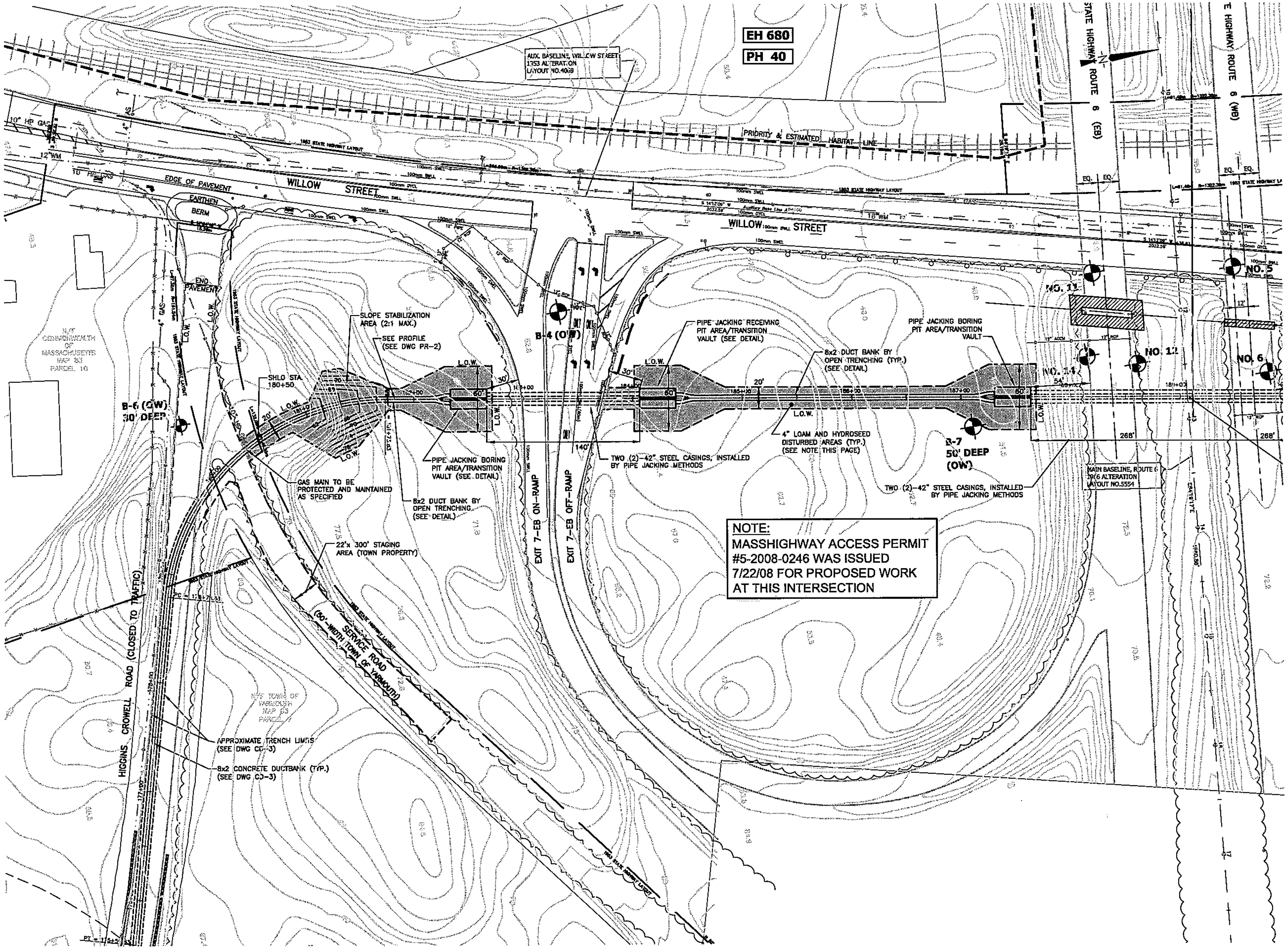
YARMOUTH & BARNSTABLE, MA.

UPLAND CABLE ROUTE PLAN (YARMOUTH, MA)

PROJECT No.: E159-504.10
DATE OF ISSUE: 02/26/10
SHEET No.:
SCALE: 1"=40'

DRAWING No.
Y-8

FOR PERMITTING PURPOSES ONLY



Cape Wind™
Energy for Life.

ESS Group Inc.

Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

DRAWN BY: KCW — CHECKED BY: PRW
DESIGNED BY: RAH — APPROVED BY:

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

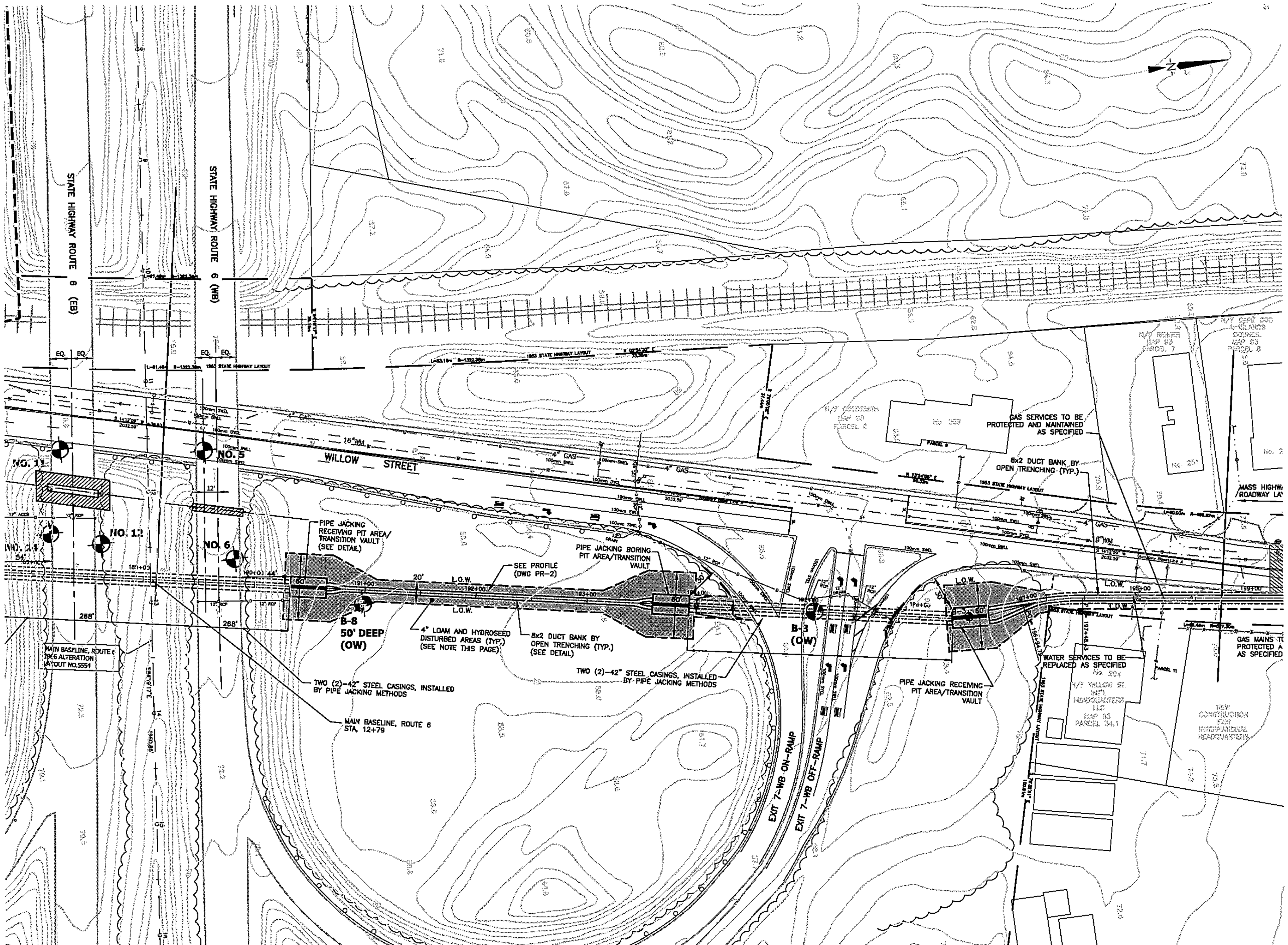
YARMOUTH & BARNSTABLE, MA.

UPLAND CABLE ROUTE PLAN (YARMOUTH, MA)

PROJECT No.: E159-504.10
DATE OF ISSUE: 02/26/10
SHEET No.:
SCALE: 1"=40'

DRAWING No. Y-9

FOR PERMITTING PURPOSES ONLY



Cape Wind™
Energy for Life.

ESS Group Inc.
Engineers
Scientists
Consultants
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

DRAWN BY: KCW — CHECKED BY: PRW
DESIGNED BY: RAH — APPROVED BY:

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

UPLAND CABLE ROUTE PLAN (YARMOUTH, MA)

PROJECT No.: E159-504.10
DATE OF ISSUE: 02/26/10
SHEET No.:
SCALE: 1"=40'
DRAWING No. Y-10

FOR PERMITTING PURPOSES ONLY

Cape Wind
Energy for Life.

NOTE:
EXECUTIVE OFFICE OF TRANSPORTATION (EOT) LICENSE AGREEMENT #613 WAS ISSUED ON 9/17/08 FOR WORK PROPOSED UNDER AND ADJACENT TO THE RAILROAD.

0 40 80
SCALE IN FEET

ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW		CHECKED BY: PRW	
DESIGNED BY: RAH		APPROVED BY:	

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

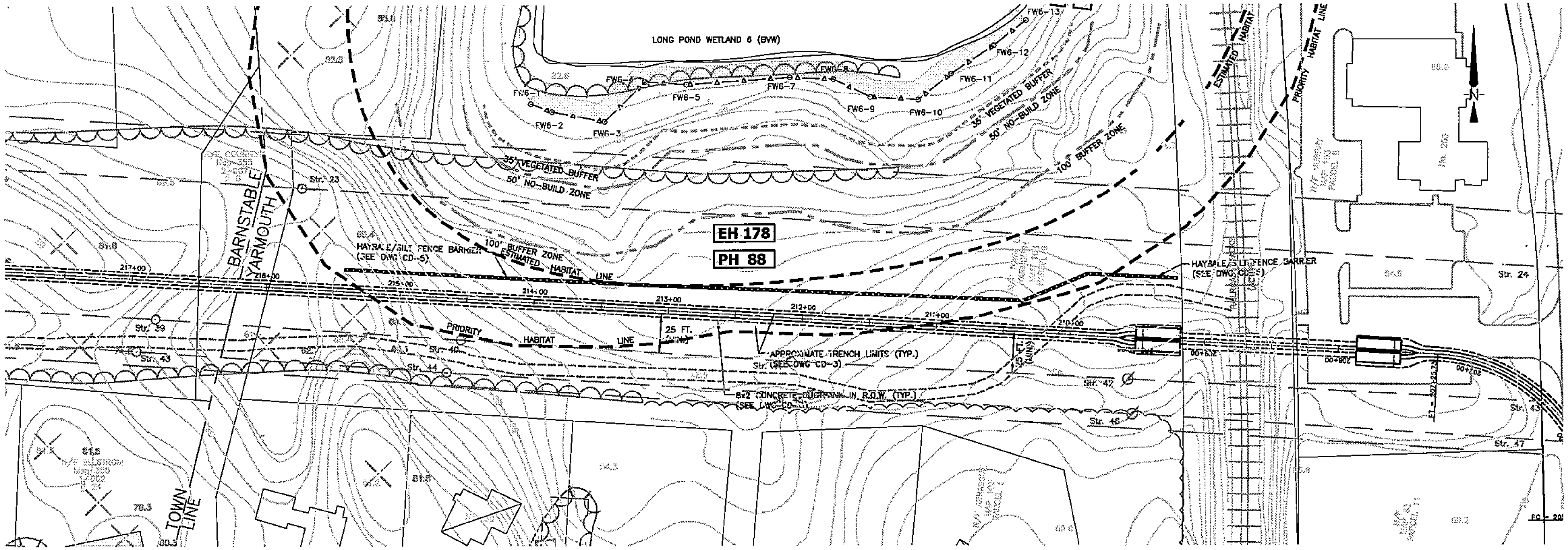
YARMOUTH & BARNSTABLE, MA.

UPLAND CABLE ROUTE PLAN (YARMOUTH, MA)

PROJECT No.: E159-504.10
DATE OF ISSUE: 02/26/10
SHEET No.:
SCALE: 1"=40'

DRAWING No.
Y-11

FOR PERMITTING PURPOSES ONLY



Cape Wind™
Energy for Life.

NOTE: ROUTE STATIONING ON THIS SHEET INCREASES FROM RIGHT TO LEFT.

NOTES:

1. AT ROAD CROSSINGS WITHIN RIGHT-OF-WAY, DUCT BANK SHALL BE INSTALLED WITH 72" COVER TO AVOID CONFLICT WITH UTILITIES IN THE ROAD.
2. UPON COMPLETION OF DUCT BANK INSTALLATION, ALL DISTURBED AREAS SHALL BE LOAMED AND SEEDED, IN ACCORDANCE WITH N-STAR REQUIREMENTS AND AS SPECIFIED.
3. ALL EXISTING UTILITIES TO BE PROTECTED AND MAINTAINED AT ROAD CROSSINGS.

WORK AREAS ON THIS SHEET UNDER MWPA JURISDICTION
NONE

0 40 80
SCALE IN FEET

ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW		CHECKED BY: PRW	
DESIGNED BY: RAH		APPROVED BY:	

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

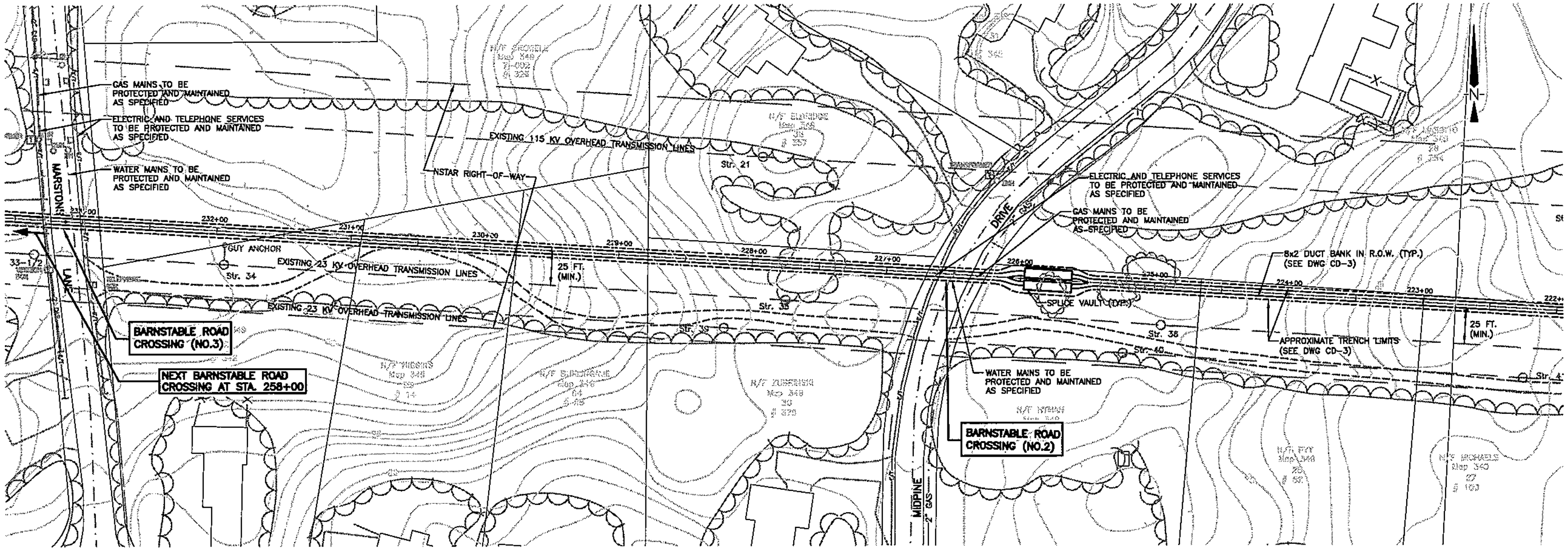
COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

UPLAND CABLE ROUTE PLAN (YARMOUTH, MA)

PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	Y-12
SHEET No.:	
SCALE: 1"=40'	

FOR PERMITTING PURPOSES ONLY

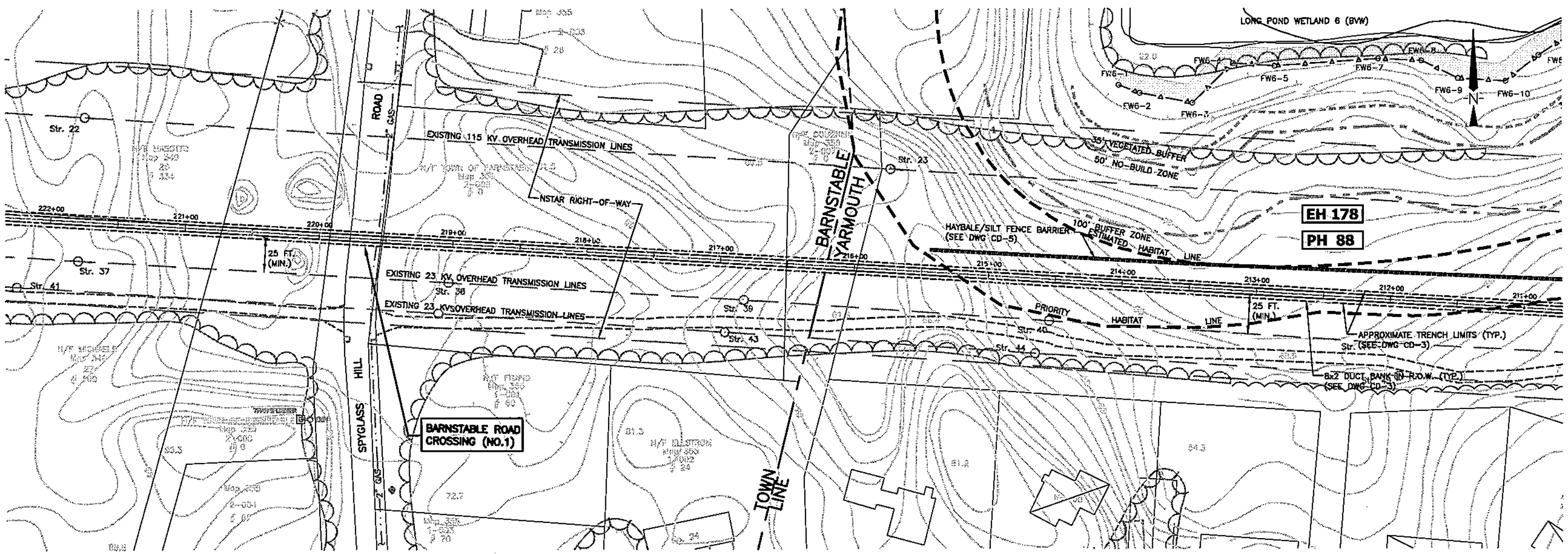


NOTE: ROUTE STATIONING ON THIS SHEET INCREASES FROM BOTTOM-RIGHT TO TOP-LEFT.

NOTES:

1. AT ROAD CROSSINGS WITHIN RIGHT-OF-WAY, DUCT BANK SHALL BE INSTALLED WITH 72" COVER TO AVOID CONFLICT WITH UTILITIES IN THE ROAD.
2. UPON COMPLETION OF DUCT BANK INSTALLATION, ALL DISTURBED AREAS SHALL BE LOAMED AND SEEDED, IN ACCORDANCE WITH N-STAR REQUIREMENTS AND AS SPECIFIED.
3. ALL EXISTING UTILITIES TO BE PROTECTED AND MAINTAINED AT ROAD CROSSINGS.

0 40 80
SCALE IN FEET



Cape Wind™
Energy for Life.

ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW	CHECKED BY: PRW		
DESIGNED BY: RAH	APPROVED BY:		

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

UPLAND CABLE ROUTE PLAN (BARNSTABLE, MA)

PROJECT No.: E159-504.10
DATE OF ISSUE: 02/26/10
SHEET No.:
SCALE: 1"=40'
DRAWING No. B-1

FOR PERMITTING PURPOSES ONLY

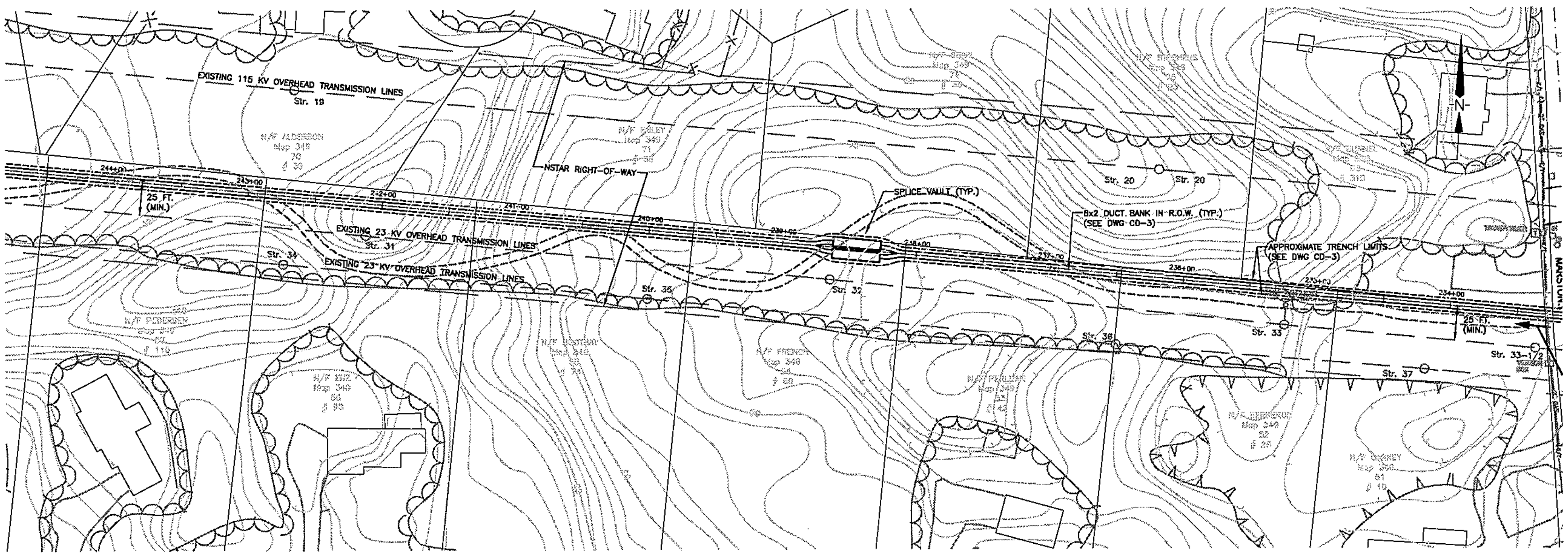
Cape Wind
Energy for Life.

NOTE: ROUTE STATIONING ON THIS SHEET INCREASES FROM BOTTOM-RIGHT TO TOP-LEFT.

NOTES:

1. AT ROAD CROSSINGS WITHIN RIGHT-OF-WAY, DUCT BANK SHALL BE INSTALLED WITH 72" COVER TO AVOID CONFLICT WITH UTILITIES IN THE ROAD.
2. UPON COMPLETION OF DUCT BANK INSTALLATION, ALL DISTURBED AREAS SHALL BE LOAMED AND SEEDED, IN ACCORDANCE WITH N-STAR REQUIREMENTS AND AS SPECIFIED.
3. ALL EXISTING UTILITIES TO BE PROTECTED AND MAINTAINED AT ROAD CROSSINGS.

0 40 80
SCALE IN FEET



ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW		CHECKED BY: PRW	
DESIGNED BY: RAH		APPROVED BY:	

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

COMPILED PLAN SET OF
THE UPLAND 115kV
TRANSMISSION CABLE ROUTE

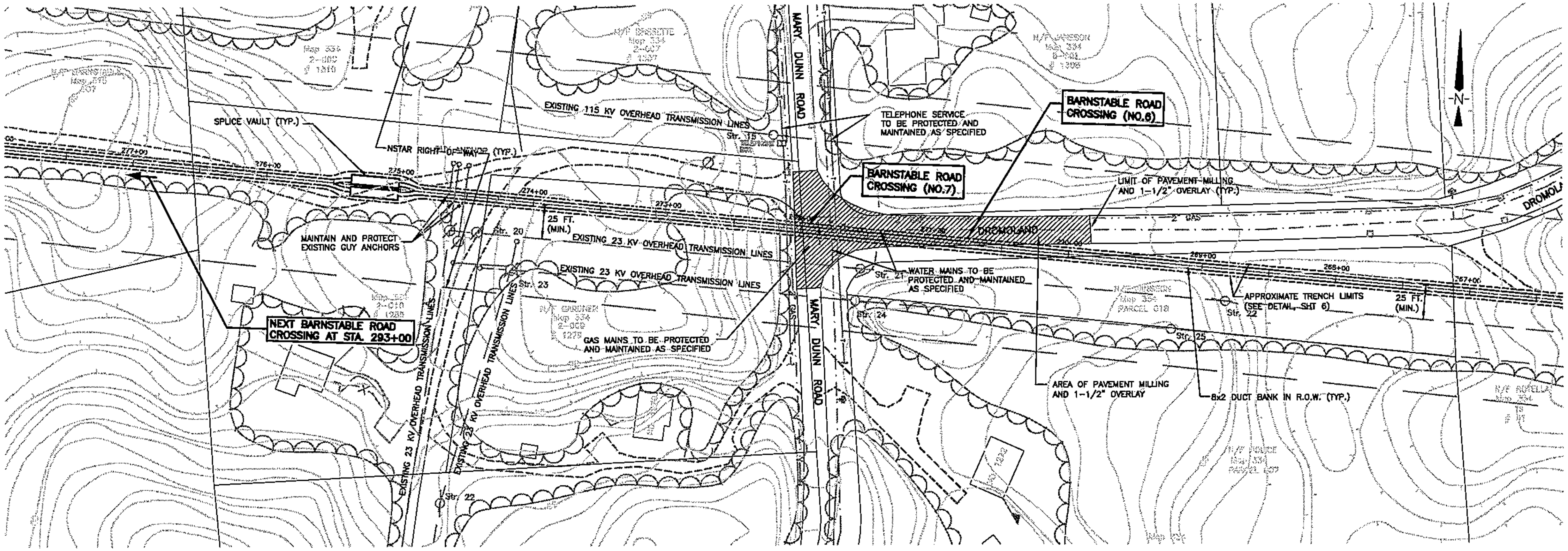
YARMOUTH & BARNSTABLE, MA.

UPLAND CABLE
ROUTE PLAN
(BARNSTABLE, MA)

PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	B-2
SHEET No.:	
SCALE: 1"=40'	

FOR PERMITTING PURPOSES ONLY

Cape Wind™
Energy for Life.

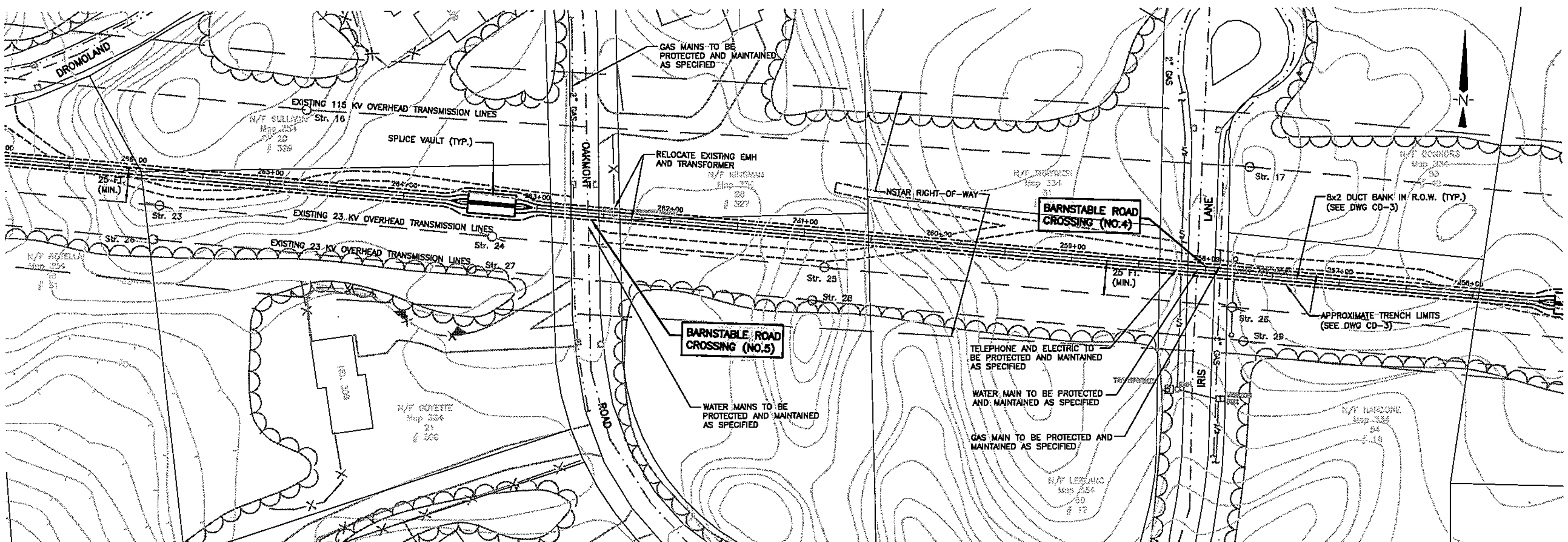


NOTE: ROUTE STATIONING ON THIS SHEET INCREASES FROM BOTTOM-RIGHT TO TOP-LEFT.

NOTES:

1. AT ROAD CROSSINGS WITHIN RIGHT-OF-WAY, DUCT BANK SHALL BE INSTALLED WITH 72" COVER TO AVOID CONFLICT WITH UTILITIES IN THE ROAD.
2. UPON COMPLETION OF DUCT BANK INSTALLATION, ALL DISTURBED AREAS SHALL BE LOAMED AND SEEDED, IN ACCORDANCE WITH N-STAR REQUIREMENTS AND AS SPECIFIED.
3. ALL EXISTING UTILITIES TO BE PROTECTED AND MAINTAINED AT ROAD CROSSINGS.

0 40 80
SCALE IN FEET



ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

DRAWN BY: KCW	CHECKED BY: PRW
DESIGNED BY: RAH	APPROVED BY:

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

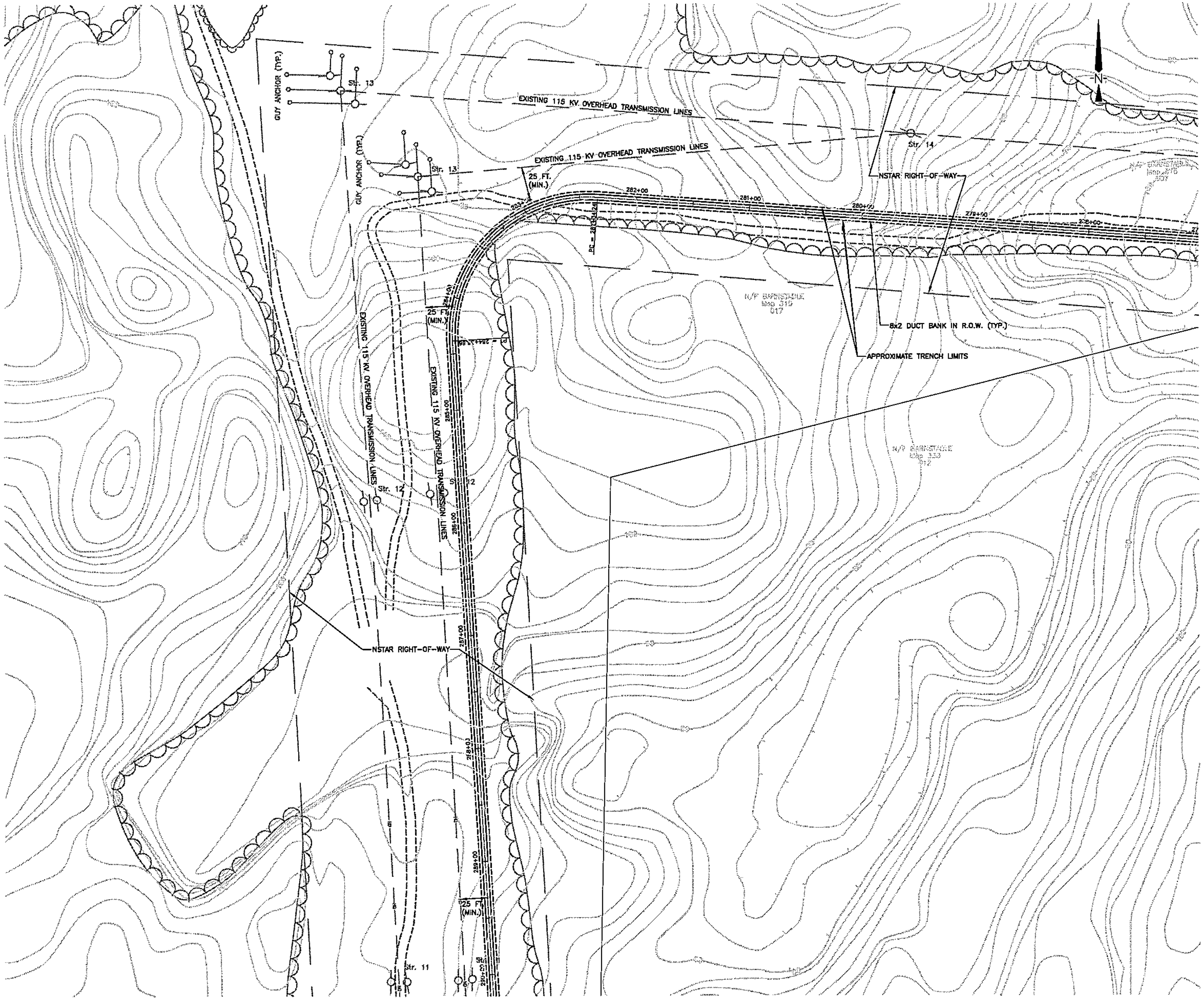
COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

UPLAND CABLE ROUTE PLAN (BARNSTABLE, MA)

PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	B-3
SHEET No.:	
SCALE: 1"=40'	

FOR PERMITTING PURPOSES ONLY



NOTES:

1. UPON COMPLETION OF DUCT BANK INSTALLATION, ALL DISTURBED AREAS SHALL BE LOAMED AND SEEDED, IN ACCORDANCE WITH N-STAR REQUIREMENTS AND AS SPECIFIED.

0 40 80
SCALE IN FEET

Cape Wind™
Energy for Life.

ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

DRAWN BY: KCW	CHECKED BY: PRW
DESIGNED BY: RAH	APPROVED BY:

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

COMPILED PLAN SET OF
THE UPLAND 115kV
TRANSMISSION CABLE ROUTE

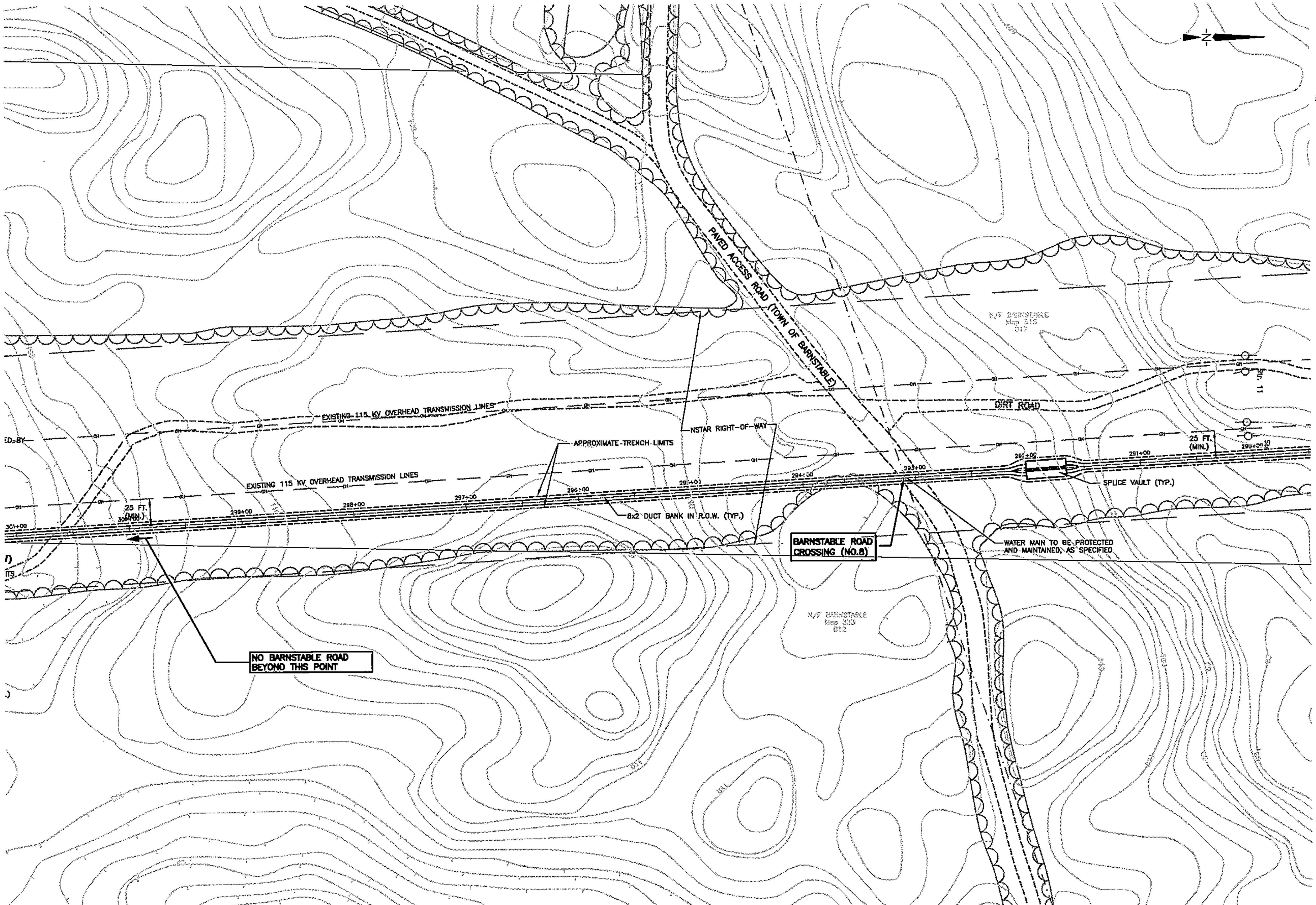
YARMOUTH & BARNSTABLE, MA.

UPLAND CABLE
ROUTE PLAN
(BARNSTABLE, MA)

PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	B-4
SHEET No.:	
SCALE: 1"=40'	

FOR PERMITTING PURPOSES ONLY

Cape Wind™
Energy for Life.



NOTES:

1. AT ROAD CROSSINGS WITHIN RIGHT-OF-WAY, DUCT BANK SHALL BE INSTALLED WITH 72" COVER TO AVOID CONFLICT WITH UTILITIES IN THE ROAD.
2. UPON COMPLETION OF DUCT BANK INSTALLATION, ALL DISTURBED AREAS SHALL BE LOAMED AND SEEDED, IN ACCORDANCE WITH NSTAR REQUIREMENTS AND AS SPECIFIED.
3. ALL EXISTING UTILITIES TO BE PROTECTED AND MAINTAINED AT ROAD CROSSINGS.

0 40 80
SCALE IN FEET

ESS Group Inc.
Engineers
Scientists
Consultants
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

DRAWN BY: KCW | CHECKED BY: PRW
DESIGNED BY: RAH | APPROVED BY:

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

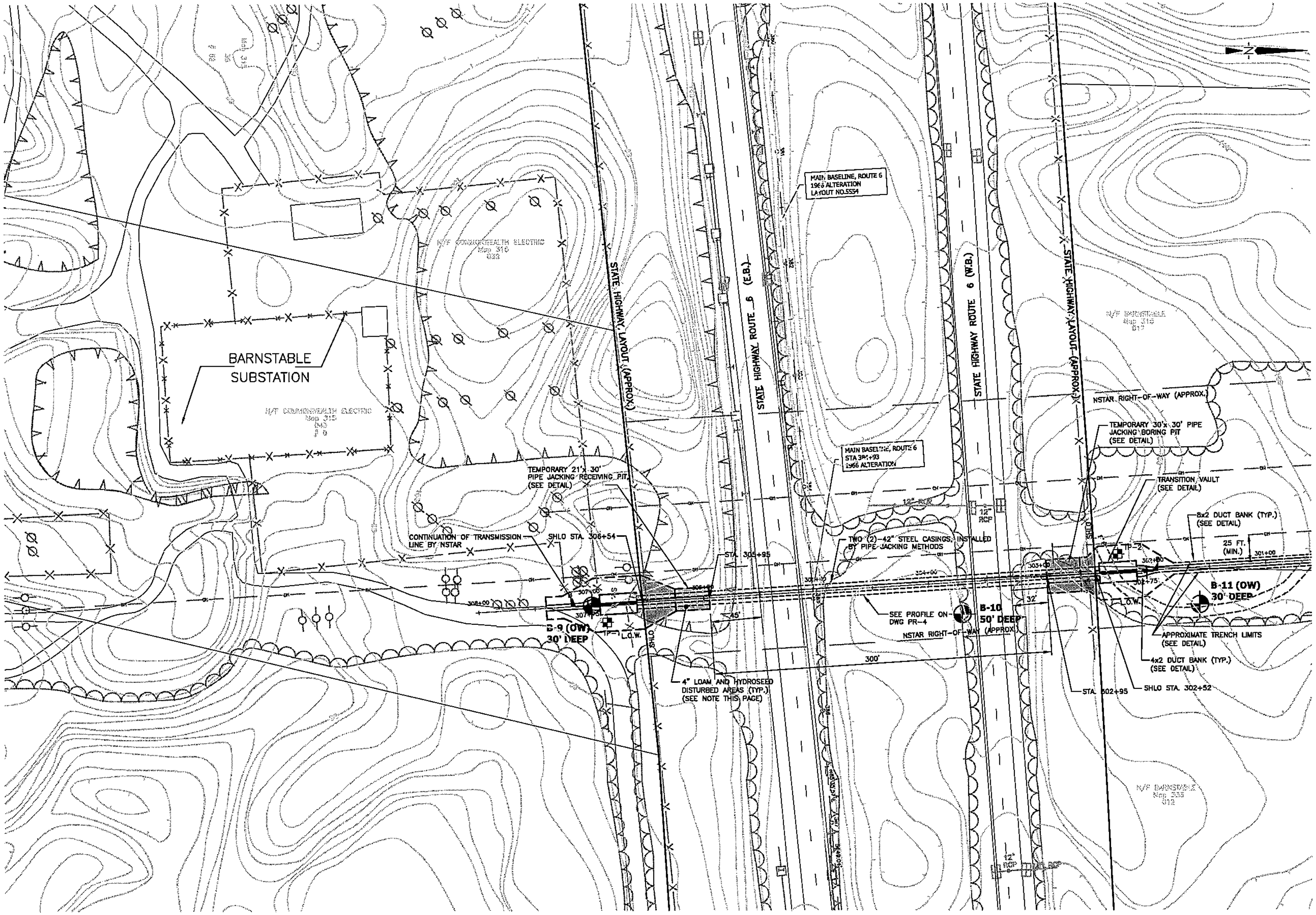
UPLAND CABLE ROUTE PLAN (BARNSTABLE, MA)

PROJECT No.: E159-504.10
DATE OF ISSUE: 02/26/10
SHEET No.:
SCALE: 1"=40'

DRAWING No.
B-5

FOR PERMITTING PURPOSES ONLY

Cape Wind™
Energy for Life.



NOTES:

1. AT ROAD CROSSINGS WITHIN RIGHT-OF-WAY, DUCT BANK SHALL BE INSTALLED WITH 72" COVER TO AVOID CONFLICT WITH UTILITIES IN THE ROAD.
2. UPON COMPLETION OF DUCT BANK INSTALLATION, ALL DISTURBED AREAS SHALL BE LOAMED AND SEEDED, IN ACCORDANCE WITH NSTAR REQUIREMENTS AND AS SPECIFIED.
3. ALL EXISTING UTILITIES TO BE PROTECTED AND MAINTAINED AT ROAD CROSSINGS.
4. EXISTING UTILITIES WERE COMPILED FROM PLANS RECEIVED BY THE TOWN OF YARMOUTH ON FEBRUARY 11, 2008 BY MS TRANSPORTATION SYSTEM, INC, FEDERAL AID PROJECT No. STP-001S(340)X, DATED 11/10/04.
5. LIMITS OF WORK AND LIMITS OF TREE CLEARING SHOWN ON THE PLANS SHALL BE PERMANENTLY REVEGETATED WITH A CONSERVATION/WILDLIFE SEED MIX APPLIED BY HYDROSEEDING METHODS OVER A 4" LAYER OF TOPSOIL. THE SEED MIX APPLICATION RATE SHALL BE (25 lbs/ACRE) MINIMUM.

0 40 80
SCALE IN FEET

ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW		CHECKED BY: PRW	
DESIGNED BY: RAH		APPROVED BY:	

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

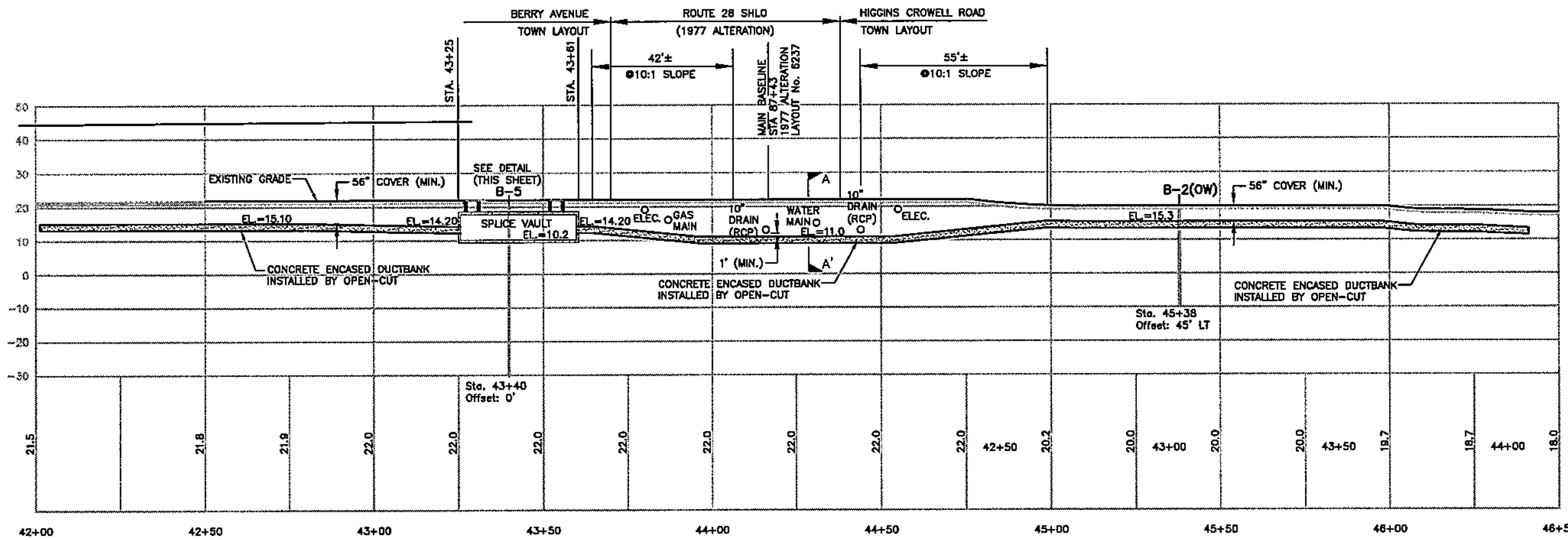
YARMOUTH & BARNSTABLE, MA.

UPLAND CABLE ROUTE PLAN (BARNSTABLE, MA)

PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	B-6
SHEET No.:	
SCALE: 1"=40'	

FOR PERMITTING PURPOSES ONLY

Cape Wind
Energy for Life.

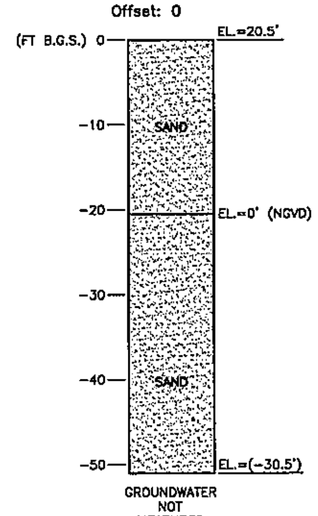


SCALE:
HORIZONTAL: 1"=20'
VERTICAL: 1"=20'

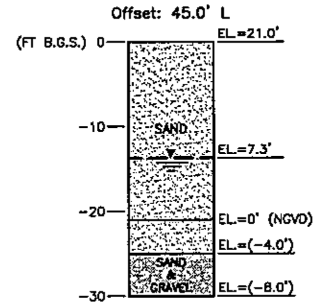
ROUTE 28 PROFILE (YARMOUTH)
(STA 42+00 TO STA 46+50)

NOTE:
1. THE LOCATION OF UNDERGROUND UTILITIES ARE APPROXIMATE AND ARE NOT FIELD VERIFIED.

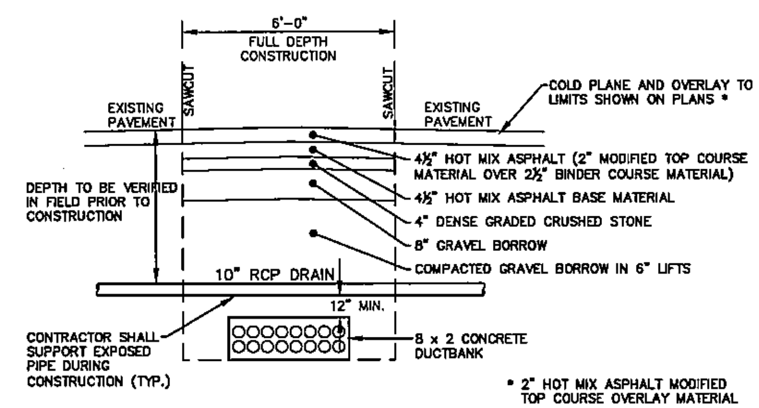
BORING No: B-5
Ground Surface Elev: 20.5'
Depth to Water (ft): N/A
Depth of Boring (ft): 51.0'
Station: 43+40
Offset: 0



BORING No: B-2 (OW)
Ground Surface Elev: 21.0'
Depth to Water (ft): 13.7'
Depth of Boring (ft): 29'
Station: 45+38
Offset: 45.0' L



NOTE:
1. BORING DATA OBTAINED FROM GZA BORING SKETCHES DATED JUNE 2008.
2. SEE BORING LOGS FOR DETAILED INFORMATION.



UTILITY CROSSING – SECTION A–A'
N.T.S.

FOR PERMITTING PURPOSES ONLY

ESS Group Inc.
Engineers
Scientists
Consultants
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW		CHECKED BY: PRW	
DESIGNED BY: RAH		APPROVED BY:	

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

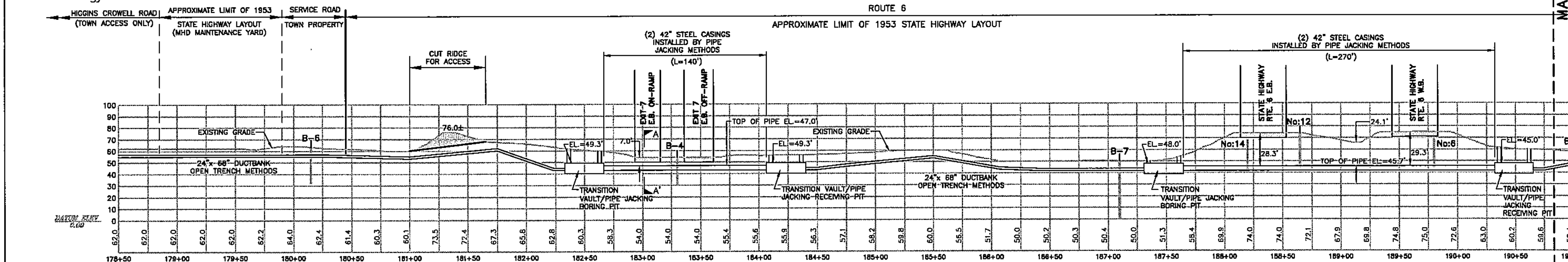
COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

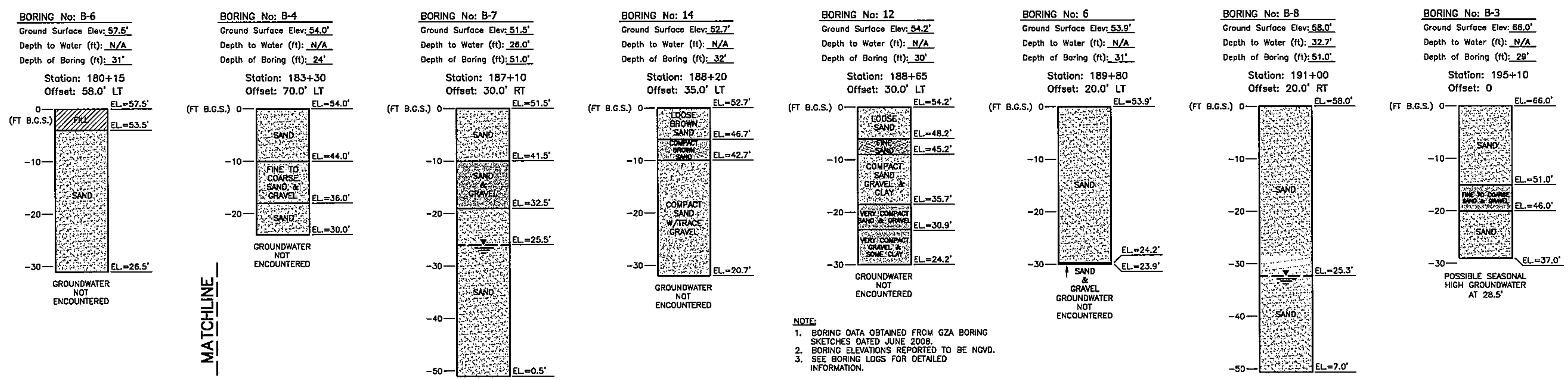
YARMOUTH & BARNSTABLE, MA.

ROUTE 28
PROFILE & DETAILS
(YARMOUTH, MA)

PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	
SHEET No.:	PR-1
SCALE: 1"=40'	

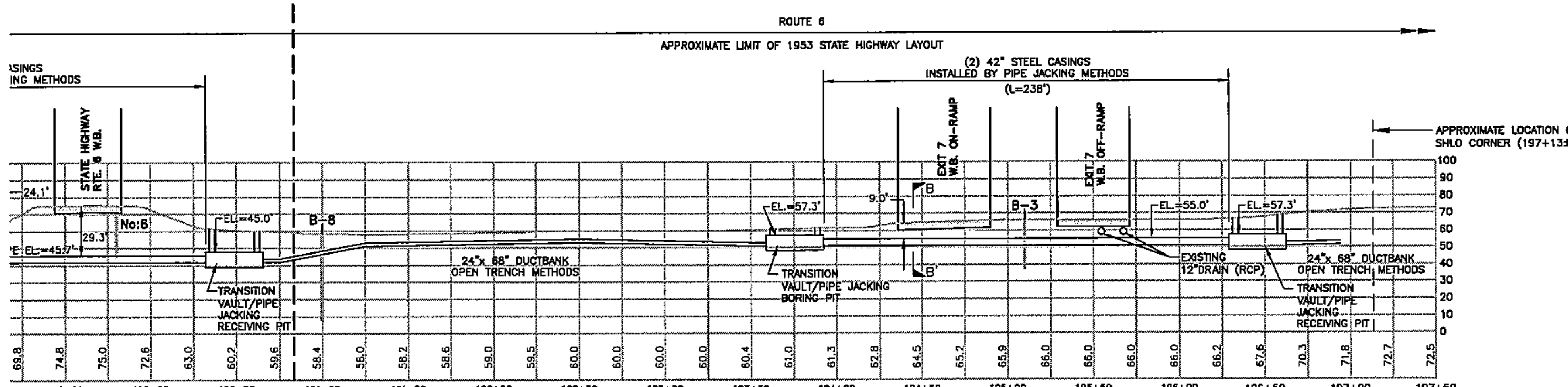
Cape Wind™
Energy for Life.





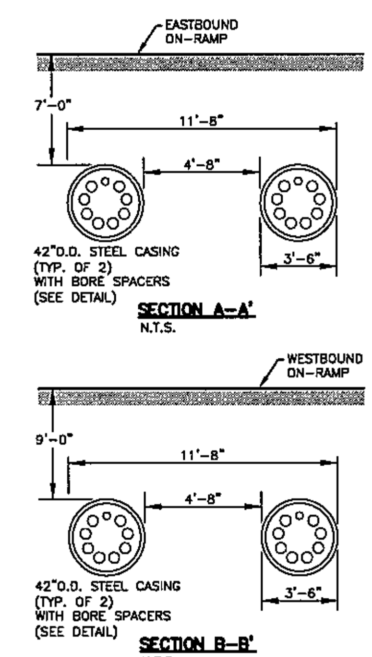
NOTE:
1. BORING DATA OBTAINED FROM GZA BORING SKETCHES DATED JUNE 2008.
2. BORING ELEVATIONS REPORTED TO BE NGVD.
3. SEE BORING LOGS FOR DETAILED INFORMATION.

NOTE:
1. THE LOCATION OF UNDERGROUND UTILITIES ARE APPROXIMATE AND ARE NOT FIELD VERIFIED.



SCALE:
HORIZONTAL: 1"=40'
VERTICAL: 1"=40'

ROUTE 6 – EXIT 7 INTERCHANGE
(STA 178+50 TO STA 197+50)



FOR PERMITTING PURPOSES ONLY

ESS Group Inc.
Engineers
Scientists
Consultants
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW		CHECKED BY: PRW	
DESIGNED BY: RAH		APPROVED BY:	

CAPE WIND ASSOCIATES, LLC

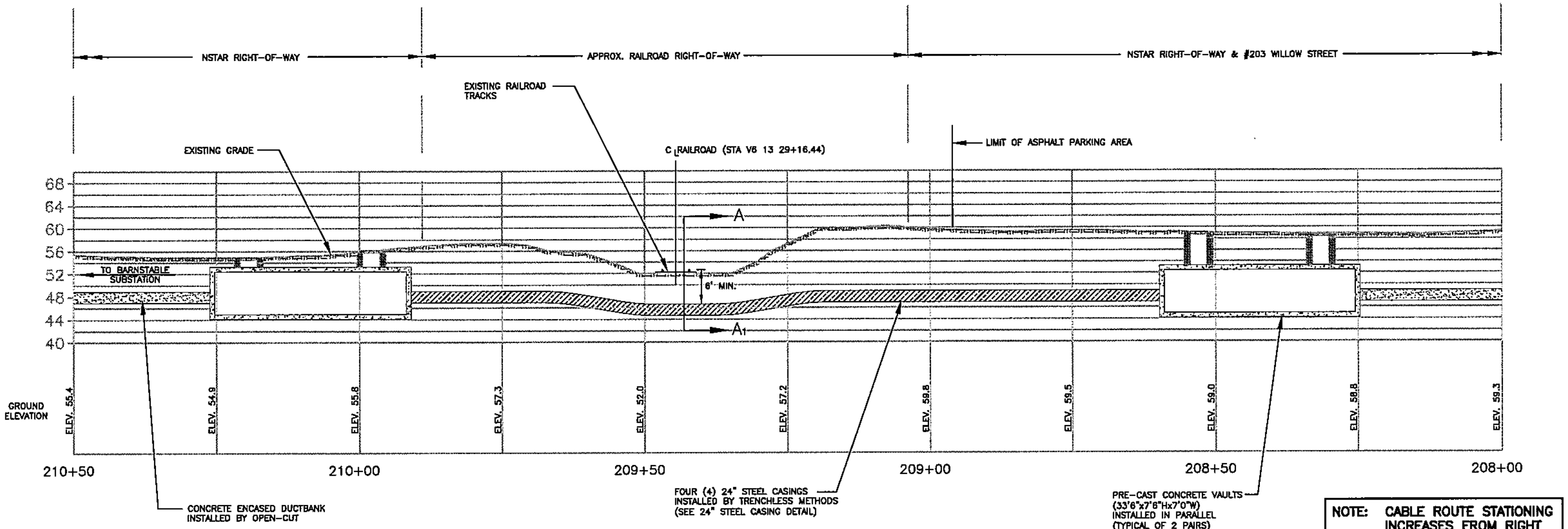
CAPE WIND PROJECT

COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

ROUTE 6
PROFILE & DETAILS
(YARMOUTH, MA)

PROJECT No.: E159-504.10
DATE OF ISSUE: 02/25/10
SHEET No.:
SCALE: 1"=40'
DRAWING No.
PR-2

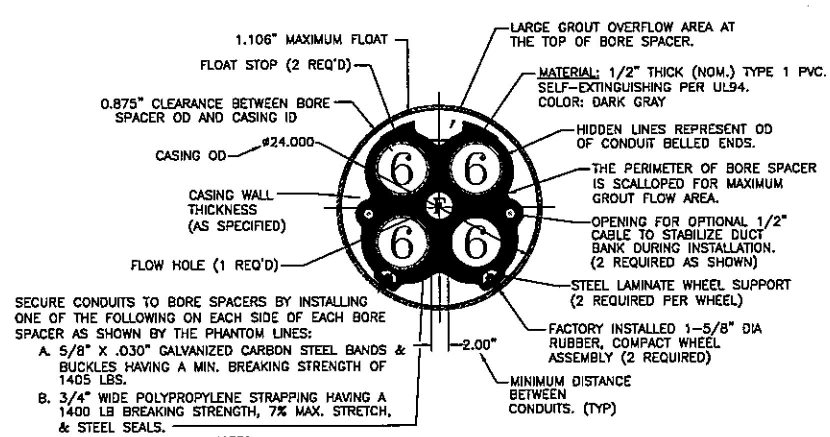


NOTE: CABLE ROUTE STATIONING INCREASES FROM RIGHT TO LEFT

LOOKING NORTH

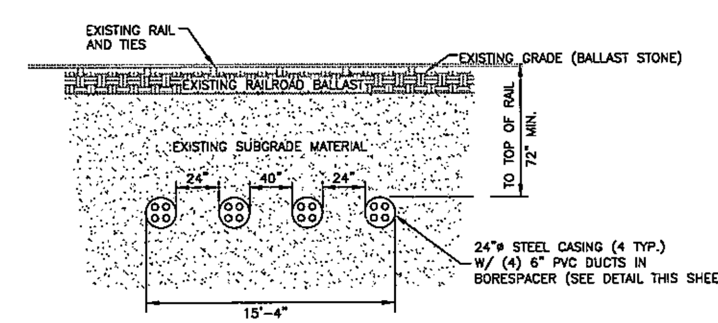
SCALE:
HORIZONTAL 1"=10'
VERTICAL 1"=10'

RAILROAD CROSSING
SECTION C–C' (STA 208+00 TO STA 210+50)



NOTES:
1) COPPER GROUND WIRE SHALL BE INSTALLED CONTINUOUSLY THROUGH CASING.
2) ANNULAR SPACE TO BE FILLED WITH FLOWABLE GROUT.

24" CASING DETAIL
NOT TO SCALE



RAILROAD CROSSING SECTION A–A1 TRENCHLESS INSTALLATION DETAIL
NOT TO SCALE

FOR PERMITTING PURPOSES ONLY

ESS Group Inc.
Engineers
Scientists
Consultants
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW		CHECKED BY: PRW	
DESIGNED BY: RAH		APPROVED BY:	

CAPE WIND ASSOCIATES, LLC

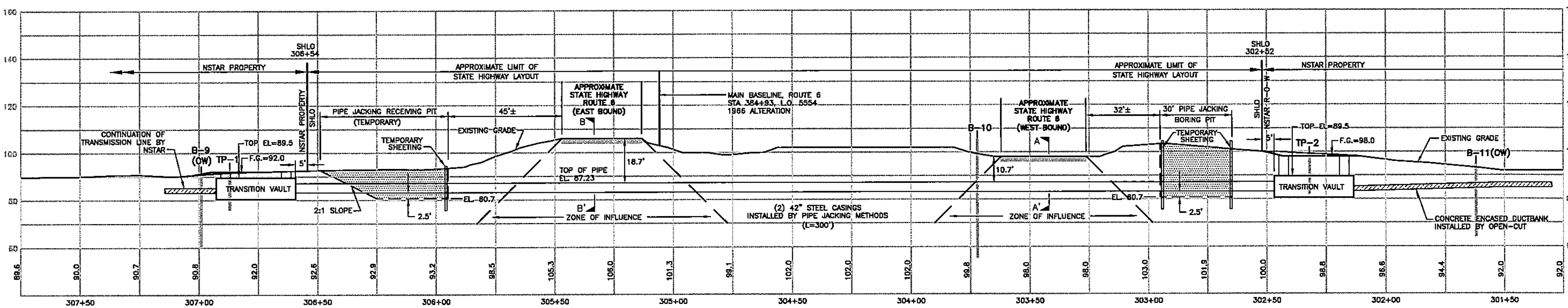
CAPE WIND PROJECT

COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

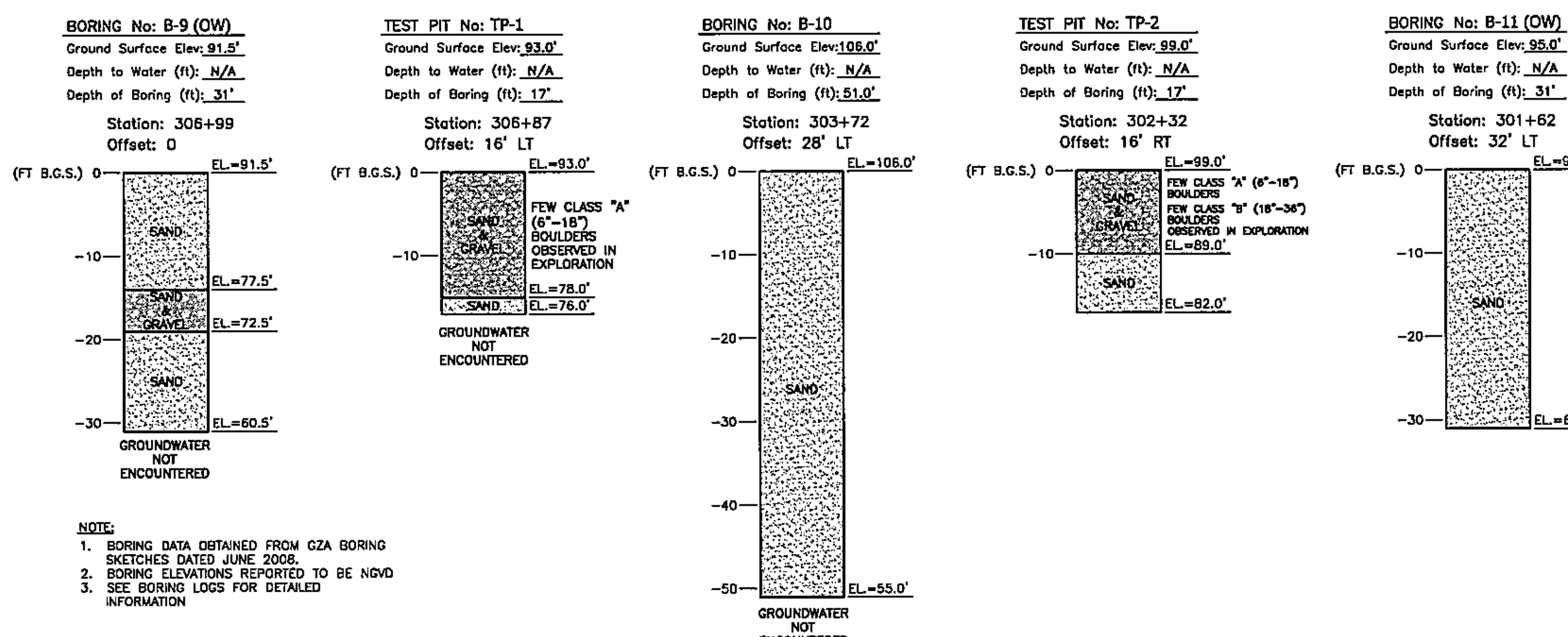
CABLE PROFILE & DETAILS (UNDER RAILROAD)

PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	PR-3
SHEET No.:	
SCALE: 1"=40'	

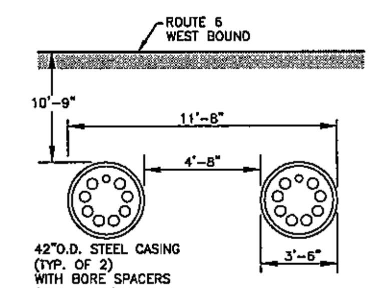


SCALE:
HORIZONTAL: 1"=20'
VERTICAL: 1"=20'

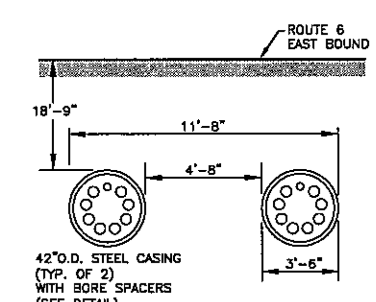
ROUTE 6 CROSSING (BARNSTABLE)
(STA 301+00 TO STA 307+25)



NOTE:
1. BORING DATA OBTAINED FROM GZA BORING SKETCHES DATED JUNE 2008.
2. BORING ELEVATIONS REPORTED TO BE NGVD
3. SEE BORING LOGS FOR DETAILED INFORMATION



SECTION A-A'
N.T.S.



SECTION B-B'
N.T.S.

FOR PERMITTING PURPOSES ONLY

ESS Group Inc.
Engineers
Scientists
Consultants
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

DRAWN BY: KCW | CHECKED BY: PRW
DESIGNED BY: RAH | APPROVED BY:

CAPE WIND ASSOCIATES, LLC

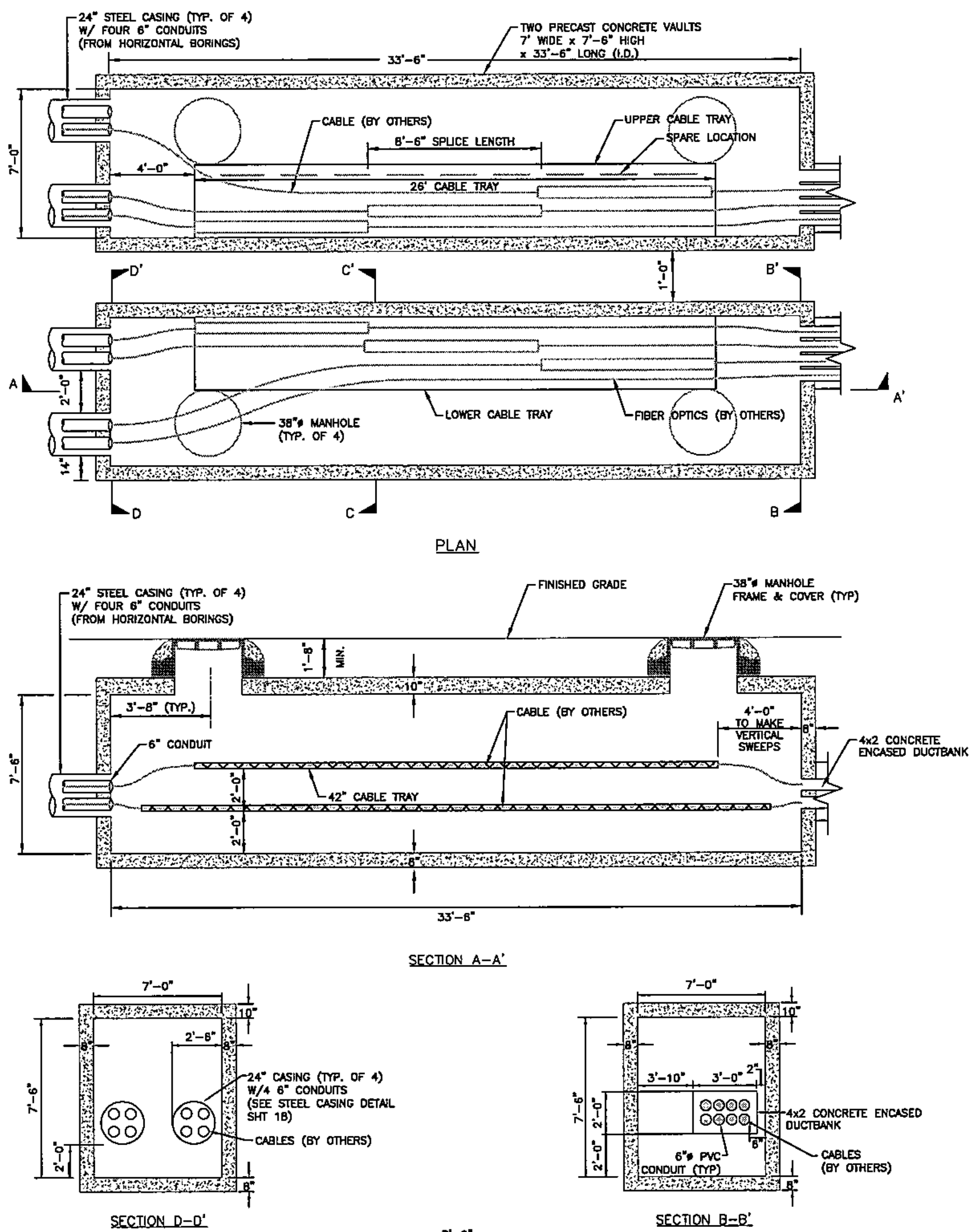
CAPE WIND PROJECT

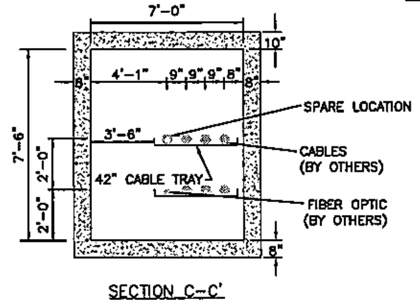
COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

ROUTE 6 CROSSING PROFILE & DETAILS (BARNSTABLE, MA)

PROJECT No.: E159-504.10
DATE OF ISSUE: 02/26/10
SHEET No.:
SCALE: 1"=40'
DRAWING No. PR-4





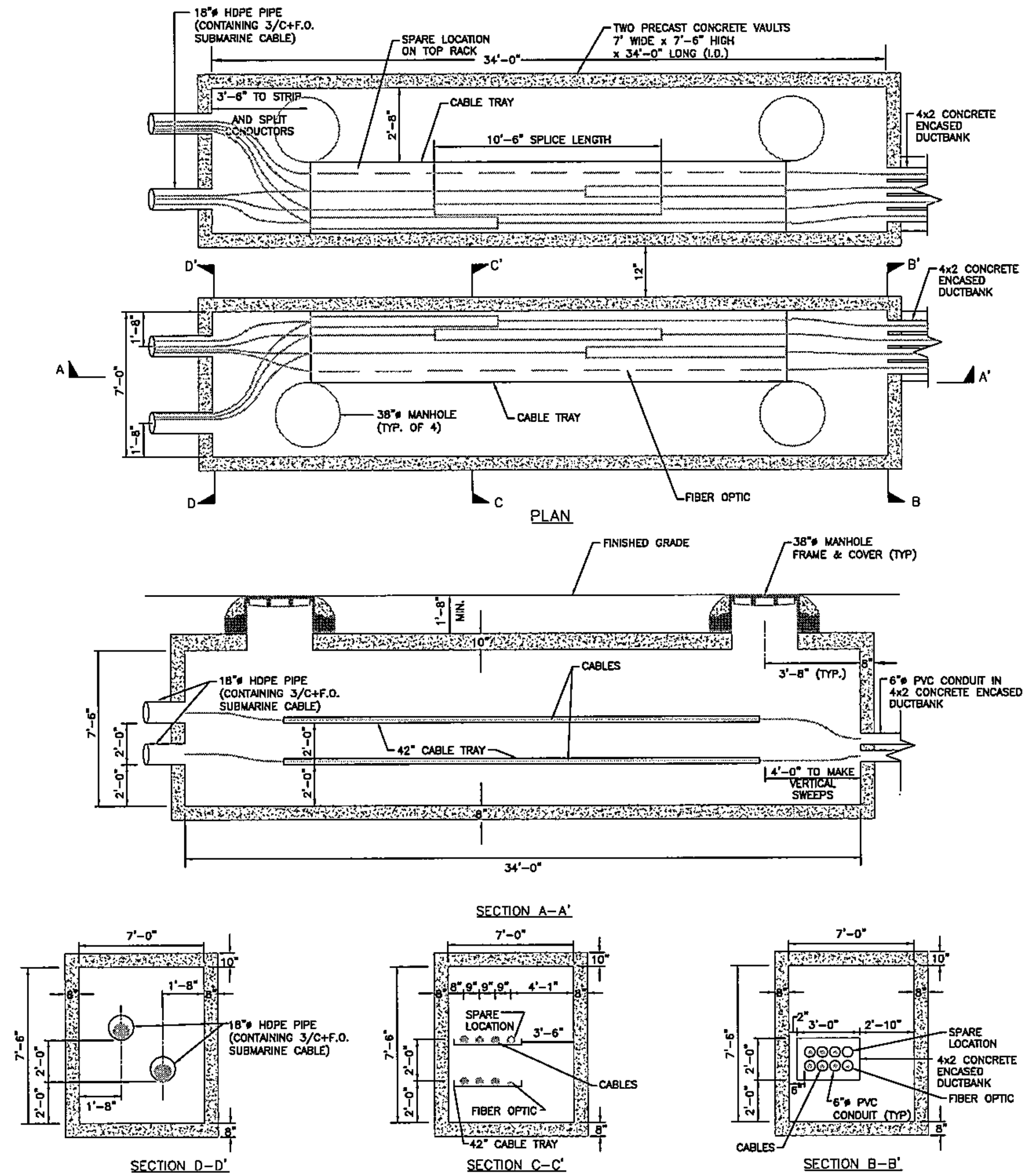
NOTES:

1. CONCRETE MINIMUM STRENGTH – 6000 PSI @28 DAYS.
2. STEEL REINFORCEMENT – ASTM A615, GRADE 60.
3. COVER TO STEEL – 1" MIN.
4. DESIGN LOADING – AASHTO HS20-44.
5. CONSTRUCTION JOINT – SEALED WITH 1" BUTYL RUBBER.
6. DESIGN SPECIFICATION – ACI 350R& 318& AASHTO LOAD FACTOR DESIGN METHOD.

SEE TYPICAL VAULT INSTALLATION DETAIL, SHEET 17.

UPLAND TRANSITION VAULT DETAIL

NOT TO SCALE



LANDFALL TRANSITION VAULT DETAIL

NOT TO SCALE

FOR PERMITTING PURPOSES ONLY

Cape Wind
Energy for Life.

ESS Group Inc.
Engineers
Scientists
Consultants
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

DRAWN BY: KCW — CHECKED BY: PRW
DESIGNED BY: RAH — APPROVED BY:

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

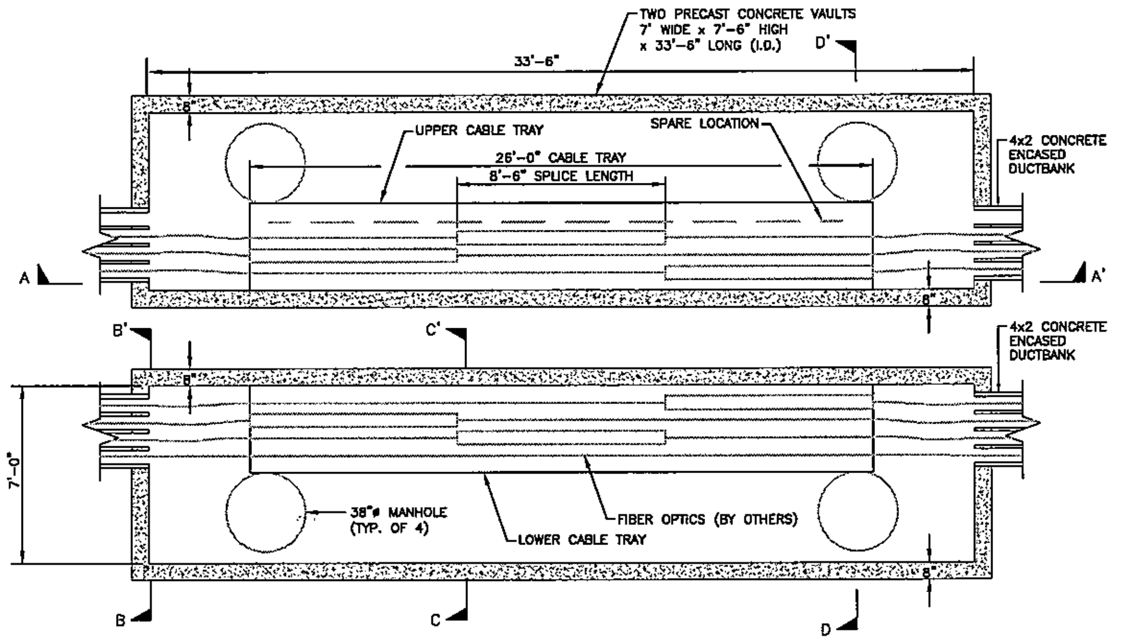
COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

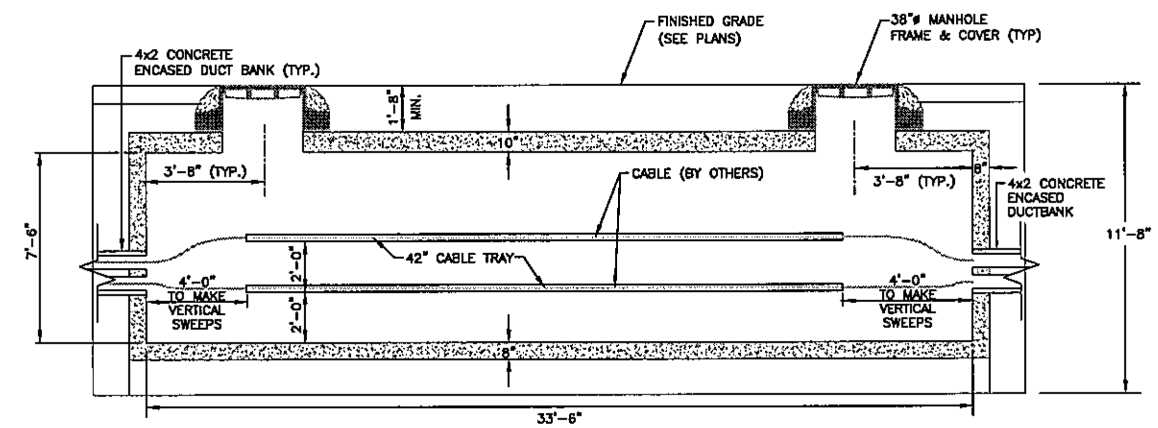
VAULT DETAILS

PROJECT No.: E159-504.10
DATE OF ISSUE: 02/26/10
SHEET No.:
SCALE: 1"=40'

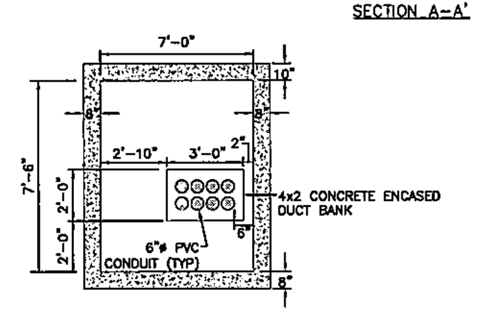
DRAWING No.
CD-1



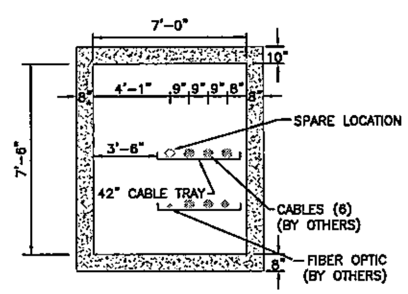
PLAN



SECTION A–A'



SECTION B–B'



SECTION C–C'

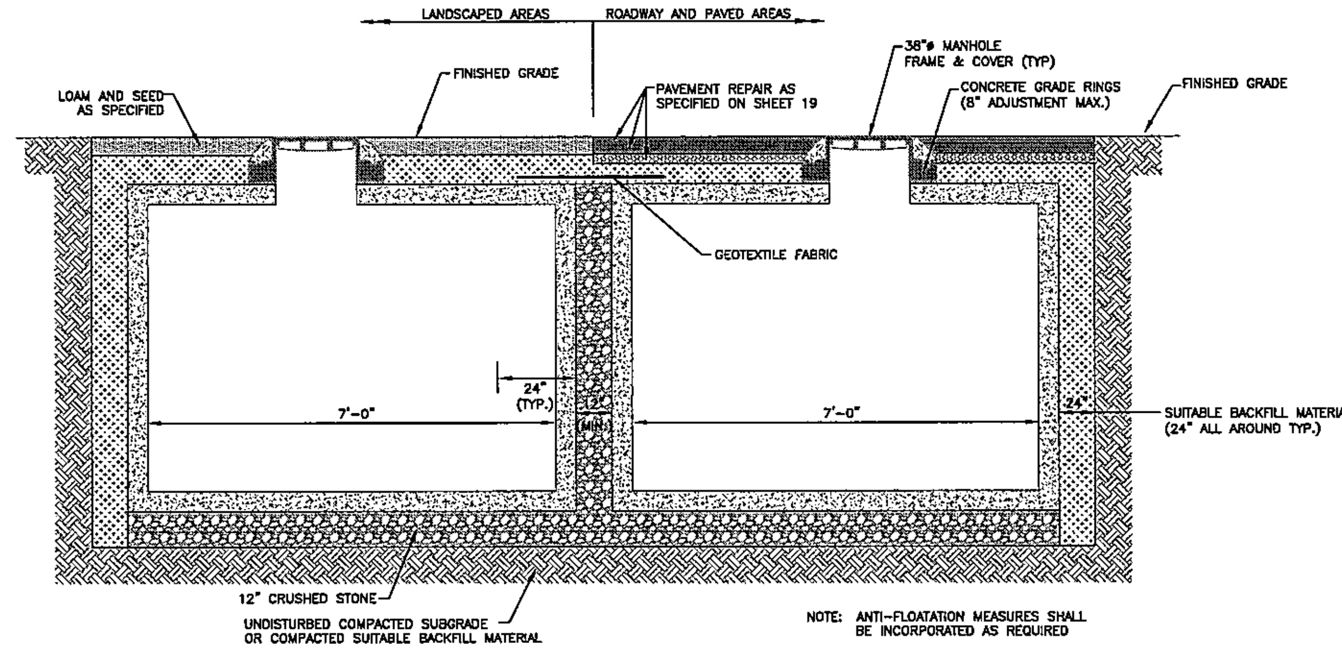
NOTES:

1. CONCRETE MINIMUM STRENGTH – 6000 PSI @28 DAYS.
2. STEEL REINFORCEMENT – ASTM A615, GRADE 60.
3. COVER TO STEEL – 1" MIN.
4. DESIGN LOADING – AASHTO HS20–44.
5. CONSTRUCTION JOINT – SEALED WITH 1" BUTYL RUBBER.
6. DESIGN SPECIFICATION – ACI 350R& 318& AASHTO LOAD FACTOR DESIGN METHOD.

SEE TYPICAL VAULT INSTALLATION DETAIL, THIS SHEET.

SPLICE VAULT DETAIL

NOT TO SCALE



NOTE: ANTI-FLOATATION MEASURES SHALL BE INCORPORATED AS REQUIRED

TYPICAL VAULT INSTALLATION DETAIL

NOT TO SCALE

FOR PERMITTING PURPOSES ONLY

Cape Wind
Energy for Life.

ESS Group Inc.
Engineers
Scientists
Consultants
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

DRAWN BY: KCW | CHECKED BY: PRW
DESIGNED BY: RAH | APPROVED BY:

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

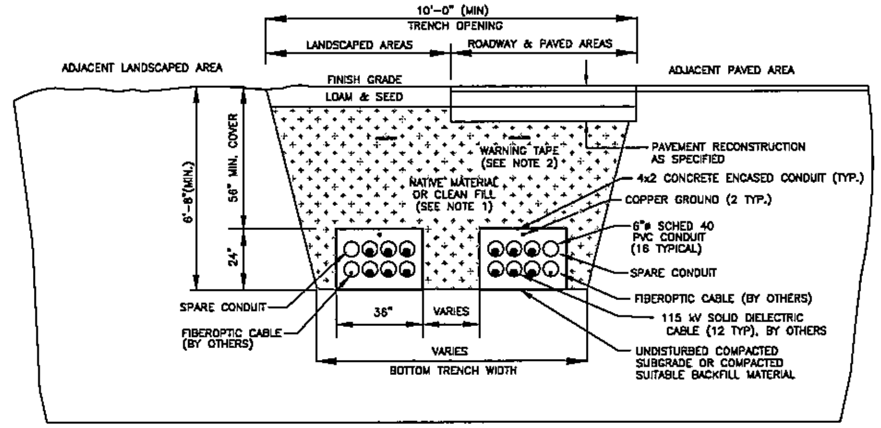
YARMOUTH & BARNSTABLE, MA.

VAULT DETAILS

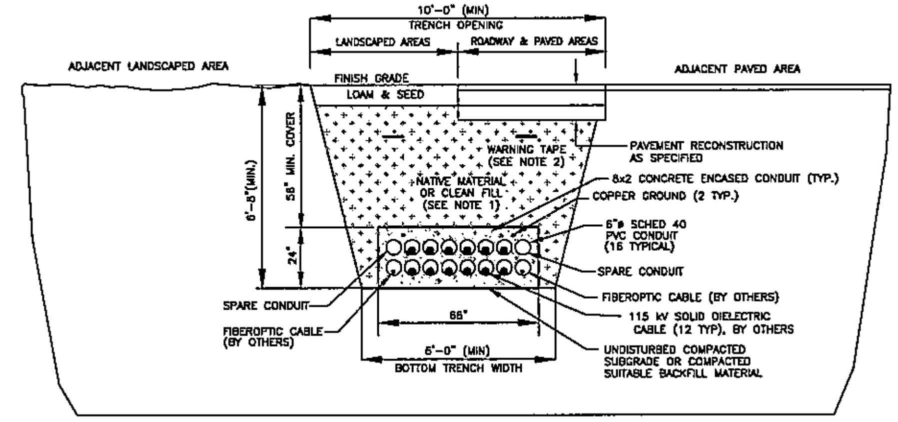
PROJECT No.: E159-504.10
DATE OF ISSUE: 02/26/10
SHEET No.:
SCALE: 1"=40'

DRAWING No. CD-2

Cape Wind
Energy for Life.



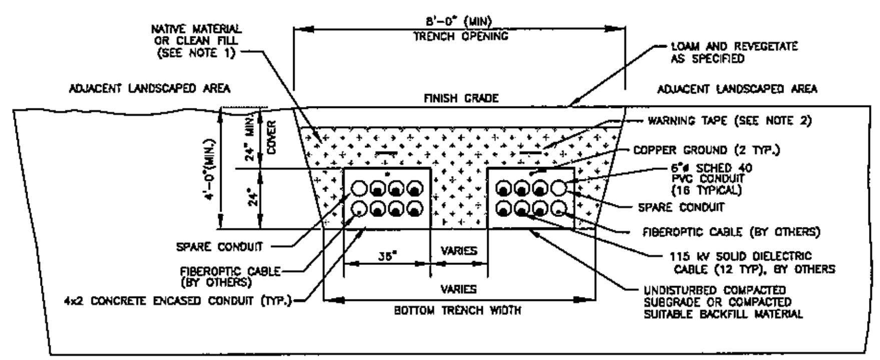
UPLAND CABLE TRENCH CROSS-SECTION (IN ROADWAYS)



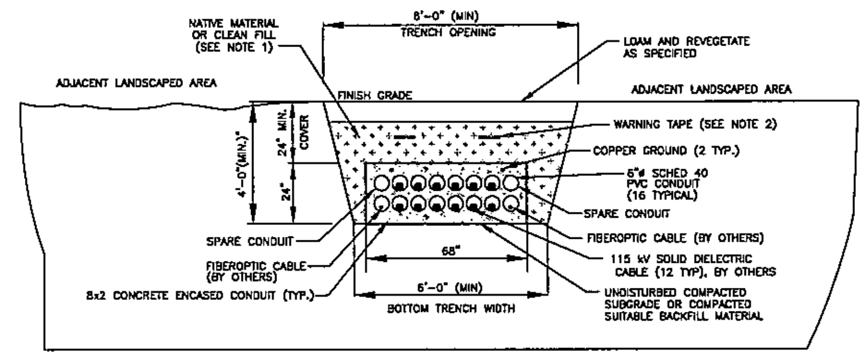
UPLAND CABLE TRENCH CROSS-SECTION (IN ROADWAYS)

TRENCH NOTES:

1. NATIVE MATERIAL TO BE USED ONLY IF DETERMINED TO HAVE APPROPRIATE THERMAL RESISTIVITY AND TO BE ACCEPTABLE IN ACCORDANCE WITH THE SOIL MANAGEMENT PLAN.
2. WARNING TAPE SHALL BE DETECTABLE TRACER TAPE LABELED "CAUTION: HIGH VOLTAGE ELECTRICAL LINES BURIED BELOW". MINIMUM COVER SHALL BE 12" UNPAVED AND LANDSCAPED AREAS. MINIMUM COVER SHALL BE 18" IN AREAS OF FULL DEPTH PAVEMENT RECONSTRUCTION.



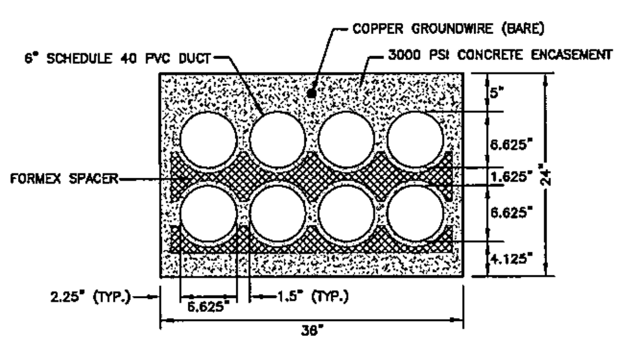
UPLAND CABLE TRENCH CROSS SECTION (IN NSTAR Right-Of-Way)



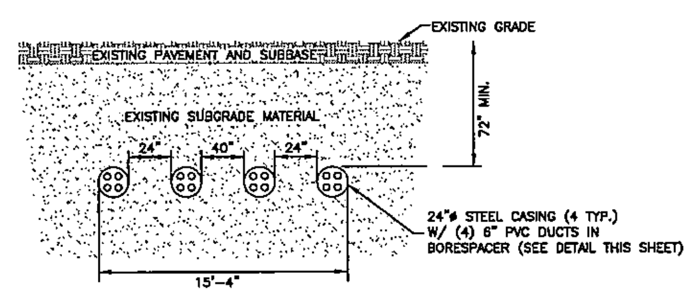
UPLAND CABLE TRENCH CROSS SECTION (IN NSTAR Right-Of-Way)

4x2 CONCRETE DUCTBANK TRENCH DETAIL
NOT TO SCALE

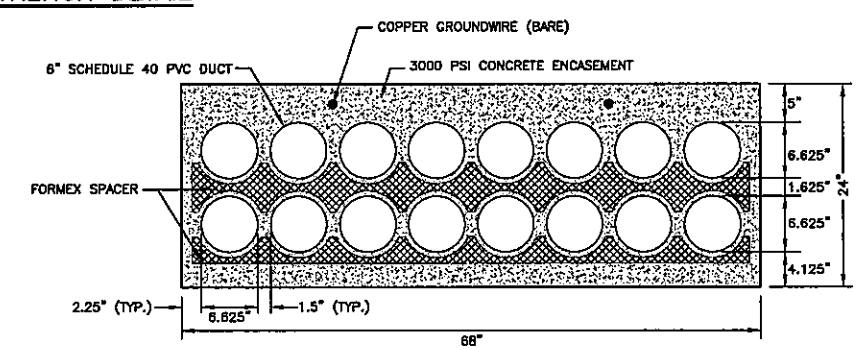
8x2 CONCRETE DUCTBANK TRENCH DETAIL
NOT TO SCALE



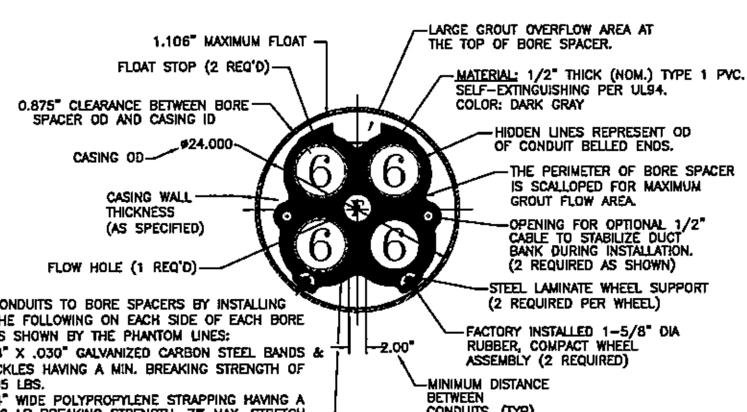
4x2 CONCRETE DUCTBANK DETAIL
NOT TO SCALE



ROAD CROSSING – TRENCHLESS INSTALLATION DETAIL
NOT TO SCALE



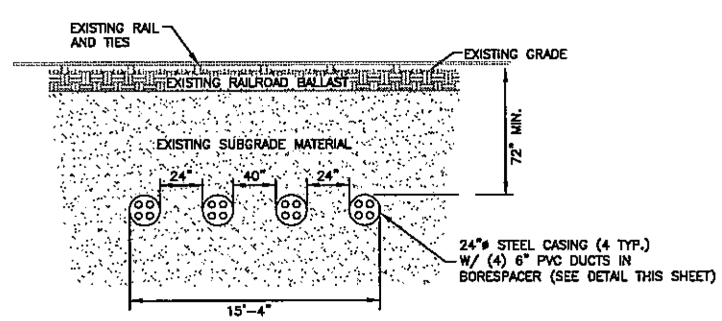
8x2 CONCRETE DUCTBANK DETAIL
NOT TO SCALE



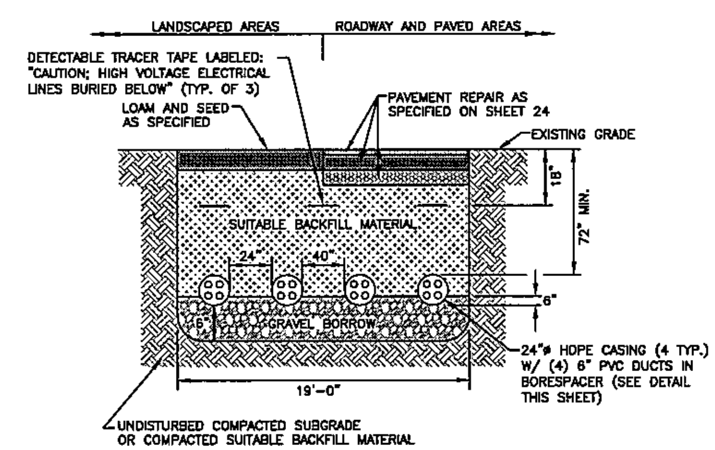
SECURE CONDUITS TO BORE SPACERS BY INSTALLING ONE OF THE FOLLOWING ON EACH SIDE OF EACH BORE SPACER AS SHOWN BY THE PHANTOM LINES:
A. 5/8" X .030" GALVANIZED CARBON STEEL BANDS & BUCKLES HAVING A MIN. BREAKING STRENGTH OF 1405 LBS.
B. 3/4" WIDE POLYPROPYLENE STRAPPING HAVING A 1400 LB BREAKING STRENGTH, 7% MAX. STRETCH, & STEEL SEALS.

NOTES:
1) COPPER GROUND WIRE SHALL BE INSTALLED CONTINUOUSLY THROUGH CASING.
2) ANNULAR SPACE TO BE FILLED WITH FLOWABLE GROUT.

24" CASING DETAIL
NOT TO SCALE



RAILROAD CROSSING – TRENCHLESS INSTALLATION DETAIL
NOT TO SCALE



4-24" HDPE CASING TRENCH DETAIL
NOT TO SCALE

FOR PERMITTING PURPOSES ONLY

ESS Group Inc.
Engineers
Scientists
Consultants
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW		CHECKED BY: PRW	
DESIGNED BY: RAH		APPROVED BY:	

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

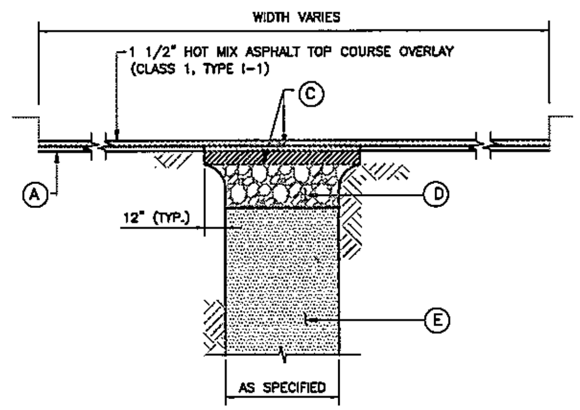
COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

TRENCH DETAILS

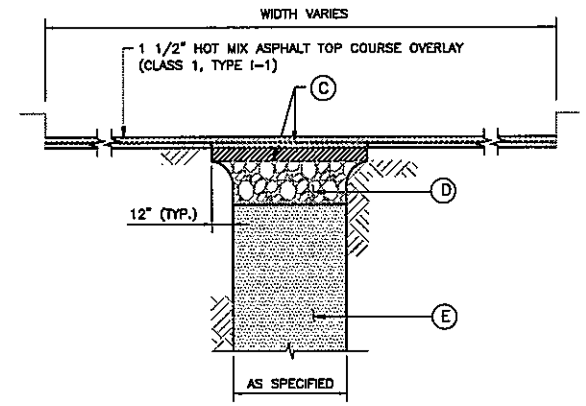
PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	CD-3
SHEET No.:	
SCALE: 1"=40'	

Cape Wind
Energy for Life.



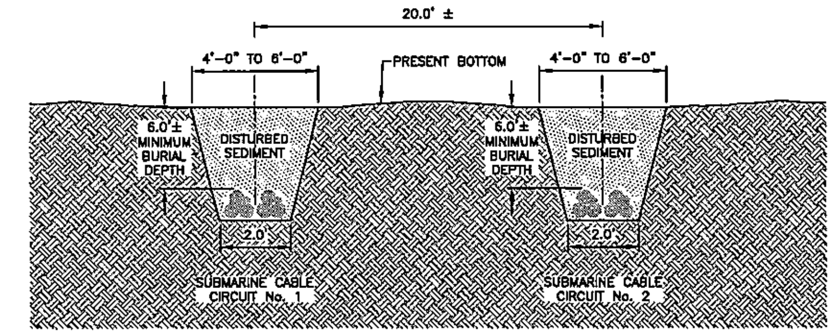
NOTE: CONSTRUCT CROWN WITH 2% CROSS SLOPE FROM CENTERLINE OF EXISTING PAVEMENT. POSITION OF TRENCH WITHIN ROADWAY WILL VARY.

FULL WIDTH ROADWAY OVERLAY
(NEW HAMPSHIRE AVE, BERRY AVE, WILLOW ST, AND HIGGINS CROWELL ROAD SOUTH OF INDUSTRIAL PARK ROAD)

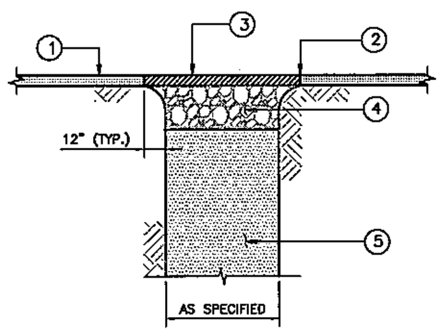


NOTE: CONSTRUCT CROWN WITH 2% CROSS SLOPE FROM CENTERLINE OF EXISTING PAVEMENT. POSITION OF TRENCH WITHIN ROADWAY WILL VARY.

FULL WIDTH ROADWAY OVERLAY
(WHERE SPECIFIED)



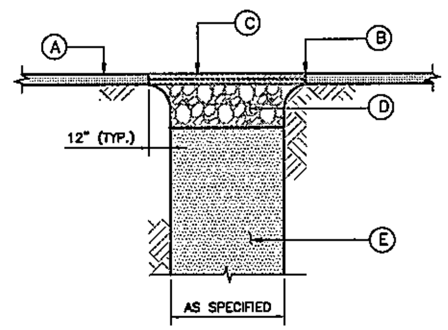
TYPICAL CROSS SECTION OF SUBMARINE CABLE TRENCH USING JET PLOW EMBEDMENT
N.T.S.



TEMPORARY (ROADWAY)

NOTES:

1. EXISTING PAVEMENT
2. SAWCUT, TACK COAT EDGES (TYP)
3. 1 1/2" HOT MIX ASPHALT TOP COURSE – CLASS 1, TYPE I-1 & 2 1/2" HOT MIX ASPHALT BINDER COURSE – CLASS 1, TYPE I-1, OR MATCH EXISTING PAVEMENT SECTION IF > 4".
4. 8 1/2" COMPACTED 3/4" DENSE GRADED CRUSHED STONE
5. FINAL BACKFILL PER TRENCH DETAIL



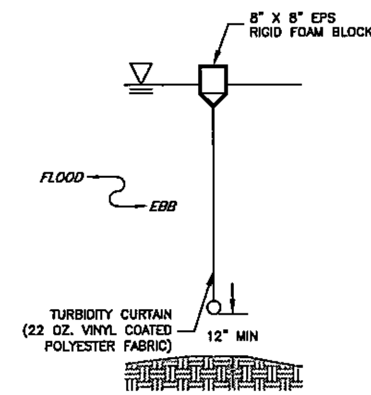
PERMANENT (ROADWAY)
WHERE NOT OTHERWISE SPECIFIED FOR FULL WIDTH ROADWAY OVERLAY

NOTES:

A. EXISTING PAVEMENT
B. SAWCUT, TACK COAT EDGES (TYP). SEAL JOINTS BY INFRARED TECHNIQUES (6 MONTHS FOLLOWING PLACEMENT OF PERMANENT PATCH).
C. 1 1/2" HOT MIX ASPHALT TOP COURSE – CLASS 1, TYPE I-1 & 2 1/2" HOT MIX ASPHALT BINDER COURSE – CLASS 1, TYPE I-1, OR MATCH EXISTING PAVEMENT SECTION IF > 4".
D. 8 1/2" COMPACTED 3/4" DENSE GRADED CRUSHED STONE
E. FINAL BACKFILL PER TRENCH DETAIL

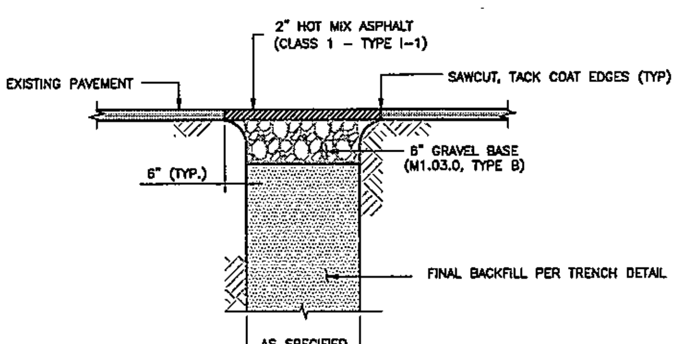
NOTES: 1) ALL WORK SHALL CONFORM TO TOWN OF YARMOUTH DEPARTMENT OF PUBLIC WORKS SPECIFICATIONS FOR TRENCH EXCAVATION/REPAIR.
2) UNLESS OTHERWISE INDICATED, ALL MATERIALS AND CONSTRUCTION METHODS MUST MEET THE MASSACHUSETTS HIGHWAY DEPARTMENT'S 1995 STANDARD SPECIFICATIONS AND 2000 SUPPLEMENTAL SPECIFICATIONS, AS AMENDED.

TRENCH REPAIR DETAILS – YARMOUTH PUBLIC RIGHT-OF-WAYS
N.T.S.

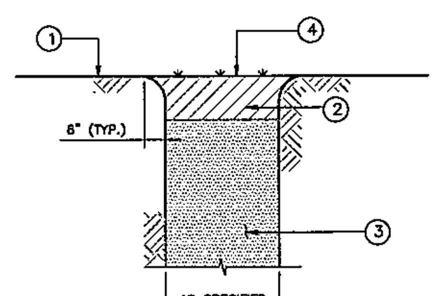


NOTES: 1. TURBIDITY CURTAIN TO BE DESIGNED FOR PROJECT SITE.
2. TO BE USED FOR COFFERDAM.

TYPICAL TURBIDITY CURTAIN
N.T.S.



TRENCH REPAIR – HOT MIX ASPHALT SIDEWALK
N.T.S.



NOTES:

1. EXISTING LANDSCAPED AREAS
2. 6" LOAM WITHIN PUBLIC RIGHT-OF-WAY, 4" LOAM OTHERWISE
3. FINAL BACKFILL PER TRENCH DETAIL
4. FERTILIZE, LIME, AND SEED

TRENCH REPAIR – LANDSCAPED AREAS
N.T.S.

ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW	CHECKED BY: PRW		
DESIGNED BY: RAH	APPROVED BY:		

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

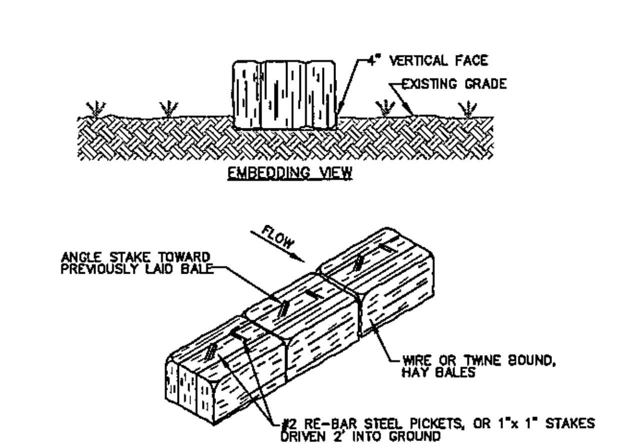
YARMOUTH & BARNSTABLE, MA.

TRENCH DETAILS
&
TURBIDITY DETAILS

PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	CD-4
SHEET No.:	
SCALE: 1"=40'	

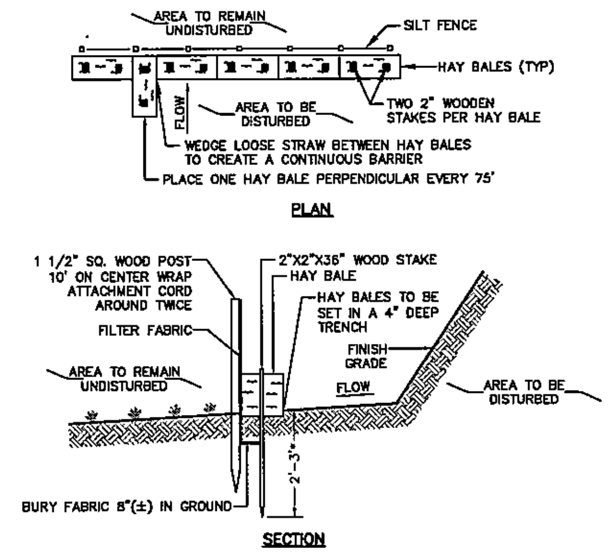
FOR PERMITTING PURPOSES ONLY

Cape Wind
Energy for Life.



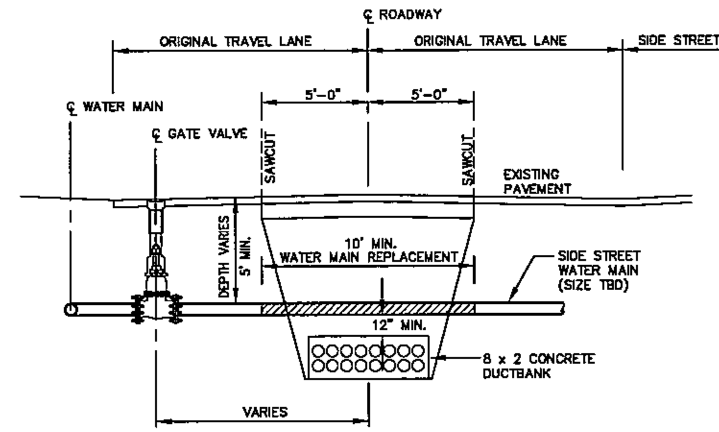
NOTES:
1. PLACE BALES 5 FEET BEYOND THE TOE OF SLOPE.
2. REMOVE BALES, AS DIRECTED, WHEN THEY ARE NO LONGER NEEDED. AFTER REMOVAL, STABILIZE AREA WITH SUITABLE EARTH MATERIAL AND VEGETATION.

TYPICAL HAYBALE
NOT TO SCALE

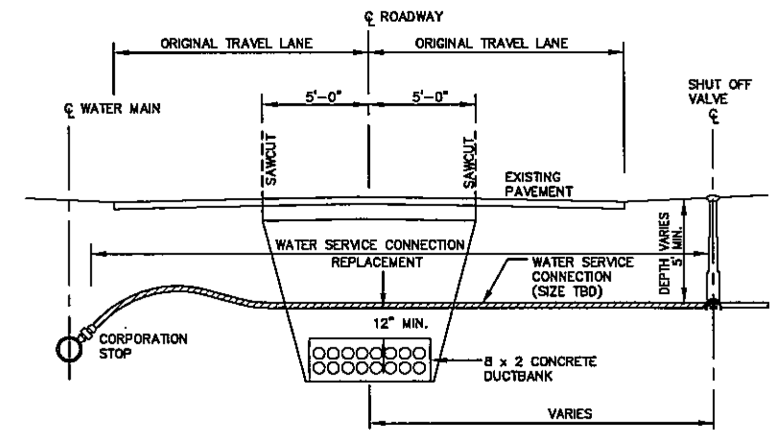


NOTE:
* = DEPTH TO BE 2' UNLESS POST IS TO BE SET IN PEAT; IN PEAT DRIVE BEYOND 2' DEPTH BY HAND TO REFUSAL OR 3' MAX.

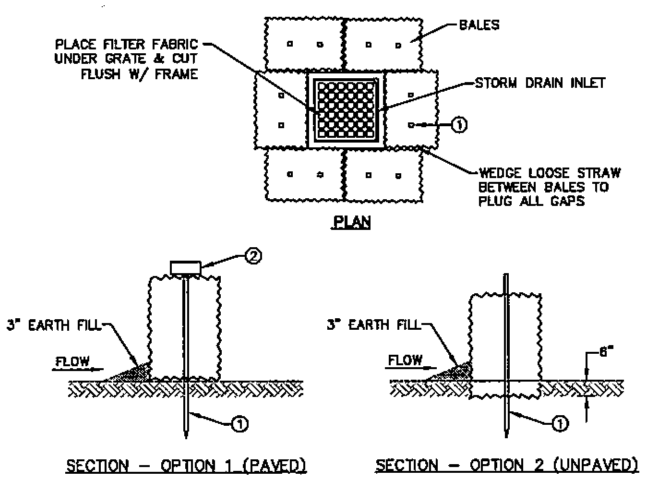
HAYBALE AND SILT FENCE
NOT TO SCALE



UTILITY CROSSING/ SIDE STREET WATER MAIN
SCALE: 1"=4'



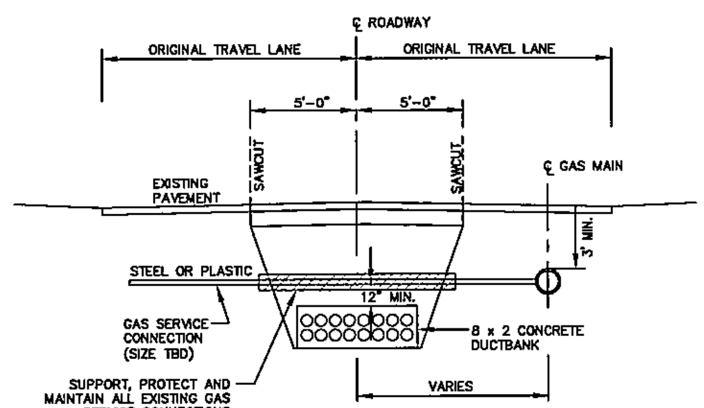
UTILITY CROSSING/ WATER SERVICE CONNECTION
SCALE: 1"=4'



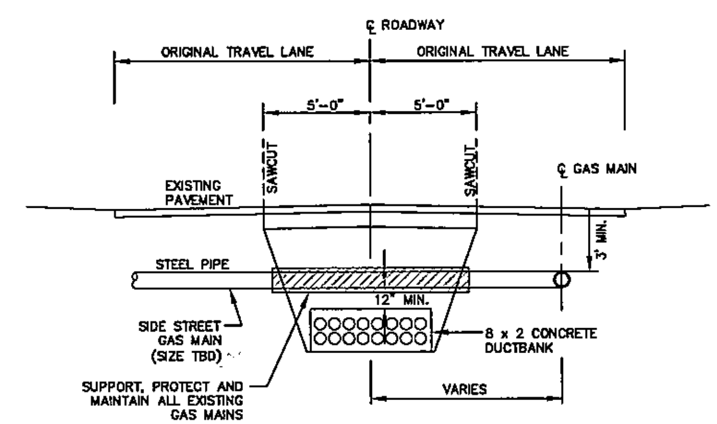
① TWO 1" X 1" WOOD STAKES OR REINFORCING BARS IN EACH BALE AND EMBEDDED IN THE GROUND 10" MINIMUM.

② PLACE DEAD WEIGHT AS NECESSARY TO HOLD HAYBALE IN PLACE.

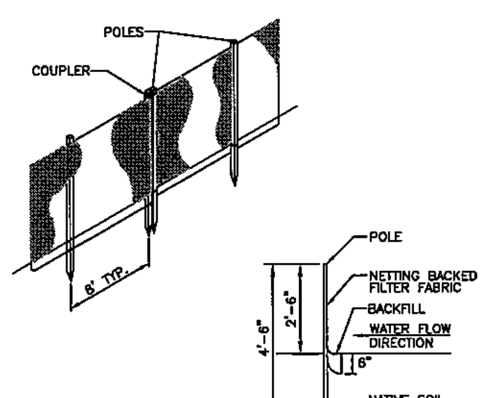
HAYBALE EROSION CONTROL AT DRAIN INLETS
NOT TO SCALE



UTILITY CROSSING/ GAS SERVICE CONNECTION
SCALE: 1"=4'

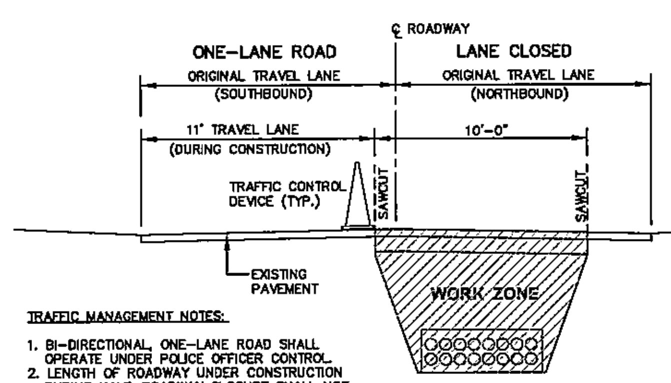


UTILITY CROSSING/ SIDE STREET GAS MAIN
SCALE: 1"=4'



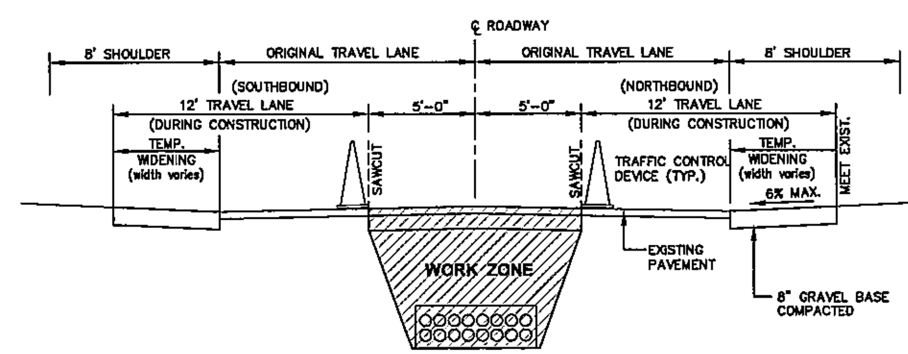
NOTES:
1. THE FILTER FABRIC MUST BE LOCATED ON THE UP-SLOPE SIDE OF THE FENCE.
2. THE BOTTOM 6" OF FILTER FABRIC MUST BE BURIED IN A PRE-EXCAVATED TRENCH WHICH WILL BE BACKFILLED, TAMPED AND SEEDED FOR STABILITY.

TYPICAL SILT FENCE
NOT TO SCALE



TRAFFIC MANAGEMENT NOTES:
1. BI-DIRECTIONAL, ONE-LANE ROAD SHALL OPERATE UNDER POLICE OFFICER CONTROL.
2. LENGTH OF ROADWAY UNDER CONSTRUCTION DURING HALF-ROADWAY CLOSURE SHALL NOT EXCEED 150 LINEAR FEET AT ONE TIME.
3. ROAD SURFACE MUST BE RESTORED TO TWO-WAY TRAFFIC AT THE END OF EACH WORK DAY.

HALF-ROADWAY CLOSURE/ ONE-WAY TRAFFIC
SCALE: 1"=4'



CENTER ROADWAY CLOSURE/ TWO-WAY TRAFFIC
SCALE: 1"=4'

FOR PERMITTING PURPOSES ONLY

ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW		CHECKED BY: PRW	
DESIGNED BY: RAH		APPROVED BY:	

CAPE WIND ASSOCIATES, LLC

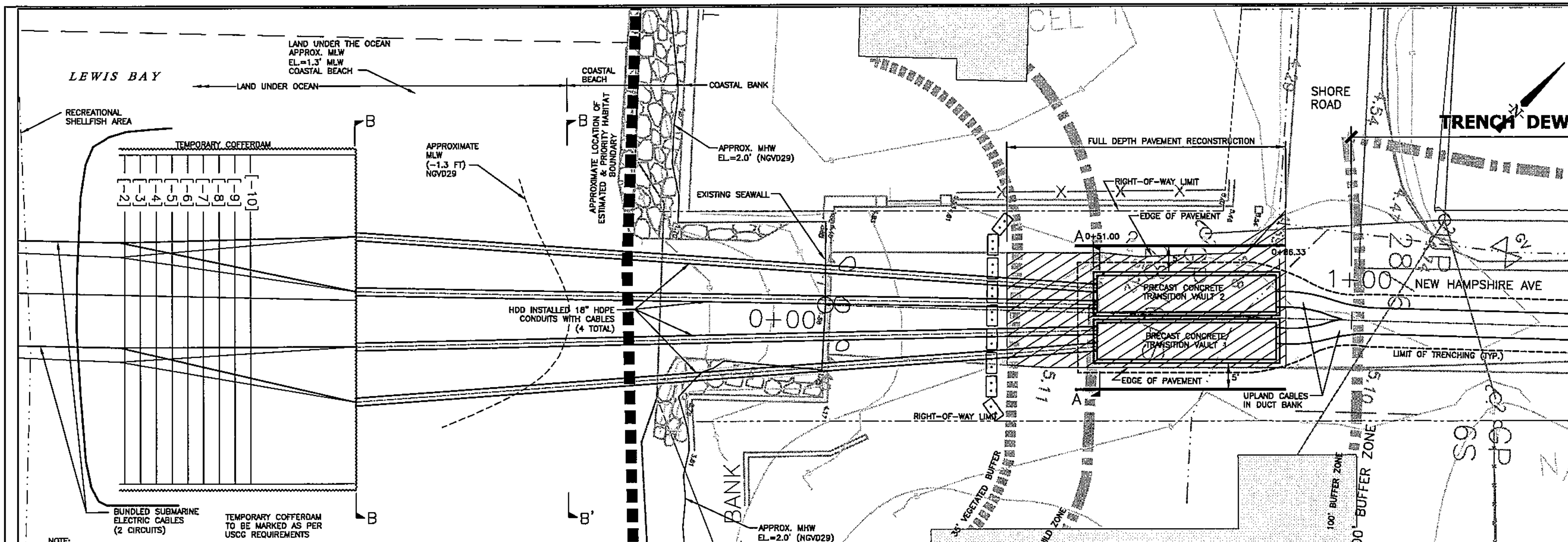
CAPE WIND PROJECT

COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

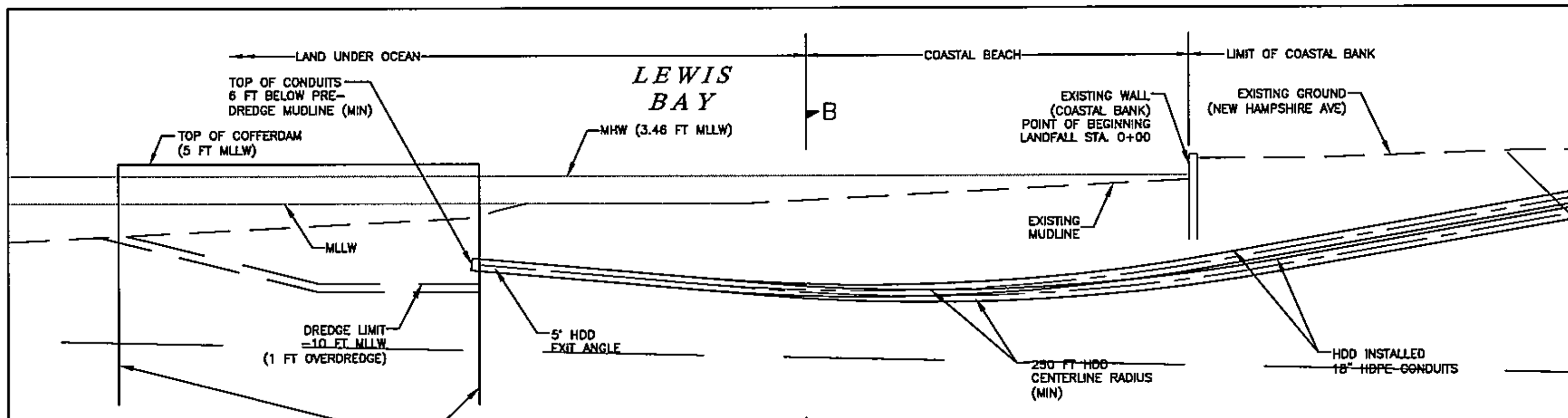
YARMOUTH & BARNSTABLE, MA.

TYPICAL DETAILS

PROJECT No.: E159-504.10
DATE OF ISSUE: 02/26/10
SHEET No.:
SCALE: 1"=40'
DRAWING No.
CD-5



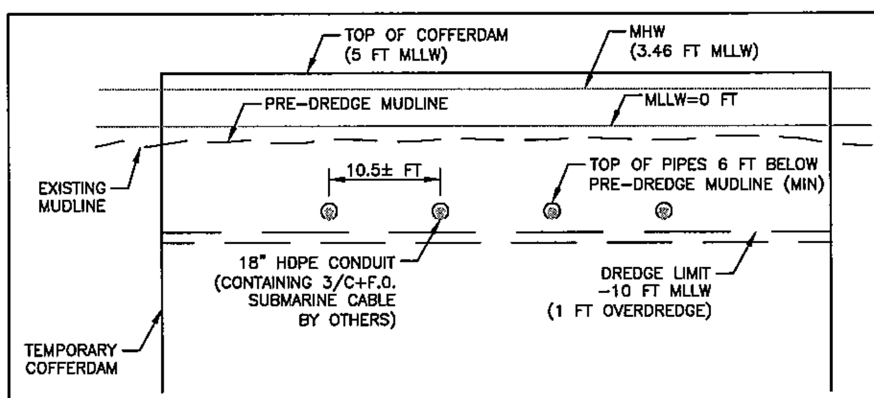
LANDFALL DETAIL – PLAN VIEW



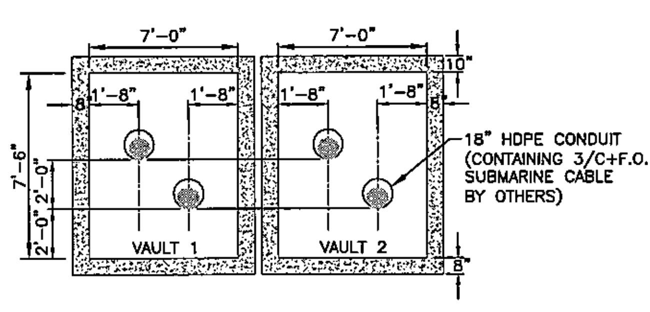
NOTES:

1. UPLAND ELEVATIONS IN PLAN ARE REFERENCED TO NGVD29.
2. THERE IS NO ACCEPTED NGVD29 CONNECTION TO MLLW IN THE PROJECT AREA. RELATIONSHIP BETWEEN MLLW AND NGVD29 APPROXIMATED TO GENERATE PROFILE.
3. EXISTING GROUND ELEVATIONS IN PROFILE ARE ESTIMATED ONLY.
4. ACTUAL RELATIONSHIP MUST BE ESTABLISHED THROUGH SURVEY PRIOR TO CONSTRUCTION.

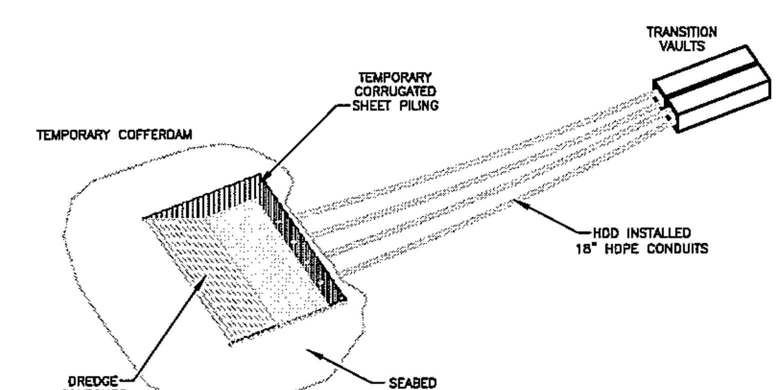
LANDFALL DETAIL – PROFILE



SECTION B–B': COFFERDAM
NOT TO SCALE



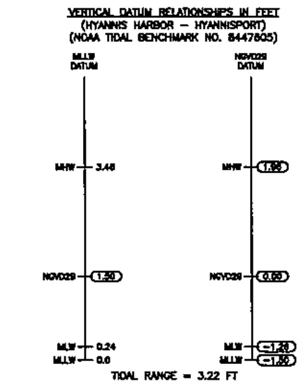
SECTION A–A': TRANSITION VAULTS
NOT TO SCALE



TEMPORARY COFFERDAM – ILLUSTRATION
NOT TO SCALE

FOR PERMITTING PURPOSES ONLY

Cape Wind
Energy for Life.



NOTE:
NO ACCEPTED REFERENCE BETWEEN MLLW AND NGVD29 EXISTS AT THIS LOCATION. RELATIONSHIPS ESTIMATED BASED ON OTHER CAPE COD LOCATIONS. ENCIRCLED NUMBERS ARE ESTIMATED.

0 10 20
SCALE IN FEET

ESS Group Inc.

Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

DRAWN BY: KCW	CHECKED BY: PRW
DESIGNED BY: RAH	APPROVED BY:

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

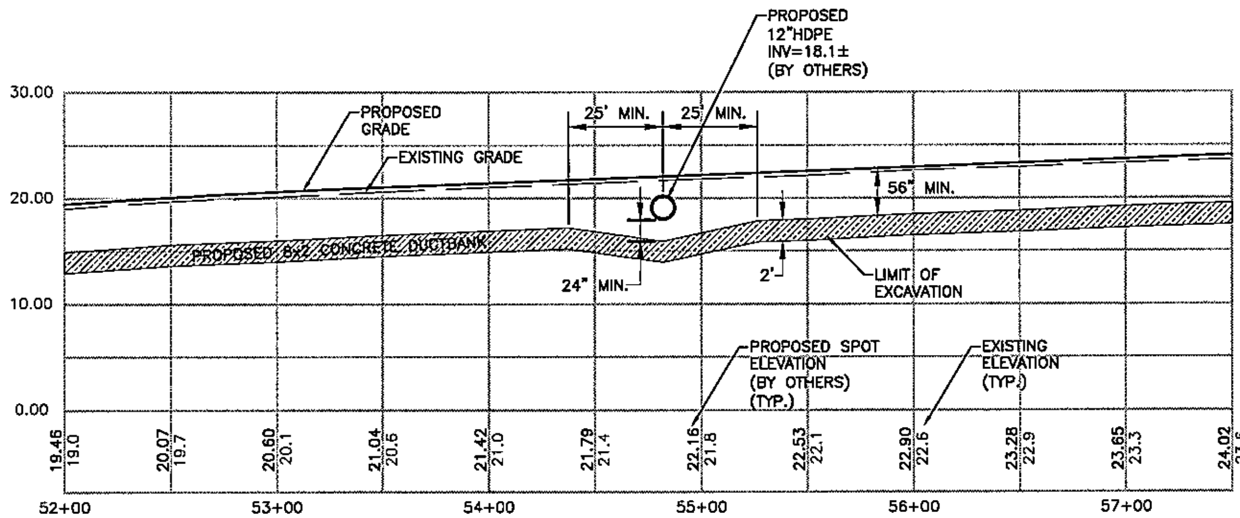
COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

LANDFALL DETAILS

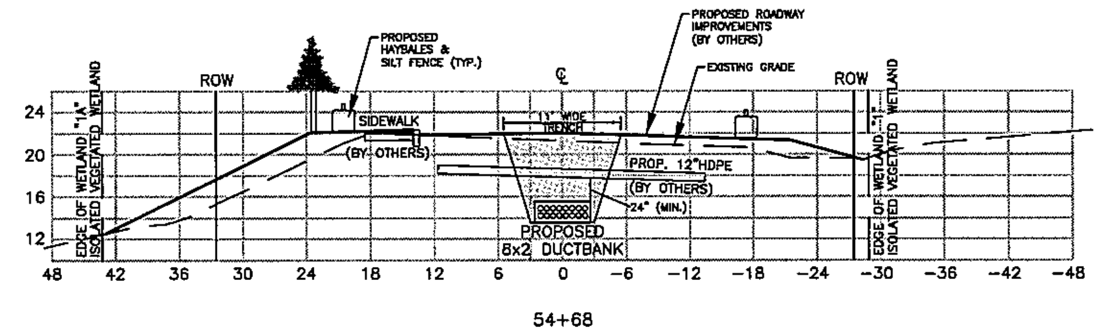
PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	CD-6
SHEET No.:	
SCALE: 1"=40'	

Cape Wind™
Energy for Life.



SCALE:
HORIZONTAL 1"=40'
VERTICAL 1"=8'

HIGGINS CROWELL ROAD CROSSING
SECTION B–B' (STA 53+00 TO STA 56+50)



SCALE:
HORIZONTAL 1"=8'
VERTICAL 1"=8'

SECTION E–E' HIGGINS CROWELL ROAD

FOR PERMITTING PURPOSES ONLY

ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW		CHECKED BY: PRW	
DESIGNED BY: RAH		APPROVED BY:	

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

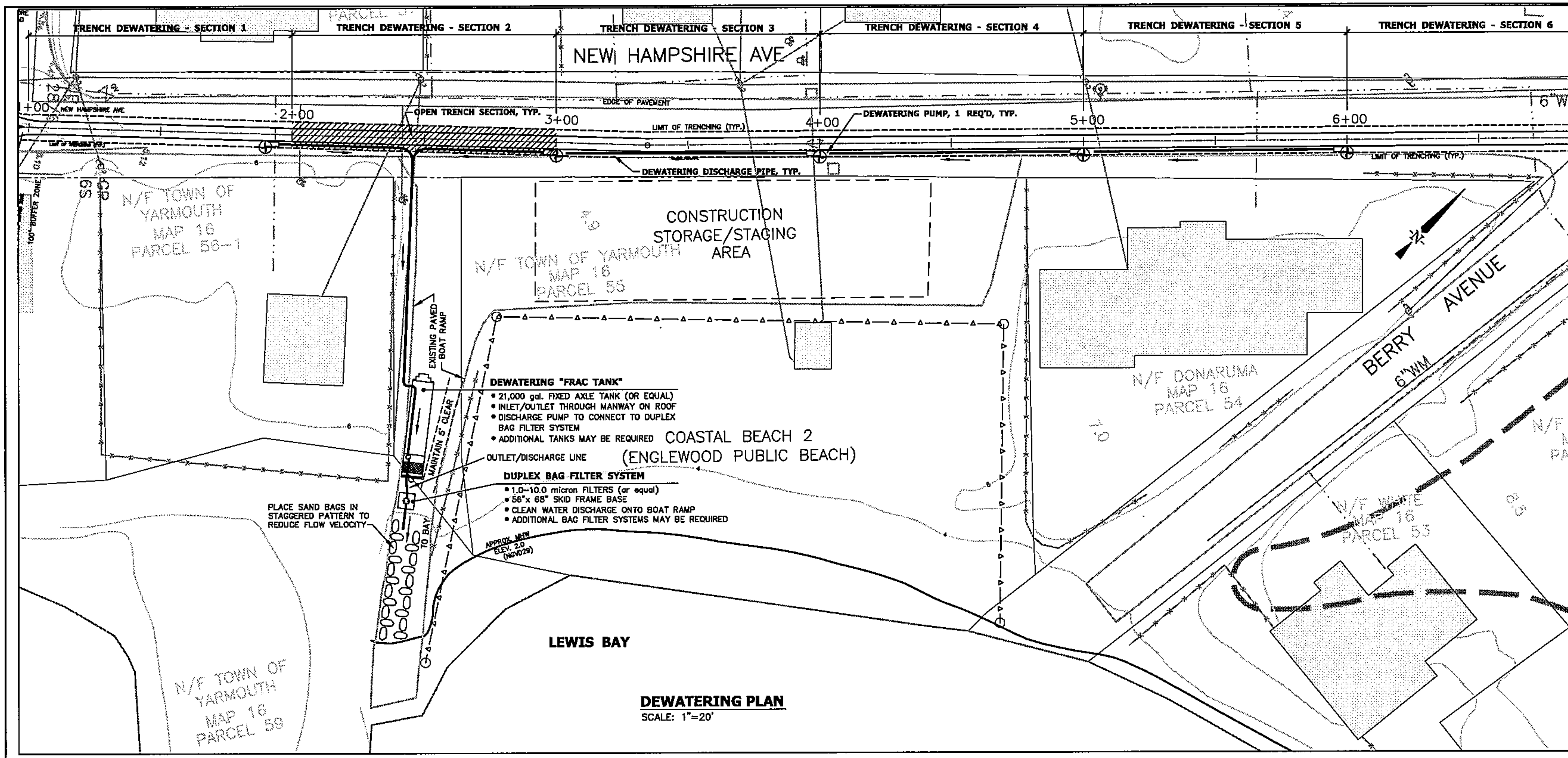
COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

DRAIN CROSSING DETAIL (HIGGINS CROWELL RD)

PROJECT No.: E159-504.10
DATE OF ISSUE: 02/26/10
SHEET No.:
SCALE: 1"=40'

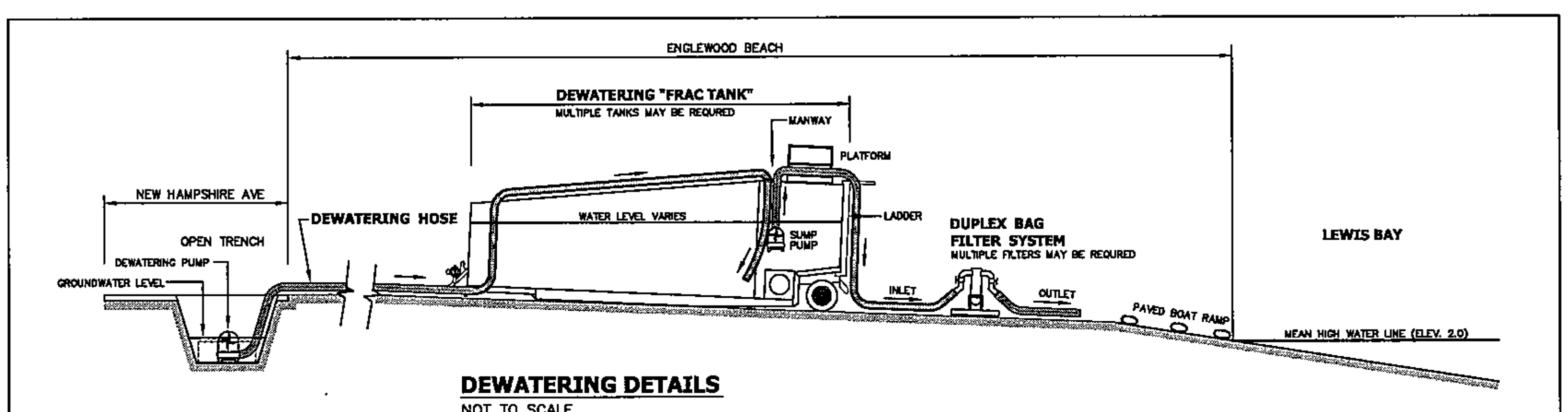
DRAWING No.
CD-7



DEWATERING PLAN

SCALE: 1"=20'

0 20 40
SCALE IN FEET



DEWATERING DETAILS

NOT TO SCALE

Cape Wind
Energy for Life.

ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW	CHECKED BY: PRW		
DESIGNED BY: RAH	APPROVED BY:		

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

DEWATERING PLAN AND DETAILS (ENGLEWOOD BEACH)

PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	CD-8
SHEET No.:	
SCALE: 1"=40'	

FOR PERMITTING PURPOSES ONLY

Cape Wind
Energy for Life.

NOTES:

1. ALL TEMPORARY TRAFFIC CONTROL WORK SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND ALL REVISIONS.
2. ALL SIGN LEGENDS, BORDERS AND MOUNTING SHALL BE IN ACCORDANCE WITH THE MUTCD.
3. TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.
4. TEMPORARY CONSTRUCTION SIGNING, BARRICADES AND ALL OTHER NECESSARY WORK ZONE TRAFFIC CONTROL DEVICES SHALL BE REMOVED FROM THE HIGHWAY OR COVERED WHEN THEY ARE NOT REQUIRED FOR CONTROL OF TRAFFIC.
5. SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY, AND REFLECTORIZED PLASTIC DRUMS WITH LIGHTING DEVICES MOUNTED ON THEM, MUST PASS THE CRITERIA SET FORTH IN NCHRP REPORT 350, "RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY FEATURES."
6. CONTRACTORS SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS, SUCH AS CONDUIT INSTALLATION, EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT AND SIMILAR OPERATIONS.
7. THE FIRST THREE PLASTIC DRUMS OF A TAPER MAY BE MOUNTED WITH TYPE A LIGHTS.
8. THE ADVISORY SPEED LIMIT, IF REQUIRED, SHALL BE DETERMINED BY THE ENGINEER.
9. DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
10. MAXIMUM SPACING OF TRAFFIC DEVICES IN A TAPER (DRUMS OR CONES) IS EQUAL IN FEET TO THE SPEED LIMIT IN MPH.
11. MINIMUM LANE WIDTH IS TO BE 10 FEET (3.0m) UNLESS OTHERWISE SHOWN. MINIMUM LANE WIDTH TO BE MEASURED FROM THE EDGE OF DRUMS OR MEDIAN BARRIER.
12. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL NECESSARY POLICE DETAILS

LEGEND:

- REFLECTORIZED PLASTIC DRUM
- WORK ZONE
- WORK VEHICLE
- P POLICE DETAIL
- DIRECTION OF TRAFFIC
- TRUCK MOUNTED ATTENUATOR
- TYPE III BARRICADE
- IMPACT ATTENUATOR
- TRAFFIC OR PEDESTRIAN SIGNAL
- FLASHING ARROW PANEL
- MEDIAN BARRIER
- SIGN
- FLASHING ARROW PANEL
- MEDIAN BARRIER WITH WARNING LIGHTS

THE IDEAL CAPACITY OF A MAJOR HIGHWAY IS GENERALLY CONSIDERED TO BE 1900 PASSENGER CARS PER HOUR PER LANE (PCPHPL). IN WORK ZONES ON A MULTI-LANE DIVIDED HIGHWAY, THE FOLLOWING VOLUME GUIDELINES HAVE BEEN SUGGESTED:

MEASURED AVERAGE WORK ZONE CAPACITIES

Number of Lanes		Number of Studies	Average Capacity	
NORMAL (existing)	OPEN (to traffic)		VPH	VPHPL
3	1	7	1,170	1,170
2	1	8	1,340	1,340
5	2	8	2,740	1,370
4	2	4	2,960	1,480
3	2	9	2,980	1,490
4	3	4	4,560	1,520

Source: Dudek, C., Notes on Work Zone Capacity and Level of Service. Texas Transportation Institute, Texas A&M University, College Station, Texas (1984)

BY OBTAINING HOURLY TRAFFIC COUNTS FOR A PARTICULAR ROADWAY (WITH A MINIMUM OF A 48-HOUR AUTOMATIC TRAFFIC RECORDER (ATR) COUNT), THIS WILL HELP TO DETERMINE AT WHAT TIMES OF THE DAY OR NIGHT A CERTAIN NUMBER OF LANES MAY BE CLOSED.

GENERAL GUIDELINES

SUGGESTED WORK ZONE WARNING SIGN SPACING

Road Type	Distance Between Signs**		
	A	B	C
LOCAL OR LOW VOLUME ROADWAYS*	350 (100)	350 (100)	350 (100)
MOST OTHER ROADWAYS*	500 (150)	500 (150)	500 (150)
FREEWAYS AND EXPRESSWAYS*	1,000 (300)	1,500 (450)	2,640 (800)

* SPEED CATEGORY TO BE DETERMINED BY HIGHWAY AGENCY

** DISTANCES ARE SHOWN IN FEET (METERS). THE COLUMN HEADINGS A, B, AND C ARE THE DIMENSIONS SHOWN IN THE DETAIL/ TYPICAL SETUP FIGURES. THE A DIMENSION IS THE DISTANCE FROM THE TRANSITION OR POINT OF RESTRICTION TO THE FIRST SIGN. THE B DIMENSION IS THE DISTANCE BETWEEN THE FIRST AND SECOND SIGNS. THE C DIMENSION IS THE DISTANCE BETWEEN THE SECOND AND THIRD SIGNS. (THE "THIRD" SIGN IS THE FIRST ONE TYPICALLY ENCOUNTERED BY A DRIVER APPROACHING A TEMPORARY TRAFFIC CONTROL (TTC) ZONE.)

THE "THIRD" SIGN ABOVE IS TYPICALLY REFERRED TO AS AN "ADVANCE WARNING" SIGN ON THE TMP SETUPS. IT IS THE ONE WHICH MAY OFTEN HAVE THE "STANDARD RED OR RED-ORANGE FLAGS (16 in. X 16 in.)" MOUNTED ON IT. THESE ADVANCE WARNING SIGNS ARE LOCATED AT THE PROJECT LIMITS ON ALL APPROACHES (i.e. THE W20-1 SERIES (ROAD WORK XX FT) SIGNS), AND USUALLY REMAIN FOR THE DURATION OF THE PROJECT.

THE FIRST AND SECOND WARNING SIGNS ABOVE ARE REFERRED TO AS THE OPERATIONAL (DAY-TO-DAY) WORK ZONE SIGNS AND MAY BE MOVED DEPENDING ON WHERE THE SPECIFIC ROADWAY WORK FOR THAT DAY IS LOCATED.

R2-10 SIGNS SHALL BE PLACED BETWEEN THE FIRST AND SECOND SIGNS.

R2-10 AND W20-1 SERIES SIGNS ARE TO BE INCLUDED ON ALL DETAILS/TYPICAL SETUPS.

Based on: Table 6C-1 2003 MUTCD

STOPPING SIGHT DISTANCE AS A FUNCTION OF SPEED

SPEED* (km/h)	DISTANCE (m)
30	35
40	50
50	65
60	85
70	105
80	130
90	160
100	185
110	220
120	250

SPEED* (mph)	DISTANCE (ft)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

*POSTED SPEED, OFF-PEAK 85TH-PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED

THESE VALUES MAY BE USED TO DETERMINE THE LENGTH OF LONGITUDINAL BUFFER SPACES.

THE DISTANCES IN THE ABOVE CHART REPRESENT THE MINIMAL VALUES FOR BUFFER SPACING.

Source: Table 6C-2 2003 MUTCD

NOTES ON WORK ZONE DISTANCES

CONVENTIONAL ROADWAY– A STREET OR HIGHWAY OTHER THAN A LOW-VOLUME ROAD, EXPRESSWAY, OR FREEWAY.

EXPRESSWAY– A DIVIDED HIGHWAY WITH PARTIAL CONTROL OF ACCESS.

FREEWAY– A DIVIDED HIGHWAY WITH FULL CONTROL OF ACCESS.

LOW-VOLUME ROAD– A FACILITY LYING OUTSIDE OF BUILT-UP AREAS OF CITIES, TOWNS, AND COMMUNITIES, AND IT SHALL HAVE A TRAFFIC VOLUME OF LESS THAN 400 AADT. IT SHALL NOT BE A FREEWAY, EXPRESSWAY, INTERCHANGE RAMP, FREEWAY SERVICE ROAD, OR A ROAD ON A DESIGNATED STATE HIGHWAY SYSTEM.

Source: 2003 MUTCD

TAPER LENGTH CRITERIA FOR TEMPORARY TRAFFIC CONTROL ZONES

Type of Taper	Taper Length (L)*
MERGING TAPER	AT LEAST L
SHIFTING TAPER	AT LEAST 0.5L
SHOULDER TAPER	AT LEAST 0.33L
ONE-LANE, TWO-WAY TRAFFIC TAPER	100 FT (30 m) MAXIMUM
DOWNSTREAM TAPER	100 FT (30 m) PER LANE

Source: Table 6C-3 2003 MUTCD

FORMULAS FOR DETERMINING TAPER LENGTHS

Speed Limit (S)	Taper Length (L) Feet
40 MPH OR LESS	$L = \frac{WS^2}{60}$
45 MPH OR MORE	$L = WS$

Speed Limit (S)	Taper Length (L) Meters
60 KM/H OR LESS	$L = \frac{WS^2}{155}$
70 KM/H OR MORE	$L = \frac{WS}{1.6}$

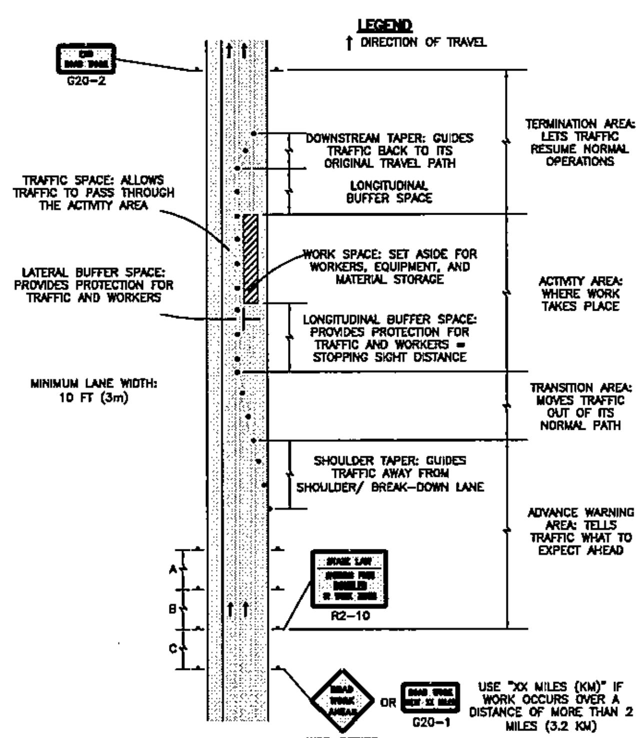
WHERE: L = TAPER LENGTH IN FEET (METERS)

W = WIDTH OF OFFSET IN FEET (METERS)

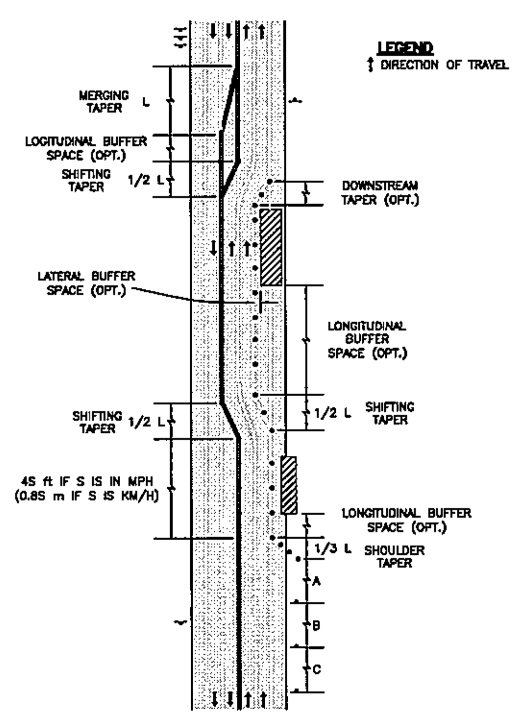
S = POSTED SPEED LIMIT, OR OFF-PEAK 85TH-PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICAPATED OPERATING SPEED IN MPH (KM/H)

Source: Table 6C-4 2003 MUTCD

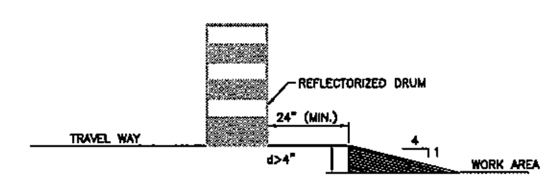
NOTES ON WORK ZONE DISTANCES



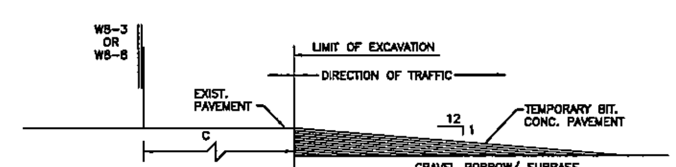
COMPONENT PARTS OF A TEMPORARY TRAFFIC CONTROL (TTC) ZONE
NOT TO SCALE



TYPES OF TAPERS AND BUFFER SPACES
NOT TO SCALE



LATERAL DROP-OFF DETAIL
NOT TO SCALE



LONGITUDINAL DROP-OFF DETAIL
NOT TO SCALE

0 20 40
SCALE IN FEET

ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

DRAWN BY: KCW | CHECKED BY: PRW
DESIGNED BY: RAH | APPROVED BY:

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

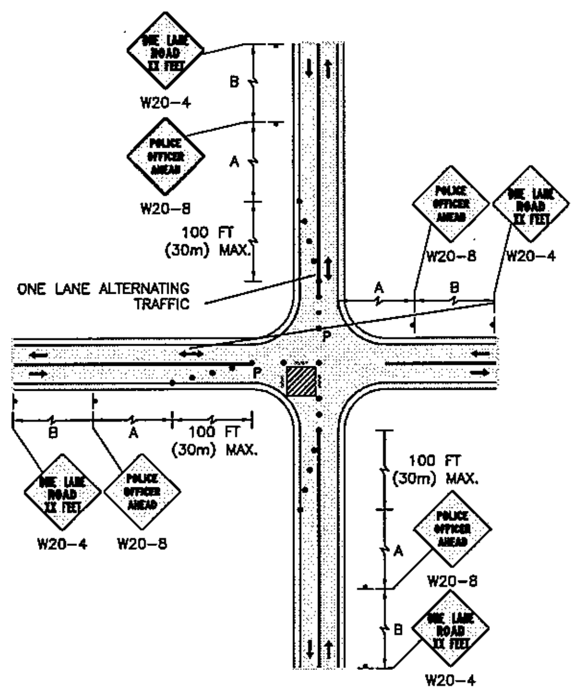
YARMOUTH & BARNSTABLE, MA.

ROAD OPENING PERMIT TRAFFIC MANAGEMENT PLAN DETAILS (SHEET 1 OF 2)

PROJECT No.: E159-504.10
DATE OF ISSUE: 02/26/10
SHEET No.:
SCALE: 1"=40'
DRAWING No. CD-9

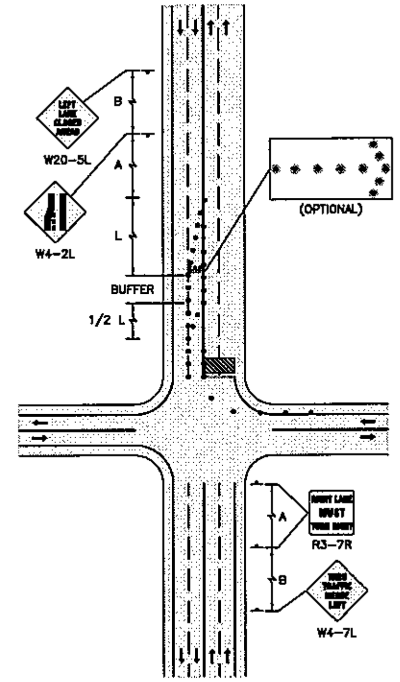
FOR PERMITTING PURPOSES ONLY

Cape Wind™
Energy for Life.



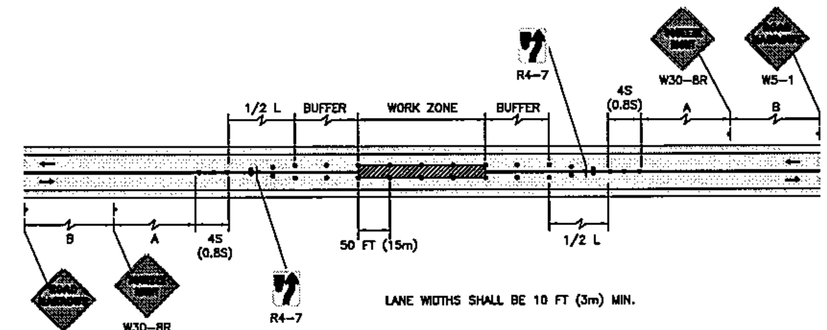
SINGLE LANE APPROACH ONE QUADRANT CLOSURE

NOT TO SCALE



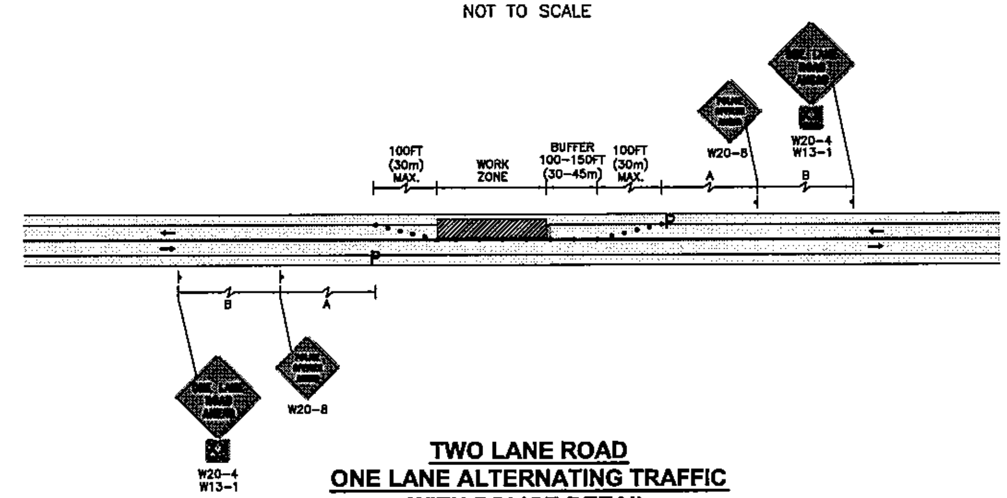
DOUBLE LANE APPROACH HALF ROAD CLOSURE

NOT TO SCALE



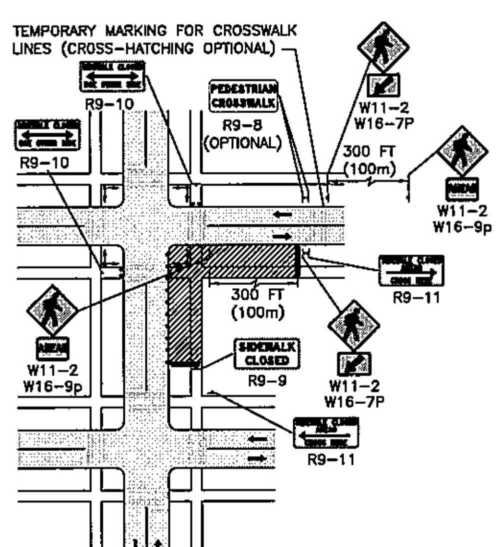
TWO LANE ROAD CENTER OF ROAD CLOSURE

NOT TO SCALE



TWO LANE ROAD ONE LANE ALTERNATING TRAFFIC WITH POLICE DETAIL

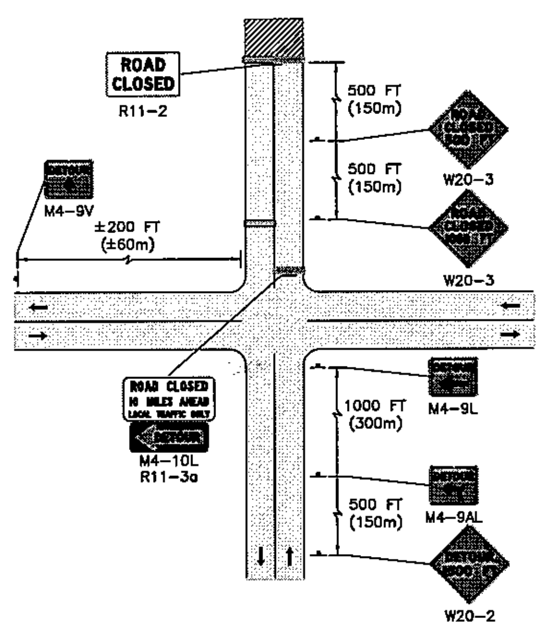
NOT TO SCALE



NOTE: FOR LONG-TERM STATIONARY WORK, THE DOUBLE YELLOW CENTERLINE AND/OR LANE LINES SHOULD BE REMOVED BETWEEN THE CROSSWALK LINES.

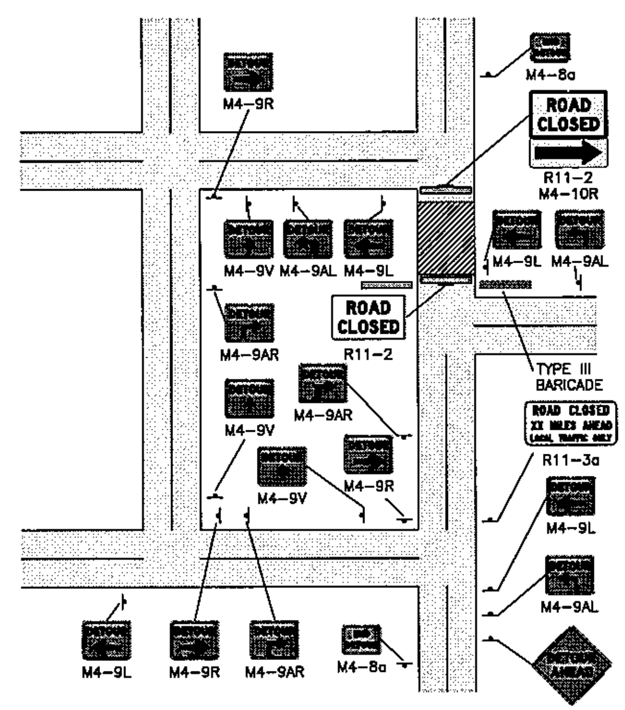
PEDESTRIAN DETOUR

NOT TO SCALE



DETOUR ADVANCE SIGNING

NOT TO SCALE



DETOUR

NOT TO SCALE

FOR PERMITTING PURPOSES ONLY

ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

DRAWN BY: KCW	CHECKED BY: FRW
DESIGNED BY: RAH	APPROVED BY:

CAPE WIND ASSOCIATES, LLC

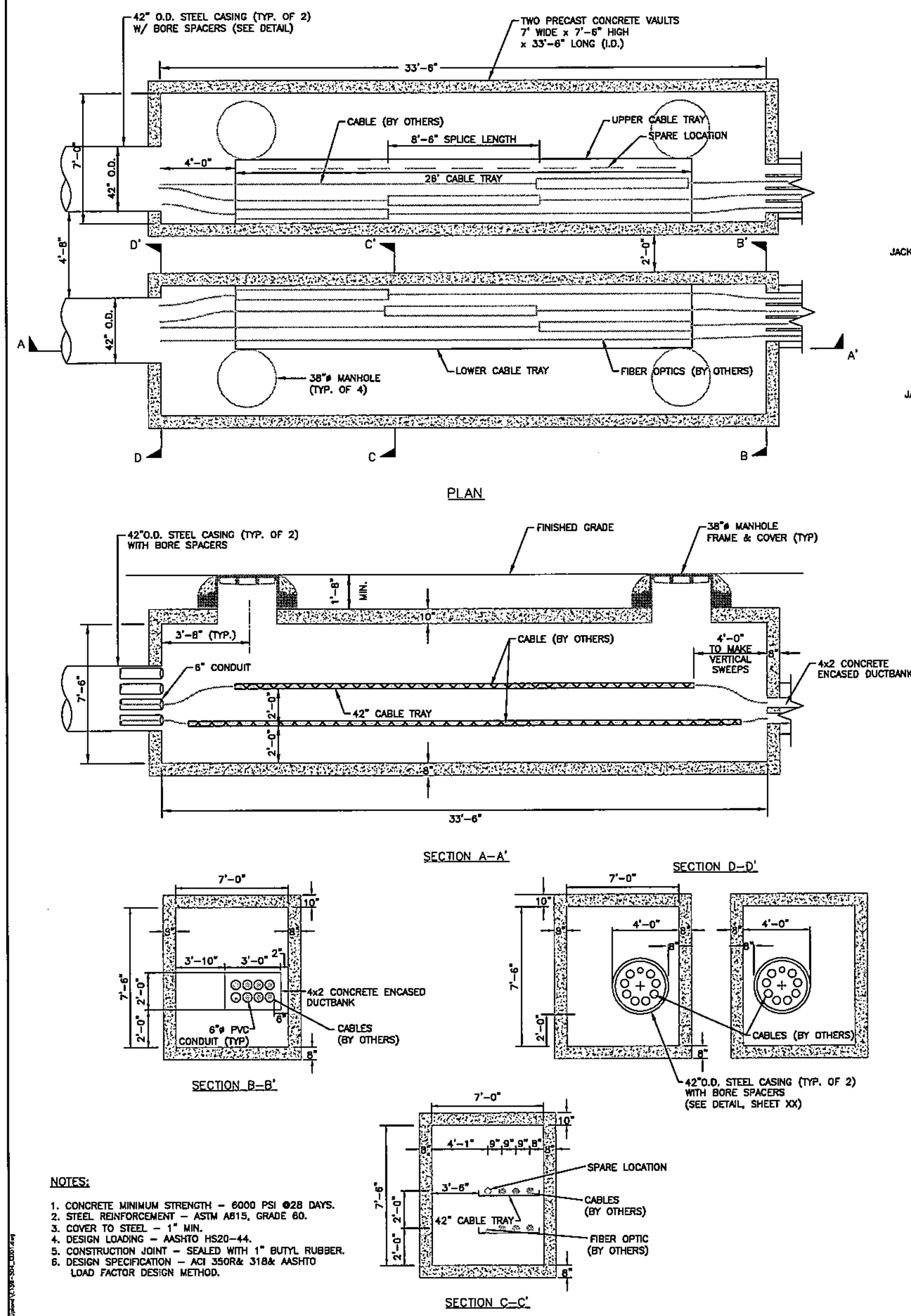
CAPE WIND PROJECT

COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

ROAD OPENING PERMIT TRAFFIC MANAGEMENT PLAN DETAILS (SHEET 2 OF 2)

PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	CD-10
SHEET No.:	
SCALE: 1"=40'	



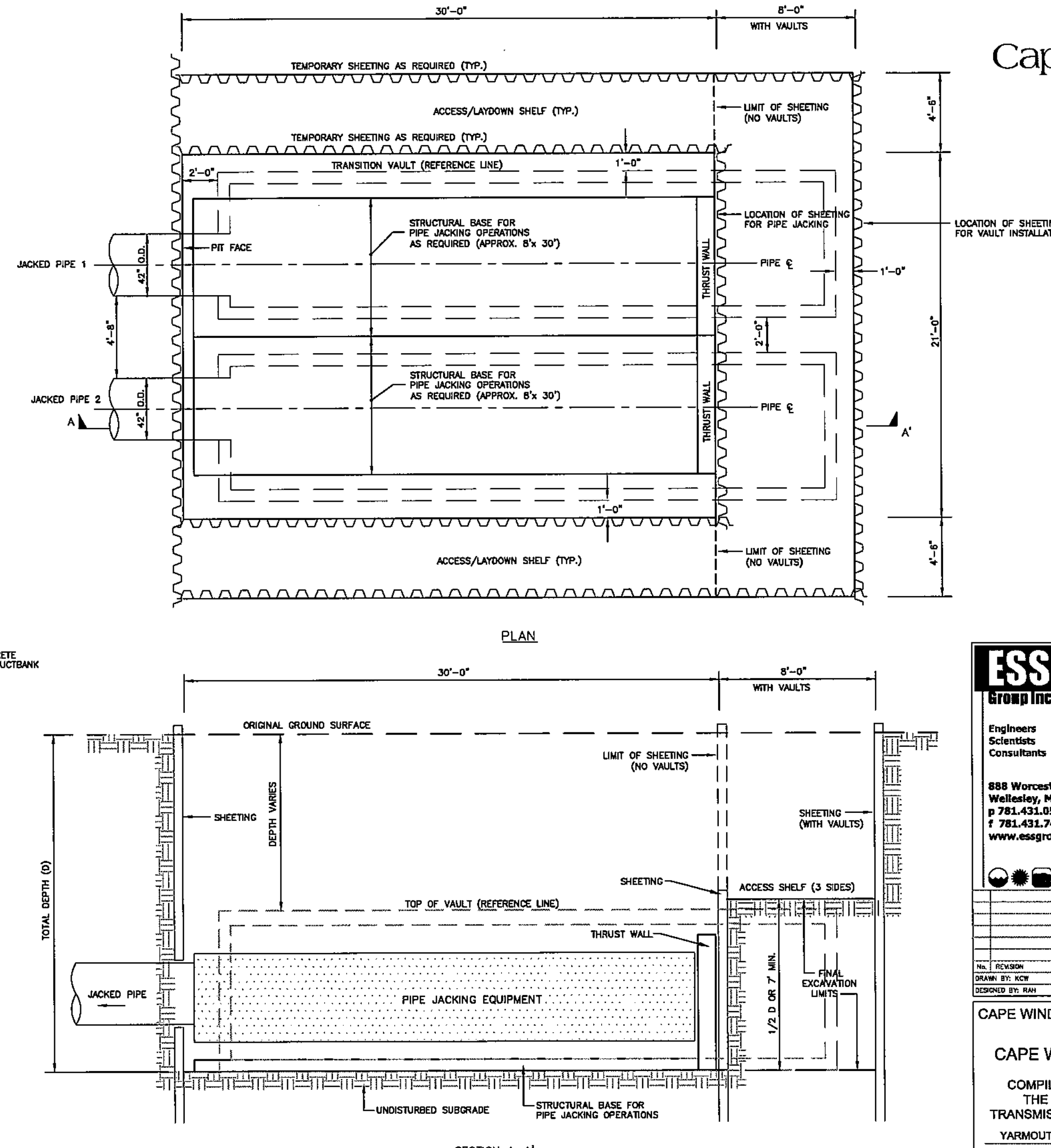
NOTES:

1. CONCRETE MINIMUM STRENGTH – 6000 PSI @28 DAYS.
2. STEEL REINFORCEMENT – ASTM A615, GRADE 60.
3. COVER TO STEEL – 1" MIN.
4. DESIGN LOADING – AASHTO HS20-44.
5. CONSTRUCTION JOINT – SEALED WITH 1" BUTYL RUBBER.
6. DESIGN SPECIFICATION – ACI 350R& 318& AASHTO LOAD FACTOR DESIGN METHOD.

SEE TYPICAL VAULT INSTALLATION DETAIL, NEXT SHEET

UPLAND TRANSITION VAULT DETAIL
OPEN TRENCH TO PIPE JACKING

NOT TO SCALE



PIPE JACKING BORING PIT DETAILS

NOT TO SCALE

FOR PERMITTING PURPOSES ONLY

Cape Wind
Energy for Life.

ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW	CHECKED BY: PRW		
DESIGNED BY: RAN	APPROVED BY:		

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

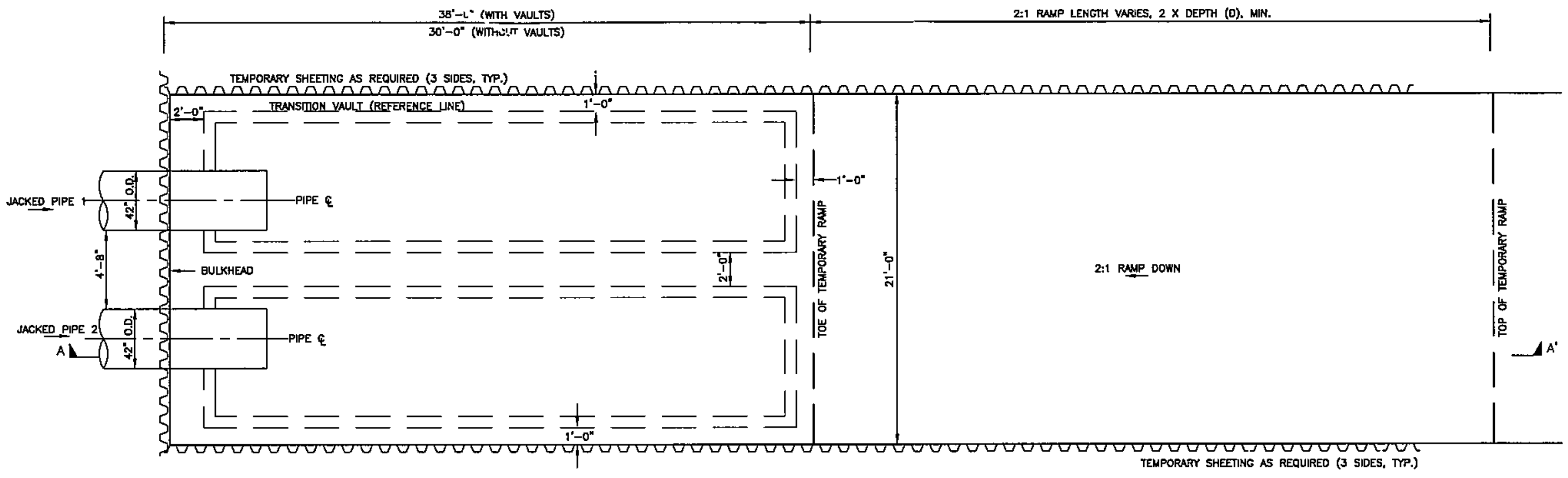
YARMOUTH & BARNSTABLE, MA.

PIPE JACKING PIT DETAILS

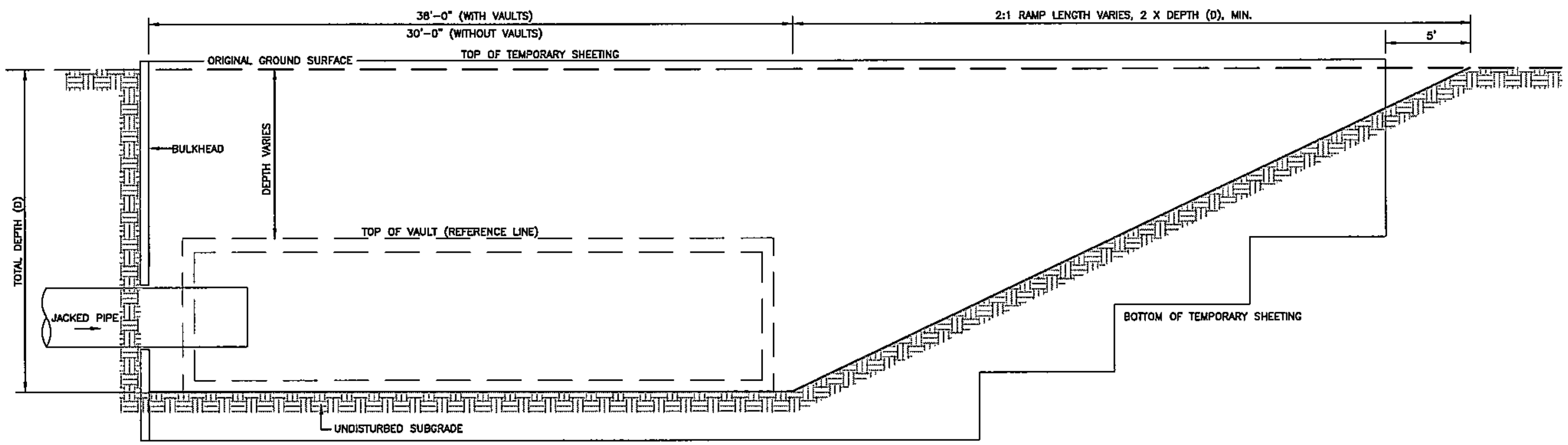
PROJECT No.: E159-504.10
DATE OF ISSUE: 02/26/10
SHEET No.:
SCALE: 1"=40'

DRAWING No. CD-11

Cape Wind
Energy for Life.

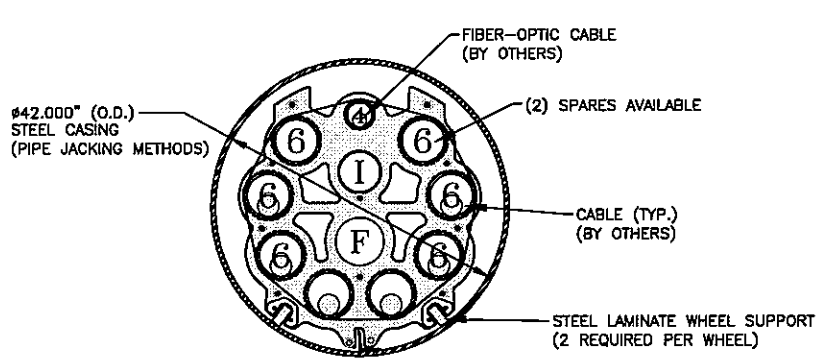


PLAN



SECTION A-A'

PIPE JACKING RECEIVING PIT DETAILS
NOT TO SCALE



42" BORE SPACER DETAIL
NOT TO SCALE

FOR PERMITTING PURPOSES ONLY

ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW		CHECKED BY: PRW	
DESIGNED BY: RAH		APPROVED BY:	

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

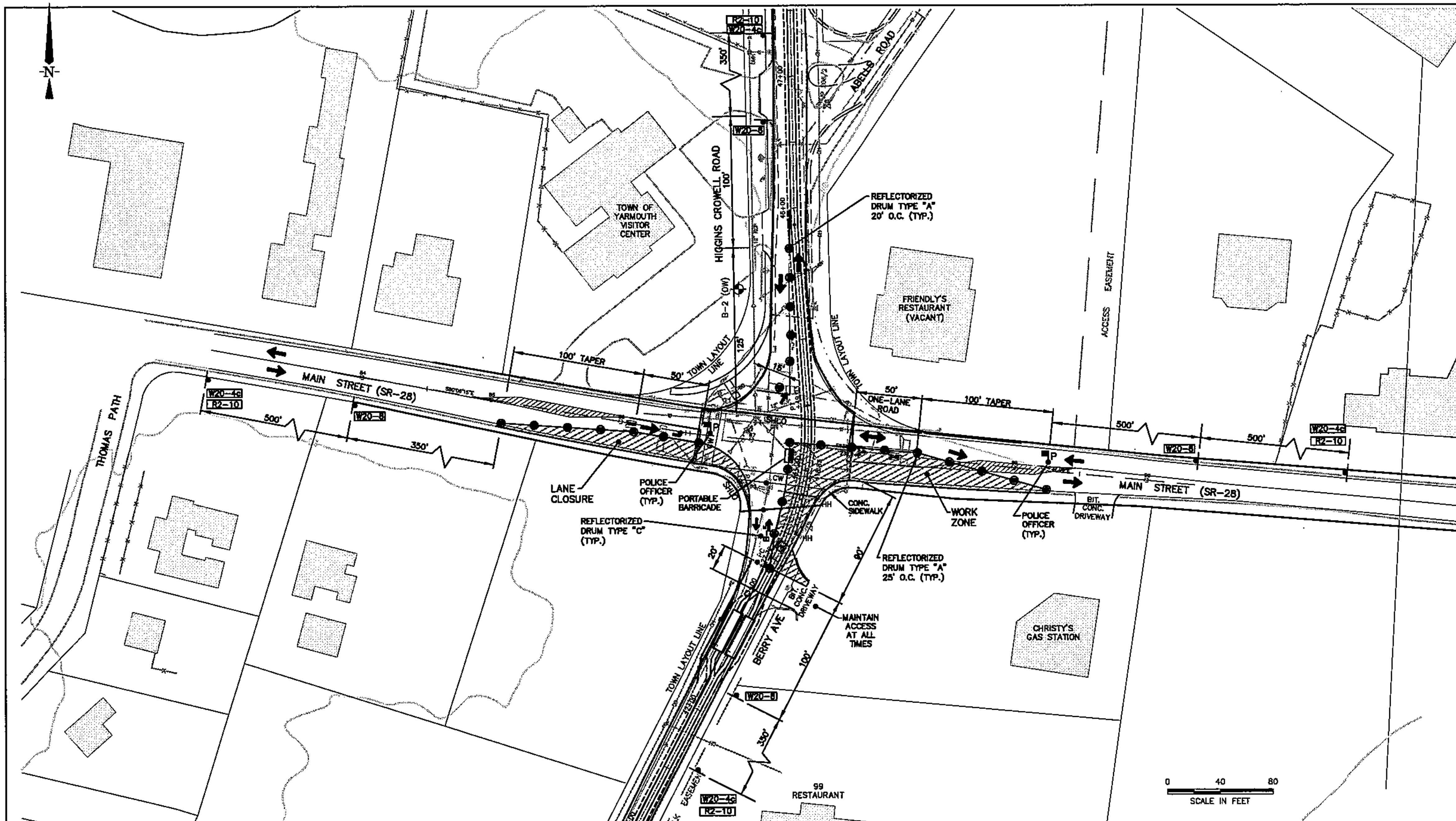
COMPILED PLAN SET OF
THE UPLAND 115kV
TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

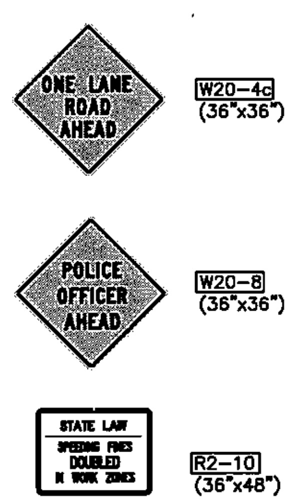
PIPE JACKING PIT
DETAILS

PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	CD-12
SHEET No.:	
SCALE: 1"=40'	

Cape Wind
Energy for Life.



SIGN LEGEND



LEGEND

- WORK ZONE
- P POLICE OFFICER
- REFLECTORIZED DRUM WITH TYPE 'A' LIGHT
- REFLECTORIZED DRUM TYPE 'C'
- TRAFFIC SIGN
- DIRECTION OF TRAFFIC
- ONE LANE ALTERNATING TRAFFIC
- CW CROSS WALK
- HH HAND HOLE
- O.C. ON CENTER
- TYP. TYPICAL

NOTES:

1. ALL TEMPORARY TRAFFIC CONTROL WORK SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND ALL REVISIONS.
2. ALL SIGN LEGENDS, BORDERS AND MOUNTING SHALL BE IN ACCORDANCE WITH THE MUTCD.
3. TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.
4. TEMPORARY CONSTRUCTION SIGNING, BARRICADES AND ALL OTHER NECESSARY WORK ZONE TRAFFIC CONTROL DEVICES SHALL BE REMOVED FROM THE HIGHWAY OR COVERED WHEN THEY ARE NOT REQUIRED FOR CONTROL OF TRAFFIC.
5. SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY, AND REFLECTORIZED PLASTIC DRUMS WITH LIGHTING DEVICES MOUNTED ON THEM, MUST PASS THE CRITERIA SET FORTH IN NCHRP REPORT 350, "RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY FEATURES."
6. CONTRACTORS SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS, SUCH AS CONDUIT INSTALLATION, EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT AND SIMILAR OPERATIONS.
7. THE FIRST THREE PLASTIC DRUMS OF A TAPER MAY BE MOUNTED WITH TYPE A LIGHTS.
8. THE ADVISORY SPEED LIMIT, IF REQUIRED, SHALL BE DETERMINED BY THE ENGINEER.
9. DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
10. MAXIMUM SPACING OF TRAFFIC DEVICES IN A TAPER (DRUMS OR CONES) IS EQUAL IN FEET TO THE SPEED LIMIT IN MPH.
11. MINIMUM LANE WIDTH IS TO BE 11 FEET UNLESS OTHERWISE SHOWN. MINIMUM LANE WIDTH TO BE MEASURED FROM THE EDGE OF DRUMS OR MEDIAN BARRIER.
12. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS.

FOR PERMITTING PURPOSES ONLY

ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW		CHECKED BY: PRW	
DESIGNED BY: RAH		APPROVED BY:	

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

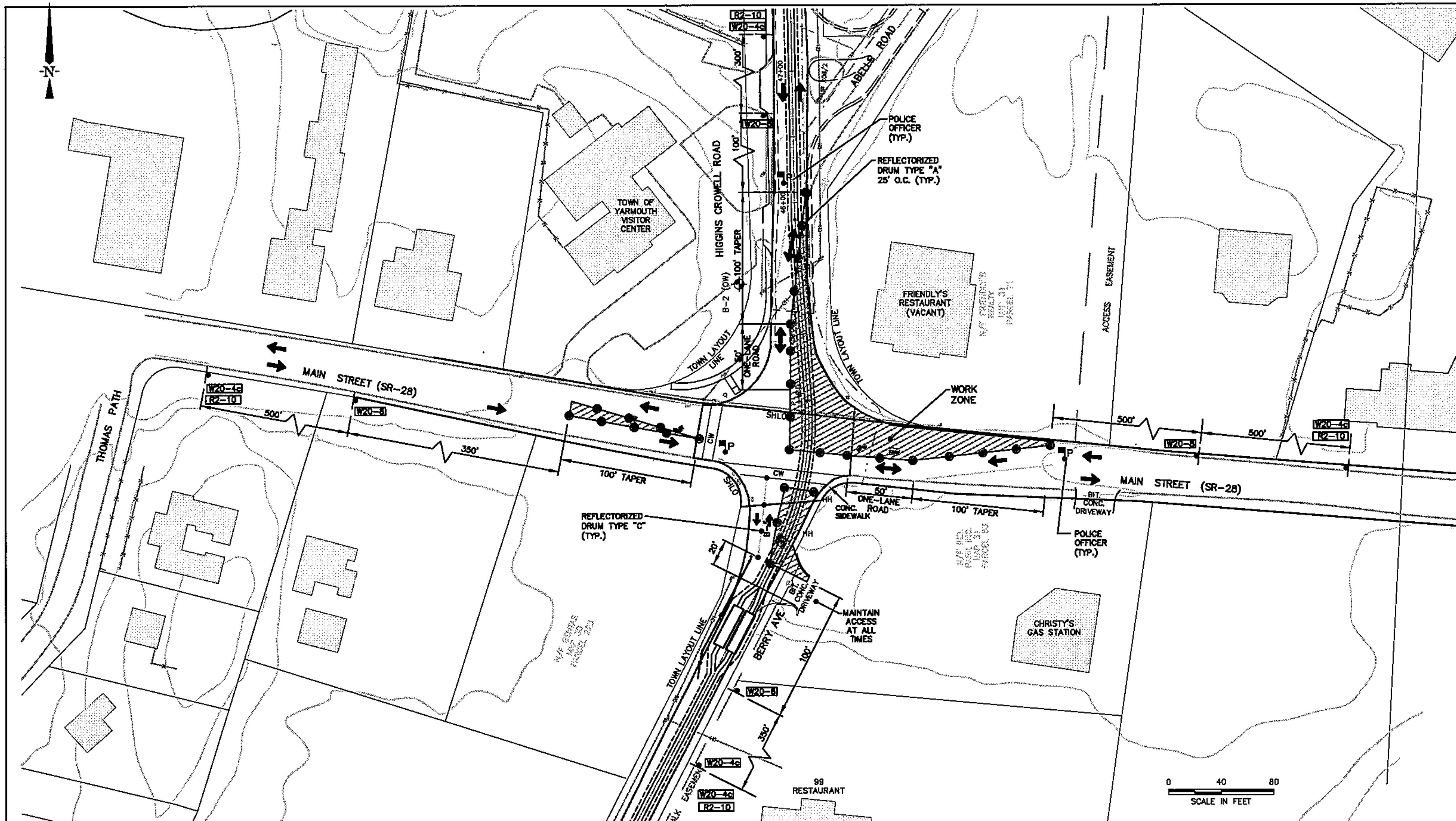
COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

ROUTE 28
TRAFFIC MANAGEMENT PLAN
(OFF PEAK HOURS)
HALF ROADWAY CLOSURE
AT INTERSECTION
(1 OF 2)

PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	CD-13
SHEET No.:	
SCALE: 1"=40'	

Cape Wind™
Energy for Life.



SIGN LEGEND

ONE LANE ROAD AHEAD — W20-4c (36"x36")

POLICE OFFICER AHEAD — W20-8 (36"x36")

STATE LAW SPEEDING FINES DOUBLED IN WORK ZONES — R2-10 (36"x48")

LEGEND

(hatched)	WORK ZONE
P	POLICE OFFICER
●	REFLECTORIZED DRUM WITH TYPE 'A' LIGHT
•	REFLECTORIZED DRUM TYPE 'C'
	TRAFFIC SIGN
←	DIRECTION OF TRAFFIC
↔	ONE LANE ALTERNATING TRAFFIC
CW	CROSS WALK
HH	HAND HOLE
O.C.	ON CENTER
TYP.	TYPICAL

NOTES:

1. ALL TEMPORARY TRAFFIC CONTROL WORK SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND ALL REVISIONS.
2. ALL SIGN LEGENDS, BORDERS AND MOUNTING SHALL BE IN ACCORDANCE WITH THE MUTCD.
3. TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.
4. TEMPORARY CONSTRUCTION SIGNING, BARRICADES AND ALL OTHER NECESSARY WORK ZONE TRAFFIC CONTROL DEVICES SHALL BE REMOVED FROM THE HIGHWAY OR COVERED WHEN THEY ARE NOT REQUIRED FOR CONTROL OF TRAFFIC.
5. SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY, AND REFLECTORIZED PLASTIC DRUMS WITH LIGHTING DEVICES MOUNTED ON THEM, MUST PASS THE CRITERIA SET FORTH IN NCHRP REPORT 350, "RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY FEATURES."
6. CONTRACTORS SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS, SUCH AS CONDUIT INSTALLATION, EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT AND SIMILAR OPERATIONS.
7. THE FIRST THREE PLASTIC DRUMS OF A TAPER MAY BE MOUNTED WITH TYPE A LIGHTS.
8. THE ADVISORY SPEED LIMIT, IF REQUIRED, SHALL BE DETERMINED BY THE ENGINEER.
9. DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
10. MAXIMUM SPACING OF TRAFFIC DEVICES IN A TAPER (DRUMS OR CONES) IS EQUAL IN FEET TO THE SPEED LIMIT IN MPH.
11. MINIMUM LANE WIDTH IS TO BE 11 FEET UNLESS OTHERWISE SHOWN. MINIMUM LANE WIDTH TO BE MEASURED FROM THE EDGE OF DRUMS OR MEDIAN BARRIER.
12. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS.

FOR PERMITTING PURPOSES ONLY

ESS Group Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW		CHECKED BY: PRW	
DESIGNED BY: RAH		APPROVED BY:	

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

ROUTE 28
TRAFFIC MANAGEMENT PLAN
(OFF PEAK HOURS)
HALF ROADWAY CLOSURE
AT INTERSECTION
(2 OF 2)

PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	CD-14
SHEET No.:	
SCALE: 1"=40'	

NOTES:

1. ALL TEMPORARY TRAFFIC CONTROL WORK SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND ALL REVISIONS.
2. ALL SIGN LEGENDS, BORDERS AND MOUNTING SHALL BE IN ACCORDANCE WITH THE MUTCD.
3. TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.
4. TEMPORARY CONSTRUCTION SIGNING, BARRICADES AND ALL OTHER NECESSARY WORK ZONE TRAFFIC CONTROL DEVICES SHALL BE REMOVED FROM THE HIGHWAY OR COVERED WHEN THEY ARE NOT REQUIRED FOR CONTROL OF TRAFFIC.
5. SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY, AND REFLECTORIZED PLASTIC DRUMS WITH LIGHTING DEVICES MOUNTED ON THEM, MUST PASS THE CRITERIA SET FORTH IN NCHRP REPORT 350, "RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY FEATURES."
6. CONTRACTORS SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS, SUCH AS CONDUIT INSTALLATION, EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT AND SIMILAR OPERATIONS.
7. THE FIRST THREE PLASTIC DRUMS OF A TAPER MAY BE MOUNTED WITH TYPE A LIGHTS.
8. THE ADVISORY SPEED LIMIT, IF REQUIRED, SHALL BE DETERMINED BY THE ENGINEER.
9. DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
10. MAXIMUM SPACING OF TRAFFIC DEVICES IN A TAPER (DRUMS OR CONES) IS EQUAL IN FEET TO THE SPEED LIMIT IN MPH.
11. MINIMUM LANE WIDTH IS TO BE 10 FEET (3.0m) UNLESS OTHERWISE SHOWN. MINIMUM LANE WIDTH TO BE MEASURED FROM THE EDGE OF DRUMS OR MEDIAN BARRIER.
12. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL NECESSARY POLICE DETAILS

LEGEND:

REFLECTORIZED PLASTIC DRUM	WORK ZONE	WORK VEHICLE
POLICE DETAIL	DIRECTION OF TRAFFIC	TRUCK MOUNTED ATTENUATOR
TYPE III BARRICADE	IMPACT ATTENUATOR	TRAFFIC OR PEDESTRIAN SIGNAL
FLASHING ARROW PANEL	MEDIAN BARRIER	SIGN
FLASHING ARROW PANEL	MEDIAN BARRIER WITH WARNING LIGHTS	

THE IDEAL CAPACITY OF A MAJOR HIGHWAY IS GENERALLY CONSIDERED TO BE 1900 PASSENGER CARS PER HOUR PER LANE (PCPHPL). IN WORK ZONES ON A MULTI-LANE DIVIDED HIGHWAY, THE FOLLOWING VOLUME GUIDELINES HAVE BEEN SUGGESTED:

MEASURED AVERAGE WORK ZONE CAPACITIES

Number of Lanes		Number of Studies	Average Capacity	
NORMAL (existing)	OPEN (to traffic)		VPH	VPHPL
3	1	7	1,170	1,170
2	1	8	1,340	1,340
5	2	8	2,740	1,370
4	2	4	2,960	1,480
3	2	9	2,980	1,490
4	3	4	4,560	1,520

Source: Dudek, C., Notes on Work Zone Capacity and Level of Service. Texas Transportation Institute, Texas A&M University, College Station, Texas (1984)

BY OBTAINING HOURLY TRAFFIC COUNTS FOR A PARTICULAR ROADWAY (WITH A MINIMUM OF A 48-HOUR AUTOMATIC TRAFFIC RECORDER (ATR) COUNT), THIS WILL HELP TO DETERMINE AT WHAT TIMES OF THE DAY OR NIGHT A CERTAIN NUMBER OF LANES MAY BE CLOSED.

GENERAL GUIDELINES

SUGGESTED WORK ZONE WARNING SIGN SPACING

Road Type	Distance Between Signs**		
	A	B	C
LOCAL OR LOW VOLUME ROADWAYS*	350 (100)	350 (100)	350 (100)
MOST OTHER ROADWAYS*	500 (150)	500 (150)	500 (150)
FREEWAYS AND EXPRESSWAYS*	1,000 (300)	1,500 (450)	2,640 (800)

* SPEED CATEGORY TO BE DETERMINED BY HIGHWAY AGENCY

** DISTANCES ARE SHOWN IN FEET (METERS). THE COLUMN HEADINGS A, B, AND C ARE THE DIMENSIONS SHOWN IN THE DETAIL/ TYPICAL SETUP FIGURES. THE A DIMENSION IS THE DISTANCE FROM THE TRANSITION OR POINT OF RESTRICTION TO THE FIRST SIGN. THE B DIMENSION IS THE DISTANCE BETWEEN THE FIRST AND SECOND SIGNS. THE C DIMENSION IS THE DISTANCE BETWEEN THE SECOND AND THIRD SIGNS. (THE "THIRD" SIGN IS THE FIRST ONE TYPICALLY ENCOUNTERED BY A DRIVER APPROACHING A TEMPORARY TRAFFIC CONTROL (TTC) ZONE.)

THE "THIRD" SIGN ABOVE IS TYPICALLY REFERRED TO AS AN "ADVANCE WARNING" SIGN ON THE TMP SETUPS. IT IS THE ONE WHICH MAY OFTEN HAVE THE "STANDARD RED OR RED-ORANGE FLAGS (16 in. X 16 in.)" MOUNTED ON IT. THESE ADVANCE WARNING SIGNS ARE LOCATED AT THE PROJECT LIMITS ON ALL APPROACHES (i.e. THE W20-1 SERIES (ROAD WORK XX FT) SIGNS), AND USUALLY REMAIN FOR THE DURATION OF THE PROJECT.

THE FIRST AND SECOND WARNING SIGNS ABOVE ARE REFERRED TO AS THE OPERATIONAL (DAY-TO-DAY) WORK ZONE SIGNS AND MAY BE MOVED DEPENDING ON WHERE THE SPECIFIC ROADWAY WORK FOR THAT DAY IS LOCATED.

R2-10 SIGNS SHALL BE PLACED BETWEEN THE FIRST AND SECOND SIGNS.

R2-10 AND W20-1 SERIES SIGNS ARE TO BE INCLUDED ON ALL DETAILS/TYPICAL SETUPS.

Based on: Table 6C-1 2003 MUTCD

STOPPING SIGHT DISTANCE AS A FUNCTION OF SPEED

SPEED* (km/h)	DISTANCE (m)
30	35
40	50
50	65
60	85
70	105
80	130
90	160
100	185
110	220
120	250

SPEED* (mph)	DISTANCE (ft)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

*POSTED SPEED, OFF-PEAK 85TH-PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED

THESE VALUES MAY BE USED TO DETERMINE THE LENGTH OF LONGITUDINAL BUFFER SPACES.

THE DISTANCES IN THE ABOVE CHART REPRESENT THE MINIMAL VALUES FOR BUFFER SPACING.

Source: Table 6C-2 2003 MUTCD

NOTES ON WORK ZONE DISTANCES

CONVENTIONAL ROADWAY– A STREET OR HIGHWAY OTHER THAN A LOW-VOLUME ROAD, EXPRESSWAY, OR FREEWAY.

EXPRESSWAY– A DIVIDED HIGHWAY WITH PARTIAL CONTROL OF ACCESS.

FREEWAY– A DIVIDED HIGHWAY WITH FULL CONTROL OF ACCESS.

LOW-VOLUME ROAD– A FACILITY LYING OUTSIDE OF BUILT-UP AREAS OF CITIES, TOWNS, AND COMMUNITIES, AND IT SHALL HAVE A TRAFFIC VOLUME OF LESS THAN 400 AADT. IT SHALL NOT BE A FREEWAY, EXPRESSWAY, INTERCHANGE RAMP, FREEWAY SERVICE ROAD, OR A ROAD ON A DESIGNATED STATE HIGHWAY SYSTEM.

Source: 2003 MUTCD

TAPER LENGTH CRITERIA FOR TEMPORARY TRAFFIC CONTROL ZONES

Type of Taper	Taper Length (L)*
MERGING TAPER	AT LEAST L
SHIFTING TAPER	AT LEAST 0.5L
SHOULDER TAPER	AT LEAST 0.33L
ONE-LANE, TWO-WAY TRAFFIC TAPER	100 FT (30 m) MAXIMUM
DOWNSTREAM TAPER	100 FT (30 m) PER LANE

Source: Table 6C-3 2003 MUTCD

FORMULAS FOR DETERMINING TAPER LENGTHS

Speed Limit (S)	Taper Length (L) Feet
40 MPH OR LESS	$L = \frac{WS^2}{60}$
45 MPH OR MORE	$L = WS$

Speed Limit (S)	Taper Length (L) Meters
60 KM/H OR LESS	$L = \frac{WS^2}{155}$
70 KM/H OR MORE	$L = \frac{WS}{1.6}$

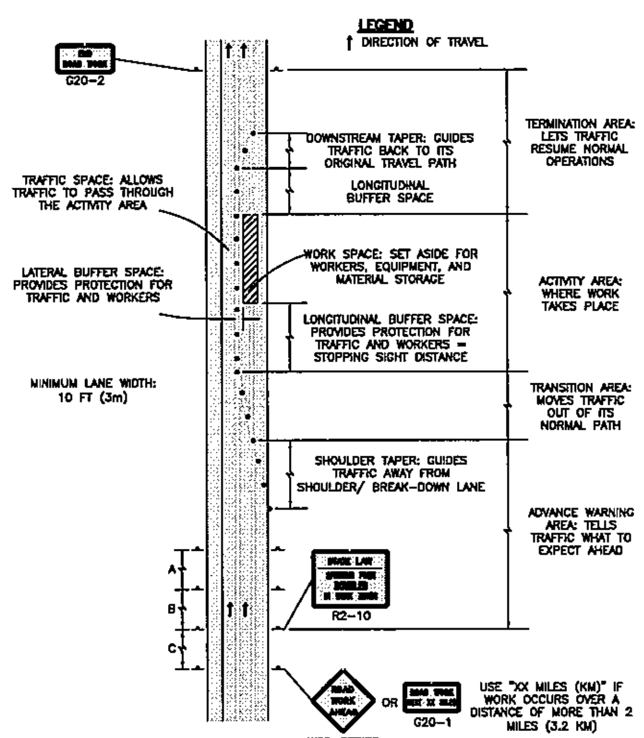
WHERE: L = TAPER LENGTH IN FEET (METERS)

W = WIDTH OF OFFSET IN FEET (METERS)

S = POSTED SPEED LIMIT, OR OFF-PEAK 85TH-PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICAPATED OPERATING SPEED IN MPH (KM/H)

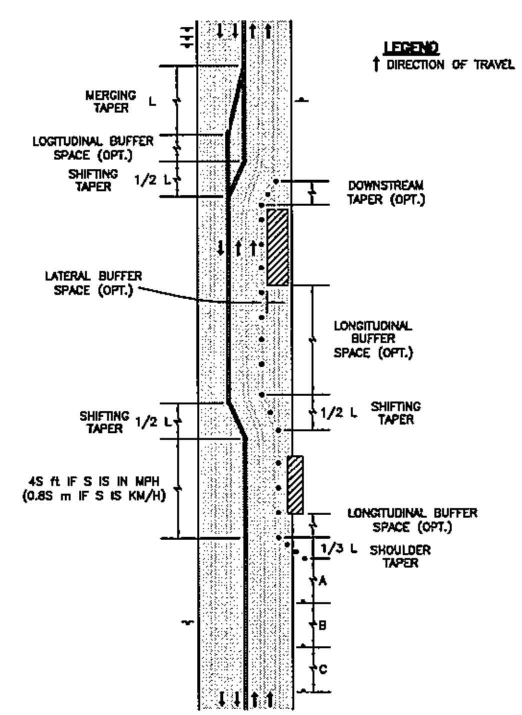
Source: Table 6C-4 2003 MUTCD

NOTES ON WORK ZONE DISTANCES



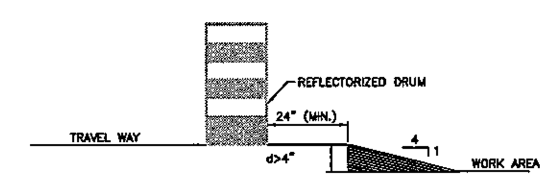
COMPONENT PARTS OF A TEMPORARY TRAFFIC CONTROL (TTC) ZONE

NOT TO SCALE

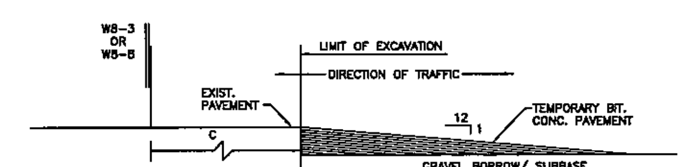


TYPES OF TAPERS AND BUFFER SPACES

NOT TO SCALE



LATERAL DROP-OFF DETAIL
NOT TO SCALE



LONGITUDINAL DROP-OFF DETAIL

NOT TO SCALE

FOR PERMITTING PURPOSES ONLY

Cape Wind
Energy for Life.

ESS Group Inc.
Engineers
Scientists
Consultants
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW	CHECKED BY: PRW		
DESIGNED BY: RAH	APPROVED BY:		

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

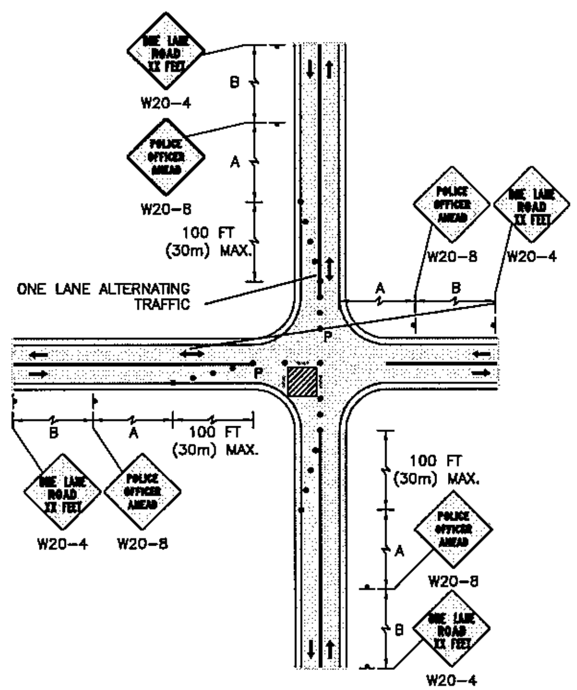
COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

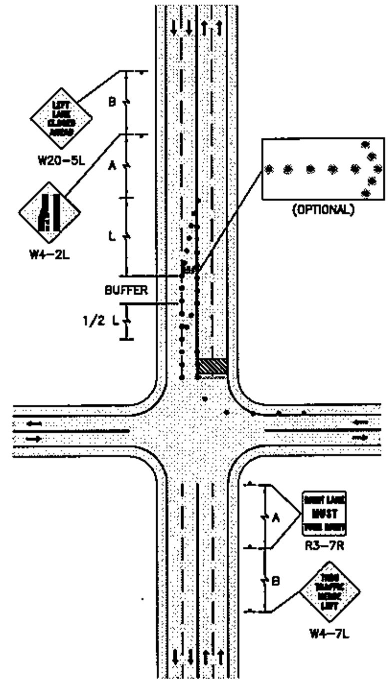
TRAFFIC MANAGEMENT PLAN DETAILS (SHEET 1 OF 2)

PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	CD-15
SHEET No.:	
SCALE: 1"=40'	

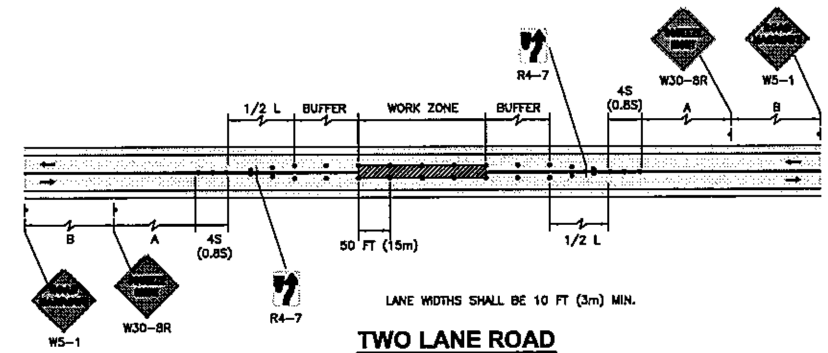
Cape Wind
Energy for Life.



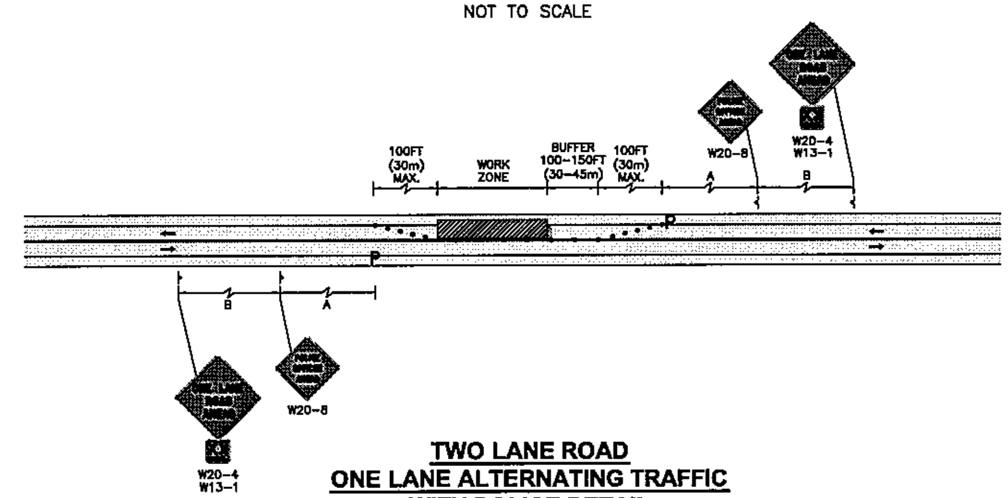
SINGLE LANE APPROACH
ONE QUADRANT CLOSURE
NOT TO SCALE



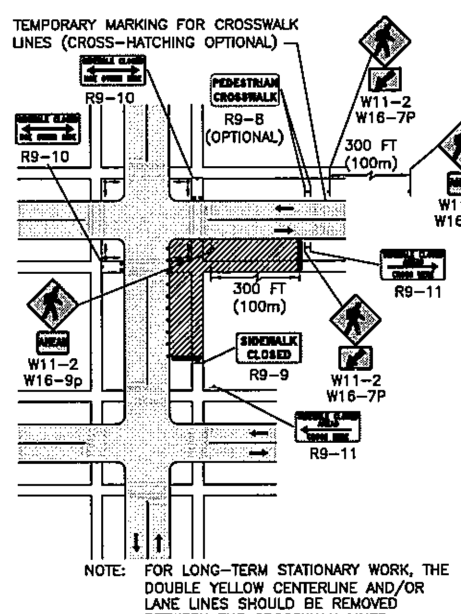
DOUBLE LANE APPROACH
HALF ROAD CLOSURE
NOT TO SCALE



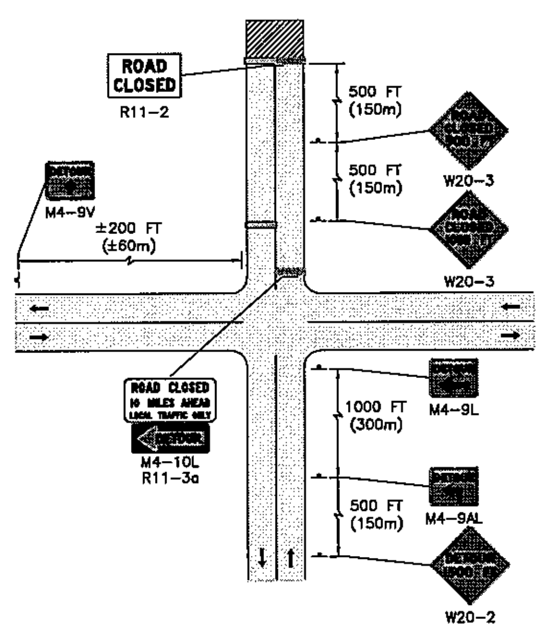
TWO LANE ROAD
CENTER OF ROAD CLOSURE
NOT TO SCALE



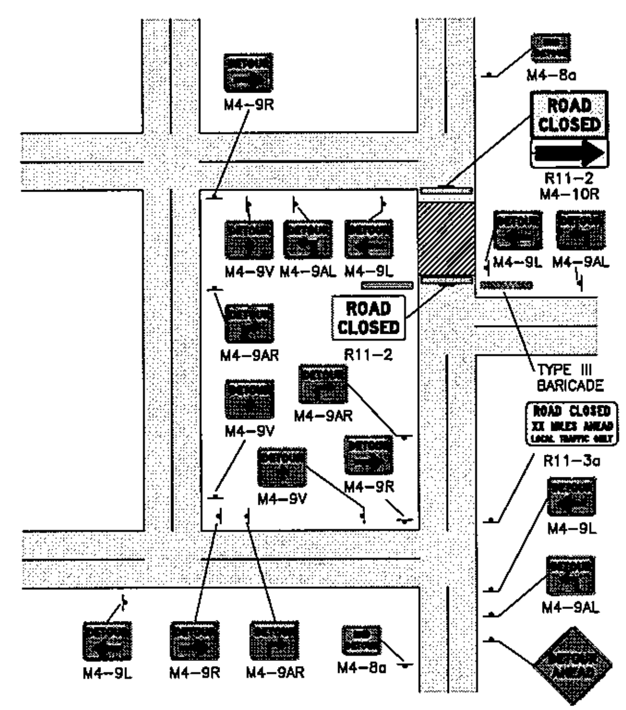
TWO LANE ROAD
ONE LANE ALTERNATING TRAFFIC
WITH POLICE DETAIL
NOT TO SCALE



PEDESTRIAN DETOUR
NOT TO SCALE



DETOUR ADVANCE SIGNING
NOT TO SCALE



DETOUR
NOT TO SCALE

FOR PERMITTING PURPOSES ONLY

ESS
Group Inc.
Engineers
Scientists
Consultants
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW		CHECKED BY: PRW	
DESIGNED BY: RAH		APPROVED BY:	

CAPE WIND ASSOCIATES, LLC

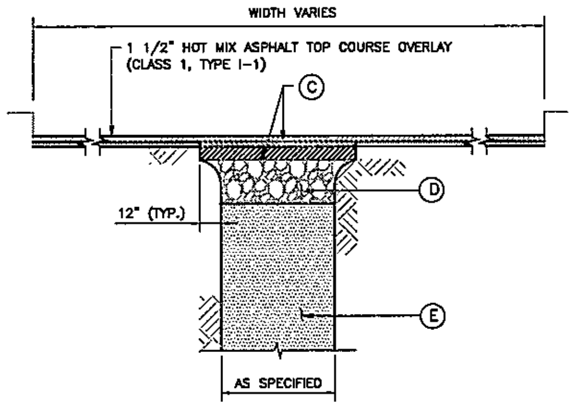
CAPE WIND PROJECT

COMPILED PLAN SET OF
THE UPLAND 115kV
TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

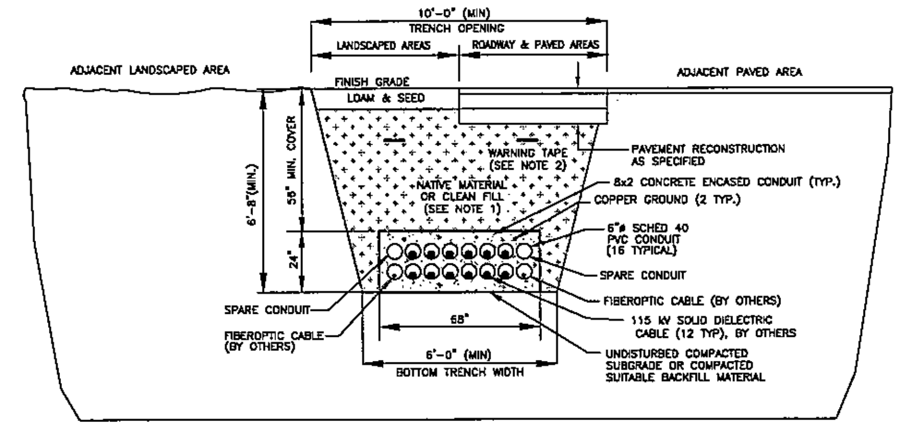
TRAFFIC MANAGEMENT
PLAN DETAILS
(SHEET 2 OF 2)

PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	CD-16
SHEET No.:	
SCALE: 1"=40'	



NOTE: CONSTRUCT CROWN WITH 2% CROSS SLOPE FROM CENTERLINE OF EXISTING PAVEMENT. POSITION OF TRENCH WITHIN ROADWAY WILL VARY.

FULL WIDTH ROADWAY OVERLAY
(WHERE SPECIFIED)



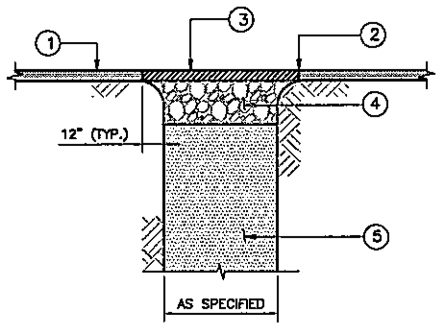
UPLAND CABLE TRENCH CROSS-SECTION (IN ROADWAYS)

8x2 CONCRETE DUCTBANK TRENCH DETAIL

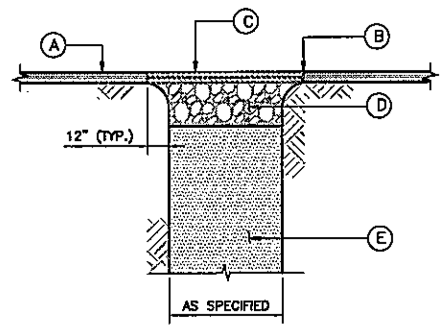
NOT TO SCALE

TRENCH NOTES:

1. NATIVE MATERIAL TO BE USED ONLY IF DETERMINED TO HAVE APPROPRIATE THERMAL RESISTIVITY AND TO BE ACCEPTABLE IN ACCORDANCE WITH THE SOIL MANAGEMENT PLAN.
2. WARNING TAPE SHALL BE DETECTABLE TRACER TAPE LABELED "CAUTION: HIGH VOLTAGE ELECTRICAL LINES BURIED BELOW". MINIMUM COVER SHALL BE 12" UNPAVED AND LANDSCAPED AREAS. MINIMUM COVER SHALL BE 18" IN AREAS OF FULL DEPTH PAVEMENT RECONSTRUCTION.



TEMPORARY (ROADWAY)



PERMANENT (ROADWAY)
WHERE NOT OTHERWISE SPECIFIED FOR FULL WIDTH ROADWAY OVERLAY

NOTES:

1. EXISTING PAVEMENT
2. SAWCUT, TACK COAT EDGES (TYP)
3. 1 1/2" HOT MIX ASPHALT TOP COURSE – CLASS 1, TYPE I-1 & 2 1/2" HOT MIX ASPHALT BINDER COURSE – CLASS 1, TYPE I-1, OR MATCH EXISTING PAVEMENT SECTION IF > 4".
4. 6" COMPACTED 3/4" DENSE GRADED CRUSHED STONE
5. FINAL BACKFILL PER TRENCH DETAIL

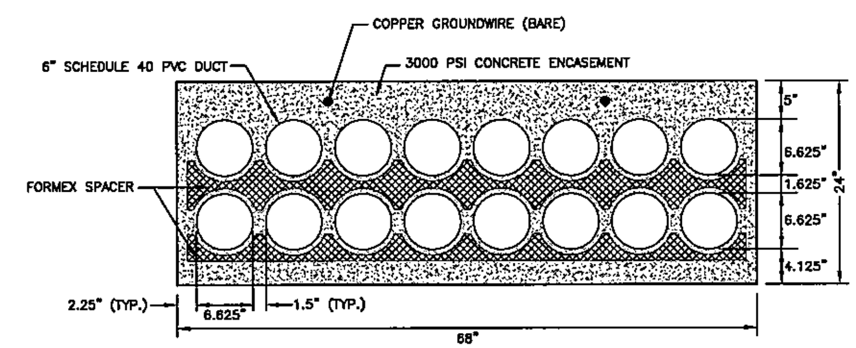
NOTES:

- A. EXISTING PAVEMENT
- B. SAWCUT, TACK COAT EDGES (TYP) SEAL JOINTS BY INFRARED TECHNIQUES (6 MONTHS FOLLOWING PLACEMENT OF PERMANENT PATCH)
- C. 1 1/2" HOT MIX ASPHALT TOP COURSE – CLASS 1, TYPE I-1 & 2 1/2" HOT MIX ASPHALT BINDER COURSE – CLASS 1, TYPE I-1, OR MATCH EXISTING PAVEMENT SECTION IF > 4".
- D. 6" COMPACTED 3/4" DENSE GRADED CRUSHED STONE
- E. FINAL BACKFILL PER TRENCH DETAIL

NOTES: 1) ALL WORK SHALL CONFORM TO TOWN OF BARNSTABLE DEPARTMENT OF PUBLIC WORKS STREET EXCAVATION RULES AND REGULATIONS DATED MARCH, 1995.
2) UNLESS OTHERWISE INDICATED, ALL MATERIALS AND CONSTRUCTION METHODS MUST MEET THE MASSACHUSETTS HIGHWAY DEPARTMENT'S 1995 STANDARD SPECIFICATIONS AND 2000 SUPPLEMENTAL SPECIFICATIONS, AS AMENDED.

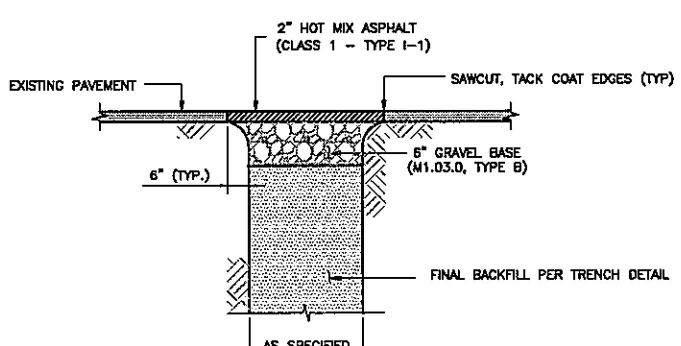
TRENCH REPAIR DETAILS – BARNSTABLE PUBLIC RIGHT-OF-WAYS

N.T.S.



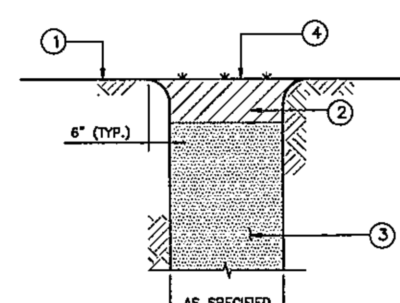
8x2 CONCRETE DUCTBANK DETAIL

NOT TO SCALE



TRENCH REPAIR – HOT MIX ASPHALT SIDEWALK

N.T.S.



NOTES:

1. EXISTING LANDSCAPED AREAS
2. 6" LOAM WITHIN PUBLIC RIGHT-OF-WAY, 4" LOAM OTHERWISE
3. FINAL BACKFILL PER TRENCH DETAIL
4. FERTILIZE, LIME, AND SEED

TRENCH REPAIR – LANDSCAPED AREAS

N.T.S.

Cape Wind
Energy for Life.

ESS Group Inc.
Engineers
Scientists
Consultants
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY
DRAWN BY: KCW		CHECKED BY: PRW	
DESIGNED BY: RAH		APPROVED BY:	

CAPE WIND ASSOCIATES, LLC

CAPE WIND PROJECT

COMPILED PLAN SET OF THE UPLAND 115kV TRANSMISSION CABLE ROUTE

YARMOUTH & BARNSTABLE, MA.

ROAD OPENING PERMIT
TRENCH DETAILS

PROJECT No.: E159-504.10	DRAWING No.
DATE OF ISSUE: 02/26/10	CD-17
SHEET No.:	
SCALE: 1"=40'	

FOR PERMITTING PURPOSES ONLY

Attachment 7

SPCC Plan Review Log

SPCC PLAN REVIEW LOG

The purpose of this log is to demonstrate that the appropriate reviews have been completed and that the Plan does or does not require amendments.

Date of Review	Certification of Review	Plan Amendments Required? (Indicate Yes Or No)	If Amendments Are Required, Provide Details	Date Next Review Is Required
	"I have completed review and evaluation of the SPCC Plan for Cape Wind on the referenced date and will amend the plan as noted in this table." Signature:______________________________		Brief reason for amendments: Plan must be amended by (date): Is PE certification required (indicate yes or no)?	
	"I have completed review and evaluation of the SPCC Plan for Cape Wind on the referenced date and will amend the plan as noted in this table." Signature:______________________________		Brief reason for amendments: Plan must be amended by (date): Is PE certification required (indicate yes or no)?	
	"I have completed review and evaluation of the SPCC Plan for Cape Wind on the referenced date and will amend the plan as noted in this table." Signature:______________________________		Brief reason for amendments: Plan must be amended by (date): Is PE certification required (indicate yes or no)?	

Attachment 8

SPCC Inspection Forms

CAPE WIND
INSTRUCTIONS FOR SPCC INSPECTIONS

Conduct the inspection at least ***once per week***. Fill in the date and time of the inspection and the inspector's name at the top of the form at the time the inspection is performed. If any items are deficient, record the deficiencies and corrective actions taken. Record the final resolution or outcome of each corrective action. ALL DEFICIENCIES MUST BE CORRECTED AS SOON AS POSSIBLE.

Use the following guidelines for inspecting each area detailed on the inspection form, completing the form, and taking corrective actions. A copy of all inspection reports must be kept for ten (10) years from the date of the inspection.

1. Inspect the area for adequate ***housekeeping***. If there is trash, clutter, spilled materials, or waste in the area, clean it up.

2. Inspect the ***condition*** of accessible portions of containers. Check for signs of release or corrosion. Releases may be evident by observation of liquid in the secondary containment system, or moisture at the seams or other locations on the container. If this is observed, ensure that the container is tagged, emptied and that no additional oil is added. If any signs of rust are observed on the exterior of a container wall, note the size and location in the inspection log and have the container repaired/repainted the next time the container is emptied. In the meantime, continue to watch for any increase in size of the rust spot and any signs of release.

3. Inspect accessible portions of the ***area immediately surrounding containers and the secondary containment*** systems to detect signs of release (e.g., wet spots, stains, etc.). If signs of a release are observed, ensure that the container is tagged, emptied and that no additional material is added to the container. Inspect the secondary containment system to ensure it is in good condition (e.g., no cracks or gaps in concrete dikes, no signs of corrosion in steel dikes). In addition, the floors and walls should be examined for signs of cracks or deterioration. If deterioration is noted the area should be repaired.

4. Inspect all ***ancillary equipment***. Ancillary equipment includes piping, fittings, pumps, valves, gauges, etc. used to distribute, meter, or control the flow of oil or to view the level of material. Inspect all visible portions of the ancillary equipment. Check for signs of releases (e.g., drips, corrosion, damage, missing or loose parts, etc.). If these problems are detected, ensure that the equipment is tagged and replaced and no additional material is transferred to the ancillary equipment.

5. Any deficiencies must be documented and corrected immediately. ***Describe corrective actions***, if any, for all inspected areas. If the integrity of the container or containment structure is compromised, and/or if there is evidence of a release or potential release of oil, the system must be shut down until the deficiency is corrected, and re-inspected prior to resuming operations.

6. Enter the ***date that corrective action described above was completed***. If corrective action cannot be completed on the same day as the inspection, indicate the date that it is anticipated to be completed, and, once completed, make a notation to confirm that it was completed and the actual date of completion.

CAPE WIND
SITE INSPECTION CHECKLIST

Each week, the areas identified below must be inspected for:

- *Leaks, spills*
- *Need for housekeeping, repairs, or maintenance*
- *Effectiveness of engineering controls (e.g. secondary containment, level gauges, etc.)*
- *Presence of liquid in containment area (discharge must be inspected and documented)*

Inspection Area	What to Include in Inspection	Note Deficiencies (Indicate Ok If There Are None)	Date Deficiencies Are Corrected
Additional Comments:			
What, if any, changes to the SPCC Plan are necessary?			
Inspection Date and time:______________________________ **Personnel Conducting Inspection:**______________________________			

Records of inspections must be kept for three years.

Attachment 9

SPCC Training Documentation

CAPE WIND
SPCC TRAINING RECORDS

This form, or its equivalent (hard copy or electronic), may be used to document Spill Prevention, Control, and Countermeasure training.

The following individuals have reviewed the combined Spill Prevention, Control, and Countermeasure Plan and are familiar with the procedures contained therein, or have received SPCC training as described below.

Name	Description of Training or Plan Review	Date	Signature

Appendix G

O & M Appendices

Appendix G-1

SCADA System DESCRIPTION

APPENDIX G-1: SCADA SYSTEM DESCRIPTION

This is a representative SCADA system design. A detailed SCADA system design will be provided upon submittal of the FIR.

General Description

Use of two or more SCADA systems is established practice for wind farms. The overall SCADA system comprises:

- WTG SCADA system (WTSS) which is a proven proprietary system developed by the WTG manufacturers for monitoring and control of the WTGs. This communicates with the WTG suppliers' and Owners' base stations enabling either or both the WTG supplier or the Owner to monitor status and performance, and undertake supervisory controls in accordance with protocols which are defined for the project.

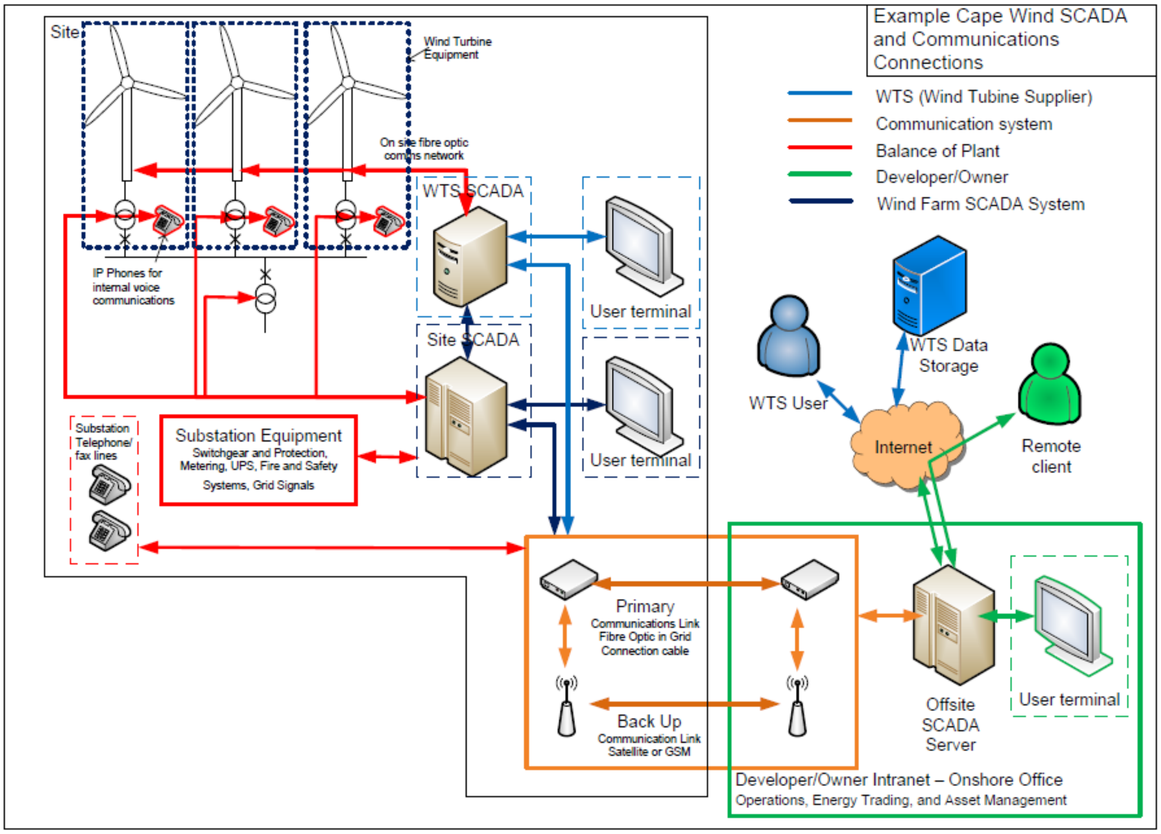
- Wind Farm SCADA system (WFSS) which is the parent system designed for the project to monitor and control the ESP and BoP. This will interface with the WTSS and may include the following sub-systems:

    - Grid monitoring or grid interface system if the ISO-NE & NSTAR requires the Project to provide real-time data on equipment status and power import / export to the ISO-NE & NSTARs' data systems.

- Owners' base station.

- Communications systems.

A typical schematic for a wind farm is provided below.



General Operation

The SCADA system shall allow individual and user defined groups of WTGs to be remotely stopped and started without compromising the operation of any of the other WTGs.

Each WTG shall be capable of operating independently of the other WTGs and of the SCADA system. Should the SCADA system fail, the individual WTGs shall continue to operate without compromising the safety of the equipment or breaching any technical conditions of the grid requirements or system design,

Should any part of the WFSS or WTSS fail, the individual WTGs, the meteorological station and electrical systems shall continue in operation unless such operation compromises the safety of the equipment or breach any technical conditions of the grid or system design,

The SCADA system shall be traceable and transparent in operation. It shall be structured in such a way as to provide maximum data integrity

The SCADA system shall be able to facilitate interfacing to a maintenance management system and to forecasting tools.

Wind Turbine SCADA System (WTSS)

The SWT-3.6-1 07 wind turbine is equipped with the Siemens WebWPS SCADA system. This system offers remote control and a variety of status views and useful reports from a standard internet web browser. The status views present information such as electrical and mechanical data, operation and fault status, meteorological data and grid station data. In addition to the Siemens WebWPS SCADA system, the SWT-3.6-107 wind turbine is equipped with the unique Siemens TCM condition monitoring system. This system monitors the vibration level of the main components and compares the actual vibration spectra with a set of established reference spectra. Result review, detailed analysis and reprogramming can all be carried out using a standard web browser.

Wind Farm SCADA System (WFSS)

The CWA WFSS remote station will be situated in the ESP and provide an interface with the WTSS.

The WFSS system shall provide alarms, indication and control for the complete wind farm including but not limited to the following subsystems and components:

a. WTGs
b. Meteorological masts.
c. Navigation lights and systems.
d. Fog sounding system.
e. WTG MV switchgear sequenced control and interlocking and protection.
f. Fire and safety system, WTG and substation.
g. Wind farm substation (ESP) HV switchgear control and protection.
h. Wind farm substation (ESP) MV switchgear control and protection.
i. Wind farm grid connection cable (115kV) protection and monitoring.
j. MV and HV transformers.
k. CCTV monitoring system.
l. WTG condition monitoring system.
m. Telecoms and broadband communications.
n. UPS's (Uninterruptable Power Supply).Utility and Utility substation
o. Environmental Monitoring devices (bird cameras, etc)

As a subset the WTSS will supply the following signals to the WFSS

a. WTGs
b. Meteorological masts.
c. Navigation lights and systems.
d. Fog sounding system.
e. WTG condition monitoring system.
f. WTG transformer and switchgear

Details of the WFSS are to be confirmed through the detailed design of the ESP and BoP.

Communication Systems

This shall comprise four fiber optic cables from the wind farm with the export cables to the onshore connection vaults (two operating redundant cables and two spare). The two operating redundant fiber optic cables will be routed with the onshore cables to the Utility Substation at the grid interconnection point. From this point, the two redundant fiber optic cables will be routed via either local utility distribution or telephone poles to the Control Room. The fiber optic communication for the SCADA system shall be backed-up by radio or satellite communication.

Details of communication systems are to be confirmed through the detailed design of the ESP and BoP.

Appendix G-2

WTG Maintenance Schedule

REDACTED
Confidential business information.
Not for public disclosure.

Appendix G-3

ESP and BOP Maintenance Schedule

APPENDIX G-3: ESP AND BOP MAINTENANCE SCHEDULE

An indicative maintenance schedule is provided below for the ESP and also covering the BoP. A detailed maintenance schedule will be provided upon submittal of the FIR.

Project Name: Cape Wind Project	Frequency of Preventative Maintenance									
Asset Type	6M	12M	18M	24M	30M	36M	42M	48M	54M	60M
Wind Turbine 33 kV cable/Fiber Optic cable terminations		EI &TI		EI & TI		EI & TI		EI & TI		EI & TI
33kV Intra Array Cables/Fiber Optic Cable						DEI&T				
Cathodic Protection System (Turbine Platform)		EI		DEI&T		EI		DEI&T		EI
Cathodic Protection System (ESP)		EI		DEI&T		EI		DEI&T		EI
Cable Protection System and Protection (Turbine Platform)						DEI&T				
Cable Protection System and Protection (ESP)						DEI&T				
Mechanical / Civil Structure (Turbine Platform)								EI		
Mechanical / Civil Structure (ESP)								EI		
Earthing and Lightning Conductor (Turbine Platform)						DEI&T		EI		
Earthing and Lightning Conductor (ESP)						DEI&T		EI		
SCADA Component (Turbine Platform)										
SCADA Component (ESP)		EI		EI		EI		DEI&T		EI
SCADA Power Perfromance and Meteorolgocial Masts		DEI&T		DEI&T		DEI&T		DEI&T		DEI&T
ESP Equipment:										
33kV Intra Array Cables/Fiber Optic Cable terminations		EI & TI		EI & TI		EI & TI		EI & TI		EI & TI
33kV ESP cables and connection to 33kV GIS Switchgear		EI & TI		EI & TI		EI & TI		EI & TI		EI & TI
33kV surge supresion equipment										
33kV GIS Switchgear and Bus to SU Transformers										
33kV disconnect and earthing switches		EI & TI		EI & TI		EI & TI		EI & TI		EI & TI
4- Step Up Transformers	EI	EI & TI*	EI	EI & TI*	EI	EI & TI*	EI	EI & TI*	EI	EI & TI*
115kV GIS Switchgear and Bus to SU Transformers		TI		TI		TI		TI		TI
115kV disconnect and earthing switches		TI		TI		TI		TI		TI
115kV surge supresion equipment		TI		TI		TI		TI		TI
115kV Bus and Cable Termination Compartments		TI		TI		TI		TI		TI
115kV Reactor System		TI		TI		TI		TI		TI
115kV Submarine Cable/Fiber Optic Cable						DEI&T				
AC auxilary power distribution system (480/240/120V)	EI	EI & TI*	EI	EI & TI*	EI	EI & TI*	EI	EI & TI*	EI	EI & TI*
Auxiliary Motors and starters	EI	EI & TI*	EI	EI & TI*	EI	EI & TI*	EI	EI & TI*	EI	EI & TI*
Facility Lighting systems	EI	EI	EI	EI	EI	EI	EI	EI	EI	EI
Protective relaying system										DEI&T
Metering system		EI		EI		DEI&T		EI		EI
Telecommunication system (voice, data, control, data acquisition)		EI		EI		DEI&T		EI		EI
Life boat and deployment systems	EI	EI*	EI	EI*	EI	EI*	EI	EI*	EI	EI*
Fire and Safety Alarm and Deluge systems	EI	EI*	EI	EI*	EI	EI*	EI	EI*	EI	EI*
Service Crane System		EI*		EI*		EI*		EI*		EI*
Navigation Lighting and Sound System	EI	EI*	EI	EI*	EI	EI*	EI	EI*	EI	EI*
Heating Ventalation and Cooling Systems	EI	DEI&T	EI	DEI&T	EI	DEI&T	EI	DEI&T	EI	DEI&T
Sanitrary Systems	EI	EI	EI	EI	EI	EI	EI	EI	EI	EI
Battery storage and charing system	EI	DEI&T	EI	DEI&T	EI	DEI&T	EI	DEI&T	EI	DEI&T
115kV Submarine/115kV On shore Cable transition duct						DEI&T				
115kV On Shore duct enclosed cable						DEI&T				
115kV Termination at Nstar Substation						DEI&T				

Legend:
EI = Means Energized Inspection
DEI&T = De-Energized Inspection and Testing
TI = Thermal Image (infrared Scanning

Appendix H

Selected Regulatory Permits and Approvals and Correspondence

H-1 FAA Determination

Federal Aviation Administration
Air Traffic Airspace Branch, ASW-520
2601 Meacham Blvd.
Fort Worth, TX 76137-0520

Aeronautical Study No.
2009-WTE-332-OE
Prior Study No.
2006-ANE-1078-OE

Issued Date: 05/17/2010

Len Fagan
Cape Wind Associates, LLC.
75 Arlington Street, Suite 704
Boston, MA 02116

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Wind Turbine 4A-HSS
Location:	Cotuit, MA
Latitude:	41-30-55.77N NAD 83
Longitude:	70-23-48.35W
Heights:	440 feet above ground level (AGL)
	440 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities. Therefore, pursuant to the authority delegated to me, it is hereby determined that the structure would not be a hazard to air navigation provided the following condition(s) is(are) met:

As a condition to this Determination, the structure is marked and/or lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, a med-dual system - Chapters 4,8(M-Dual),&12.

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be completed and returned to this office any time the project is abandoned or:

__X__ At least 10 days prior to start of construction (7460-2, Part I)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part II)

See attachment for additional condition(s) or information.

This determination expires on 05/17/2012 unless:

(a) extended, revised or terminated by the issuing office.
(b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE POSTMARKED OR DELIVERED TO THIS OFFICE AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE.

This determination is subject to review if an interested party files a petition that is received by the FAA on or before June 16, 2010. In the event a petition for review is filed, it must contain a full statement of the basis upon which it is made and be submitted in triplicate to the Manager, Airspace and Rules Division - Room 423, Federal Aviation Administration, 800 Independence Ave., Washington, D.C. 20591.

This determination becomes final on June 26, 2010 unless a petition is timely filed. In which case, this determination will not become final pending disposition of the petition. Interested parties will be notified of the grant of any review. For any questions regarding your petition, please contact Office of Airspace and Rules via telephone -- 202-267-8783 - or facsimile 202-267-9328.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

This aeronautical study considered and analyzed the impact on existing and proposed arrival, departure, and en route procedures for aircraft operating under both visual flight rules and instrument flight rules; the impact on all existing and planned public-use airports, military airports and aeronautical facilities; and the cumulative impact resulting from the studied structure when combined with the impact of other existing or proposed structures. The study disclosed that the described structure would have no substantial adverse effect on air navigation.

An account of the study findings, aeronautical objections received by the FAA during the study (if any), and the basis for the FAA's decision in this matter can be found on the following page(s).

If we can be of further assistance, please contact Donna ONeill, at (816)329-2525. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2009-WTE-332-OE.

Signature Control No: 107807735-126050584 (DNH -WT)
Sheri Edgett-Baron
Acting Manager, Obstruction Evaluation Service

Attachment(s)

Additional Information
Map(s)

The proposed construction consists of 130 wind turbines that would be located in Nantucket Sound, Massachusetts, within the area bounded by the following latitude/longitude coordinates:

North Boundary Line 41-32-36.55N
East Boundary Line 70-14-24.92W
South Boundary Line 41-27-37.39N
West Boundary Line 70-23-48.35W

Each wind turbine was studied separately under Aeronautical Study Numbers 2009-WTE-332-OE through 2009-WTE-461-OE. In order to facilitate the public comment process, all 130 of the proposed structures were included in the public notice and circularized under 2009-WTE-332-OE. However, separate determinations will be issued for each structure. All comments received from this circularization were considered in completing each of the determinations for the studies.

None of the turbines exceed any standards contained in Title 14 Code of Federal Regulations (14 CFR) Part 77, Subpart C, Obstruction Standards. None of the turbines would require a change to any instrument flight procedure. However, each of the 130 wind turbines were identified as having an adverse effect on the use of air navigation facilities or navigable airspace and were studied in accordance with 14 CFR, Part 77, Subpart D, Aeronautical Studies of Effect of Proposed Construction on Navigable Airspace.

The proposal was circularized (public notice) on February 13, 2009 to all known aviation interests and to non-aeronautical interests that may be affected by the proposal. That notice advised that to be eligible for consideration comments must be received on or before March 22, 2009. Subsequent to the distribution of the public notice, the FAA released the radar analysis report for the Cape Wind project that was used as the basis for the summary provided in the public notice. The FAA received many requests for an extension of the comment period to allow additional time for interested persons to carefully read the radar study prior to submitting their comments. In response to those requests, on March 19, 2010, the FAA extended the comment period until April 30, 2010.

Fourteen (14) letters of objection (in addition to supporting information and documents) were received as a result of the circularization. Most of the responders had similar concerns in two major areas: radar impact and the effect on visual flight rules (VFR) flight operations. There were also concerns expressed regarding the availability of wind turbines that meet the height filed, and environmental noise impacts. The concerns expressed are summarized below.

Comment: Responder stated that any route adjustments that pilots would make to circumnavigate the proposed wind turbine farm would result in contributing significantly to environment noise impacts on the mainland as well as Martha's Vineyard and Nantucket islands.

FAA Response: Noise concerns are outside the scope of 14 CFR part 77 and are not addressed in an aeronautical study.

Comment: Responder objected to the FAA's continued study of this project when, to his knowledge, there are no wind turbines currently being manufactured that meet the "Description of the Action" stated in the Minerals Management Service (MMS) Cape Wind Draft Environmental Impact Statement (DEIS).

FAA Response: An FAA aeronautical (airspace) study completed in accordance with 14 CFR Part 77 is a separate action to evaluate any impact on the navigable airspace, and not subject to requirements or statements in the MMS Cape Wind DEIS. Our analysis and subsequent determination(s) are based on the information provided in the notice of construction filed with the FAA. An FAA determination is valid for the height and location specified in a determination. Any changes in the height of the proposed structure require a new filing and aeronautical study.

Comment: Many responders objected to this proposed wind turbine project based on adverse effect to the safety and efficiency of aircraft operating in accordance with VFR stating a considerable number of operations that would be affected; compression of flight as aircraft moved from the lower altitude strata (500 -1000 ft. AGL/AMSL) to a higher altitude to avoid the turbines; and, issues with circumnavigation during the frequent periods of marginal VFR weather experienced in this area.

FAA Response: The FAA does not agree. In order for a proposed structure to have an adverse effect, it must first exceed a 14 CFR part 77 obstruction standards and/or be found to have a physical or electromagnetic radiation effect of the operations of air navigation facilities. The proposed wind turbines do not exceed any 14 CFR part 77 obstruction standards. The proposals would have a physical or electromagnetic radiation effect on the current operation of the Falmouth Air Route Surveillance (ASR-8) radar facility (FMH ASR) and this issue is addressed in the next comment/response. The effect on VFR aircraft operations are addressed later in this document.

Comment: Most responders objected to the proposed wind turbine project due to the adverse effect on the operation of air navigation facilities (specifically radar facilities) in the area. Some of the responders provided their own external analysis of radar impacts. This information was reviewed by the FAA's Technical Operations Division, which is responsible for the installation, maintenance, and operation of FAA air navigation facilities.

FAA Response:

There are three FAA radar sites that provide detection of aircraft for air traffic control within the Nantucket Sound area. These radar facilities are North Truro Cape (QEA), Nantucket (ACK), and Otis Air Force Base (FMH). QEA is Air Route Surveillance Radar (ARSR-4) digital/long range search radar with secondary radar. ACK is an ASR-9 (digital/terminal search radar) with digital secondary radar, and FHM is an ASR-8 (analog/terminal search radar) with analog secondary radar.

The FAA completed an extensive analysis of potential impacts to radar facilities that serve the subject area. Analysis indicated that the wind turbines may cause "unwanted search radar targets" to be displayed (i.e. clutter) on air traffic controller displays at the Cape TRACON and the intensity of the unwanted targets may inhibit search radar detection of real aircraft flying in the airspace above the wind turbines, especially in the case of the FMH ASR-8.

The wind turbines will only affect the search radar service (primary). There will be no noticeable effect on beacon (i.e. transponder) radar service as the proposed wind farm is not likely to affect detection of aircraft with an operational transponder. Although unlikely, detection of transponder equipped aircraft flying within 2 nautical miles (NM) behind the wind farm (as viewed from the radar site) and at an altitude of 600', or lower, may be reduced due to line-of-sight shielding. At 11 NM, it is highly unlikely that there will be any false targets due to reflections. Beam distortion caused by the wind turbines is also not likely.

Line-of-sight shielding is not an issue for primary surveillance radar (search) as the wind turbines will be a minimum of 9 nm from the nearest radar, and separated at a distance of 0.25 nm. Only targets below 800' and within 3 NM of the wind farm may potentially be affected by shadowing. However, at maximum range for either of the primary radars, the other radar will provide better coverage for areas impacted by the wind turbines.

Depending on wind patterns and due to raised thresholds that are a product of the dynamic geocensor map function, the probability of detection for the ACK ASR-9 system over the wind farm will decrease as a result of wind turbine clutter. This could result in a decrease in the beacon reinforcement rate over the wind farm, or result in primary target loss of aircraft without transponders. There could also be a minimal amount of clutter displayed. All ASR-9 sites have been upgraded with a 9PAC-II. Included in this upgrade is the dynamic geocensor which is very adept at suppressing clutter. Therefore, the adverse effect on the ACK ASR-9 system is not considered to be significant.

The radar system most vulnerable to the effects of the proposed wind turbine project is the FMH ASR-8. The analog ASR-8 has limited capabilities to resolve the effects of clutter caused by multiple wind turbines within a confined area. Although changes made within the ASR-8 can reduce clutter, these changes also adversely impact detection of aircraft.

The search radar located at FMH (ASR-8) will also be impacted by the cumulative effect of the wind turbines associated with this project. The cumulative effect of rotational blades is expected to reduce search radar detection for aircraft at all altitudes above the wind farm area. The unwanted clutter will be excessive for the ASR-8 over the wind farm and the ability to track non-transponder equipped aircraft over the wind farm will be impeded. In its current configuration, the FMH ASR-8 has no effective means of mitigating clutter created by wind farms.

Action will be necessary by the FAA to re-optimize one or more search radar system(s) to reduce the effects of unwanted targets caused by the wind turbines. Re-optimization to reduce the unwanted targets may result in radar service performance losses in the subject area, such that, the probability of search detection of real targets may be diminished. Additionally, in the case of the older search radar located at Falmouth (FMH ASR-8) it will be necessary to add additional equipment to reduce the unwanted effects if re-optimization does not mitigate the effects of the turbines or replace the existing radar system with a newer system, specifically an ASR-11.

Without action by the FAA to modify or enhance the two radar systems adversely affected by the proposed wind turbines, a hazard that affects search radar target detection will exist in the airspace above the wind turbine area.

Study disclosed that re-optimization is possible by adding a TDX-2000 modification on the FMH ASR-8 radar, which will resolve any unwanted target issues. In the unlikely event that the TDX-2000 modification is deemed unsatisfactory, an ASR-11 radar system would be required. The proponent has agreed to pay for the TDX-2000 modification to the FMH ASR-8 radar. The proponent also agreed to provide financial assurance by escrow or other financial means in the amount of $15,000,000 for a period of 24 months after 7460-2's are filed (based on substantiated, solid supporting evidence of an ASR-11 requirement) for the acquisition, siting, and installation of an ASR-11 system. With this agreement and the re-optimization/modification of the radar systems at ACK and FMH, the FAA believes that there will not be a significant adverse effect to radar service in Nantucket Sound.

Aeronautical study disclosed that the proposed structure would have no effect on any existing or proposed arrival, departure, or en route instrument flight rule (IFR) operations or procedures.

Study for possible visual flight rules (VFR) effect disclosed that the proposed structure would have no effect on any existing or proposed arrival or departure VFR operations or procedures. It would not conflict with airspace required to conduct normal VFR traffic pattern operations at the Cape Cod Coast Guard Air Station (FMH), Barnstable Municipal Airport-Boardman/Polando Field (HYA), Nantucket Memorial Airport (ACK), Martha's Vineyard (MVY), or any other known public use or military airports. FAA Order 7400.2G, Procedures for Handling Airspace Matters (the Order) provides criteria for evaluating the effect on VFR operations in Paragraph 6-3-8. Subparagraph (c) states that the area considered for en route VFR flight begins and ends outside the airport traffic pattern airspace area or Class B, C, and D airspace areas. The location of all wind turbines in this project would lie outside all traffic pattern airspace and outside Class B, C, and D airspace. Therefore, they meet the criteria for and are appropriately considered to be in the area of en route operations.

While it is recognized that some aircraft operating under visual flight rules (VFR) may have to alter their altitude or route of flight FAA Order 7400.2G, Paragraph 6-3-8(c)(1) states that a structure would have an adverse effect upon VFR en route air navigation if its height is greater than 500 ft. above the surface at its site and within 2 statute miles of any regularly used VFR route. The Cape Wind project is within 2 statute miles of a regularly used VFR route. However, the requested height for these structures is not greater than 500 ft. above the surface at their site. The requested height is 440 ft. AGL/AMSL. Therefore, according to the FAA Order 7400.2G, the wind turbines at their proposed location and height do not meet the criteria to have an adverse effect on VFR en route operations. At 440 ft. AGL/AMSL, the proposed structure(s) cannot be considered to have a substantial adverse effect on VFR en route flight operations.

The proposed structures would be appropriately marked and/or lighted to make them conspicuous to airmen should circumnavigation be necessary.

The cumulative impact of the proposed structure, when combined with other proposed and existing structures, is not considered to be significant. Study did not disclose any adverse effect on existing or proposed public-use or military airports or navigational facilities, nor would the proposal affect the capacity of any known existing or planned public-use or military airport.

Therefore, it is determined that the proposed construction would not have a substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on any air navigation facility and would not be a hazard to air navigation provided the conditions set forth within this determination are met.

Additional Conditions

1) In addition to the 10 day prior notice specified earlier in this determination, the proponent for this project shall also notify this office at least 90 days prior to the start of construction to ensure aeronautical charts are updated to reflect this area as now being under construction. It is imperative that the proponent ensures that this information has been received and acted upon. This requires the proponent to speak directly with the current FAA Obstruction Evaluation Service (OES) specialist responsible for the Cape Wind project or his/her supervisor. This information can be obtained from our website at http://oeaaa.faa.gov

DO NOT LEAVE A VOICE OR ELECTRONIC MESSAGE. PERSONAL CONTACT IS REQUIRED.

2) No construction may begin on any of the wind turbines within this project (structures studied and determined under ASN 2009-WTE-332-OE through 2009-WTE-461-OE) until the following actions have been completed:

a) The proponent has signed a reimbursable agreement with the FAA to cover the cost and installation of a TDX-2000 modification to the FMH ASR-8 radar.

b) Extensive study supports the TDX-2000 as a viable solution to the projected radar interference issue. However, to ensure acceptable radar coverage in the area, the proponent shall established financial assurance by escrow or other financial instrument in the amount of $15,000,000 for a period of 24 months after 7460-2's are filed (based on substantiated, solid supporting evidence of an ASR-11 requirement) for the acquisition, siting, and installation of an ASR-11 system in the event the TDX-2000 modification to the current FMH ASR-8 does not fully mitigate the radar interference/clutter issues.

3) The proponent shall work directly with the FAA during the construction period to ensure adequate temporary obstruction marking and lighting is in place to protect aviation until such time as all wind turbines are built and the final obstruction marking and lighting scheme is completed and operational.

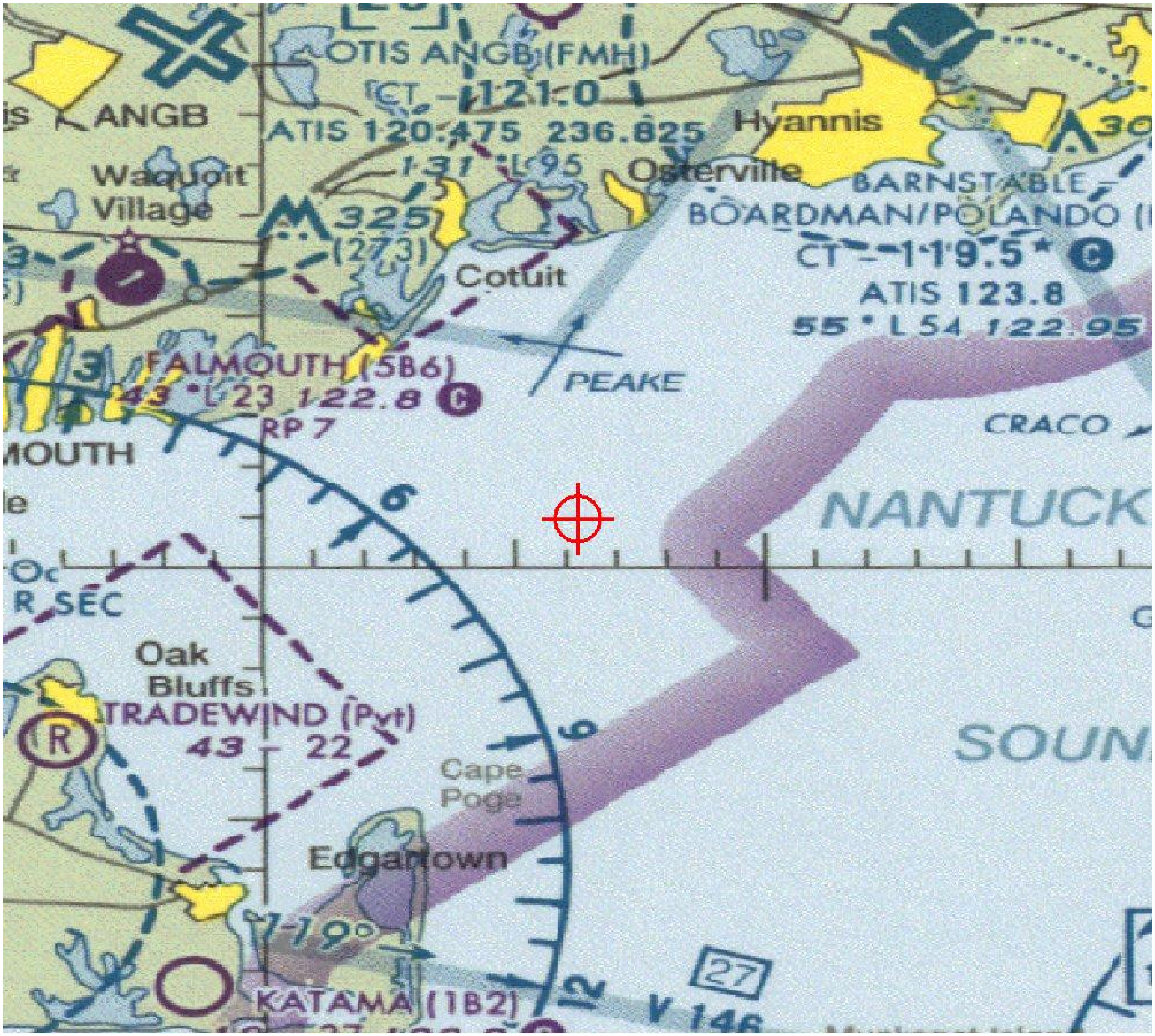
4) Obstruction lighting systems on all wind turbines for which obstruction lighting is recommended shall be synchronized (specifically the red lights) to flash at the same time.

NOTE: THE SEPARATE DETERMINATIONS FOR ALL CASES ASSOCIATED WITH THE CAPE WIND PROJECT MAY BE IMMEDIATELY OBTAINED, AS THEY ARE COMPLETED, FROM OUR WEBSITE AT:

http://oeaaa.faa.gov

SEARCH USING THE INDIVIDUAL AERONAUTICAL STUDY NUMBER (2009-WTE-332 through 461-OE).

Sectional Map for ASN 2009-WTE-332-OE



H-2 FAA CW Affirmation of Determination

U.S. Department
of Transportation
**Federal Aviation
Administration**

System Operations Services
800 Independence Avenue, SW.
Washington, DC 20591

AUG 5 2010

Mr. Craig Olmsted
Vice President
Cape Wind Associates LLC
75 Arlington Street, Suite 704
Boston, MA 02116

Dear Mr. Olmsted:

Determination of No Hazard to Air Navigation
Aeronautical Study Number: 2009-WTE-332-OE through 2009-WTE-461-OE
Obstruction Evaluation Case Number: 10-AW-OE-10
Wind Turbines – Nantucket Sound, Massachusetts

We have completed our examination of the petition for discretionary review of the subject aeronautical studies that concern several proposed wind turbines located in Nantucket Sound, Massachusetts. The enclosed copy of the affirmation of the Determination of No Hazard to Air Navigation is self-explanatory.

The determination is now final and will expire on FEB 4 2012.

If you have any questions regarding this matter, please contact Mrs. Ellen Crum at (202) 267 8783

Sincerely,

Edith V. Parish
Manager, Airspace & Rules Group
Air Traffic Organization

Enclosure

AUG 4 2010

DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION

Obstruction Evaluation Case Number 10-AWA-OE-10

Aeronautical Study Number's 2009-WTE-332-OE through 2009-WTE-461-OE

Wind Turbines – Nantucket Sound, Massachusetts

NOTICE OF DENIAL OF REQUEST FOR DISCRETIONARY REVIEW OF DETERMINATION OF NO HAZARD TO AIR NAVIGATION

On May 17, 2010, the Federal Aviation Administration's Obstruction Evaluation Services (OES) Team issued Determinations of No Hazard to Air Navigation under Aeronautical Study numbers 2009-WTE-332-OE through 2009-WTE-461-OE, in response to a proposal for a wind turbine farm (turbines). The wind farm, comprised of 130 turbines, would be located offshore in Nantucket Sound, south of Hyannis, Massachusetts (MA), at a height of 440 feet (ft.) above ground level (AGL), 440 ft. above mean sea level (MSL). The proposed turbines do not exceed obstruction standards as contained in Title 14 Code of Federal Regulations (14 CFR) part 77, but were found to adversely impact air navigation facilities (radar).

The FAA received four valid petitions for discretionary review of the subject determinations. The petitioners include the town of Barnstable, MA, (owner and operator of Barnstable Municipal Airport), Save the Sound Alliance, a local government official, and a regional airline (hereinafter referred to as the petitioner(s)). The petitioners do not agree with the FAA's issued determinations, and submitted many documents in support of their position. For the purpose of determining whether or not to grant discretionary review, we looked specifically at two issues raised by all four petitioners: (1) the impact of the wind turbines to aircraft operating under visual flight rules (VFR), and (2) the impact of the turbines to the air traffic radar system.

The petitioners allege the determinations are in error because the FAA did not properly consider the impact of the proposed turbines to aircraft operating under VFR. We do not agree. The regulations pertaining to obstructions in the National Airspace System (NAS) are contained in 14 CFR Part 77, Objects Affecting the Navigable Airspace. In accordance with section 77.23 (a)(1), Standards for determining obstructions, an object is considered to be an obstruction if it is greater than 500 ft. AGL at the site. Since these turbines do not exceed 500 ft. AGL, based on height alone, they do not exceed obstruction standards, thus cannot be considered as a hazard to air navigation.

In spite of the above, we would like to respond to the petitioners concerns about the impact to VFR operations. The guidelines and procedures for the conduct of aeronautical studies are contained in FAA Order (FAAO) 7400.2, Procedures for Handling Airspace Matters. Paragraph 6-3-8, Evaluating Effect on VFR operations, discusses standards for consideration in determining a structure's impact on VFR operations. If built, the turbines would be located outside the protected airspace for adjacent airport traffic patterns and over open water at a proposed altitude of 440 ft. AGL. Per this paragraph, a proposed structure would have an adverse effect upon VFR navigation if it is greater than 500 ft. AGL, and is within 2 miles of any regularly used VFR route (VFR routes are considered in this paragraph to be rivers, roads, coastlines, railroads, or similar landmarks). Since these proposed turbines would not exceed 500 ft. AGL, and are not located along a VFR route, they do not meet the criteria for an obstruction and are not considered to have an adverse effect to VFR operations. We agree with the OES Team conclusion that these proposed structures do not have an adverse impact to VFR operations in the NAS.

The petitioners also allege the proposed structures, when built, would impair the operation of existing radar facilities, and do not believe the FAA's proposed mitigation is sufficient. We do not agree. During the course of the aeronautical study, the FAA conducted extensive research about the impact of these turbines to three radar systems and concluded these turbines would have an adverse impact. The determinations detail the effects to the radar systems and offer several actions to mitigate the impact. During this examination, we looked at the available data, the aeronautical studies, and the petitions, and concluded the proposed mitigation for the anticipated impacts to the radar systems is sound and reasonable. We support the findings contained in the issued determinations.

In conclusion, we find the OES Team followed all the current procedures in making the subject determinations. The petition fails to provide any new facts or information that would change the basis on which the determinations were made. So, your request for discretionary review is denied, and the above referenced Determination of No Hazard to Air Navigation is final, and will expire on FEB 4 2012

Issued in Washington, DC on

Elizabeth L. Ray
Director of Systems Operations Airspace and Aeronautical Information Management
Air Traffic Organization

H-3 EPA Draft Air Permit

United States Environmental Protection Agency New England

Outer Continental Shelf Air Permit

issued to

Cape Wind Associates, LLC

for the

Cape Wind Energy Project
Offshore Renewable Wind Energy Project

Horseshoe Shoal in Nantucket Sound

EPA Permit Number
OCS-R1-01

Pursuant to the provisions of Section 328 of the Clean Air Act (CAA) and the Code of Federal Regulations (C.F.R.) Title 40, Part 55, the United States Environmental Protection Agency-New England (EPA) is proposing to issue an Outer Continental Shelf (OCS) air quality permit to Cape Wind Associates, LLC (Cape Wind). Cape Wind proposes to construct and operate 130 wind turbine generators (WTGs) and other supporting equipment (The Project) in a grid pattern on or near the Horseshoe Shoal in Nantucket Sound off the coast of Massachusetts.

The design, construction and operation of the Project shall be subject to the attached permit conditions and permit limitations. This permit shall be effective 30 days after the date of signature unless (1) review is requested on the permit under 40 C.F.R. § 124.19, in which case the permit shall be effective when provided by 40 C.F.R. § 124.19(f), or (2) no comments requesting a change in the draft permit are received, in which case the permit shall be effective immediately upon signature. The permit shall remain in effect until it is surrendered to EPA. This permit becomes invalid if Cape Wind does not commence construction within 18 months after the permit's effective date. EPA may extend the 18-month period upon a satisfactory showing that an extension is justified. This permit does not relieve the Cape Wind from the obligation to comply with applicable state and federal air pollution control rules and regulations.

H. Curtis Spalding
Regional Administrator

1/7/2011
Date of signature

Acronyms and Abbreviations

Cape Wind	Cape Wind Associates, LLC
C.F.R.	Code of Federal Regulations
CI	Compression Ignition
CO	Carbon Monoxide
EPA	Environmental Protection Agency
ESA	Endangered Species Act
g/hp-hr	Grams per horsepower-hour
g/kw-hr	Grams per kilowatt-hour
kW	Kilowatt
NMHC	Non-methane hydrocarbons
NOx	Nitrogen Oxides
OCS	Outer Continental Shelf
PM	Particulate matter
The Project	Wind turbines and supporting equipment
WTG	Wind Turbine Generator

Environmental Protection Agency - New England

Outer Continental Shelf Air Permit

Cape Wind Energy Associates, LLC
Cape Wind Energy Project

Permit Terms and Conditions

I. Background for informational purposes

On December 17, 2008, Cape Wind filed an OCS air permit application with EPA. Cape Wind proposes to install and operate 130 WTGs and other supporting equipment (The Project) in a grid pattern on or near the Horseshoe Shoal in Nantucket Sound. This air permit approves Cape Wind's application and regulates the pollutants emitted from the preconstruction, construction and operation activities of the proposed wind energy facility.

For air permitting purposes, the Project is divided into three sections that closely track the life cycle or phases of the Cape Wind project. Phase 1 includes site preparation and construction of the Project; Phase 2 includes operations, maintenance and repair of the Project; and Phase 3 includes decommissioning and removal of the project. This permit includes emissions and operational requirements applicable to Phases 1 and 2. All permit requirements apply during both Phase 1 and Phase 2 except where specifically provided otherwise. EPA is not including the requirements for Phase 3 at this time.

This permit organization is different from most air permits. Typically, state and federal air regulations define emissions that result from the construction and decommissioning of a new source as "secondary emissions" that are not regulated under the air permit. However, the definition of "OCS source" in section 328 of the Clean Air Act and 40 Part C.F.R. Part 55 is broader in scope than EPA's regulations for land-based stationary sources. The OCS source definition requires EPA to include emissions from certain on-site construction equipment in the air permit. The OCS regulations also require EPA to include pollutants emitted from vessels that service Cape Wind in the "potential emissions" of Cape Wind.

II. Definitions

The following definitions shall be used for the purposes of this permit only. Terms not otherwise defined in this permit have the meaning assigned to them in the referenced Clean Air Act provisions and EPA regulations (including the Massachusetts regulations incorporated by reference into 40 C.F.R. Part 55).

The owner/operator includes Cape Wind Associates, LLC; its successor(s) in operating the permitted project; its contractors; and any agents or parties acting on its behalf that conduct activities regulated by this permit, including but not limited to vessel, barge, and equipment operators.

Vessel has its normal meaning under the Clean Air Act, and specifically includes both (1) self-propelled vessels and (2) barges or other non-self-propelled vessels that must be towed by another vessel. It includes vessels with or without jacking systems.

Jack-up Unit means a vessel (whether self-propelled or not) that includes legs and a lifting system that enables the vessel to lower its legs into the seabed and elevate its hull to provide a stable work deck. Such a vessel is considered a Jack-up Unit at all times, including when it is not attached to the seabed.

Non-stationary Engine means any engine, including but not limited to a vessel propulsion engine, that (1) is not engaged or participating in an OCS Activity, and (2) is on a vessel that (a) is not itself an OCS Source, but (b) is physically attached to an OCS Source. While a vessel is physically attached to an OCS Source, all of its operating engines (including propulsion engines) that are *not* participating in the OCS Source's OCS Activities are considered Non-stationary Engines.

Non-stationary Engine Emissions means all emissions from Non-stationary Engines during a given period of time.

OCS Attachment means the moment when at least three legs from a Jack-up Unit have attached to the seafloor.

OCS Detachment means the moment when a Jack-up Unit has retracted enough of its legs so that fewer than three legs remain attached to the seafloor.

OCS Activity means activity relating to the construction, operation or maintenance or any other pollutant-emitting activity conducted by a vessel, or equipment on a vessel, from the time of the vessel's OCS Attachment to the time of the vessel's OCS Detachment.

OCS Source means any equipment, activity, or facility, including vessels, that emits or has the potential to emit any air pollutant and is or will be used to conduct an OCS Activity as part of the permitted project. A vessel or equipment on a vessel becomes an OCS Source each time the vessel completes an OCS Attachment, and ceases to be an OCS Source each time the vessel completes an OCS Detachment.

OCS Source Emissions means the emissions from any OCS Source during an OCS Source Period.

OCS Source Period means each period of time from when a vessel completes an OCS Attachment to when the vessel completes an OCS Detachment.

OCS Stationary Engine means (1) any engine on an OCS Source that operates during an OCS Source Period, and (2) any engine that (a) is on a vessel that (i) is not itself an OCS Source but (ii) is physically attached to an OCS Source, and (b) is engaged or participating in the OCS Source's OCS Activity during an OCS Source Period.

OCS Vessel Transit Emissions means all emissions from a given vessel in transit within the Project Area.

Phase 1 Start Date means the date of the first occasion on which any vessel or barge associated with the project performs an OCS Attachment.

Phase 1 End Date means the last day of the calendar month that is 36 months after the Phase 1 start date, unless extended by EPA as described in Section XI.A.

Phase 1 means all project activities (including but not limited to site preparation, preconstruction and construction) from the Phase 1 Start Date to the Phase 1 End Date.

Phase 2 Start Date means the first day of the calendar month following the Phase 1 End Date.

Phase 2 means all project activities (including but not limited to the normal operation and maintenance of the wind farm, and repair activities requiring OCS Attachments) from the Phase 2 Start Date and thereafter.

Project Area means the area within 25 miles of the WTGs as shown in Figure 1-1 of the December 17, 2008 application.

Total OCS Emissions means the sum of OCS Source Emissions, OCS Vessel Transit Emissions, and Non-stationary Engine Emissions for all OCS Sources and vessels in the Project Area.

Transit means, for a vessel, both (1) actual movement within the Project Area, and (2) periods when the vessel is idling within the Project Area and is neither an OCS Source nor physically attached to an OCS Source.

Vessel Engine means any engine (including but not limited to propulsion engines) on a vessel that is (1) within the Project Area, (2) not an OCS Source, and (3) not physically attached to an OCS Source.

III. Emission Standards - Phase 1 and Phase 2

The emissions standards of Section III apply to each OCS Stationary Engine, during each OCS Source Period.

A. The owner/operator shall ensure that any OCS Stationary Engine with a maximum power output at or below 560 kilowatts (kW) on any OCS Source has been certified by the manufacturer(s) to meet or surpass the following emission standards required for 40 C.F.R. Part 89, Tier 3 engines:

Nitrogen oxides (NOx) + non-methane hydrocarbons (NMHC):	4.0 grams/kilowatt-hour (g/kW-hr)
Particulate Matter (PM):	0.2 g/kW-hr
Carbon monoxide (CO):	3.5 g/kw-hr

B. The owner/operator shall ensure that any OCS Stationary Engine with a maximum power output greater than 560 kW on any OCS Source has been certified by the manufacturer(s) to meet or surpass the following emission standards required for 40 C.F.R. Part 89, Tier 2 engines:

NOx + NMHC:	6.4 g/KW-hr
PM:	0.2 g/kW-hr
CO:	3.5 g/KW-hr

C. The owner/operator shall ensure that any OCS Stationary Engine has been certified by the manufacturer to meet or surpass the following exhaust opacity standards:

1. 20 percent during the acceleration mode,
2. 15 percent during the lugging mode, and
3. 50 percent during the peaks in either the acceleration or lugging modes.

D. The owner/operator shall ensure that the emissions from any OCS Stationary Engine do not exceed the following smoke and opacity standards:

1. Smoke that has a shade, density, or appearance equal to or greater than No. 1 of the Ringelmann Scale shall not be emitted for more than a total of six minutes during any hour.

2. During the six minute period referred to in Section III.D.1, smoke with a shade, density, or appearance equal to or greater than No. 2 of the Ringelmann Scale shall not be emitted at any time.

3. Visible emissions (not including uncombined water or smoke) in excess of 20% opacity shall not be emitted for more than a total of two minutes during any hour.

4. During the two minute period referred to in Section III.D.3, visible emissions (not including uncombined water or smoke) with an opacity exceeding 40% shall not be emitted at any time.

E. The owner/operator shall ensure that any naturally-aspirated OCS Stationary Engine has been certified by the manufacturer not to discharge crankcase emissions into the ambient atmosphere, unless such crankcase emissions are permanently routed into the exhaust and included in all exhaust emission measurements. This provision does not apply to engines using turbochargers, pumps, blowers, or superchargers for air induction.

F. If the owner/operator uses any compression ignition (CI) OCS Stationary Engine(s) with an actual model year of 2011 or later, the owner/operator shall meet all of the requirements applicable to owners and operators of stationary CI engines specified in the then-applicable subpart of 40 C.F.R. Part 60 that apply to the actual model year of the engine(s) used. This provision does not require that the owner/operator use CI engines of a model year later than 2011, but only that, if the owner/operator does in fact use such engine(s), the owner/operator shall comply with the then-applicable owner/operator provisions of 40 C.F.R. Part 60 applicable to such engine(s).

IV. Operational Conditions

A. For each OCS Stationary Engine, the owner/operator shall use only ultra-low sulfur fuel oil with a sulfur content that does not exceed 0.0015% by weight.

B. From the Phase 1 Start Date to the Phase 1 End Date, the Total OCS Emissions of NOx shall not exceed 226 tons.

C. From the Phase 2 Start Date and continuing thereafter, Total OCS Emissions of NO_X shall not exceed 49 tons per year in any rolling 12-month period.

D. For each OCS Stationary Engine, the owner/operator shall:

1. Ensure that the engine is installed and configured according to the manufacturer's specifications.
2. Operate and maintain the engine and control device(s) according to the manufacturer's written instructions or procedures developed by the owner or operator that are approved by the engine manufacturer.
3. Only change those settings that are permitted by the manufacturer.
4. Install and operate a non-resettable clock.
5. Comply with those General Requirements of 40 C.F.R. Part 60 that are specifically listed in Table 8 to subpart IIII of Part 60.
6. Comply with the requirements of 40 C.F.R. Parts 60, 89, 94 and/or 1068 that apply to owners or operators of engines regulated under those parts.

E. The owner/operator shall not operate any vessel propulsion engine on any OCS Source from the OCS Source's OCS Attachment until its OCS Detachment.

V. Monitoring Requirements

A. The owner/operator shall monitor the hours of operation (to the nearest tenth of an hour) of each OCS Stationary Engine on any OCS Source during each OCS Source Period.

B. The owner/operator shall monitor the hours of operation (to the nearest tenth of an hour) of each OCS Vessel while the vessel is in transit within the Project Area.

C. The owner/operator shall monitor the hours of operation (to the nearest tenth of an hour) of each Non-stationary Engine.

D. The owner/operator shall monitor the sulfur content of all fuel used in any OCS stationary engine by obtaining fuel certifications from the fuel supplier.

VI. Testing Requirements

Upon request by EPA, the owner/operator shall conduct a 40 C.F.R. Part 60, Appendix A: Method 9 opacity test on any engine that is or may be subject to Section III.D.1.

VII. Phase 1 Offset Requirements

A. The owner/operator shall obtain a minimum of 285 tons of discrete NOx emission reductions to offset the NOx emissions from Phase 1.

B. The owner/operator shall obtain only emission reduction credits that are certified under the Massachusetts trading bank codified under 310 CMR 7.00 Appendix B, "Emissions Banking, Trading and Averaging," and which comply with all applicable provisions of 310 CMR 7.00 Appendices A and B, including but not limited to the geographic requirements of Appendix A(6)(b) and the seasonal requirements of Appendix A(6)(j).

C. No later than 30 days before the Phase 1 Start Date, the owner/operator shall submit a report to EPA documenting that it has obtained 285 tons of discrete NOx emissions reduction credits as described in Section VII.A-B above, and that these reductions have actually occurred as of 30 days before the Phase 1 Start Date.

D. The owner/operator shall not conduct any OCS Activities until it obtains the required emissions reduction credits as described in Section VII.A-C above.

VIII. Record Keeping Requirements

A. The owner/operator will maintain records of the following:

1. Make and model of each OCS Stationary Engine used for OCS Activities

during Phase 1 and Phase 2 of the project.

2. Initial date each OCS Stationary Engine was used on the project.

3. Manufacturing date of each OCS Stationary Engine used on the project.

4. Manufacturer's information that shows all OCS Stationary Engines comply with all 40 C.F.R. Part 60 emission standards.

5. Emission rate of each pollutant regulated under 40 C.F.R. Part 60, Subpart IIII for each OCS Stationary Engine, in grams per kilowatt-hour.

6. Maximum rated power output for each engine (including OCS Stationary Engines, Non-stationary Engines, and Vessel Engines) in kW.

7. Phase 1 Start Date, Phase 1 End Date, and Phase 2 Start Date.

8. Fuel records that show the sulfur content of all fuel used by the OCS Stationary Engines (i.e., certifications provided by fuel supplier).

9. All notifications submitted to comply with 40 C.F.R. Part 60, Subpart IIII and all documentation supporting any notification.

10. All maintenance conducted on each OCS Stationary Engine (including but not limited to oil changes, compression checks, tune ups, timing changes, etc.).

11. Documentation showing that each OCS Stationary Engine is certified to meet the 40 C.F.R. Part 89, Tier 2 or Tier 3 emission standards, whichever is applicable.

12. Hours of operation of each engine (including OCS Stationary Engines, Non-stationary Engines, and Vessel Engines) within the Project Area.

13. For any Non-stationary or Vessel Engine that does not match the power specifications of any engine in Attachment 1 or 2 (as provided by Section VIII.B footnotes 1 and 2 of this permit), the engine's maximum nameplate power output and maximum emission rate as provided by the engine manufacturer.

B. The owner/operator shall calculate and record the OCS Source Emissions, OCS Vessel Transit Emissions, Non-stationary Engine Emissions and Total OCS Emissions of NOx (monthly and 12-month rolling average) as follows:

OCS Source Emissions of NOx = H * P * NER / GT
H = Hours of operation (from Section V.A)
P = Maximum engine power (from Section VIII.A.6)

NER = NMHC + NOx emission rate from Section III.A or B as appropriate
GT = 907,185 grams per short ton

Non-stationary Engine Emissions of NOx = H * P * NER / GT
H = Hours of operation (from Section V.C)
P = Maximum engine power (from Footnote 1.)
NER = NMHC + NOx emission rate (from Footnote 1.)
GT = 907,185 grams per short ton

OCS Vessel Transit Emissions of NOx = Ht * P * LF * NER / GT
Ht = Hours of operation in transit in the Project Area (from Section V.B)
P = Maximum power of Vessel Engine (from Footnote 2.)
LF = assumed engine load factor (from Footnote 2.)
NER = NMHC + NOx emission rate for Vessel Engine in transit (from Footnote 2.)
GT = 907,185 grams per short ton

Total OCS Emissions of NOx = sum of OCS Emissions for all OCS Sources + sum of OCS Vessel Transit Emissions for all vessels in transit in the Project Area + sum of Non-stationary Engine Emissions for all Non-stationary Engines.

Footnote 1. The owner/operator shall obtain the power output and emission rates for the Non-stationary Engines from Attachment 1 to this permit (the June 4, 2010 letter from the ESS Group, Inc. to David Conroy entitled "Outer Continental Shelf Air Regulation Permit Application: Cape Wind Energy Project"), Appendices, Tables entitled "Cape Wind Energy Project: Preconstruction Emissions Inside 25 miles." If the owner/operator uses a Non-stationary Engine that does not match the power specifications of any engine in Attachment 1, then for that engine the owner/operator shall use (1) the maximum nameplate power output, (2) a load factor of 1.0, and (3) the maximum emission rates provided by the engine manufacturer.

Footnote 2. The owner/operator shall obtain the power output, engine load factors, and emission rates for the Vessel Engines from Attachment 2 to this permit (the September 23, 2009 letter from the ESS Group, Inc. to David Conroy entitled "Revised Emissions Estimates: Outer Continental Shelf Air Regulation Permit Application: Cape Wind Energy Project: Preconstruction Emissions Inside 25 Miles"). If the owner/operator uses a Vessel Engine that does not match the power specifications of any engine in Attachment 2, then for that engine the owner/operator shall use (1) the maximum nameplate power output, (2) a load factor of 1.0, and (3) the maximum emission rates provided by the engine manufacturer.

C. The owner/operator shall record the date and time of each OCS Attachment and each OCS Detachment for each vessel and each OCS Stationary Engine.

D. The owner/operator shall maintain all of the above records for five years and shall, upon request by EPA, supply any of the above records.

IX. Reporting and Notification Requirements

A. For equipment installed with OCS Stationary Engines greater than 2,237 kW, the owner/operator shall, no later than 30 days before the Phase 1 Start Date, submit an initial notification including the following information:

1. Name and address of the owner or operator;

2. The address of the affected source;

3. Engine information including make, model, engine family, serial number, model year, maximum engine power, and engine displacement; and

4. Emission control equipment.

B. The owner/operator shall submit all notifications and reports required by this permit to the address listed in Section XVI below.

C. The owner/operator shall submit to EPA New England semi-annual reports postmarked by January 30th and July 30th of each year. Each semi-annual report shall contain a spreadsheet of all records required under Section VIII, and records of (1) all emission limit or other permit condition violations, (2) all equipment failures or malfunctions, and (3) all corrective actions.

D. The owner/operator shall notify EPA at least 24 months before initiating any decommissioning activities, and seek an applicability determination or revised permit for decommissioning activities at that time, based on then-applicable emissions estimates and regulatory requirements.

X. General Requirements

A. The owner/operator shall display a copy of this permit on each Jack-up Unit, in a reasonably accessible location as near to the subject equipment as is practical.

B. After the occurrence of any violation of any emission limitation or condition contained herein, the owner/operator must notify EPA New England, Office of Environmental Stewardship, attention Compliance and Enforcement Chief, by FAX at (617) 918-1810 within two business days, and subsequently in writing to the address listed in Section XVI below within seven calendar days.

XI. Special Conditions

A. Phase 1 Extension: The owner/operator may request an extension of the Phase 1 End Date. The owner/operator must submit any such request no later than 18 months after the Phase 1 Start Date, and in that request, demonstrate the following:

1. The owner/operator has complied with all Phase 1 permit requirements;
2. For good cause, the owner/operator requires limited additional operation under the permit conditions applicable to Phase 1, rather than Phase 2;
3. The owner/operator can continue to comply with all Phase 1 permit requirements (including the obligation to possess adequate emissions offsets) during the additional period under Phase 1;
4. All requirements applicable to the project outside of this permit will continue to be satisfied during the extension.

EPA will review the owner/operator's request and any other relevant information to determine whether the request satisfies the requirements of Section XI.A.1-4; is reasonable in light of the information in the request and all other relevant circumstances; and is consistent with the CAA, its implementing regulations, and the requirements of this permit (including but not limited to monitoring, recordkeeping and reporting requirements). If EPA determines that the owner/operator's request satisfies the preceding requirements, then EPA will, by letter, extend the Phase 1 End Date. All Phase 1 permit requirements, including Section IV.B, will continue to apply until the extended Phase 1 End Date.

B. Endangered Species Act: If at any time during the life of the Project, either the United States Fish and Wildlife Service or the National Marine Fisheries Service, or a successor agency, request that Endangered Species Act (ESA) consultation be re-initiated, withdraws an Incidental Take Statement, or determines that the requirements of the ESA are not being satisfied, the owner/operator shall notify EPA within five (5) calendar days of its receipt of such request, withdrawal; or determination.

C. Prevention & Abatement of Air Pollution Episodes & Emergencies

1. No later than 180 days before the Phase 1 Start Date, the owner/operator shall submit to EPA a Standby Emission Reduction Plan (ERP) that the owner/operator would implement to reduce air contaminants if the Massachusetts Department of Environmental Protection declares an Air Pollution Episode under 310 C.M.R. 8.00 during Phase 1. The plan shall identify the sources of air contaminants, the approximate amount of reduction of contaminants, and a brief description of the manner in which the reduction will be achieved. If EPA determines that the ERP is inadequate, EPA will disapprove the plan, give the reasons for disapproval, and require resubmittal of an amended plan in a reasonable period of time as determined by EPA.

2. If an Air Pollution Episode is declared during Phase 1, the owner/operator shall implement the standby ERP.

3. If, pursuant to 310 C.M.R. 8.05, the Massachusetts Department of Environmental Protection declares an Air Pollution Episode Alert, Air Pollution Episode Warning, or Air Pollution Episode Emergency for particulate matter and/or sulfur dioxide, then the owner/operator shall stop all construction activities that generate air pollutants until the Department terminates the Alert, Warning, or Emergency.

4. If, pursuant to 310 C.M.R. 8.15, the Massachusetts Department of Environmental Protection declares an Air Pollution Incident Emergency and issues orders to construction projects and/or vessels in southeastern Massachusetts, then the owner/operator shall comply with such order.

XII. Right of Entry

A. The owner/operator shall allow all authorized representatives of EPA, upon presentation of credentials, to enter upon or through the facility where records required under this permit are kept. The owner/operator shall allow such authorized representatives, at reasonable times:

1. To access and copy any records that must be kept under this permit;

2. To inspect any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under this permit; and

3. To monitor substances or parameters for the purpose of assuring compliance with this permit.

B. The owner/operator shall provide transportation for EPA inspectors by appointment, when requested by EPA, from a coastal port location to, and from, any vessel engaged in OCS activities, and shall, no later than 30 days after any such transportation, provide EPA with an invoice reflecting the reasonable transportation cost involved in transporting the EPA inspector(s).

XIII. Transfer of Ownership

In the event of any changes in control or ownership of the project, this permit shall be binding on all subsequent owners and operators. The owner/operator shall notify the succeeding owner and operator of the existence of this permit and its conditions no later than the effective date of the change of control or ownership. Notification shall be by letter with a simultaneous copy forwarded to the EPA.

XIV. Severability

The provisions of this permit are severable, and if any provision of the permit is held invalid, the remainder of this permit will not be affected thereby.

XV. Other Applicable Regulations

The owner/operator shall construct and operate the Cape Wind facility in compliance with all other applicable provisions of federal regulations and state regulations that are applicable under 40 C.F.R. Part 55.

XVI. Agency Addresses

All correspondence required by this permit shall be forwarded to:
Air Compliance Clerk
U.S. EPA New England
5 Post Office Square, Suite 100
Boston, MA 02109-3912

XVII. Attachments

Attachment 1: June 4, 2010 letter from the ESS Group, Inc. to David Conroy entitled "Outer Continental Shelf Air Regulation Permit Application: Cape Wind Energy Project."

Attachment 2: September 23, 2009 letter from the ESS Group, Inc. to David Conroy entitled "Revised Emissions Estimates: Outer Continental Shelf Air Regulation Permit Application: Cape Wind Energy Project: Preconstruction Emissions Inside 25 Miles."

H-4 MA CZM Consistency Certificate CW MMS Action

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
OFFICE OF COASTAL ZONE MANAGEMENT
251 Causeway Street, Suite 800, Boston, MA 02114-2136
(617) 626-1200 FAX: (617) 626-1240

January 23, 2009

Terry L. Orr
ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, MA 02482

Re: CZM Federal Consistency Review of Cape Wind Energy Project – Minerals Management Service Action; Nantucket.

Dear Mr. Orr:

The Massachusetts Office of Coastal Zone Management (CZM) has completed its review of the proposed project to build, operate, and eventually decommission an electric generation facility consisting of 130 wind turbine generators arranged in a grid pattern in the Horseshoe Shoals region of Nantucket Sound off the coast of Massachusetts. The project is designed to generate a maximum electric output of 454 megawatts and an average output of 182.6 megawatts of renewable wind-generated energy that will be transmitted and distributed to the New England regional power grid, including Cape Cod and the islands of Nantucket and Martha's Vineyard.

To inform our federal consistency review, CZM reviewed the Environmental Notification Form (ENF), Notice of Project Change (NPC), Draft Environmental Impact Report (DEIR), and Final Environmental Impact Report (FEIR) developed pursuant to the Massachusetts Environmental Policy Act; two Draft Environmental Impact Statements (DEIS) and a Final Environmental Impact Statement developed pursuant to the National Environmental Policy Act; and, pursuant to the Coastal Zone Management Act, your federal consistency certification, applicable state permits/licenses, and lease/easement/right-of-way application to the Minerals Management Service under the Outer Continental Shelf Lands Act. Over the course of the state and federal review process, CZM has received all of the data and information necessary to make a consistency determination.

Based on our review, all aspects of the project, including those project elements located in federal waters, and the project's effects on resources and uses in the Massachusetts coastal zone, we concur with your certification that the activity as proposed is consistent with the CZM enforceable program policies.

If the above-referenced project is modified in any manner, including any changes resulting from permit, license or certification revisions, including those ensuing from an appeal, or the project is noted to be having effects on coastal resources or uses that are different than originally proposed, it is incumbent upon the proponent to notify CZM and submit an explanation of the nature of the change pursuant to 15 CFR 930. CZM will use this information to determine if further federal consistency review is required.

Thank you for your cooperation with CZM.

Sincerely,

Deerin Babb-Brott
Director

czm #5059

Cc:
Craig Olmsted, Cape Wind Associates LLC
Rachel Pachter, ESS Group Inc.
James F. Bennett, Minerals Management Service, US Department of the Interior
Dr. Rodney E. Cluck, Minerals Management Service, US Department of the Interior
Karen Kirk Adams, US Army Corps of Engineers
Robert Varney, US Environmental Protection Agency
Tim Timmermann, US Environmental Protection Agency
Michael Bartlett, US Fish & Wildlife Service
Vern Lang, US Fish & Wildlife Service
Ken Kimmell, MA Executive Office of Energy and Environmental Affairs
Laurie Burt, MA Department of Environmental Protection
Phil Weinberg, MA Department of Environmental Protection
Ben Lynch, MA Department of Environmental Protection
Elizabeth Kouloheras, MA Department of Environmental Protection
Mary Griffin, MA Department of Fish and Game
Rich Lehan, MA Department of Fish and Game
Paul Diodati, MA Division of Marine Fisheries
Jollette Westbrook, Energy Facilities Siting Board
Town of Yarmouth Conservation Commission
Town of Barnstable Conservation Commission
Cape Cod Commission

H-5 MA CZM Consistency Certificate CW USACE Action

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
OFFICE OF COASTAL ZONE MANAGEMENT
251 Causeway Street, Suite 800, Boston, MA 02114-2136
(617) 626-1200 FAX: (617) 626-1240

January 23, 2009

Terry L. Orr
ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, MA 02482

Re: CZM Federal Consistency Review of Cape Wind Energy Project – Army Corps of Engineers Action; Nantucket.

Dear Mr. Orr:

The Massachusetts Office of Coastal Zone Management (CZM) has completed its review of the proposed project to build, operate, and eventually decommission an electric generation facility consisting of 130 wind turbine generators arranged in a grid pattern in the Horseshoe Shoals region of Nantucket Sound off the coast of Massachusetts. The project is designed to generate a maximum electric output of 454 megawatts and an average output of 182.6 megawatts of renewable wind-generated energy that will be transmitted and distributed to the New England regional power grid, including Cape Cod and the islands of Nantucket and Martha's Vineyard.

To inform our federal consistency review, CZM reviewed the Environmental Notification Form (ENF), Notice of Project Change (NPC), Draft Environmental Impact Report (DEIR), and Final Environmental Impact Report (FEIR) developed pursuant to the Massachusetts Environmental Policy Act; two Draft Environmental Impact Statements (DEIS) and a Final Environmental Impact Statement developed pursuant to the National Environmental Policy Act; and, pursuant to the Coastal Zone Management Act, your federal consistency certification, applicable state permits/licenses, and application for US Army Corps of Engineers authorization under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Over the course of the state and federal review process, CZM has received all of the data and information necessary to make a consistency determination.

Based on our review, all aspects of the project, including those project elements located in federal waters, and the project's effects on resources and uses in the Massachusetts coastal zone, we concur with your certification that the activity as proposed is consistent with the CZM enforceable program policies.

If the above-referenced project is modified in any manner, including any changes resulting from permit, license or certification revisions, including those ensuing from an appeal, or the project is noted to be having effects on coastal resources or uses that are different than originally proposed, it is incumbent upon the proponent to notify CZM and submit an explanation of the nature of the change pursuant to 15 CFR 930. CZM will use this information to determine if further federal consistency review is required.

Thank you for your cooperation with CZM.

Sincerely,

Deerin Babb-Brott
Director

czm #5059

Cc:
Craig Olmsted, Cape Wind Associates LLC
Rachel Pachter, ESS Group Inc.
James F. Bennett, Minerals Management Service, US Department of the Interior
Dr. Rodney E. Cluck, Minerals Management Service, US Department of the Interior
Karen Kirk Adams, US Army Corps of Engineers
Robert Varney, US Environmental Protection Agency
Tim Timmermann, US Environmental Protection Agency
Michael Bartlett, US Fish & Wildlife Service
Vern Lang, US Fish & Wildlife Service
Ken Kimmell, MA Executive Office of Energy and Environmental Affairs
Laurie Burt, MA Department of Environmental Protection
Phil Weinberg, MA Department of Environmental Protection
Ben Lynch, MA Department of Environmental Protection
Elizabeth Kouloheras, MA Department of Environmental Protection
Mary Griffin, MA Department of Fish and Game
Rich Lehan, MA Department of Fish and Game
Paul Diodati, MA Division of Marine Fisheries
Jollette Westbrook, Energy Facilities Siting Board
Town of Yarmouth Conservation Commission
Town of Barnstable Conservation Commission
Cape Cod Commission

H-6 MA DEP Water Quality Certificate

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

IAN A. BOWLES
Secretary

LAURIE BURT
Commissioner

August 15, 2008

Cape Wind Associates, LLC
Attn: Rachel Pachter
75 Arlington Street, Suite 704
Boston, MA 02116

Re: **401 WATER QUALITY CERTIFICATION**
Application for BRP WW 07, Major project dredging

At: Lewis Bay and Nantucket Sound, in the municipalities of Barnstable and Yarmouth

DEP Transmittal №: W133663
ACOE Application №: NAE-2004-338
DEP Wetlands File №: 3-4697 (Barnstable) and 83-1816 (Yarmouth)

Dear Ms. Pachter:

The Massachusetts Department of Environmental Protection (the "Department" or "MassDEP") has reviewed the application of Cape Wind Associates, LLC (the "permittee") for a 401Water Quality Certification, as referenced above, for construction of a submarine transmission cable system as described below. In accordance with the provisions of Section 401 of the Federal Clean Water Act as amended (33 U.S.C. §1251 et seq.), M.G.L. c.21, §§ 26-53, and 314 CMR 9.00, it has been determined there is reasonable assurance the project will be conducted in a manner which will not violate applicable water quality standards (314 CMR 4.00) and other applicable requirements of state law.

The cable system will pass through Nantucket Sound and Lewis Bay, which are designated as Class SA in the Massachusetts Surface Water Quality Standards (314 CMR 4.00). Class SA waters are intended "as excellent habitat for fish, other aquatic life and wildlife and for primary and secondary contact recreation." Anti-degradation provisions of these Standards require that "existing uses and the level of water quality necessary to protect the existing uses shall be maintained and protected."

Proposed Project

The project entails the installation of two 12.5 mile-long submarine transmission cable circuits, of which approximately 7.6 miles of each circuit are in state waters in Lewis Bay and Nantucket Sound, within the municipalities of Barnstable and Yarmouth. The portion of the transmission cable route through state waters also lies within the Cape and Islands Ocean Sanctuary. The transmission cables will connect land-based facilities to an Electric Service Platform (ESP) located amidst a proposed 130 turbine wind farm located outside of state jurisdiction on Horseshoe Shoals in Nantucket Sound. The entire project, including the wind farm and associated structures, such as the ESP and transmission cables, is currently undergoing review by the United States Minerals Management Service (MMS), which was granted lead federal authority for the project pursuant to the 2005 Energy Policy Act. The portion of the project within state jurisdiction, limited to the transmission cables, has completed reviews under the Massachusetts Environmental Policy Act ("MEPA"- Final Certificate issued on March 29, 2007) and by the Massachusetts Energy Facilities Siting Board ("EFSB"- approval decisions issued on May 11, 2005 and May 2, 2008). However, the MMS review has not been completed, and this Certification may not be valid for an alternative route approved by MMS. This Certification does not authorize any future activities associated with the decommissioning of the project or any additional dredging or jet plowing necessary to maintain cover over the transmission cables beyond the 5 year term of this Certification.

Cable route and construction methodology
The proposed pipeline route proceeds west through Lewis Bay from its landfall at New Hampshire Avenue in Yarmouth, then turns south to exit Lewis Bay between Egg Island and Dunbar Point in Barnstable. Once in Nantucket Sound, the circuits follow a generally southerly route to the 3-mile state jurisdictional limit and on to the ESP on Horseshoe Shoals. The submarine portion of each cable circuit will be installed, using a jet plow, in an 8 foot deep trench measuring 4 to 6 feet across at the top and 2 feet wide at the bottom of the trench. A jet plow is used to embed the cable in a trench created by fluidizing the sediment with a directed jet of water. Approximately six feet of material will cover the conduits once they are buried in this manner. As described in the application, a shallow depression is expected over the cable route due to dispersion of some sediment due to the jet plowing operation, however natural transport of sediments by storms and ocean currents is expected to restore benthic conditions. Addition of hard material to cover and protect the transmission cable is not expected to be necessary and is not authorized herein.

Jet plowing of the transmission cable circuits within Lewis Bay is expected to take 1-2 days for each of the two circuits, and will pass in close proximity (approximately 70 feet) to eelgrass resource areas at Egg Island. The proponent will re-survey the extent of the eelgrass beds prior to the start of construction to confirm the boundary of the resource area. In addition, the proponent will install a silt curtain between the jet plow and the eelgrass bed prior to jet plowing activities in Lewis Bay to protect the resource from any turbidity or suspended sediments associated with the plowing. Post-construction monitoring of the eelgrass will be conducted to determine whether construction activities had any impact, and mitigation in the form of replanting of eelgrass will be required if impacts are found. The proponent will also perform another survey of shellfish resources in Lewis Bay prior to construction and provide mitigation for impacts to shellfish.

The submarine transmission cable will be brought onto land using Horizontal Directional Drilling (HDD) to install the final 200 feet of cable within the HDD conduit. The use of HDD will minimize impacts to near shore and intertidal resources. The transition from jet plowing to HDD will take place at an excavated pit within a cofferdam, where the cables will be pulled through conduits installed by HDD. Approximately 840 cubic yards (cy) of material will be mechanically dredged from the area of the cofferdam pit to an elevation of approximately –10 feet MLLW. The dredged material will be temporarily stored and then used to backfill the dredged area; additional clean sandy material will be used if necessary to achieve pre-construction contours.

Sediment analysis

Physical and chemical analyses of the sediments along and adjacent to the proposed route indicated that the material generally consisted of fine to medium-grained sand, with silt and clay also found within Lewis Bay. A due diligence report was prepared in accordance with 314 CMR 9.07(2)(a), which concluded that known releases were unlikely to impact sediments. Pursuant to 314 CMR 9.07(2), no chemical testing is required if the sediment to be dredged contains less than 10% by weight of particles passing through a No. 200 sieve. Gradation analysis revealed that of the 10 locations along the proposed route that were sampled, samples at four locations exceeded this 10% limit. The applicant provided chemical analysis of sediment samples collected along and adjacent to the cable route to determine if any of the chemical constituents listed at 314 CMR 9.07(2)(b)(6) were present in reportable concentrations. Low levels of arsenic, chromium, copper, lead, and zinc were found in some samples; however, in each case the samples fell in the low effects range according to accepted values in accordance with 314 CMR 9.07(3).

Four samples were also collected from the cofferdam area. Gradation analysis of the samples revealed that in each case, less than 10% by weight passed through the No. 200 sieve, and therefore no chemical analysis of sediments in this area was necessary. Nevertheless, the applicant provided chemical analysis of sediment samples collected in this area to determine if any of the chemical constituents listed at 314 CMR 9.07(2)(b)(6) were present in reportable concentrations. The results revealed the presence of low levels of arsenic, chromium, copper, lead, mercury, and zinc. In each case the samples were below reporting limits or fell in the low effects range according to the accepted values.

The proponent will be required to monitor turbidity during jet plowing and dredging. In the event that turbidity limits are exceeded, additional sediment and water quality monitoring may be required to determine whether contaminants associated with the sediments may have been released into the water column.

Beneficial Reuse of sediments: The 840 cy of dredged material from the cofferdam area will be stored during construction and used to restore the area to preconstruction grades.

Time of Year restrictions: The Division of Marine Fisheries (DMF) recommended that no in-water silt producing work occur between January 15 and May 30 to protect spawning of winter flounder. DMF recommended a time of year (TOY) restriction from June 15 to September 15 to protect spawning by bay scallops and quahogs that could be waived provided a turbidity monitoring program is performed by the applicant during plowing activities in Lewis Bay that ensures that a turbidity level of 30 NTUs above background is not exceeded.

This Certification protects winter flounder spawning by prohibiting or conditioning all in-water silt producing work between January 15 and May 30. During the month of May, limited activities related to the installation of the cofferdam, dredging of the HDD pit, and HDD operations, but no jet plowing, are allowed to take place within silt curtains and/or cofferdams, which will limit the area of impact by preventing the spread of suspended sediment. Turbidity monitoring is required during these activities to confirm that water quality impacts do not occur outside of the silt curtain/cofferdam. Jet plowing activities are conditionally permitted from June 1 to January 14 with turbidity monitoring to be carried out by the applicant in accordance with the requirements in this Certificate and consistent with DMF's recommendation. The Department notes that the required turbidity monitoring program must be implemented whether or not the activity occurs during the TOY restriction.

This Certification requires the proponent to conduct a pre-construction survey of shellfish resources in Lewis Bay and provide mitigation for direct impacts on shellfish. Additional measures will be implemented to protect the Egg Island eelgrass beds, including a) a silt curtain will be placed between the jet plow and eelgrass bed; b) turbidity monitoring on the eelgrass side of the silt curtain; and c) post-construction monitoring of the eelgrass bed to determine whether the jet plowing resulted in indirect impacts to eelgrass. Finally, the proponent will conduct a multi-year post-construction benthic habitat monitoring plan and provide mitigation if the results of the monitoring indicate that the jet plowing had a long-term impact.

Ocean Sanctuaries Act

Pursuant to the Ocean Sanctuaries Act, M.G.L. 132A §§13-16 and 18 and its regulations at 302 CMR 5.00, the Department of Conservation and Recreation (DCR) has regulatory jurisdiction over the Commonwealth's Ocean Sanctuaries. In a letter dated July 18, 2008, DCR recommended that this Certificate include conditions that: a) ensure that no dumping or discharge of waste occurs from construction vessels; b) that no discharge of material results in a significant degradation of water quality; and c) that the project's impacts plant or animal life be appropriately mitigated. In addition, DCR noted that the applicant should submit details on the financial instrument that will secure the proponent's obligations through decommissioning of the facility. Since this Certificate does not authorize decommissioning activities, the Department believes that the c. 91 license is a more appropriate forum to address decommissioning. DCR's recommendations have been incorporated into this Certificate and Department finds that the project complies with the Ocean Sanctuaries Act.

Public Comment

The applicant published the required public notice in the Boston Globe on November 8, 2007. One comment letter, from the Alliance to Protect Nantucket Sound and sixteen individuals was received. The applicant provided a response to comments to the Department on January 17, 2008. The Department believes that the construction mitigation and monitoring measures required herein address the water quality impact concerns raised during the comment period. In addition, in accordance with 314 CMR 9.05(4), the Department conducted a site visit of the landfall site attended by representatives of the applicant and Alliance to Protect Nantucket Sound.

Section 61 Findings

Pursuant to the Massachusetts Environmental Policy Act ("MEPA"), M.G.L. c.30, §§61 to 62H inclusive, this project was reviewed as EOEA # 12643. On March 29, 2007, the Secretary of Energy and Environmental Affairs issued a Certificate on the Final Environmental Impact Report ("FEIR") for the project finding that the FEIR adequately and properly complied with MEPA and its implementing regulations.

MassDEP has reviewed the MEPA documents and the documents submitted in connection with the application for a Water Quality Certification. Based on information currently in the record, MassDEP grants a 401 Water Quality Certification for this project subject to the following conditions to maintain water quality, to minimize impact on waters and wetlands, and to ensure compliance with appropriate state law. The Department further certifies in accordance with 314 CMR 9.00 that there is reasonable assurance the project or activity will be conducted in a manner which will not violate applicable water quality standards (314 CMR 4.00) and other applicable requirements of state law. Finally, the Department has determined that upon satisfying the conditions and mitigation requirements of this approval, the project provides a level of water quality necessary to protect existing uses and accordingly finds that the project as implemented satisfies the Surface Water Quality Standards at 314 CMR 4.00. Please see the Department's detailed Section 61 Findings for this project attached hereto as Attachment A.

Conditions

1. All work shall conform to the plans submitted with the "Request for 401 Water Quality Certification- Cape Wind Energy Project" prepared by ESS Group, Inc., dated October 31, 2007. See Table 1 below:

TABLE 1

Title	Figure No.	Scale
Locus Map	1	1"=6000'+/-
Proposed Submarine Cable Route	2	1"=2500'=/-
Typical Cross Section of Submarine Cable Trench Using Jet Plow Embedment	3	Not to scale
Horizontal Directional Drilling & Landfall Details	4	Not to scale
Turbidity Curtain Detail	5	Not to scale

Proposed No-Wake Zone, Egg Island, Lewis Bay	6	1"=600'
Marine Geologic Location Plan (Through 2005)	7 (1 of 2)	1"=8000'
Vibracore Locations, Lewis Bay	7 (2 of 2)	1"=30'
Distances to Navigation Channels	8	1"=1000'+/-

2. All work shall further comply with:

   (a) the information and methodologies contained in the 401 Water Quality Certification application for this project, dated October 31, 2007, prepared by ESS Group, Inc., as amended by subsequent submittals referenced in this Certification and on file with MassDEP; and

   (b) the terms and condition of this Certification including the following Attachments and documents incorporated herein by reference:

      A. Section 61 Findings appended as Attachment A;
      B. Turbidity Monitoring Plan for Massachusetts Coastal Waters, revised August 1, 2008 appended as Attachment B;
      C. Landfall Preparation Marine Construction Plan, revised May 21, 2008, appended as Attachment C;
      D. Eelgrass Monitoring and Mitigation Measures, appended as Attachment D;
      E. Seafloor Habitat/Benthic Community Monitoring plan, dated April 23, 2008, appended as Attachment E.

3. To the extent that the following conditions modify or differ from the plans, specifications or other proposals referenced in Conditions 1 and 2, the conditions of this Certification shall control.

4. Any change to the plans identified in Condition 1 resulting in changes in construction methodologies approved in this Water Quality Certification shall require the permittee to notify MassDEP of the proposed change and receive written approval prior to undertaking any work not authorized by this permit. A new or amended Water Quality Certificate may be required if the route of the transmission cable circuits changes due to requirements of any state, local, or federal permit or authorization.

5. The permittee shall designate an Environmental Inspector for this project whose responsibilities shall include ensuring the project complies with the requirements of this Certification and that all necessary reports are made on a timely basis. Prior to the start of construction, the permittee shall provide to MassDEP the name, phone number and qualifications of the Environmental Inspector assigned to the project.

6. A copy of this Certification and referenced plans and documents shall be provided to the contractor prior to the start of construction.

7. A copy of this Certification and referenced plans and documents shall be kept available on the major construction vessels during all phases of construction.

8. Staff of MassDEP shall have the right to enter and inspect the area and activities subject to this Certification at reasonable hours to evaluate compliance with the conditions stated in this Certification, and may require the submittal of any data deemed necessary by MassDEP for that evaluation.

9. MassDEP shall be notified, to the attention of Alex Strysky (617-292-5616), one week prior to the start of any dredging work so that Department staff may inspect the work for compliance with the terms and conditions of this Certification.

10. Construction work in accord with this Certification may begin following the 21-day appeal period described on pages 8 and 9 and receipt of all required approvals.

11. Except for any monitoring, mitigation, or other activities specifically authorized for a different timeframe, all work authorized herein shall be completed within five (5) years of the date of issuance of this Certification. In the event the permittee does not complete construction within the work windows established or modified in accordance with the conditions herein, it shall submit a written notification to the Department that provides the following information, as appropriate:

    a. An explanation of the reasons for non-completion of the work.
    b. A description of the construction status of the cable circuits.
    c. A description and schedule of the construction work to be performed within the waters of the Commonwealth within the work windows established or modified in accordance with the conditions herein.

12. All vessels used in the project shall be maintained in sea-worthy condition. Construction and construction-support vessels shall, at a minimum, implement best management practices to control discharge of drainage and trash. Discharges of sanitary waste, grey water, and other discharges are prohibited unless otherwise authorized a NPDES permit, NPDES general permit, or other NPDES authorization applicable to this project.

13. Sediment dredged from the cofferdam pit shall be stored on a barge in the vicinity of the landfall site and re-used to restore the pit to pre-construction benthic conditions. The permittee shall not use imported backfill, except for any additional backfill necessary to restore the cofferdam area to preconstruction contours. Any imported material to be used in the cofferdam area shall be clean and free of contaminants and contain no more than 10% fine material.

14. Prior to commencement of construction, the permittee shall file with the Department a copy of an Oil Spill Response Plan (OSRP) for its review. All construction activity shall comply

with the terms and conditions of the OSRP on file with MassDEP. A copy of the OSRP shall be kept on each affected construction vessel at all times during construction.

15. Prior to commencement of construction, the permittee shall file with the Department a copy of any marine mammal monitoring plan required and approved by the relevant federal agencies. A copy of the approved plan shall be kept on each affected construction vessel at all times during construction and all work shall be conducted in accordance with the requirements therein.

16. Water quality monitoring during dredging and jet plowing activities shall be performed in accordance with the "Turbidity Monitoring Plan for Massachusetts Coastal Waters," appended hereto as Attachment B. In the event of an exceedance of the turbidity limits specified therein, the permittee shall cease jet plowing operations, notify the Department, and take the corrective measures identified in the plan and other measures specified by the Department, which may include additional water quality sampling to determine if contaminants associated with bottom sediments have been released into the water column or other measures deemed necessary by the Department to protect water quality.

17. Mid-line buoys shall be used on anchor cables in order to minimize disturbance due to anchor sweep.

18. Prior to dredging the cofferdam pit and installing the cofferdam, a weighted silt curtain shall be installed around the area so as to completely enclose the area during cofferdam installation and dredging activities. The silt curtain and cofferdam shall remain in place until all Horizontal Directional Drilling (HDD) activities are completed and jet plowing commences. The area shall again be surrounded by a silt curtain and/or cofferdam during backfilling activities. Water quality monitoring during dredging and backfilling of the cofferdam pit shall take place in accordance with the Turbidity Monitoring Plan (Attachment B).

19. Horizontal Directional Drilling (HDD) operations shall be conducted in accordance with the procedures described in Attachment C, Landfall Preparation Marine Construction Plan (LPMCP) so as to minimize any potential for water quality impacts. As specified in the LPMCP, the permittee shall monitor the levels of bentonite drilling fluid so as to minimize its discharge in the event of a release, and promptly take necessary actions to minimize water quality impacts and clean up any bentonite released outside of the cofferdam/silt curtain area. A copy of the LPMCP shall be kept at the work site at all times during HDD operations.

20. The permittee shall monitor, on an on-going basis, the depth of burial of the transmission cable conduits and maintain adequate cover over the conduits to the maximum extent practicable. In the event that the cable needs to be re-buried, the applicant shall identify necessary response measures and provide the Department with an analysis for its review and approval. At a minimum, activities related to maintenance of cover over cable circuits shall be subject to the requirements of this Certificate and may require either that a request for an Amendment or a new application be filed. Long-term maintenance of cable circuit burial depth shall be

described in any environmental management system/adaptive management documents prepared for maintenance and operations of the project and provided to the Department.

21. The permittee shall implement the construction mitigation measures described in Attachment D, "Eelgrass Monitoring and Mitigation Measures," during jet plowing and dredging activities in Lewis Bay in order to prevent impacts to eelgrass resources. The applicant shall also conduct post-construction monitoring and mitigation of eelgrass beds in accordance with specific monitoring and success criteria to be finalized by the Department in consultation with the permittee and appropriate regulatory agencies, and provide any mitigation necessary for detrimental impacts to eelgrass, in accordance with the eelgrass monitoring and mitigation measures specified in Attachment D.

22. At least six months prior to the start of dredging activities, the applicant shall submit a Shellfish Survey and Mitigation Plan to the Department for its review and approval. The purpose of the plan shall be to survey shellfish conditions in the footprint of dredging activites in Lewis Bay prior to the start of dredging activities in order to determine existing shellfish resources and any necessary mitigation for shellfish impacts. At a minimum, reseeding of shellfish shall be at a ratio of 3:1 to compensate for shellfish directly impacted by construction activities. The Plan shall be prepared in consultation with the Division of Marine Fisheries and shellfish constables of Yarmouth and Barnstable and describe survey methods and proposed mitigation.

23. In order to avoid or minimize impacts to water quality and aquatic resources, no dredging shall occur from January 15 to April 30 of any year. Dredging or backfilling within an enclosed cofferdam and/or silt curtain, and Horizontal Directional Drilling, may occur in Lewis Bay from May 1 to January 14. Jet plowing may occur from June 1 to January 14 only with turbidity monitoring as required in condition 16. These work windows were selected upon consultation with the Division of Marine Fisheries and are necessary to avoid impacts to spawning of winter flounder and shellfish (quahogs and bay scallops). The permittee, or its contractor, shall complete the activity within the permitted timeframe except as provided herein. In the event the permittee seeks to conduct construction activities, except for monitoring and mitigation activities, outside of these work windows, the permittee, or its contractor, shall submit a written request to the Department as soon as feasible and at least one (1) month prior to the close of the specified work window. Any affected Conservation Commission shall concurrently be provided a copy of the written request. The request shall include the following:

    a. location, extent, and type of activity(ies);
    b. the date on which the activity(ies) is expected to start and end;
    c. a comparative summary of the projected daily average production rate and the actual daily average production rate;
    d. an explanation of why the activity will fail to conclude within the permitted timeframe;
    e. an account of any supplemental efforts/alternatives to keep the activity on schedule;
    f. an evaluation by a qualified professional of the impact of continued work outside the permitted timeframe on the species of concern;

g. a description of any efforts that will be made to minimize the impacts of said activity on the species of concern; and
h. an explanation of the basis for any requested change other than an extension.

The Department, the permittee, and other appropriate agencies will evaluate the significance of the potential impacts. The Department may request, and the permittee shall provide, any supplemental information necessary to make this assessment. After consultation with the appropriate agencies, any extension of the work windows may be granted at the sole discretion of the Department, which may require development of a monitoring plan for implementation, if necessary, and determination of the requirements for mitigation. The frequency and severity of exceedances of the work windows shall be used to determine the extent of mitigation that will be required, if any.

24. Within six months from the date of completion of the construction of the cables, the permittee shall submit a bathymetric survey of the entire route within Commonwealth waters to MassDEP, depicting post-installation conditions, with special reference to locations where the location of the constructed conduits differs from the proposed route. The permittee also shall provide an evaluation of the extent to which the pre-construction bottom contours were restored.

25. Post-construction benthic habitat monitoring shall be carried out in accordance with the Seafloor Habitat/Benthic Community Monitoring plan dated April 23, 2008 ("Benthic Monitoring Plan"), attached hereto as Attachment E. Any changes to the Benthic Monitoring Plan shall be reviewed and approved by the Department. It shall be the responsibility of the Permittee to schedule the agency review meetings necessary to: review monitoring results; determine the need for additional monitoring; and/or identify mitigation. In the event the Department determines, in accordance with the Seafloor Habitat/Benthic Community Monitoring plan, that additional compensatory mitigation is due from the permittee as a result of construction related impacts to the benthic habitat, the Department shall consult with other state and federal agencies and specify additional measures to be implemented by the permittee.

26. All notices and submissions required herein shall be sent, as appropriate, to the attention of Alex Strysky, DEP Wetlands and Waterways Program, One Winter Street, Boston, MA 02108; by email at Alexander.Strysky@state.ma.us; by fax at (617) 292-5696; or by telephone at (617) 292-5616.

This certification does not relieve the applicant of the obligation to comply with other applicable state or federal statutes or regulations. Any changes made to the project as described in the previously submitted Notices of Intent, 401 Water Quality Certification application, or supplemental documents will require further notification to the Department. Certain persons shall have a right to request an adjudicatory hearing concerning certifications by the Department when an application is required:

a. the applicant or property owner;
b. any person aggrieved by the decision who has submitted written comments during the public comment period;

c. any ten (10) persons of the Commonwealth pursuant to M.G.L. c.30A where a group member has submitted written comments during the public comment period; or
d. any governmental body or private organization with a mandate to protect the environment that has submitted written comments during the public comment period.

Any person aggrieved, any ten (10) persons of the commonwealth, or a governmental body or private organization with a mandate to protect the environment may appeal without having submitted written comments during the public comment period only when the claim is based on new substantive issues arising from material changes to the scope or impact of the activity and not apparent at the time of public notice. To request an adjudicatory hearing pursuant to M.G.L. c.30A, § 10, a Notice of Claim must be made in writing, provided that the request is made by certified mail or hand delivery to the Department, with the appropriate filing fee specified within 310 CMR 4.10 along with a DEP Fee Transmittal Form within twenty-one (21) days from the date of issuance of this Certificate, and addressed to:

Docket Clerk
Office of Administrative Appeals
Department of Environmental Protection
One Winter Street, 3rd Floor
Boston, MA 02108.

A copy of the request shall at the same time be sent by certified mail or hand delivery to the issuing office of the Wetlands and Waterways Program at:

Department of Environmental Protection
One Winter Street, 5th Floor
Boston, MA 02108.

A Notice of Claim for Adjudicatory Hearing shall comply with the Department's Rules for Adjudicatory Proceedings, 310 CMR 1.01(6), and shall contain the following information pursuant to 310 CMR 9.10(3):

a. the 401 Certification Transmittal Number and DEP Wetlands Protection Act File Number;
b. the complete name of the applicant and address of the project;
c. the complete name, address, and fax and telephone numbers of the party filing the request, and, if represented by counsel or other representative, the name, fax and telephone numbers, and address of the attorney;
d. if claiming to be a party aggrieved, the specific facts that demonstrate that the party satisfies the definition of "aggrieved person" found at 314 CMR 9.02;
e. a clear and concise statement that an adjudicatory hearing is being requested;
f. a clear and concise statement of (1) the facts which are grounds for the proceedings, (2) the objections to this Certificate, including specifically the manner in which it is alleged to be inconsistent with the Department's Water Quality Regulations, 314 CMR 9.00, and (3) the relief sought through the adjudicatory hearing, including specifically the changes desired in the final written Certification; and

g. a statement that a copy of the request has been sent by certified mail or hand delivery to the applicant, the owner (if different from the applicant), the conservation commission of the city or town where the activity will occur, the Department of Environmental Management (when the certificate concerns projects in Areas of Critical Environmental Concern), the public or private water supplier where the project is located (when the certificate concerns projects in Outstanding Resource Waters), and any other entity with responsibility for the resource where the project is located.

The hearing request along with a DEP Fee Transmittal Form and a valid check or money order payable to the Commonwealth of Massachusetts in the amount of one hundred dollars ($100) must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
Commonwealth Master Lockbox
P.O. Box 4062
Boston, MA 02211

The request will be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver. The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority. The Department may waive the adjudicatory-hearing filing fee pursuant to 310 CMR 4.06(2) for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file an affidavit setting forth the facts believed to support the claim of undue financial hardship together with the hearing request as provided above.

No activity may begin prior to the expiration of the appeal period or until a final decision is issued by the Department if an appeal is filed.

Failure to comply with this certification is grounds for enforcement, including civil and criminal penalties, under MGL c.21 §42, 314 CMR 9.00, MGL c. 21A §16, 310 CMR 5.00, or other possible actions/penalties as authorized by the General Laws of the Commonwealth.

If you have questions on this decision, please contact Alex Strysky 617-292-5616.

Sincerely,

for

Glenn Haas
Director
Division of Watershed Management

cc: Rodney Cluck, U.S. Minerals Management Service, 381 Elden St., Herndon, VA 20170
Karen Adams, Regulatory/Enforcement Division, U.S. Army Corps of Engineers,

696 Virginia Road, Concord, MA 01742-2751
Dave Johnston, Liz Kouloheras, DEP SERO
Gary Moran, DEP
Ed Coletta, DEP
Bob Boeri, CZM, 251 Causeway Street, Suite 800, Boston, MA 02114-2119
Todd Callaghan, CZM, 251 Causeway Street, Suite 800, Boston, MA 02114-2119
Tay Evans, Division of Marine Fisheries, 30 Emerson Ave, Gloucester, MA 01930
Chris Boelke, NMFS, 1 Blackburn Drive, Gloucester, MA 01930
Phil Colarusso, EPA, 1 Congress Street, Boston, MA 02114-2023
Marilyn McCrory, DCR, 251 Causeway Street, Boston, MA 02114-2119
Barnstable Conservation Commission, 200 Main Street, Hyannis, MA 02601
Yarmouth Conservation Commission 1146 Route 28, South Yarmouth, MA 02664-4492
Alliance to Protect Nantucket Sound, 4 Barnstable Road, Hyannis, MA 02601
T.J. Roskelly, Anderson & Krieger LLP, One Canal Park, Suite 200,
Cambridge MA 02141
Terry Orr, ESS Group, 888 Worcester Street, Suite 240, Wellesley, MA 02482

ATTACHMENT A

Section 61 Findings

General Finding

These Findings for the Cape Wind Energy Project, including construction and maintenance of two transmission cable circuits within the Commonwealth and municipalities of Barnstable and Yarmouth in, over and under Submerged Lands of Lewis Bay and Nantucket Sound (the "Cape Wind project" or the "Project"), have been prepared in accordance with the provisions of M.G.L. c.30, § 61 and 301 CMR 11.00. On March 29, 2007, the Secretary of Environmental Affairs issued a certificate, EOEA No. 12643, stating that the Final Environmental Impact Report ("FEIR") prepared for the Project complied with the MEPA statute and regulations.

A description of the potential impacts and the associated mitigation measures associated with the Cape Wind Energy Project as currently proposed is provided in Table A. These Findings and the mitigation measures described in Table A are based principally on the Proposed Section 61 Findings provided by Cape Wind in the FEIR.

As the Project is currently described, it will require the following MassDEP permits: this water quality certification, a waterways license pursuant to 310 C.M.R. 9.00, and possibly a Superseding Order of Conditions pursuant to 310CMR 10.00.

Based on its review of the MEPA documents, the permit application, public comments and MassDEP's regulations, MassDEP finds the terms and conditions to be incorporated into the permits required for the Project and the mitigation commitments set forth in the attached Table A will constitute all feasible measures to avoid damage to the environment and will minimize and mitigate such damage to the maximum extent practicable for those impacts subject to MassDEP's authority. The proponent will also provide: $780,000 to the Department of Fish and Game for the restoration of Bird Island; $4.22 million in annual payments for natural resource preservation, marine habitat restoration, and coastal recreation enhancement project on Cape Cod, Nantucket, and Martha's Vineyard, with funds to be managed by the Coastal Zone Management office; and, as required by the Energy Policy Act of 2005, the project will provide 27 percent of the revenues received by the federal government, expected to amount to approximately $5.6 million. Implementation of the mitigation measures will occur in accordance with the terms and conditions set forth in the permits.

Wetlands Protection	Order of Conditions from the City of Barnstable Conservation Commission following submission of Notice of Intent.	Temporary Impact to Land Under Ocean and Land Containing Shellfish. Potential indirect impacts to submerged aquatic vegetation.	• Cape Wind will not anchor vessels or perform cable installation work in the area near Egg Island where eelgrass beds are located. • A dive survey will be conducted to confirm the limits of the eelgrass bed near Egg Island (verifying the limits of SAV previously surveyed in July 2003), and divers will also be used to confirm correct placement of work vessel anchors. • Pre and post-construction monitoring of the eelgrass bed will be performed and if it is determined that eelgrass has been lost as a result of project activities, replanting will occur. The post-construction monitoring plan will be developed to document potential indirect impacts from cable embedment and subsequent habitat recovery. Habitat recovery would be considered successful if it is found that SAV has migrated back to the site of disturbance. Should the habitat not recover naturally, the disturbance will be mitigated by replanting: • Cape Wind has committed to aerially photograph the entrance to Lewis Bay in the month of July immediately prior to jet-plowing, under conditions conducive to documenting the extent of eelgrass beds, to use the photographs in finalizing the exact location of jet-plowing, and to provide such photographs to DEP. • As requested in the Certificate, Cape Wind will denote the edge of the eelgrass bed at the water surface with buoys near Egg Island and install a silt curtain between the eel grass and the work area during jet plowing operations. In addition, Cape Wind will implement a No Wake Zone for its construction vessels at a distance of 200 feet (61 meters) from the edge of the eelgrass bed. • An eelgrass survey will be performed, in the same timeframe as the pre-construction surveys, for the two consecutive years following construction to document the change in density. • The scope of work to perform the dive survey at the eelgrass bed within Lewis Bay will be coordinated with the appropriate state and federal agencies. • Development of a Before Action Control Impact (BACI) Plan for eelgrass located near Lewis Bay. • Impacts to marine aquatic resources from jet plowing are expected to be localized, short-term, and minimal. The direct impacts from jet plow disturbance will be limited to the area within and in the immediate vicinity of the jet plow cable embedment. • The Proponent will coordinate with the Barnstable Conservation Commission, the MADEP, and NHESP as appropriate to prevent impacts to state-listed species during construction/decommissioning and operation of the Project. • The Proponent will work with the Barnstable Town Shellfish Constable to appropriately avoid and minimize impacts to designated shellfish areas from installation of the submarine cable. • The Proponent will work with the Barnstable Town Shellfish Constable to mitigate for any short-term impacts to shellfish productivity, if necessary. • Following construction, the Proponent will conduct a bathymetric survey of limited portions of the same representative reaches used to document pre-construction conditions within the Project Area to assess post-construction seabed elevation and surface conditions. Sediment profile images will be taken at a representative sub-set of the sample stations used to document pre-construction conditions in order to assess post-construction seabed physical conditions and benthic habitat quality. • To avoid or minimize impacts to the commercial fishing industry, the submarine cable system will be buried to a minimum of 6 feet below the seabed to avoid the potential for conflicts with fishing vessels and gear operation. • Proponent is committed to no-work within the Lewis Bay area between January 1 and May 1 of any given year to protect sensitive fish species. • The use of mid-line buoys on anchor lines in order to minimize the impacts from anchor line sweep. • Potential conflict with commercial fishing activity and gear would be minimized by notifying registered fishermen of the location and timeframe of Project construction activities well in advance of mobilization with updates throughout the construction period including a daily broadcast on marine channel 16 as to the construction activities for that and upcoming days. • The Proponent plans to work cooperatively with commercial/recreational fishing agencies and interests to ensure that the construction and operation of the Project would minimize potential impacts to commercial and recreational fishing interests.

	Order of Conditions from the City of Yarmouth Conservation Commission following submission of Notice of Intent.	Temporary impacts to Land Under Ocean and Land Containing Shellfish.	• Impacts to the marine aquatic resources will be minimized through the use of hydraulic jet plow technology in offshore areas and through the use of HDD methodology under the intertidal zone and shoreline. • The Proponent will work with the Yarmouth Town Shellfish Constable to appropriately avoid or minimize impacts to designated shellfish areas from installation of the submarine cable. • The Proponent will work with the Shellfish Constable of Yarmouth to mitigate for any short-term impacts to shellfish productivity. The Proponent will provide the Town of Yarmouth with funds to mitigate for the direct area of impact within the Town's designated recreational shellfish bed in accordance with the Town's mitigation policies. Based upon preliminary discussions with the Yarmouth Shellfish Constable, the Proponent is planning to provide mitigation to shellfish beds (i.e, "seeding") at a 2:1 ratio. • Potential conflict with commercial fishing activity and gear would be minimized by notifying registered fishermen of the location and timeframe of Project construction activities well in advance of mobilization with updates throughout the construction period including a daily broadcast on VHS marine channel 16 as to the construction activities for that and upcoming days. • The Proponent plans to work cooperatively with commercial/recreational fishing agencies and interests to ensure that the construction and operation of the Project would minimize potential impacts to commercial and recreational fishing interests. • The proposed submarine cable route avoids privately licensed shellfish areas or grants in Lewis Bay. • The Proponent will coordinate with the Yarmouth Conservation Commissions, the MADEP, and NHESP as appropriate to prevent impacts to state-listed species during construction/decommissioning and operation the Project. • The use of hydraulic jet plowing within Nantucket Sound and Lewis Bay and HDD at the landfall will minimize sediment disturbance and avoid direct impacts to shoreline and coastal wetland resource areas at the submarine cable landfall. Staging areas and the transitional cable vault will be located in the upland. • Following construction, the Proponent will conduct a bathymetric survey of limited portions of the same representative reaches used to document pre-construction conditions within the Project Area to assess post-construction seabed elevation and surface conditions. Sediment profile images will be taken at a representative sub-set of the sample stations used to document pre-construction conditions in order to assess post-construction seabed physical conditions and benthic habitat quality. • Proponent is committed to no-work within the Lewis Bay area between January 1 and May 1 of any given year to protect sensitive fish species. • To avoid or minimize impacts to the commercial fishing industry, the submarine cable system will be buried to a minimum of 6 feet below the seabed to avoid the potential for conflicts with fishing vessels and gear operation. • Restoration of the dredged cofferdam area using originally dredged material supplemented with imported clean sandy backfill material if necessary to restore preconstruction contours.

		Potential minor impacts to paved Riverfront Area and Buffer Zones; Potential impacts to state-listed species	• The Proponent will coordinate with the Yarmouth Conservation Commission, the MADEP, and NHESP as appropriate to prevent impacts to state-listed species during construction/decommissioning and operation of the Project. • A pre-construction survey was performed to document the occurrence of state-listed rare species along the NSTAR Electric ROW route. Should a state-listed species be located within the proposed transmission line route, a Conservation Permit under MESA will be obtained and efforts will be made to eliminate, minimize, or mitigate for any potential impacts. • Site- and species-specific habitat requirements will be incorporated into the construction methods for the proposed route in order to avoid impacts to the state-listed plant and animal species and habitat. • Post-construction monitoring will document habitat disturbance and recovery. • In the event that a state-listed rare species is identified within the footprint of the upland transmission cable route, post-construction monitoring of these species will be conducted according to a Conservation Plan developed to document habitat disturbance and recovery. These monitoring efforts may be repeated periodically on an on-going basis to determine that recovery has occurred. • Direct wetland impacts will be minimized through the use of hydraulic jet plowing, HDD and installation of the upland transmission line within existing paved roadways or disturbed electric ROWs. • To minimize the potential for erosion during construction, mitigation measures such as hay bales and silt fences will be placed as appropriate around disturbed areas and any stockpiled soils. Prior to commencing construction activities, erosion control devices will be installed between the work areas and down-slope waterbodies and wetlands to reduce the risk of soil erosion and siltation. • A Stormwater Pollution Prevention Plan will be developed which will incorporate applicable BMPs for erosion control and storm water management during construction. • A Dewatering Plan, if necessary, will be prepared to address the procedures for handling of any water encountered during excavation. • Measures will be taken to restore vegetation and contours to pre-existing conditions. Trenches within paved roadways will be backfilled and repaved, and trenches within the maintained electric ROW will be restored to pre-construction contours and revegetated using a suitable upland seed mixture. • The transmission line will not contain any fluids, petroleums, oils, or lubricants. As such, there is no threat to groundwater or surface water from the installation, presence, or future maintenance of the transmission line and/or associated infrastructure. • Water quality will be protected during the construction phase of the Project through the installation and maintenance of erosion and sedimentation control barriers. These mitigation measures will be fully described in an Erosion and Sedimentation Control and Storm Water Management Plan.
Water Quality	401 Water Quality Certification	Potential impacts to water quality from dredging in Lewis Bay.	• OSRP, SWPPP, and O&M Plans would be implemented during Project construction/decommissioning and operation to prevent potential impacts to water quality from spills and erosion/sedimentation • Prepare a "Landfall Preparation Marine Construction Plan" that will describe the construction methods, monitoring protocols, and mitigation measures to be used in conjunction with preparation of the landfall area for installation of the submarine cables. The plan will describe the operations required to install and remove the temporary cofferdam, dredge sediment within the temporary cofferdam to achieve required project depths, and install cable conduits from land to the temporary cofferdam using HDD methods. • Installation of transmission cables by jet plow embedment would result in temporary and localized impacts to water quality through sediment suspension, transport, and deposition. • The transition of the interconnecting 115 kV submarine transmission lines from water to land will be accomplished through the use of HDD methodology in order to minimize disturbance within the intertidal zone and nearshore area. A temporary cofferdam will be used during construction to minimize sediment resuspension at the interface between the HDD conduit and submarine cable system.

			• To minimize the release of the bentonite drilling fluid into Lewis Bay during HDD, freshwater will be used as a drilling fluid to the extent practicable prior to the drill bit or the reamer emerging in the pre-excavated pit. This will be accomplished by pumping the bentonite slurry out of the bore hole, and replacing it with freshwater as the drill bit nears the pre-excavated pit. Prior to drill exit and while the potential for bentonite release exists, diver teams will install a water-filled temporary dam around the exit point to act as an underwater "silt fence". This dam will contain any bentonite fluid that may escape when it sinks to the bottom of the pre-excavated pit to allow easy clean-up using high-capacity vacuum systems. • The use of mid-line buoys on anchor lines in order to minimize the impacts from anchor line sweep. • The Proponent will work with the Shellfish Constable of Yarmouth to mitigate for any short-term impacts to shellfish productivity. The Proponent will provide the Town of Yarmouth with funds to mitigate for the direct area of impact within the Town's designated recreational shellfish bed in accordance with the Town's mitigation policies. • Proponent is committed to no-work within the Lewis Bay area between January 1 and May 1 of any given year to protect sensitive fish species. • Restoration of the dredged cofferdam area using originally dredged material supplemented with imported clean sandy backfill material if necessary to restore preconstruction contours. • A Turbidity Monitoring Program will be implemented in accordance with the Water Quality Certificate. • In accordance with the Water Quality Certificate, a post-construction benthic habitat monitoring program will be implemented and mitigation provided in the even that habitat is found to have not recovered after two years.
Waterways	Chapter 91	Potential impacts to flowed tidelands.	• The installation of the submarine cable system will be accomplished using low-impact jet plow embedment process. The HDD operation transitioning the transmission line from submarine to upland will be conducted from the upland area and is not expected to significantly impact marine navigation. The HDD operation from the upland landfall will have no navigational impacts associated with the installation of the conduits and landside operations. All work within the waterway will be temporary, localized and short term. Once the submarine cable system is installed, there are no anticipated impacts to commercial or recreational navigation activities since the submarine cable system will be buried approximately six feet below the seafloor. Channel widths and depths along the submarine cable system route are sufficient to allow the cable-laying vessel to operate and maneuver. • A temporary cofferdam will be used during construction to minimize sediment resuspension at the interface between the HDD conduit and submarine cable system. • Cable burial depth will be inspected periodically during Project operation to ensure adequate coverage is maintained so as not to interfere with fishing gear/activity or with the safe operation of the cable. • Cape Wind will implement procedures outlined by the USCG to deconflict the areas around ongoing construction activities. • Cape Wind has committed to providing the USCG; other local, state, and federal agencies; and commercial salvors with a plan showing the designations of each WTG. • Cape Wind has committed to have its work vessels that are working in the area assist vessels in distress within the Wind Park upon receiving a request for assistance from the vessel or the USCG. • Cape Wind will work with the USCG to develop information that could be provided to mariners to educate them regarding the potential effects of the WTGs on marine radar. • The location of the Project will be published in the Notice to Mariners and noted on all applicable NOAA marine charts. • The submarine cable system will be buried 6 feet below the present sea bottom. • A Host Community Agreement (the Agreement) that Cape Wind entered into with the Town of Yarmouth, dated July 25, 2003. Among other things, the Agreement provides that Cape Wind would take a number of steps to mitigate impacts of its proposed transmission line on the Town, including: making physical improvements to Berry Avenue, New Hampshire Avenue, and the Englewood Beach area; and, if feasible, locating its operations center in the Town. Following its commercial operation, Cape Wind has agreed to make payments of $250,000 annually to cover any real and personal

			property taxes (which are estimated in the DEIR at $217, 168), increased by inflation, and will also contribute $100,000 annually, increased by inflation, to a charitable fund for benevolent purposes in the Town. The Agreement further provides that the Town agrees to act reasonably and in good faith with respect to any street opening permits, grants of location, or other similar authorizations requested by Cape Wind. Accordingly, Cape Wind will pay a total of $350,000 annually or $7,000,000 over twenty years of operation, (excluding the effects of inflation) to the Town of Yarmouth according to the Agreement. • Massachusetts Chapter 91 program fees will compensate the Commonwealth for the use of tideland areas affected by the 115 kV submarine cable system • The Proponent will work with the Town Shellfish Constable to mitigate for any short-term impacts to shellfish productivity, if necessary. • Following construction, the Proponent will conduct a bathymetric survey of limited portions of the same representative reaches used to document pre-construction conditions within the Project Area to assess post-construction seabed elevation and surface conditions. Sediment profile images will be taken at a representative sub-set of the sample stations used to document pre-construction conditions in order to assess post-construction seabed physical conditions and benthic habitat quality. • To avoid or minimize impacts to the commercial fishing industry, the submarine cable system will be buried to a minimum of 6 feet below the seabed to avoid the potential for conflicts with fishing vessels and gear operation. • Proponent is committed to no-work within the Lewis Bay area between January 1 and May 1 of any given year to protect sensitive fish species. • Notification of registered lobster fishermen well in advance of mobilization as to the location and timeframe of Project construction activities, as well as a daily broadcast to all mariners on VHS marine channel 16 as to the construction activities for that and upcoming days. • Potential conflict with commercial fishing activity and gear would be minimized by notifying registered fishermen of the location and timeframe of Project construction activities well in advance of mobilization with updates throughout the construction period including a daily broadcast on marine channel 16 as to the construction activities for that and upcoming days.

Cape Wind Associates
Water Quality Certificate, Transmittal #W133663
Attachment B

Turbidity Monitoring Plan for Massachusetts Coastal Waters

CAPE WIND ENERGY PROJECT
NANTUCKET SOUND

PREPARED FOR Cape Wind Associates, LLC
75 Arlington Street
Boston, Massachusetts 02116

PREPARED BY ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482

Project No. E159-504.7

Revised August 1, 2008

ESS Group, Inc.

TURBIDITY MONITORING PLAN FOR MASSACHUSETTS COASTAL WATERS

Cape Wind Energy Project
Nantucket Sound

Prepared For:

Cape Wind Associates, LLC
75 Arlington Street
Boston, Massachusetts 02116

Prepared By:

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482

ESS Project No. E159-504.7

August 1, 2008 A.L.
Revised ~~March 27, 2008~~

ESS Group, Inc.

TABLE OF CONTENTS

SECTION **PAGE**

FIGURES

ESS Group, Inc.

1.0 INTRODUCTION

This document presents the Turbidity Monitoring Plan (the "Plan") for the Cape Wind Energy Project and the associated installation of a 115 kV submarine cable system inside Lewis Bay out to the 3-mile state jurisdictional limit. The installation of the cable system will include the jet-plowing of the submarine cables and the construction of a Horizontal Directional Drilling (HDD) cofferdam at the landfall transition. The Plan is to be implemented during both of these cable system installation activities.

Final monitoring requirements will be established in conjunction with the Massachusetts Department of Environmental Protection (MassDEP) prior to construction as part of the Water Quality Certificate.

2.0 GENERAL MONITORING PROCEDURES

The goal of the Turbidity Monitoring Plan is to characterize the effect of sediment disturbance on the overlying water column during installation of the submarine cable system in Lewis Bay and out to the 3-mile state jurisdictional limit. Monitoring will focus on defining the extent of the turbidity plume and on recording turbidity associated with sediment disturbance from the cable installation activities. This will be accomplished during daylight hours, using real-time instrumentation from a small boat as follows:

1. Periodic turbidity profiling measurements using *in situ* turbidity probe monitoring equipment; and

2. Concurrent time and positional information using a differential global positioning system (DGPS).

The turbidity probe will be used to define the vertical and areal extent of the anticipated turbidity plume in real-time. These measurements will be conducted within the anticipated turbidity plume and at background stations up-current of the cable installation operations. All data will include time and positional information from the monitoring vessel's Differential Global Positioning System (DGPS).

3.0 TURBIDITY MONITORING

Turbidity is measured in nephelometric turbidity units (NTU) using a turbidity probe. The turbidity probe instrument will be lowered through the water column for each sampling location. Measurements at each sampling location will be taken at two to three depths depending upon water depth (near bottom, at surface, and mid-level if water depths exceed 15 feet). The measurements at each sampling location will be averaged to determine the NTU value. Turbidity monitoring will be conducted along a single transect positioned down-current and perpendicular to the axis of the expected plume of the cable burial operations. The transect will be located approximately 150 – 175 feet down-current from the jet plow operation. However, no sampling will be conducted at a survey distance from the cable vessel deemed unsafe by the Project contractor. One transect will also be conducted approximately 200 to 500 feet up-current of the cable installation activities to detail ambient or background conditions. All data collection operations will be documented using a DGPS positioning system. Monitoring events will be concentrated around high slack, peak ebb, low slack and peak flood tidal conditions, and will occur at least twice per tidal cycle (12.4 hours) during cable burial activities, during a running tide (i.e. ebb or flood) and during slack tide as conditions allow.

Based on consultation with MassDEP, if monitoring results demonstrate acceptable performance, monitoring frequency outside of Lewis Bay may be decreased as the Project progresses. Therefore, assuming acceptable performance standards are met for the cable installation activities, ESS proposes to conduct turbidity monitoring for a total of three (3) days during each week of the 115 kV submarine cable system installation in Massachusetts waters. Assuming that it will take approximately 9 days to jet plow the first cable circuit from the cofferdam to the 3 mile limit, it is estimated that up to 5 days of monitoring may be necessary per cable.

Additionally, turbidity monitoring will be conducted for the dredging of the cofferdam once the sheet piles and turbidity curtain are in place. The monitoring will take place 150-175 feet from the edge of the sheet piles (see Figure 1). It is expected that the cofferdam dredging will be completed in two (2) ten-hour days, both of which will be monitored.

Jet-plow cable installation will begin at the cofferdam inside Lewis Bay (defined as that portion of the cable route landward of coordinates Lat 41° 37′ 49″ Long 70° 16′ 15″ as shown on Figure 2). Monitoring will occur for each day that jet plowing occurs inside Lewis Bay, where the finer sediments of the 115 kV submarine cable route are expected to be disturbed. It is estimated that this will involve monitoring for approximately three (3) days of the cable-laying for each cable, at which time the installation inside Lewis Bay is expected to be complete. As the jet plow operations pass Egg Island, monitoring will also be conducted on the eastern side of the temporary silt curtain placed to protect the eelgrass bed.

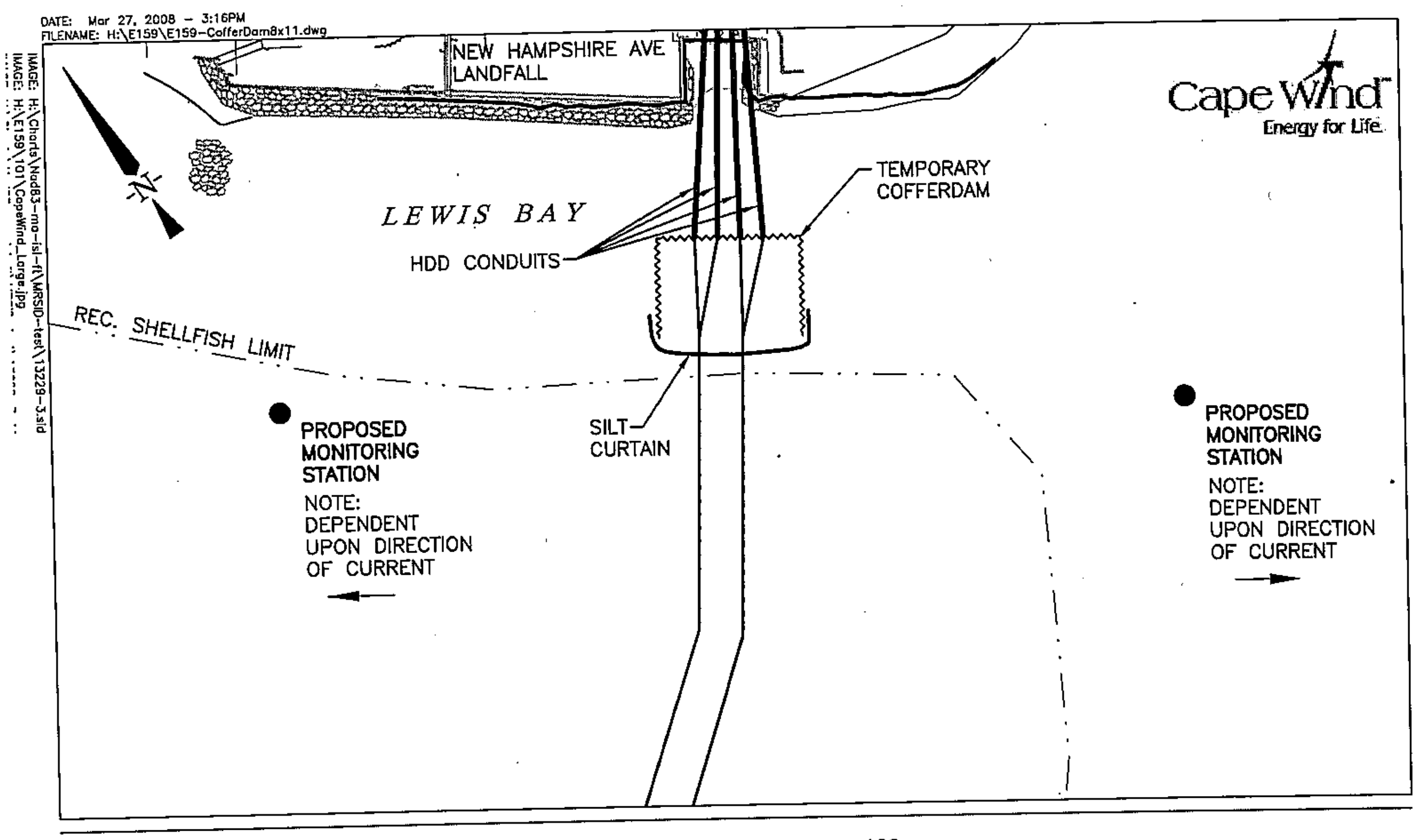
As the jet-plowing operations for the first cable move out of Lewis Bay towards the 3-mile state jurisdictional limit and away from the finer sediments, up to two (2) additional days of monitoring may take place. Jet plow operators and monitors will base their field determination of this transition from Lewis Bay on passing south of Kalmus Beach and reaching GPS coordinates Lat 41° 37′ 49″ Long 70° 16′ 15″. At this time, monitoring frequency is expected to decrease, if not cease, assuming performance standards continue to meet the turbidity thresholds of the Plan. This frequency of turbidity monitoring will be conducted and reported on during the installation of the first of the two cable circuits; the results of the first circuit monitoring will influence the installation of the second cable circuit, and it is anticipated that the second cable circuit will not require monitoring outside of Lewis Bay.

According to the Massachusetts Surface Water Quality Standards (310 CMR 4.00), Class SA waters shall be free from color and turbidity in concentrations or combinations that are aesthetically objectionable or would impair any use assigned to this class. Although NTU standards for saltwater classifications have not been established for Massachusetts waters, existing literature review finds that water quality standards for turbidity (NTU) have been established for other states. Specifically, North Carolina enforces a 25 NTU turbidity standard for all saltwater classifications to protect aquatic life. Additional investigation revealed that for the Boston Harbor Navigation Improvement Project, a maximum of 40 NTU was measured twenty-five feet from the dredge bucket. Therefore, in order to satisfy the surface water quality standards, a threshold of 30 NTU above ambient conditions at the 150-175 foot down-current transect is proposed as offering adequate protection of the environment and facilitating installation operations. Once an ambient NTU is measured as part of the background monitoring for Lewis Bay and Nantucket Sound, the turbidity instrumentation will allow real-time detailing of plume characteristics sufficient for both scientific and management needs. If depth-averaged turbidity levels at the 150-175 down-current transect approach 30 NTU above up-current background levels (i.e. reach or exceed 25 NTU above up-current background levels), preparations will be made to institute appropriate mitigation measures.. If average turbidity levels over the vertical exceed up-current background turbidity levels by 30 NTU at the 150-175 foot transect, the Proponent and contractor will evaluate and implement reasonable mitigation measures such as adjusting the fluid pressure or the rate of advancement of the jet-plow to minimize *in-situ* sediment disturbance. If required, additional mitigation measures will be implemented. Nothing in this Plan, however, shall preclude adjustments to installation protocols if such adjustments are necessary to achieve proper cable burial in a single installation pass.

4.0 REPORTING

Once the installation of the 115 kV submarine cable system commences, monitoring reports will be prepared and filed that include the stations traversed, a catalog of data collected, and other field notes/data used to guide the field monitoring. Following completion of the installation activities inside the 3-mile state jurisdictional limit, a final report will be submitted to MassDEP that will include the procedures, field data, findings, and limitations of the monitoring performed during all phases of the Plan. All results from the sampling locations will be provided to MassDEP.

Figures



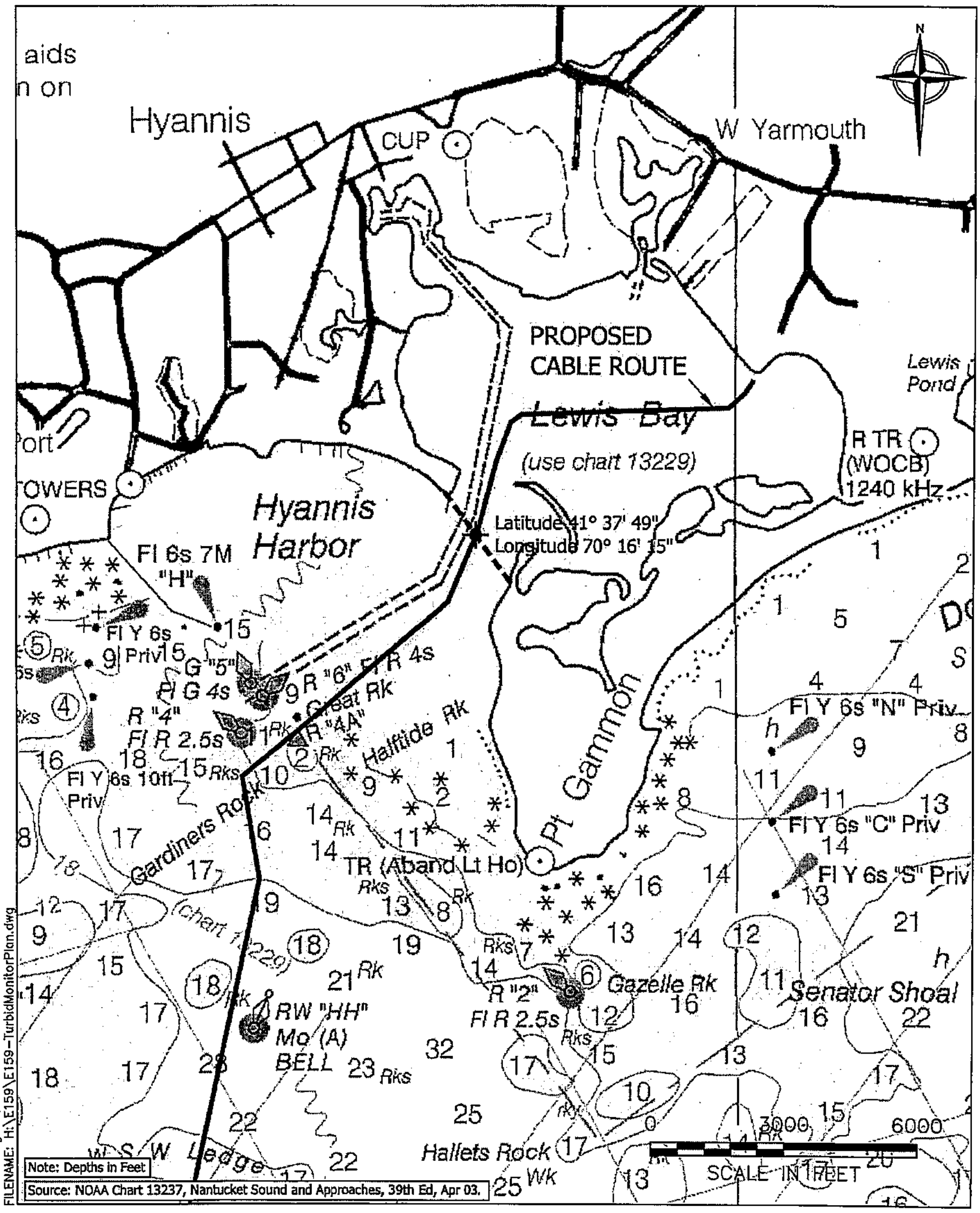
ESS Group, Inc.
Engineers
Scientists
Consultants

Cape Wind Associates, LLC
Cape Wind Project

0 60 120
SCALE IN FEET

Proposed Cofferdam Turbidity Monitoring

Figure 1



DATE: Aug 01, 2008 – 12:22PM
FILENAME: H:\E159\E159-TurbidityMonitorPlan.dwg

ESS Group, Inc.
Engineers
Scientists
Consultants

Cape Wind Associates, LLC
Cape Wind Project

Scale: 1"=3000'

Turbidity Monitoring Plan
Lewis Bay Demarcation

Figure 2

Cape Wind Associates
Water Quality Certificate, Transmittal #W133663
Attachment C

Landfall Preparation Marine Construction Plan

CAPE WIND PROJECT
LEWIS BAY

PREPARED FOR
Cape Wind Associates LLC
75 Arlington Street, Suite 704
Boston, Massachusetts 02116

PREPARED BY
ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482

Project No. E159-504.7

Revised May 21, 2008

ESS Group, Inc.

CAPE WIND PROJECT
LANDFALL PREPARATION
MARINE CONSTRUCTION PLAN

Lewis Bay

Prepared For:

Cape Wind Associates
75 Arlington Street, Suite 704Site Address
Boston, Massachusetts 02116

Prepared By:

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482

ESS Project No. E159-504.7

Revised May 21, 2008

ESS Group, Inc.

TABLE OF CONTENTS

SECTION **PAGE**

FIGURES

ESS Group, Inc.

1.0 INTRODUCTION

As part of the 401 Water Quality Certification application being submitted to MADEP, Cape Wind has included this "Landfall Preparation Marine Construction Plan" that describes the construction methods, monitoring protocols, and mitigation measures anticipated to be used in conjunction with preparation of the landfall area for installation of the submarine cables. The plan describes the operations required to install and remove the temporary cofferdam, dredge sediment within the temporary cofferdam to achieve required project depths, and to install cable conduits from land to the temporary cofferdam using horizontal directional drilling (HDD) methods.

The plan does not include descriptions of the operations necessary to install the submarine cables in this area.

2.0 CONSTRUCTION METHODS

The transition of the interconnecting 115 kV submarine transmission lines from water to land will be accomplished through the use of HDD methodology in order to minimize disturbance within the intertidal zone and nearshore area. HDD will be staged at the upland landfall area and involve the drilling of the boreholes from land toward the offshore exit point. Conduits will then be installed the length of the boreholes and the transmission line would be pulled through the conduits from the seaward end toward the land. A transition manhole/transmission line splicing vault will be installed using conventional excavation equipment (backhoe) at the upland transition point where the submarine and land transmission lines would be connected, Figure 2-1.

There will be four 18-inch (0.46 m) High Density Polyethylene (HDPE) conduit pipes (one for each three-conductor 115 kV cable and fiber optic cable set) installed to reach from the onshore transition vaults to beyond the mean low water level. The offshore end will terminate in a pre-excavated pit behind a cofferdam where the jet plow cable burial machine will start. The four conduits will have an approximately 10 foot (3 meters) separation within the cofferdam area. The four boreholes will be approximately 200 feet (61 meters) long (borehole diameters will be slightly larger than the conduit diameter to allow the conduit to be inserted in the borehole), Figure 2-1.

2.1 Pre-Construction Activities

Prior to beginning construction at the landfall, the contractor will perform certain pre-construction activities to prepare the area for construction. These pre-construction activities will include:

- Submittal of Marine Support Plan to Cape Wind (Refer to Section 3.2).
- Making required pre-construction notifications (Refer to Section 3.3).
- Installation of erosion and sedimentation controls as required.
- Mobilization of required upland and marine-based construction equipment to the work area.

2.2 Temporary Cofferdam

To facilitate the HDD operation, a temporary cofferdam will be constructed at the end of the boreholes. The cofferdam will help to facilitate threading of the submarine cable system through the 18-inch (45.7 cm) diameter HDPE pipes placed in the horizontal directional drilled boreholes. This temporary cofferdam will be installed prior to the beginning of the HDD borehole construction, and will remain in place until jet plow embedment installation of the submarine cable system is complete. Installation and removal operations will include a barge mounted crane, tender vessels, and possibly divers.

The cofferdam will be approximately 65 feet (19.8 meters) wide and 45 feet (13.7 meters) long and will be open at the seaward end to allow for manipulation of the HDD conduits. The area enclosed by the cofferdam will be approximately 2,925 square feet (271.7 square meters). The cofferdam will be constructed using steel sheet piles driven from a barge-mounted crane. The top of the sheet piles will be cut off approximately 5 feet (1.52 meters) above mean high water. During the removal of the material from the cofferdam, a turbidity curtain will be placed along the open end of the cofferdam. The placement of the curtain and the location of the top of the cofferdam, would serve to contain any turbidity associated with the dredging and subsequent jet plow embedment operations and to provide a visual reference to its location for mariners. While the cofferdams will be located outside of areas normally subject to vessel traffic, the location of the cofferdam will be appropriately marked to warn vessels of the temporary cofferdam's presence.

The temporary cofferdam will be installed by driving the sections sheet pile into the sediment using the barge-mounted crane. The sheet piles will be driven with either a vibratory or impact hammer. This decision will be left to the contractor. The temporary cofferdam will be removed by using the barge mounted crane to lift the pile sections out of the sediment. A vibratory hammer may be used to assist removal of the sheet pile sections. Divers may be used to cut the sections around the borehole conduits to assist removal.

It is anticipated that installation and removal of the cofferdam will take approximately one week each.

2.3 Dredging

The area inside the cofferdam will be excavated to expose the seaward end of the borehole. The dredging operation will include a barge mounted clamshell bucket or goose-neck excavator, tender vessels, and a scow for temporary storage of the dredged material.

Sediment inside the cofferdam will be excavated to expose the area where the HDD boreholes will end at an elevation of approximately -10 feet (-3 meters) MLLW, with a 1 foot (0.3 meter) allowable overdredge. A 20 foot (6.1 meters) long level area will be created at the closed end of the cofferdam at this elevation. From that point, the bottom of the excavated area will be sloped at 3H:1V until it meets the existing seafloor bottom contour. Approximately 840 cubic yards (642.2 cubic meters) of sediment will be excavated from the cofferdam.

The cofferdam excavation will be backfilled, rather than allowed to in-fill over time. The dredged material will be temporarily placed on a barge for storage[1], and then the dredged area of the cofferdam will be backfilled with the dredged material by the barge-mounted excavator. The use of a bottom dumping scow for backfilling is not anticipated. If necessary, the dredged material backfill will be supplemented with imported clean sandy backfill material to restore the seafloor to preconstruction contours. No removal of sediment outside of the cofferdam will be required.

It is anticipated that dredging inside the cofferdam will take approximately one week.

2.4 Horizontal Directional Drilling

The HDD and HDPE conduit installation process involves drilling a pilot hole by a directionally guided boring rig, followed by reaming to achieve the desired borehole dimension. The HDD operation will include an upland based HDD drilling rig system, drilling fluid recirculation systems, residuals management systems, and associated support equipment. HDD drilling material handling equipment will be located on New Hampshire Avenue. Drilling will take place from the upland to Lewis Bay. Excavated soils from the upland pit will be temporarily stored near the HDD drill rig during construction, and will then be reused onsite or removed and disposed of as required.

The HDD construction process will involve the use of bentonite drilling fluids in a water slurry in order to transport drill cuttings to the surface for recycling, aid in stabilization of the in situ sediment drilling formations, and to provide lubrication for the HDD drill string and down-hole assemblies. This drilling fluid is composed of a carrier fluid and solids. The selected carrier fluid for this drilled crossing will consist of water (approximately 95%) and inorganic bentonite clay (approximately 5%). To minimize the release of the bentonite drilling fluid into Lewis Bay, freshwater will be used as a drilling fluid to the extent practicable prior to the drill bit emerging in the pre-excavated pit. This will be accomplished by pumping the bentonite slurry out of the hole, and replacing it with freshwater as the drill bit nears the pre-excavated pit.

A drill rig will be set up onshore behind a bentonite pit where a 40-foot (12.1 meter) length of drill pipe will be set in place to begin the horizontal drilling. A bentonite and water slurry will then fill the pit in which the bentonite forms a hard shell lining of the tunnel wall during the drilling process. After each 40 feet (12.1 meter) of drill pipe installation, an additional length of drill pipe is added. When the drill bit emerges in the pre-excavated pit, the bit is replaced with a series of reamers to widen the borehole followed by a pulling head on the end of pipe and then the drill pipe is used to pull back the conduit into the bored hole from the offshore end. Freshwater will be utilized to the maximum extent practicable as the reaming process nears the pre-excavated pit as described below.

After the borehole has been constructed, 18-inch (45.7 cm) diameter HDPE pipe will be installed in each borehole to serve as protection for the submarine cable system. Pulling wires will be placed inside the 18-inch (45.7 cm) diameter HDPE pipe to facilitate the pulling of the submarine cable

[1] Most of the water would be contained within the barge. Any water that does exit the barge would do so at a relatively slow rate. The sediments would settle to the bottom of the barge, limiting any sediment in the water. If excessive sedimentation is observed while the barge is anchored, the barge would be surrounded by a turbidity curtain. The contractor will be required to limit the volume of dredged material in each barge so as to limit any spillage from the barge.

system. The conduits will be sealed at both ends until the submarine cable system is ready to be pulled through the conduit. After submarine cable system installation, the conduits will then be permanently sealed with a clay/bentonite medium to complete the installation process.

Upon completion of the installation of the conduit pipes and submarine cable system, the HDD equipment will be removed and New Hampshire Avenue will be restored to its pre-construction grades and conditions.

It is anticipated that the installation of the borehole and conduit by HDD techniques will take approximately two to four weeks.

3.0 PROTECTION OF NAVIGATION

Unrestricted navigational access to Lewis Bay will be allowed during Landfall Preparation operations. Marine traffic will only be restricted in the immediate vicinity of ongoing marine construction operations for protection of public safety. Cape Wind and its contractor will work closely with the US Coast Guard (USCG) to deconflict the waterway around the construction operations. The USCG routinely deconflicts waterways and channels around marine construction activities, and it is anticipated that such procedures will be implemented as necessary in Lewis Bay during Landfall Preparation operations.

3.1 Location of Work Area

The location of the work area is shown in Figure 3-1. The area, which is in the easterly end of Lewis Bay, is located approximately 5,500 feet (0.9 nautical miles) from the Federal Navigation Channel. Approximately 800 feet south of the work area, there is a privately marked channel.

3.2 Marine Support Plan Requirements

Cape Wind will require that its Contractor submit a Marine Support Plan (MSP) to Cape Wind prior to the start of any work. The MSP will describe the vessels, schedules, work routes, and communication practices associated with the Landfall Preparation work associated with the Cape Wind Project. The MSP will be required to include the number and location of vessels to be used during construction, ability of the vessels to relocate during construction, and the expected duration of use of the vessels.

3.3 Pre-construction Notifications

Prior to the commencement of Landfall Preparation activities, the Contractor will be required to request that the USCG issue a Notice to Mariners. This Notice to Mariners will be expected to included information such as a description of the work, the location of the work, proper channels for communications, and contact names for the working vessels. Independent of the Notice to Mariners, Cape Wind will contact the following parties one week prior to construction to provide information regarding the impending construction activities:

- USCG Sector Southeastern New England
- USACE New England District
- Massachusetts Department of Environmental Protection

- Yarmouth Conservation Commission
- Yarmouth and Barnstable Harbormasters
- Woods Hole, Martha's Vineyard & Nantucket Steamship Authority
- Hy-Line Ferries
- Local harbor pilots associations
- Local shellfish, lobster, and fishing companies

3.4 Communications

Communications between vessels involved in Landfall Preparation and local marine interests will be maintained throughout the duration of work in the area.

During construction, the Contractor will be responsible for communicating with parties that may be affected by any of the scheduled construction activities.

Work vessels will be required to monitor appropriate VHF radio channels (typically Channels 9, 13, and 16) during all construction operations.

3.5 Project Status Updates

Since Landfall Preparation construction activities in the area are only anticipated to last for two to six weeks, project status updates to the parties described in Section 3.3 will be limited to continued publication of the work in the Local Notice to Mariners. If the nature or duration of the Landfall Preparation operations must change significantly as a result of conditions encountered, Cape Wind will notify the parties listed in Section 3.3.

4.0 MONITORING DURING CONSTRUCTION

Cape Wind and the contractor will implement a visual monitoring program during dredging and HDD operations.

4.1 Horizontal Directional Drilling

The HDD operation will be designed to include a drilling fluid fracture or overburden breakout monitoring program to minimize the potential of drilling fluid breakout into waters of Lewis Bay. It is expected that the HDD conduit systems will be drilled through sediment overburden at the landfall location. However, it is anticipated that drilling depths in the overburden will be sufficiently deep to avoid pressure-induced breakout of drilling fluids through the seafloor bottom based primarily on estimates of overburden thickness and porosity. Nevertheless, a visual and operational monitoring program will be implemented during the HDD operation to detect a fluid loss. This monitoring includes:

- continual visual monitoring of surface waters in the adjacent Lewis Bay by drilling operation monitoring personnel while active HDD operations are underway to observe potential drilling fluid breakout points;
- continual drilling fluid volume monitoring by technicians throughout the drilling and reaming operations for each HDD conduit system;
- development and implementation of a fluid loss response plan and protocol by the drill operator in the event that a fluid loss occurs. These response plans shall include, at a minimum, halting HDD operations immediately once a release or frac-out is observed; contacting DEP as soon as possible once a release or frac-out occurs and reporting the time, duration and dimensions of the affected area; drill stem adjustments, injection of loss circulation additives such as Benseal that can be mixed in with drilling fluids at the mud tanks, and other mitigation measures as appropriate; and
- use of appropriate bentonite drilling fluids that will gel or coagulate upon contact with sea water.

4.2 Dredging

Since the dredging will take place within the temporary cofferdam area, suspended sediments resulting from dredging are anticipated to be largely confined within the cofferdam. To further minimize the sediment dispersal and turbidity, a turbidity curtain will be placed at the open end of the cofferdam pit during dredging and backfilling of the pit. During dredging operations, suspended sediment conditions in the area of the dredging will be visually monitored on a daily basis.

5.0 MITIGATION MEASURES

The following is a summary of the proposed mitigation for potential impacts to Water Quality as a result of Landfall Preparation operations:

- The Project has been planned, sited, and designed to avoid and/or minimize impacts to water quality within the Project area.
- Cape Wind will work with the Yarmouth Shellfish Constable to mitigate for any short-term impacts to shellfish productivity.
- Cape Wind will provide the Town of Yarmouth with funds to mitigate for the direct area of impact within the Town's designated recreational shellfish bed in accordance with the Town's mitigation policies.
- The transition of the interconnecting 115kV submarine transmission lines from water to land will be accomplished through the use of HDD methodology in order to minimize disturbance within the intertidal zone and nearshore area.
- To minimize the release of bentonite drilling fluid into Lewis Bay during HDD, freshwater will be used as a drilling fluid to the extent practicable prior to the drill bit or the reamer emerging in the pre-excavation pit.

More detailed description of the mitigation measures proposed for the HDD and dredging operations are provided in the following sections.

5.1 Horizontal Directional Drilling

In the unlikely event of an unexpected drilling fluid release, the bentonite fluid density and composition will cause it to remain as a cohesive mass on the seafloor in a localized slurry pile similar to the consistency of gelatin. This cohesive mass can be quickly cleaned up and removed by divers and appropriate diver-operated vacuum equipment.

As described above, a bentonite and freshwater slurry will be used as the drilling fluid as the drilling and reaming operations approach the exit point in the pre-excavated pit. The drilling fluid will consist of water (approximately 95%) and an inorganic, bentonite clay (approximately 5%). The bentonite clay is a naturally occurring hydrated aluminosilicate composed of sodium, calcium, magnesium, and iron. It is likely that some residual volume of bentonite slurry will be released into the pre-excavated pit. The depth of the pit and the temporary cofferdam perimeter are expected to contain any bentonite slurry that may be released. Prior to drill exit and while the potential for bentonite release exists, diver teams will install a water-filled temporary dam around the exit point to act as an underwater "silt fence". This dam will contain the bentonite fluid as it escapes and sinks to the bottom of the pre-excavated pit to allow easy clean-up using high-capacity vacuum systems.

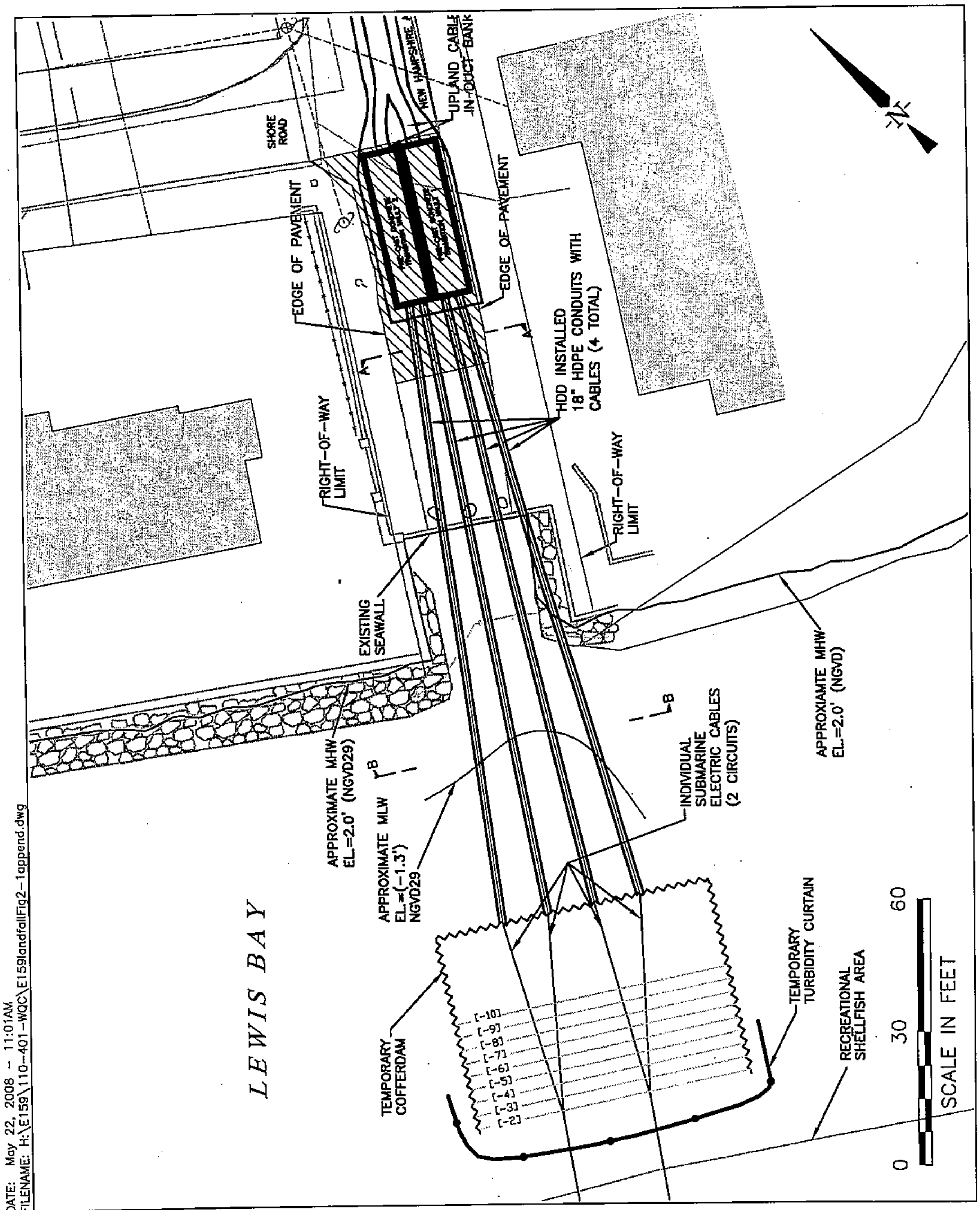
5.2 Dredging

Turbidity curtains will be used around the dredging operation when suitable conditions (i.e., currents and sea state) exist for their use. To provide for proper containment the dredged material, a storage barge will be used to hold the dredged material until it used to backfill the cofferdam location. The use of a deck barge for temporary storage of the dredge material will not be allowed.

5.3 Shellfish Reseeding

The designated recreational shellfish bed disturbed by project activities in Lewis Bay near the landfall will be re-seeded as discussed with the shellfish constable for the Town of Yarmouth. Cape Wind will provide the Town of Yarmouth with funds to mitigate for the direct area of impact within the Town's designated recreational shellfish bed in accordance with the Town's mitigation policies.

Figures



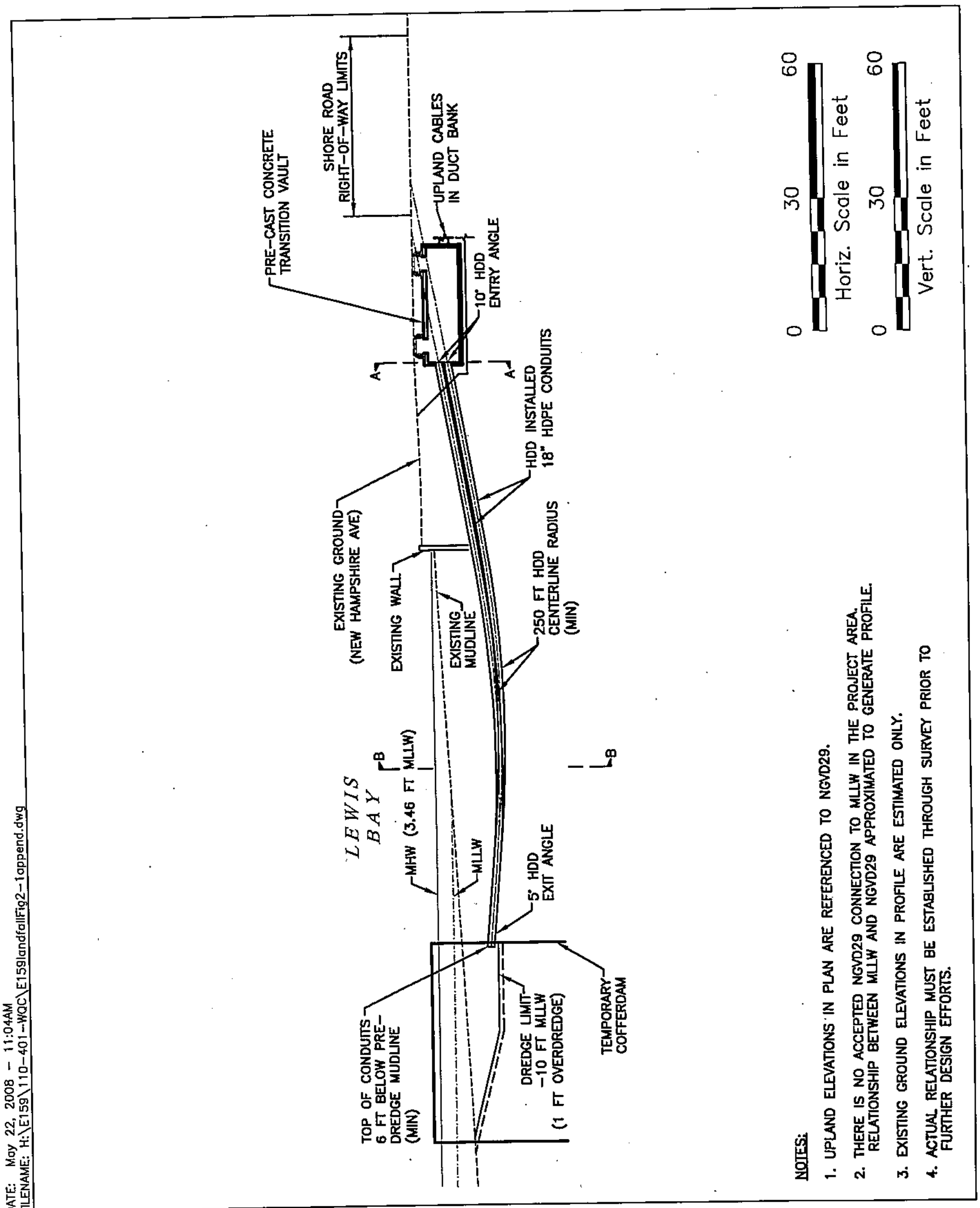
ESS Group, Inc.
Engineers
Scientists
Consultants

Cape Wind Associates, LLC
Cape Wind Project

Landfall Transition: Preliminary Design Plan

Figure 2-1
Sheet 1 of 3

DATE: May 22, 2008 - 11:04AM
FILENAME: H:\E159\110-401-WQC\E159landfallFig2-1append.dwg



NOTES:

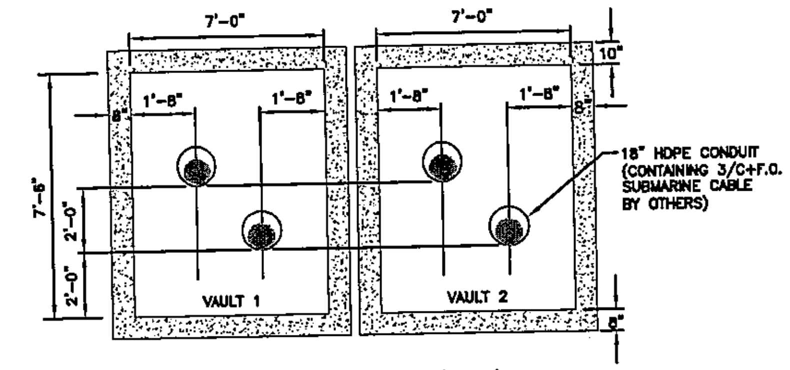
1. UPLAND ELEVATIONS IN PLAN ARE REFERENCED TO NGVD29.
2. THERE IS NO ACCEPTED NGVD29 CONNECTION TO MLLW IN THE PROJECT AREA. RELATIONSHIP BETWEEN MLLW AND NGVD29 APPROXIMATED TO GENERATE PROFILE.
3. EXISTING GROUND ELEVATIONS IN PROFILE ARE ESTIMATED ONLY.
4. ACTUAL RELATIONSHIP MUST BE ESTABLISHED THROUGH SURVEY PRIOR TO FURTHER DESIGN EFFORTS.

ESS Group, Inc.
Engineers
Scientists
Consultants

Cape Wind Associates, LLC
Cape Wind Project

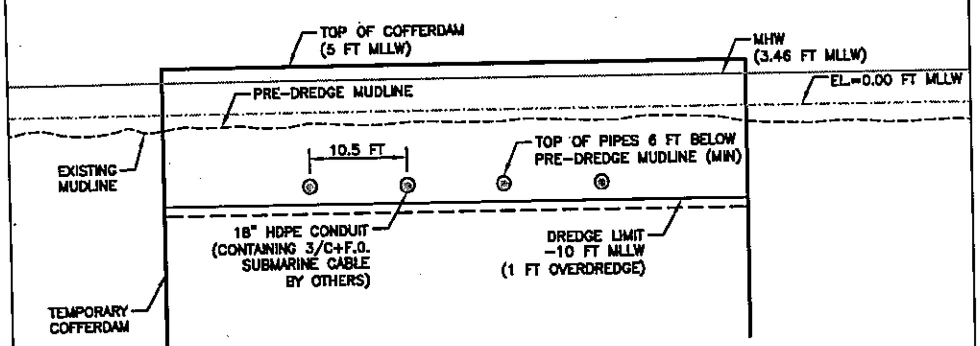
Landfall Transition: Preliminary Design Plan

Figure
2-1
Sheet 2 of 3



SECTION A–A

NOT TO SCALE



SECTION B–B

NOT TO SCALE

DATE: May 22, 2008 – 11:05AM
FILENAME: H:\E159\110-401-WQC\E159landfallFig2-1append.dwg

ESS Group, Inc.
Engineers
Scientists
Consultants

Cape Wind Associates, LLC
Cape Wind Project

Landfall Transition: Preliminary Design Plan

Figure 2-1
Sheet 3 of 3

DATE: May 22, 2008 - 11:07AM
FILENAME: H:\E159\110-401-WQC\E159landfallFig3-1append.dwg

IMAGE: H:\E159\003\CapeWind_Small72.jpg
IMAGE: H:\Charts\Nad83-ma-lal-ft\13229-3.tif

ESS Group, Inc.
Engineers
Scientists
Consultants

Cape Wind Associates, LLC
Cape Wind Project

Source: NOAA Chart #13229
Scale: 1"=1000'

Location of Work Area
Marine Construction Acitivities

Figure 3-1

Eelgrass Monitoring and Mitigation Measures

A. Construction Mitigation Measures

- Cape Wind will not anchor vessels or perform cable installation work in the Egg Island eelgrass.
- A turbidity curtain will be placed between the Egg Island eelgrass bed and the jet plow route during plowing activities so as to completely separate the eelgrass bed from plowing activities in order to minimize potential sediment deposition on the eelgrass. In accordance with the Turbidity Monitoring Plan (Attachment B to the Water Quality Certification), turbidity will be monitored on the eelgrass side of the silt curtain, in addition to monitoring along the route of the cables, during jet plowing in Lewis Bay.
- During installation of the submarine transmission cable within Lewis Bay, divers will be used to confirm correct placement of work vessel anchors in order to monitor and avoid any impacts to the Egg Island eelgrass bed.
- Cape Wind will demarcate the edge of the eelgrass bed at the water surface with buoys near Egg Island. In addition, Cape Wind will implement a No Wake Zone for its construction vessels at a distance of 200 feet (61 meters) from the edge of the eelgrass bed. The proposed extent of the No Wake Zone for Cape Wind construction vessels is shown in Figure 6 of the Water Quality Certification application.

B. Pre-construction eelgrass surveys

- A dive survey will be conducted to confirm the limits of the eelgrass bed near Egg Island (the "target site") no more than 60 days prior to the commencement of cable installation. Should aerial photography identify other eelgrass beds in the vicinity of the route of the transmission cable circuits, diver surveys may be required in those instances as well. The survey shall document the edge of the eelgrass bed closest to the work area in two ways: a) the last point at which vegetation is seen along the edge of the bed, and b) the edge of the continuous meadow. The edge of the bed defined in these ways will be marked using a buoy system (which will be visible from the surface). These buoys will be surveyed via Differential Global Positioning System (DGPS). No jet plowing is authorized within the eelgrass bed as delineated by the buoys. Additionally, transects through the eelgrass bed will be performed in order to determine the extent and health of the bed. The scope of work to perform the dive survey at the eelgrass bed within Lewis Bay will be coordinated with the appropriate state and federal agencies. At least six months prior to jet plow activities, Cape Wind shall provide to DEP, for its review and approval, a detailed description of the sampling design of the pre-construction survey as part of an Eelgrass Monitoring and Mitigation Plan.

C. Post-construction eelgrass monitoring

- The same protocol approved by DEP as part of the Eelgrass Monitoring and Mitigation Plan for use during pre-construction surveys shall be implemented following construction to assess any impacts to the eelgrass bed as revealed by change in shoot mass density and/or percent cover. Initial post-construction monitoring of the target site shall take place two weeks and four weeks after the jet plow passes the Egg Island eelgrass bed.
- Additional eelgrass surveys one year and two following construction may be required by DEP, or proposed by the applicant, based on the results of the surveys conducted after the initial post-construction surveys.
- In addition to the surveys proposed at the target site, a control site located outside of the potential area of impact shall be monitored to determine the rates of natural variability within the Lewis Bay eelgrass bed over the monitoring period in the event that monitoring is required beyond the initial post-construction surveys. The control site will be selected from an undisturbed area as close to the project site as practicable. The control site will also be selected to have habitat characteristics (depth, light, salinity, water flow, etc.) as similar as possible to those measured within the target site. The area offshore of Point Gammon has been proposed as a control site. Shoot mass density and/or percent cover shall be surveyed at the target site. The specific site to be used as the control site, and the rationale and alternative sites considered, shall be part of the Eelgrass Monitoring and Mitigation Plan to be approved by the Department.

D. Comparison of Pre-and Post-Construction Surveys

- In order to assess the effects of the proposed construction activities, the initial post-construction surveys documenting the edge of the eelgrass bed, shoot mass density and/or percent cover at the target site will be compared with the pre-construction survey. For any additional monitoring required, target and control sites will be compared based on a variety of variables which may include eelgrass bed area, eelgrass density, and/or shoot morphometrics. Specific monitoring and success criteria will be finalized during consultation with the appropriate regulatory agencies. This comparison between sites will assist in differentiating between impacts that may have been caused by construction activities versus the natural changes that may have occurred within the Lewis Bay eelgrass population due to annual variability that may be associated with fluctuations in habitat conditions. A detailed description of the Before Action Control Impact (BACI) analysis to be performed shall be prepared in cooperation with federal and state permitting agencies and presented to the Department for its review and approval as part of the Eelgrass Monitoring and Mitigation Plan. The description of the analysis shall include the criteria that are to be used to determine the health of the eelgrass bed and whether there has been a post-construction impact to the eelgrass resource.

E. Eelgrass mitigation

- If the surveys conducted at 2 and 4 weeks post-construction demonstrate that the proposed construction activities have been found to have caused detrimental impacts to the Lewis Bay eelgrass bed and the natural recovery is not progressing at an acceptable rate, DEP may require that additional surveying and/or compensatory mitigation be completed by Cape Wind. This mitigation will involve replanting the impacted area with a 3:1 ratio of impact to restoration so as to restore the original area of eelgrass. Specific details regarding compensatory mitigation, including criteria for determining whether the mitigation has been successful and what additional mitigation measures may be appropriate in the event that the replanting is not successful, will be developed in cooperation with appropriate federal and state regulatory agencies and included in the Eelgrass Monitoring and Mitigation Plan to be submitted to the Department for its review and approval.

Cape Wind Associates
Water Quality Certificate
Transmittal #W133663
Attachment E

Seafloor Habitat/Benthic Community Monitoring

CAPE WIND ENERGY PROJECT

SUBMITTED TO
Massachusetts Department of Environmental Protection
One Winter Street
Boston, Massachusetts 02108

SUBMITTED BY
Cape Wind Associates, LLC
75 Arlington Street, Suite 704
Boston, Massachusetts 02116

PREPARED BY
ESS Group, Inc.
401 Wampanoag Trail, Suite 400
East Providence, Rhode Island 02915

Project No. E159-504.7

April 23, 2008

www.essgroup.com

ESS Group, Inc.

SEAFLOOR HABITAT/BENTHIC COMMUNITY MONITORING
Cape Wind Energy Project

Submitted to:

Massachusetts Department of Environmental Protection
One Winter Street
Boston, Massachusetts 02108

Submitted by:

Cape Wind Associates, LLC
75 Arlington Street, Suite 704
Boston, Massachusetts 02116

Prepared By:

ESS Group, Inc.
401 Wampanoag Trail, Suite 400
East Providence, Rhode Island 02915

April 23, 2008

ESS Group, Inc.

TABLE OF CONTENTS

ESS Group, Inc.

1.0 INTRODUCTION

This plan describes the level of pre-construction, baseline, and benthic monitoring activities that have been performed or will be performed and outlines the proposed post-construction benthic monitoring program that will be implemented along the jet-plow embedment route of the submarine interconnecting transmission cable system associated with the Cape Wind Energy Project. This plan discusses the sequence of monitoring activities in support of the plan, the proposed sampling locations and level of effort, and the benthic community target endpoints. Standardized marine benthic sampling protocols are available for review under separate cover.

The Cape Wind Energy project has been designed to minimize impacts on resources found in the area through the use of a variety of techniques including jet plow cable embedment, use of mid-line anchor buoys and jack-up barges during construction, and the use of monopile foundations for the wind turbines themselves. However, it is recognized that construction and operational activities will result in minor loss, reduction, or temporary exclusion of some local resources, including seafloor habitat and the associated benthic communities. To evaluate these effects, Cape Wind Associates, LLC (Cape Wind) will undertake a seafloor habitat and benthic community monitoring program to measure impacts and the recovery of the benthic community to levels comparable to control areas established outside of the area of potential impact.

It should be noted that this proposed plan is for the area within Massachusetts's 3-mile jurisdictional limit (3-mile limit) and may need to be modified following the completion of the National Environmental Policy Act review presently being conducted, in order to be consistent with any monitoring or adaptive management program required, by the Minerals Management Service.

Table 1 provides a summary of completed and proposed monitoring components for the seafloor habitat and benthic community monitoring program.

Table 1. Seafloor Habitat and Benthic Community Monitoring Program

Component	Baseline Conditions	Frequency
Pre-construction Monitoring (2001–2005 and pre-construction)		
Benthic Community	Monitoring of benthic community composition throughout Horseshoe Shoal and along interconnecting route to Lewis Bay completed as part of the permitting process – data collection from 2001–2005	Completed 2001–2005
Seafloor Habitat	Video monitoring of selected transects prior to construction (post permit approval) to document seafloor habitat conditions such as substrate composition, submerged aquatic vegetation (SAV), etc. within the areas of proposed cable embedment and at locations outside of the area of potential habitat impact.	Pre-construction
Benthic Community	Video monitoring of selected transects prior to construction (post permit approval) to document the relative frequency of large epibenthic organisms such as lobster, crabs, scallops, etc. within and outside of the area of potential habitat impact.	Pre-construction

Component	Baseline Conditions	Frequency
Post-construction Monitoring (Year 1 and Year 2 Post-construction)		
Benthic Community	Monitoring of benthic community composition along the centerline of selected segments of the cable installation and at locations outside of the area of potential habitat impact but with comparable seafloor habitat as mapped by the pre-construction video monitoring program.	Years 1 and 2 post-construction (Year 3 post-construction potentially)

2.0 BACKGROUND

The Cape Wind submarine and interconnecting cable system will traverse 7.6 linear miles within the 3-mile limit. The submarine cable will be embedded using jet plow techniques through soft-sediment. Although the cables will be buried below the surface of the substrate, the substrate will be temporarily disturbed.

Most of the project will impact soft-bottom substrates and ubiquitous benthic communities. The geophysical surveys previously conducted have identified predominantly sandy substrates within the project area. Benthic samples will be collected from homogenous areas within and outside of the areas of impact to evaluate these substrates.

3.0 MONITORING ACTIVITIES

The seafloor habitats and benthic community monitoring program consists of two basic activities:

1. Video survey of habitat/substrate conditions; and
2. Benthic community analysis.

Video survey will be performed in order to document resources along three pre-selected sections of the cable embedment route up to 0.5 miles each. The video recordings made along the cable embedment route will be used to select a control area within 5 miles of the project area. The control area will be selected to have similar habitat features (e.g. sediment type and depth) to those observed along the cable embedment route and outside of the influence of any known sources of disturbance or unnatural alteration of water chemistry or sediments. The control area and the stations along the cable route will then be sampled for benthic invertebrates following the construction activities.

A conceptualized representation of the proposed benthic community sampling locations within the 3-mile limit is provided in Figure 1. The final locations will be selected following the pre-construction video monitoring effort so that locations within the control and impact areas can be chosen based on similarity of habitat types (e.g. sediment type, depth, anticipated current patterns, etc.).

3.1 Resource Characterization

Various types of resources have been, and will be, characterized so that post-construction effects can be monitored. These resources include the following.

- Shellfish: The primary species of concern are sea scallops and, to a lesser extent, ocean quahogs.

- Sea scallops – Although scallops are not prevalent in the project area, they were present within the Yarmouth shellfish bed in very limited numbers. Video survey data will be obtained from inside the 3-mile limit for selected transects along the construction corridor and from along a control corridor.
- Ocean quahogs – Cape Wind has already agreed to perform mitigation for quahogs within known quahog habitat. No monitoring specific to quahogs is proposed, although additional quahog data may become available through the video survey or the benthic grab sampling programs.

- Benthos: Assessment of benthic community composition and diversity will be the primary measures for determining recovery. Benthic organism abundance will be assessed, but not relied upon, as the sole means for determining recovery since this can be greatly influenced by inter-annual and inter-seasonal factors.

4.0 PRE-CONSTRUCTION MONITORING

The seafloor habitat and benthic community monitoring program is proposed to document the existing conditions in the project area and provide a framework for assessing the actual impacts and recovery of the benthic habitat following construction. Sampling conducted during 2001, 2003, and 2005, along with the additional video monitoring that will occur prior to construction (post-permit approval), will serve as the basis for comparison with the post-construction conditions. The pre-construction monitoring period will be selected to coincide and support pre-construction data obtained during the surveys of 2001, 2003, and 2005 for subsequent comparison to post-construction data proposed for the same period (summer).

4.1 Video Survey

Video surveillance is proposed for three pre-selected cable embedment segments within the 3-mile limit, each up to 0.5-mile in length with the intent being to collect all video data in a single day. A video camera with global positioning system (GPS) linkage will be towed along each of the routes, tracking the centerline. Video surveillance is preferable to static image cameras since the intent of this survey is to document the similarities or differences between large general areas along the cable embedment route and the control area rather than examine specific attributes of a single location such as sediment grain size (which has been demonstrated to be relatively uniform across the project area) or the depth of the redox layer (which is not relevant in this mobile substrate environment).

Depending on water clarity, the video camera will be towed from 2 to 8 feet above the substrate. The field of view of the substrate will depend on the height of the sled but is generally about 1 to 1.5 times the height above the bottom. Height above the substrate will be determined to aid in the semi-quantitative analysis of the video. The remotely operated vehicle (ROV) will be towed at 0.5 to 1 knot to provide good resolution of the substrate. A marine biologist will be on board during the survey to make recommendations on speed and elevation to ensure that the quality of the video will be sufficient for the desired analysis.

Once collected, videos of the selected segments of the route will be reviewed by a marine biologist. The three pre-selected segments will be targeted to include the dominant bottom type identified during geophysical surveys of the project area.

Observations will be made for presence/characterization of epibenthic invertebrates (lobsters, crabs); shellfish (especially scallops); lobster burrows; fish habitat; substrate texture; other organisms identified to lowest possible taxonomic level; and other features. It should be noted that based on the baseline data collected to date, very little evidence exists that would indicate use of the project area by lobsters or scallops; however, the video survey is expected to confirm this. A semi-quantitative index of abundance or frequency for immobile species (shellfish) or features (burrows, substrate texture) will be developed from videotape review.

The following observations will be made:

- Presence and general characterization of the substrate (three-dimensional features and regularity).
- Presence and general characterization of epibenthic invertebrates (especially lobster and crabs).
- Presence and general characteristics of shellfish (especially scallops).
- Evidence of lobster burrows, if visible.
- Presence and general characterization of fish and habitat.
- Organisms that have been identified to the lowest practicable taxonomic level.
- Location of features.

Footage from similarly sized segments of the control corridor will be obtained and reviewed to confirm that these areas are similar to the benthic stations selected along the cable route. It is in the best interest of Cape Wind to ensure that the control corridor selected is as similar as possible to the cable embedment route (or construction corridor) in order to eliminate potential variables that may result in dissimilar benthic communities between the control and impact locations.

4.2 Benthic Community Analysis

Cape Wind has already performed a comprehensive assessment of the benthic community baseline condition within the project area. Additional pre-construction sampling of the benthic community is not proposed since it is the intent of this monitoring program to compare post-construction-impacted areas to post-construction areas that were not impacted (control or reference sites) within the same period of time. This will allow for a better understanding of the rate of benthic community recovery and be less susceptible to inter-annual and seasonal variability.

Recovery of communities within the dominant substrate or habitat type to pre-construction function and values will be determined based on the comparison of the post-construction monitoring results from impacted areas to post-construction monitoring results from reference, or control, areas of similar habitat type. Comparison of post-construction monitoring results to pre-construction monitoring results may also be performed, but this comparison will not be relied upon as the sole determinant of recovery.

The primary function of the dominant benthic habitat in the project area is to support benthic diversity and abundance, provide potential for shellfish habitat, and fish support. The benthic community composition is generally a good indication of these functions. Species composition, diversity, and abundance can all be assessed using numerical classification methods that calculate similarity values among and between sites. Information on the ecological role of individual taxon (e.g., successional stage) can be incorporated into the review.

5.0 POST-CONSTRUCTION MONITORING

Post-construction monitoring of the seafloor habitat and benthic community is proposed to document the continued existing conditions (i.e., control corridor stations) in the dominant substrates identified within the project area (principally sand) and assess the actual impacts and recovery of the benthic habitats following construction. Sampling conducted during 2001, 2003, and 2005, along with the additional video monitoring that will occur pre-construction, will serve as a basis for comparison with the post-construction conditions.

The subsequent post-construction monitoring activities will be conducted during the summer one year and two years post cable installation (with a possible extension through three years post-installation). If evaluation of field data indicates that recovery is occurring as expected then subsequent annual monitoring activities (Year 3) would not be necessary.

The benthic samples will be taken during the summer (July 1–September 30) following the date of jet-plow activity at pre-determined survey locations. A minimum of six months shall elapse between jet plow activity and the proposed benthic sampling before the program commences. An effort will be made to complete sampling activities within a one-week period, or, if not possible, on subsequent days with similar weather and oceanic conditions to ensure consistency.

A total of up to five sampling locations are proposed to be collected from locations on the centerline of the cable route. An attempt will be made to locate samples within the dominant substrate type present. An additional five samples will be obtained from the control corridor with similar sediment and depth characteristics that are adjacent to the cable route at a maximum distance of 5 miles in order to provide control data.

The proposed sampling size (five) was derived from iterative solutions of the minimum sample size equation for a one-sample/paired-sample t-test over a range of effect sizes (Zar, 1996[1]). An estimate of the standard deviation in taxonomic richness for the study area was obtained from data collected as part of the Benthic Macroinvertebrate Community Assessment in Summer 2001. Data from later assessments in 2003 and 2005 were not included in the estimate of standard deviation because they were either collected during a different season (i.e. spring or fall) or at geographic locations outside of the proposed

[1] Citation: Zar, J.H. 1996. Biostatistical Analysis, 3rd ed. Prentice Hall. 662 pages.

project area. Therefore, to avoid introducing seasonal and geographic variability (which are not expected to be important factors in the proposed monitoring plan), only the geographically relevant data from the 2001 assessment were used.

The estimated standard deviation was used to derive a curve of sample size against effect size (i.e. detectable difference). As one moves along the curve from left to right, the improvement in detectable difference per sample collected decreases asymptotically (Figure 2). The proposed sample size of five was chosen partly because the marginal improvement per additional sample decreases to less than one at this point. Furthermore, a sample size of five allows a resolution of detectable difference in richness that is better than 1.5 standard deviations. This is anticipated to be sufficient for the detection of meaningful differences in taxonomic richness between the construction corridor and the control corridor.

The post-construction monitoring program will replicate the sampling methodology and protocols used to conduct the pre-construction monitoring that was completed between 2001 and 2005.

5.1 Benthic Community Analysis

The benthic infauna will be identified to the lowest practical taxonomic category as had been done previously for the pre-construction monitoring completed during 2001 through 2005; benthic community parameters such as species density by sample, the dominant infaunal species, evenness of distribution, and community assemblage patterns will be developed. Species composition, diversity, and abundance can all be assessed using numerical classification methods that calculate similarity values among all stations and collections. Information on the ecological role of individual taxon (e.g., successional stage, mobility, etc.) can be incorporated into the review.

5.1.1 Framework for Evaluating Benthic Community Recovery

A framework for determining the success of benthic community recovery is outlined in Table 2. This general approach will be implemented as a part of the evaluation process, although the details may change as required.

Table 2. Framework for Evaluating Benthic Community Recovery

Dominant Substrate	Method	Criteria
Sand	1. Similarity of community composition	▪ Post-construction, centerline stations in construction corridor should exhibit same level of similarity to reference stations in control corridor
	2. Taxa richness	▪ Post-construction, no significant differences in species richness between construction corridor and control corridor

The decision for continued monitoring during Year 3 post-construction will be based on discussions between Cape Wind and an agency review group. The decisions will be based upon the data gathered during the monitoring activities and results of the various statistical analyses that will be conducted. The monitoring plan is scheduled to last up to three years post-construction, with a minimum of one year. Each year the data will be reviewed and a determination made as to whether or not "recovery" has been reached. Table 3 describes the approach, or tools, that will likely be used to evaluate to what degree a system may have recovered and to determine the need for further monitoring or additional mitigation.

Table 3. Benthic Habitat Recovery Evaluation Approach/Tools

Analytical Tool	Recovered	Not Recovered
Clustering (similarity analysis) and ANOSIM (or comparable analysis) - Benthic community structure (species composition)	Post-construction – the benthic community of the construction corridor clusters with control corridor; no significant differences (ANOSIM or comparable analysis). Recovered if there is >75% assurance of similarity.	Post-construction – the benthic community of the construction corridor does not cluster with that of the control corridor; differences are significant (ANOSIM or comparable analysis). Not recovered if there is <75% assurance of similarity.
t test* - Species richness - Abundance of filter feeders	No significant difference between the construction corridor and control corridor (an increase in species richness within the construction corridor is acceptable). The benthic community of the construction corridor exhibits same pattern as control corridor.	Measures of interest are significantly different between the construction corridor and control corridor.

*A *t* test is assumed to be appropriate based on the distribution of the 2001 benthic assessment data. However, a nonparametric alternative test may be deemed more suitable if the data collected during the benthic monitoring program do not appear to be normally distributed.

5.1.2 Habitat Restoration Success – Decision Making Process

The steps to be employed to determine if successful restoration is achieved are outlined below.

1. First Year Post-construction Monitoring.
   i) Cape Wind will complete the required surveys in accordance with the agreed-upon criteria.
   ii) Cape Wind will prepare a monitoring report that summarizes the monitoring results in accordance with the agreed-upon criteria and will make a recommendation regarding the need for additional monitoring.
   iii) Cape Wind will organize a meeting with the applicable agencies to discuss the results presented in the monitoring report. If the benthic community diversity in the construction corridor is not deemed to be recovered to a level comparable to the control corridor, additional monitoring will be performed during Year 2.
2. Second Year Post-construction Monitoring (if needed).

i) Cape Wind will complete the required surveys in accordance with the agreed-upon criteria.

ii) Cape Wind will prepare a monitoring report that summarizes the monitoring results in accordance with the agreed-upon criteria and will make a recommendation regarding the need for additional monitoring.

iii) Cape Wind will organize a meeting with the applicable agencies to discuss the results presented in the monitoring report. If the benthic community diversity in the construction corridor is not deemed to be recovered to a level comparable to the control corridor, additional monitoring will be performed during Year 3.

3. Third Year Post-construction Monitoring (if needed).

   i) Cape Wind will complete the required surveys in accordance with the agreed-upon criteria.

   ii) Cape Wind will prepare a monitoring report that summarizes the monitoring results in accordance with the agreed-upon criteria and will make a recommendation regarding the need for additional monitoring or mitigation.

   iii) Cape Wind will organize a meeting with the applicable agencies to discuss the results presented in the monitoring report. If the benthic community diversity in the construction corridor is not deemed to be recovered to a level comparable to the control corridor, Cape Wind may request the opportunity to perform an additional year of monitoring if the data show a trend toward recovery that would be achieved within an additional year's time. If the data do not exhibit such a trend, then the construction corridor will be deemed not recovered and the plan for mitigation will be discussed.

   iv) Mitigation, if necessary, will be determined by the responsible agency/ies and will be comparable in scope and scale to the nature of the impact.

5.1.3 Post-construction Benthic Monitoring Protocols

The following guidelines are to be used for marine benthic macroinvertebrate sampling conducted using a gravity dredge (VanVeen, Ekman, Shipek, or other similar device) deployed from a boat. The laboratory analysis procedures outlined below are specific with respect to critical techniques and quality assurance and quality control procedures.

The following materials may be required for this procedure.

Field Equipment

- Gravity Dredge (VanVeen, Ekman, Shipek, or other similar dredge)
- Forceps (may be useful but not necessary)

- 10% Buffered Formalin Solution to then be diluted to 10% strength with sample in sample jar
- One sample jar per site (liter size or larger)
- Labels and markers for sample jars (or write-in-the-rain paper and a pencil)
- 9-inch by 13-inch (or larger) pan (may be useful but not essential)
- Wash bottle or similar device (may be useful but not essential)
- Large scoop w/ handle (ideal) or rubber gloves

Laboratory Equipment

- Ethyl Alcohol
- Rose Bengal
- Sieve with screen size less than 0.5 millimeters
- Two funnels
- Waste formalin container
- Bucket with spout
- Several small plastic containers (sorting pans)
- Small (<200 milliliters) sample jars
- Collection and Processing Log
- Forceps – fine-gauge
- NHCl
- Dissecting microscope
- Fiber-optic lamp
- Marine invertebrate identification keys

<u>Macroinvertebrate Collection</u>

The details provided below assume that the work will be conducted from the research vessel.

Summary of Requirements

- All samples to be taken with a gravity dredge.
- Samples must be taken from all sediment coring locations. Each sample is to be placed into a separate jar and labeled with all pertinent information (site ID, date, collector name, etc.).
- Sample coordinates and water depth will be recorded for each sample taken at each site.

- If samples are silty in nature, top 2 inches of material (with benthic organisms) will be placed directly into a 500-micron (µm) sieve for on-board sieving prior to being placed into the sample jars, otherwise the top 2 inches of material are to be preserved in their entirety within one or more appropriately labeled jars.
- All samples must be preserved on the day of collection with a solution representing 10% formaldehyde (see below for details) and mixed well.

Specific Requirements

1. Sample bottom material with gravity dredge. As with most dredges, open jaws on dredge and lock in ready position. Ensure that metal flaps are open on top of sampler to minimize disturbance of benthic community by shockwave generated by lowering dredge. Lower dredge to the bottom such that the dredge is directly below the boat and vertically aligned. It is best to do this with minimal disturbance of the bottom. Drop the messenger to trigger jaws (if Ekman type dredge) or consult dredge manual. Once jaws have been released, give a quick, but slight, tug to completely set jaws around mud sample. A slack tide, minimal currents, or good timing may be required to effectively get samples.
2. Record location of sample on site map (in relation to core location) as accurately as possible (GPS coordinates if possible). Record water depth and type of substrate material retrieved whenever possible.
3. If samples are silty in nature, top 2 inches of material (with benthic organisms) will be placed directly into a 500-µm bucket sieve for on-board sieving prior to being placed into the sample jars, otherwise the top 2 inches of material are to be preserved in their entirety within one or more appropriately labeled jars.
4. When sieving on board, place entire sample (benthic organisms and muck) directly into a 500-µm bucket sieve. Sieve is to be cleared of all fine materials (silt and mud) by lowering it into water over the side of the boat without overtopping its rim. The sieve bucket is then raised to allow water and fines to flow out the bottom (twisting the bucket back and forth enhances this process).
5. Ideally, jars should contain no more than one-half of their volume of actual sample material. If additional storage is required, additional jars should be created and labeled.
6. Preserve sample by adding enough Formalin solution to bring the sample to 10% Formalin solution and 90% sample and seawater. Make sure that the Formalin solution is mixed well within the sample but do not shake vigorously. If you are not able to properly preserve sample with Formalin in the field, you can preserve the samples on ice for up to 24 hours, at which time they must be preserved with Formalin.
7. Return preserved samples to ESS Group, Inc. (ESS) for laboratory analysis.

The following is the protocol for laboratory analysis.

Summary of Requirements

- Invertebrates will be stained with a concentrated Rose Bengal Stain and Ethyl Alcohol solution.
- Samples will be sub-sampled and sorted manually using a dissecting microscope.
- Sorted samples will be preserved with 70% ethanol in small appropriately labeled jars.
- Microscope identification will be performed for all processed samples.
- Organisms will be identified to lowest practical taxon using 45X magnification and available taxonomic keys.

Specific Requirements:

1. In order to facilitate the sorting procedure, 2 milliliters of Rose Bengal stain and Ethyl Alcohol solution will be added to each sample.
2. Each sample is to then be sub-sampled and sorted under a dissecting microscope. Sub-sampling is conducted by pre-dividing the material in a sieve into quarters and eighths then removing organisms from a single eighth. If over 100 organisms are found, sorting for the sample is considered complete. If fewer than 100 organisms are found, additional eighths are to be sorted until over 100 organisms are retrieved.
3. Sorting under the microscope will enable organisms to be sorted into the following broad taxonomic groups: arthropods, annelids, mollusks, and "others" for quicker identification.
4. After processing a sample, the sorter will log the sample into the Processing Log Sheet for each sample site.
5. Types (to the lowest practical taxonomic level) and counts for all organisms within each sample will be determined through the use of a dissecting microscope (up to 45X magnification), a fiber optic lamp, standard dissecting tools, and appropriate taxonomic keys.

Quality Assurance/Quality Control

The quality assurance/quality control protocol for the benthic monitoring program will be comparable to procedures outlined for other similar assessment programs. ESS will randomly perform a quality check on a minimum of 10% of the samples analyzed. This quality check will cover both the sorting and the identification phases of the analysis.

For the sorting phase, if more than 10% error (calculated by dividing the number found in the quality check by the total number of individuals) is found between the sorter and the quality assurance check, four additional samples will be reprocessed. If the error in those samples is more than 10%, then all samples sorted by that individual will be reprocessed.

For identification, a second ESS staff member trained in macroinvertebrate identification will randomly check a minimum of 10% of the samples analyzed. The purpose of this check will be to validate the identifications made on the individuals comprising the sample. In addition, ESS will confirm the identifications made with other regional experts as necessary.

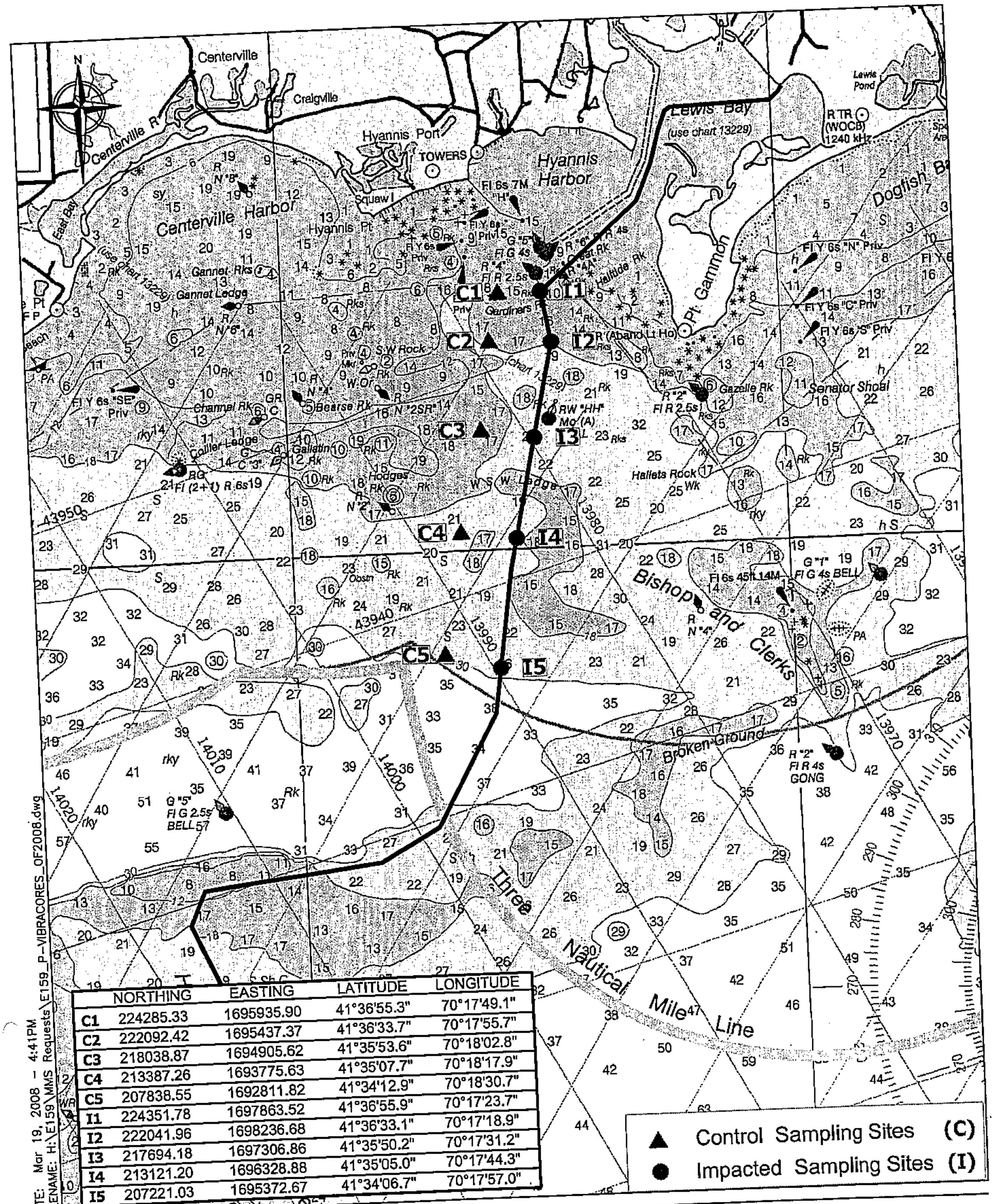
A record of the results of each of the various quality assurance checks described above will be kept in a laboratory analysis log.

6.0 PROPOSED AVOIDANCE, MINIMIZATION, AND MITIGATION

The following is a comprehensive summary of the proposed avoidance, minimization, and mitigation for potential impacts to benthic species and shellfish that has already been committed to by Cape Wind.

- Utilizing state-of-the-art hydraulic jet plow for cable installation in order to minimize seabed disturbance and sediment dispersion during cable embedment.
- Utilizing monopile foundations for wind turbine generator towers which minimize the seabed footprint and sediment disturbance while also minimizing opportunities for benthic organism colonization or fish habitat creation.
- Post-construction monitoring to document habitat disturbance and recovery.
- The use of mid-line buoys on anchor lines in order to minimize the impacts from anchor line sweep.
- The duration and sequencing of construction has been designed to minimize the period of disturbance.
- Impacts to benthos and benthic habitat in Lewis Bay within 200 feet (61 meters) of shore would be minimized by using horizontal directional drilling methodology to transition the submarine cable system to the shore.
- Cape Wind will work with the Yarmouth Shellfish Constable to appropriately avoid or minimize impacts to designated shellfish areas from installation of the submarine cable. Cape Wind would provide the Town of Yarmouth with funds to mitigate for the direct area of impact within the Town's designated recreational shellfish bed in accordance with the Town's mitigation policies.
- Notification of registered lobster fishermen well in advance of mobilization as to the location and timeframe of Project construction activities, as well as a daily broadcast to all mariners on VHS marine channel 16 as to the construction activities for that and upcoming days.

Figures



	NORTHING	EASTING	LATITUDE	LONGITUDE
C1	224285.33	1695935.90	41°36'55.3"	70°17'49.1"
C2	222092.42	1695437.37	41°36'33.7"	70°17'55.7"
C3	218038.87	1694905.62	41°35'53.6"	70°18'02.8"
C4	213387.26	1693775.63	41°35'07.7"	70°18'17.9"
C5	207838.55	1692811.82	41°34'12.9"	70°18'30.7"
I1	224351.78	1697863.52	41°36'55.9"	70°17'23.7"
I2	222041.96	1698236.68	41°36'33.1"	70°17'18.9"
I3	217694.18	1697306.86	41°35'50.2"	70°17'31.2"
I4	213121.20	1696328.88	41°35'05.0"	70°17'44.3"
I5	207221.03	1695372.67	41°34'06.7"	70°17'57.0"

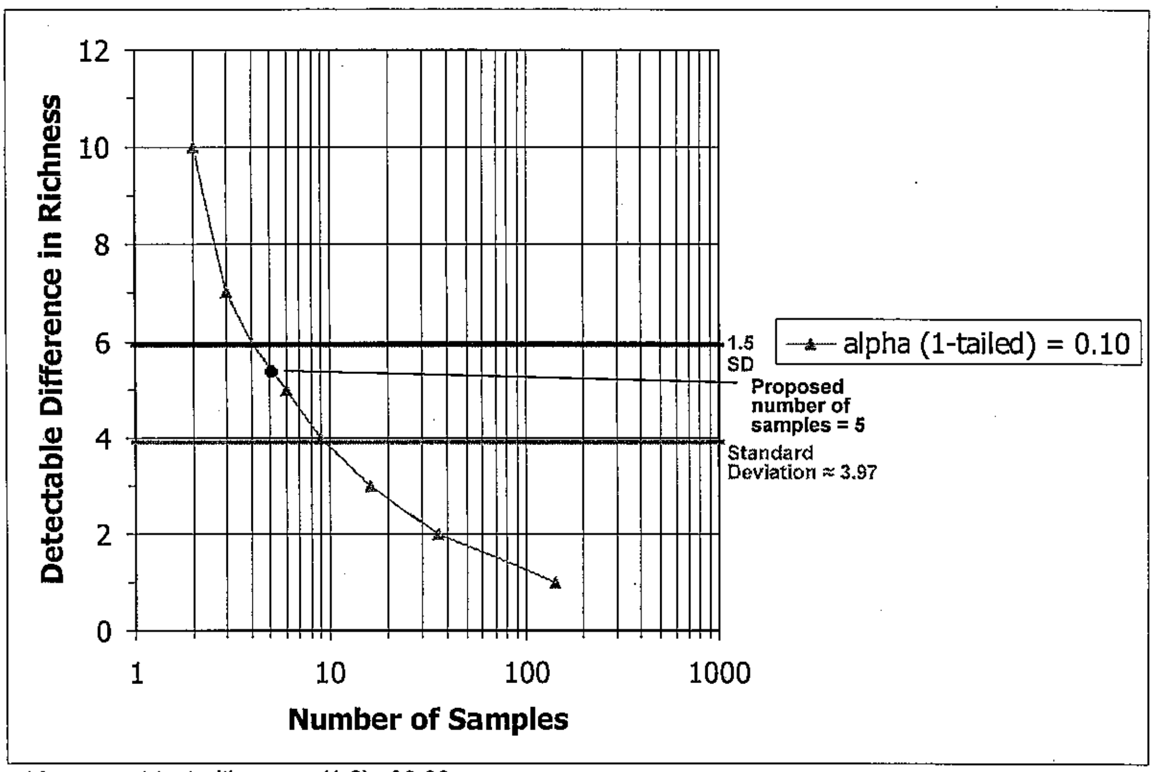
ESS Group, Inc.
Engineers
Scientists
Consultants

Cape Wind Associates, LLC
Cape Wind Project

SCALE: 1"=6000'

Schematic Representation of Post Construction Benthic Community Sampling Program within Massachusetts Waters

Figure 1



*Assumes t-test with power (1-β) of 0.80

ESS Group, Inc.
Engineers
Scientists
Consultants

CAPE WIND ENERGY PROJECT
Nantucket Sound

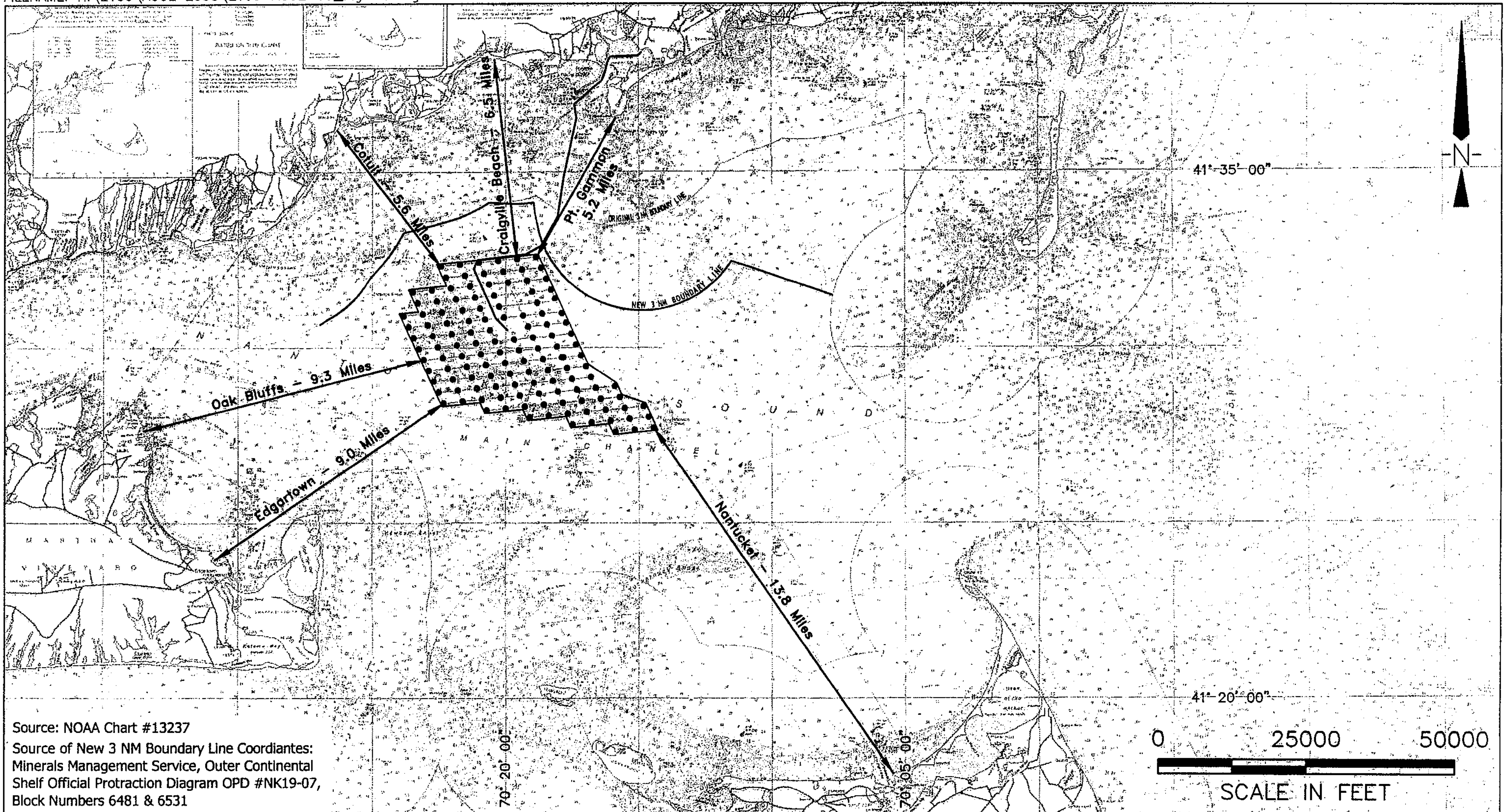
Source: 2001 Benthic Assessment Data

Sampling Effort Needed to Detect Differences in Benthic Invertebrate Taxonomic Richness in Nantucket Sound*

Figure 2

H-7 USACE Individual and Sect. 10/404 Permits

DATE: Jan 11, 2008 – 11:55AM
FILENAME: H:\E159\ACOE 2008\E159-ACOE-08_Fig-01.dwg

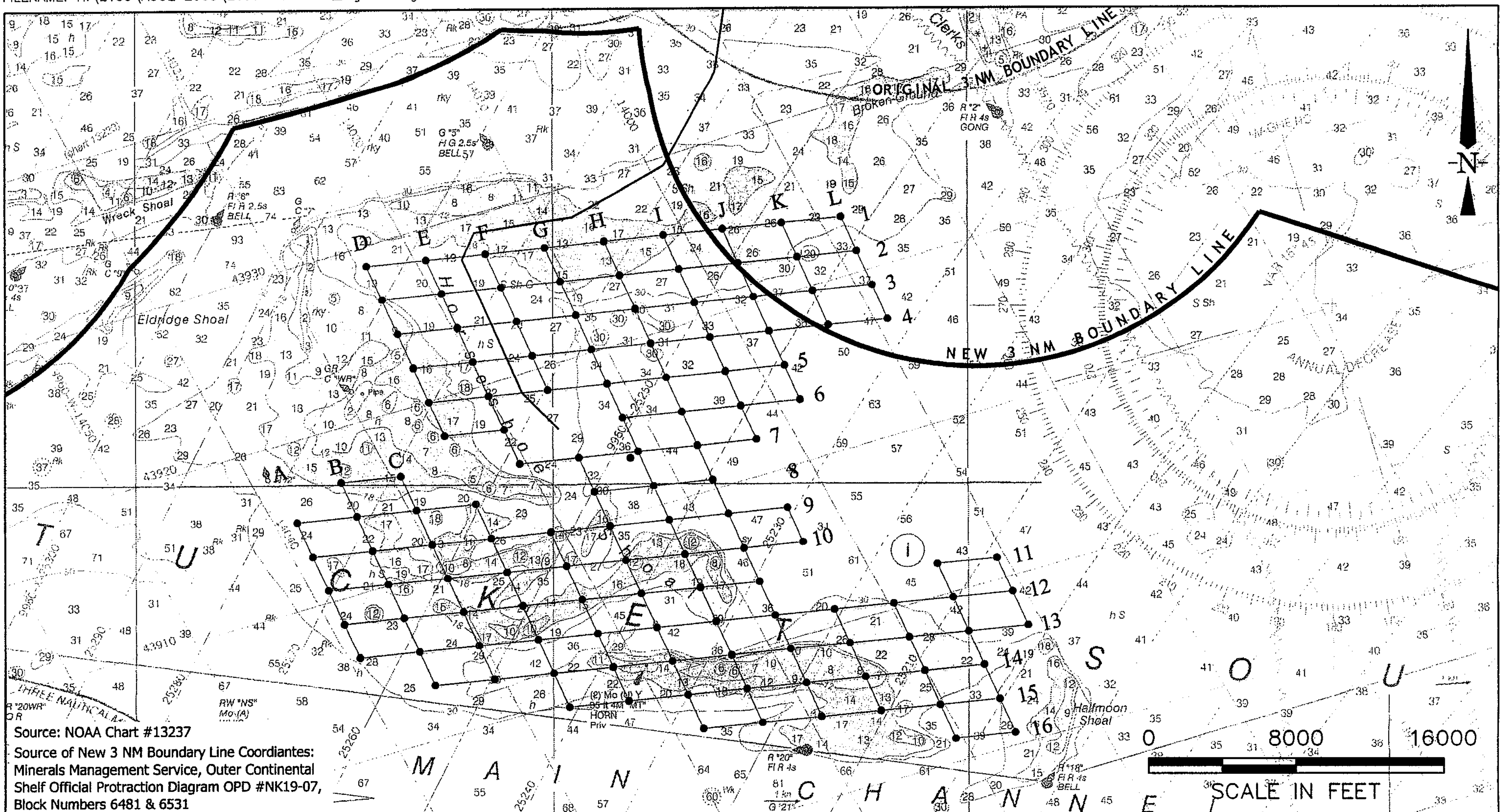


Source: NOAA Chart #13237
Source of New 3 NM Boundary Line Coordiantes: Minerals Management Service, Outer Continental Shelf Official Protraction Diagram OPD #NK19-07, Block Numbers 6481 & 6531

Purpose: Wind Energy Generation and Submarine/ Overland Transmission Cable Project	**Proposed Turbine Array** **Nantucket Sound & Approaches - New 3 Mile Boundary** **Cape Wind Project**	**SHEET NO.** **1 of 18**
Cape Wind™ Energy for Life.	At: Yarmouth, Barnstable County, Massachusetts In: Nantucket Sound Applicant: Cape Wind Associates, LLC	**DATE:** **February 15, 2007** **PROJECT NO.** **E159-504**

ESS Group Inc.

DATE: Jan 11, 2008 – 11:56AM
FILENAME: H:\E159\ACOE 2008\E159-ACOE-08_Fig-02.dwg

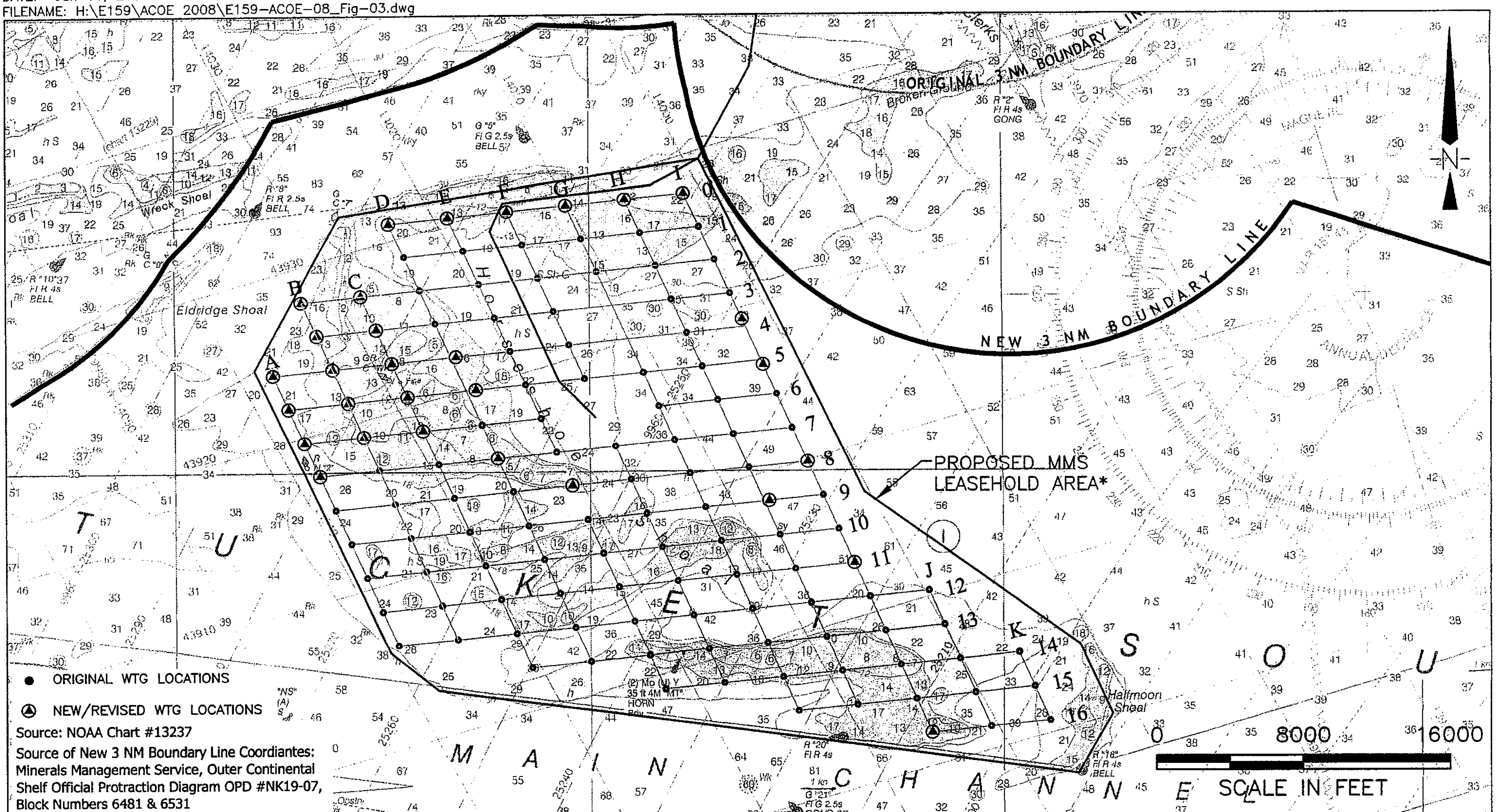


Source: NOAA Chart #13237
Source of New 3 NM Boundary Line Coordiantes: Minerals Management Service, Outer Continental Shelf Official Protraction Diagram OPD #NK19-07, Block Numbers 6481 & 6531

Purpose: Wind Energy Generation and Submarine/ Overland Transmission Cable Project	**Preliminary Turbine Array** **Nantucket Sound & Approaches - New 3 Mile Boundary** **Cape Wind Project**	**SHEET NO.** **2 of 18**
Cape Wind Energy for Life.	At: Yarmouth, Barnstable County, Massachusetts In: Nantucket Sound Applicant: Cape Wind Associates, LLC	**DATE:** **February 15, 2007** **PROJECT NO.** **E159-504**

ESS Group Inc.

DATE: Jan 11, 2008 – 11:59AM
FILENAME: H:\E159\ACOE 2008\E159-ACOE-08_Fig-03.dwg



● ORIGINAL WTG LOCATIONS

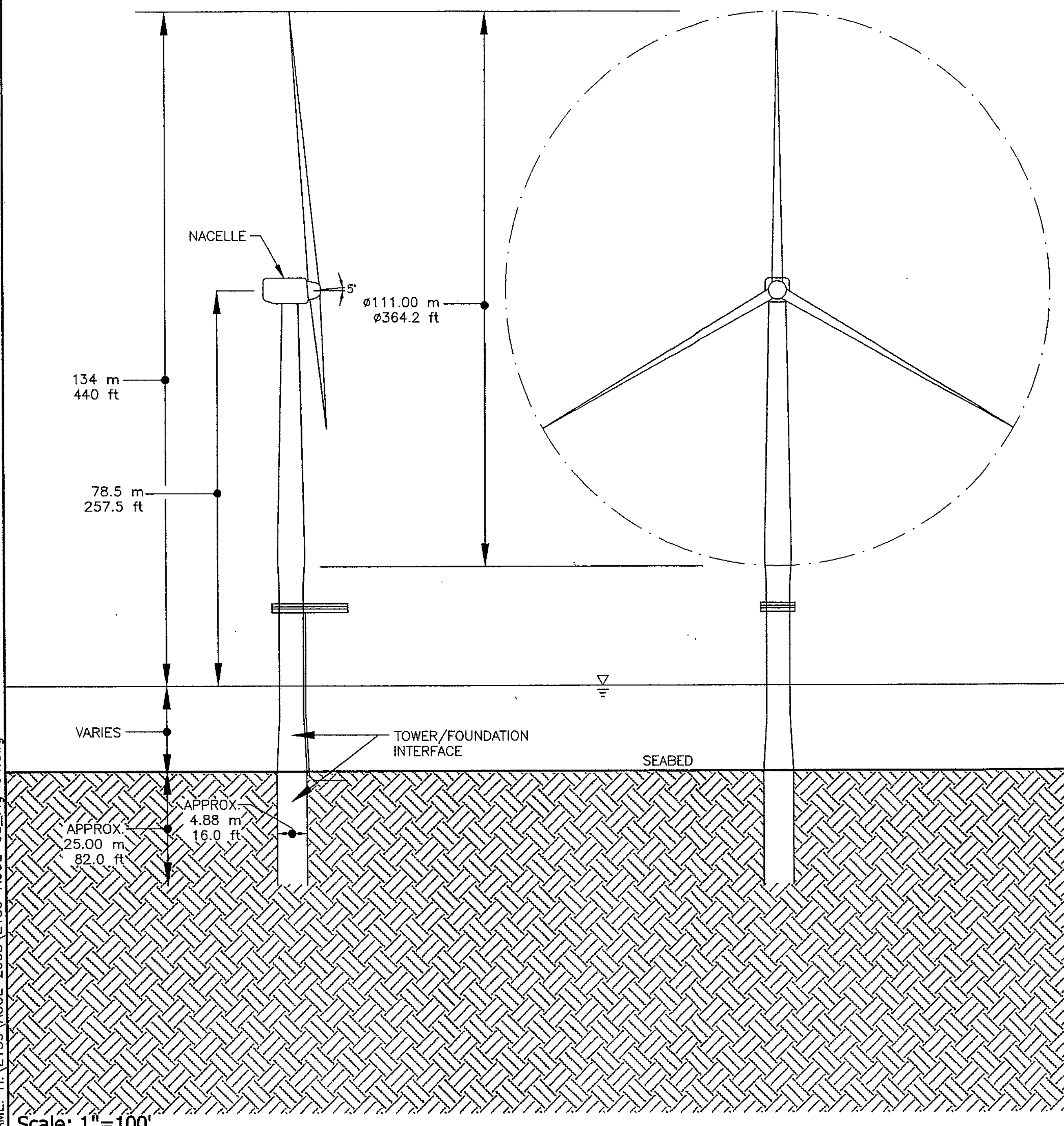
▲ NEW/REVISED WTG LOCATIONS

Source: NOAA Chart #13237

Source of New 3 NM Boundary Line Coordiantes: Minerals Management Service, Outer Continental Shelf Official Protraction Diagram OPD #NK19-07, Block Numbers 6481 & 6531

Purpose: Wind Energy Generation and Submarine/ Overland Transmission Cable Project	**Revised Turbine Array** **Nantucket Sound & Approaches - New 3 Mile Boundary** **Cape Wind Project**	**SHEET NO.** **3 of 18**
Cape Wind™ Energy for Life.	At: Yarmouth, Barnstable County, Massachusetts In: Nantucket Sound Applicant: Cape Wind Associates, LLC	**DATE:** **February 15, 2007** **PROJECT NO.** **E159-504**

ESS Group Inc.

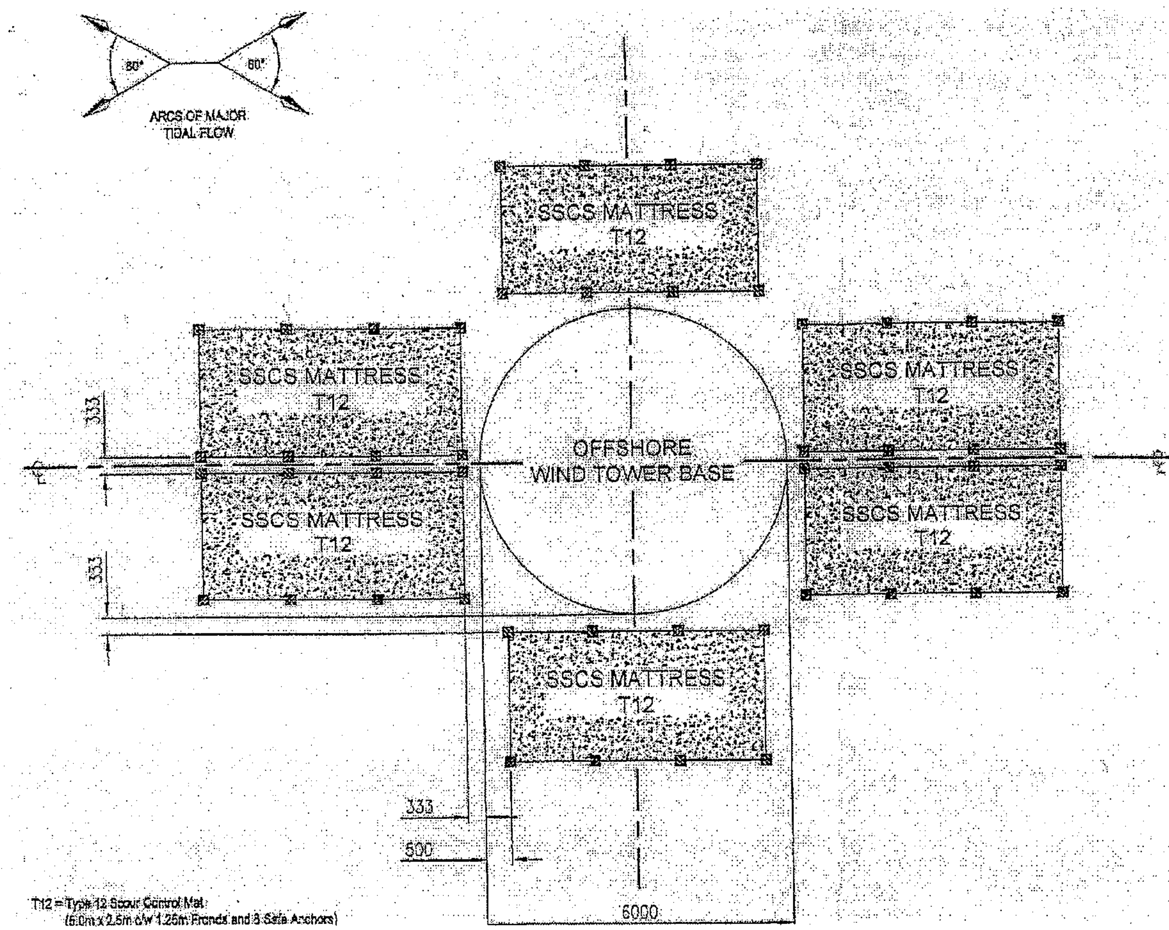


Scale: 1"=100'

DATE: Jan 11, 2008 – 11:59AM
FILENAME: H:\E159\ACOE 2008\E159-ACOE-08_Fig-04.dwg

Purpose: Wind Energy Generation and Submarine/ Overland Transmission Cable Project	**Proposed Wind Turbine Generator Profile Detail** **Cape Wind Project**	**SHEET NO.** **4 of 18** **DATE:** **02/15/07**
Cape Wind™ Energy for Life.	At: Yarmouth, Barnstable County, Massachusetts In: Nantucket Sound Applicant: Cape Wind Associates, LLC	**PROJECT NO.** **E159-504**

ESS Group Inc.



NOTES: - OFFSHORE WIND ENERGY TOWER

1. MATS for SCOUR PROTECTION as Indicated on this DRAWING to be by SEABED SCOUR CONTROL SYSTEMS Ltd.

SAMPLE REQUIREMENT per Wind Tower:
8 No. SSCS Type 12 SCOUR CONTROL MATS 5.0m x 2.5m, BUOYANT FROND HEIGHT 1.25m, with 8 in No. Safe Anchors. Weight in Air: 100kg; Weight Submerged: 45kg.- FROND Tensile Strength >681N and up to 1131N. Mat Layout to face into MAXIMUM tidal flow directions.

It is IMPORTANT that these Scour Control Mats be Installed a.s.a.p. Tower Installation.

2. MATS to be positioned and anchored by two (2) competent DIVERS. Mats are crane deployed by 2 leg wire rope slings (Slings can be supplied by SSCS). Detailed Installation Instruction are supplied with the Mats.

3. NOMINAL MINIMUM CLEAR DISTANCE between Tower Base and Scour Control Mats to be >9" (>228mm), Normal/Standard: 12" to 15" (305 to 380mm).

4. INSTALLATION SEQUENCE as required by Dive Team. During Installation the SAFE NETS must NOT BE REMOVED UNTIL ALL ADJACENT MATS HAVE BEEN FULLY INSTALLED to prevent Diver or ROV entanglement.

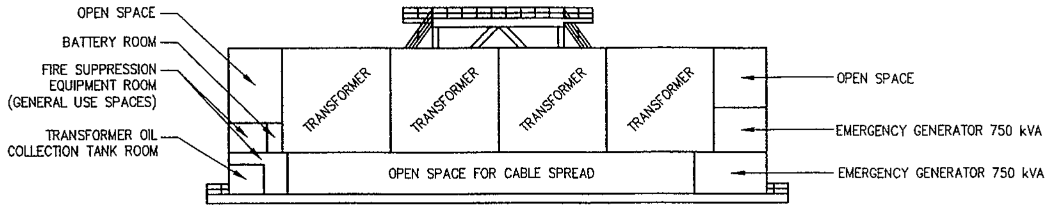
5. MATS should **NOT** be Installed at Entry/ Attachment Points Intended for Cables. Such Scour Control Mats can be installed immediately AFTER any subsequent connections to the Tower Base have been completed and BEFORE Winter Storms, and Mats should be continued out to the inner end of any cable trenching.

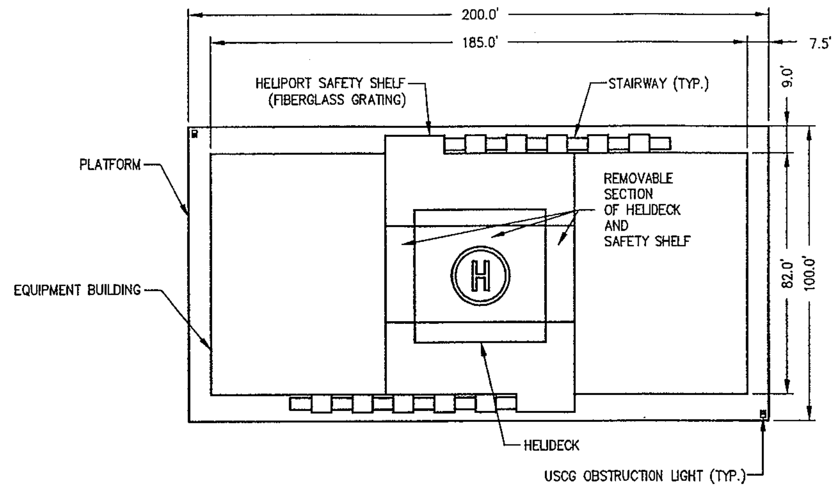
6. **Additional Stability Post Installation - Frond Induced Sedimentation:** EACH Type 12 Mat, 5m x 2.5m, the submerged sediment bank should be in the range:

~ 10.2 tonnes to 12.4 tonnes submerged weight over **each** mat; this hold down is additional to the retention provided by the eight (8) Safe Anchors and also excludes gently sloping extension of sediment bank down to seabed in a smooth curve up to 2.2m away from mat edge.

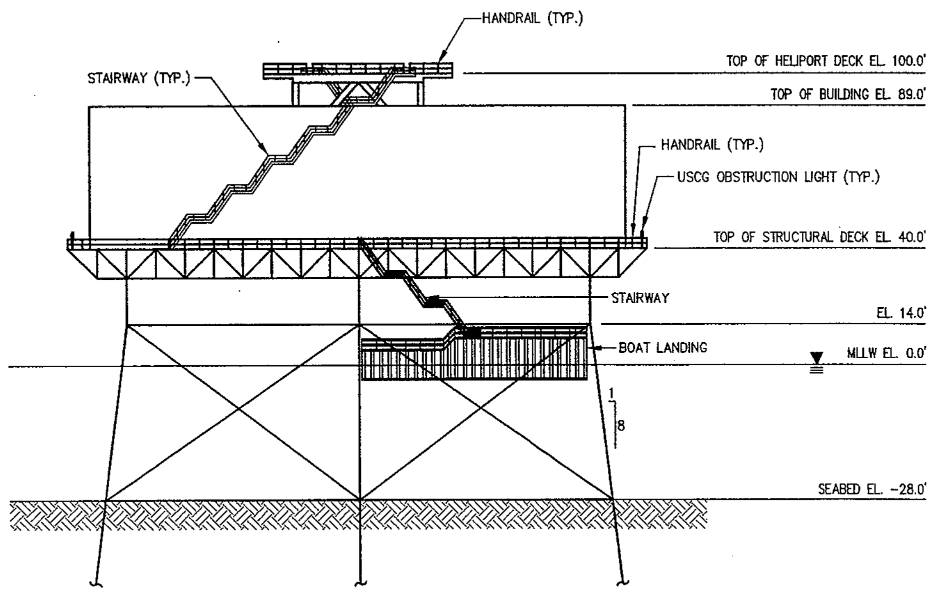
Purpose: Wind Energy Generation and Submarine / Overland Transmission Cable Project Source: Seabed Scour Control Systems, LTD Not to scale	**Scour Control Measures** **CAPE WIND ENERGY PROJECT**	**Sheet** **5 of 18**
Cape Wind™ Energy for Life.	At:Yarmouth, Barnstable County, Massachusetts In: Nantucket Sound Applicant:Cape wind Associates, LLC	**Date:** 2/15/2007 PROJECT NO. E159-504

ESS Group, Inc.





PLAN



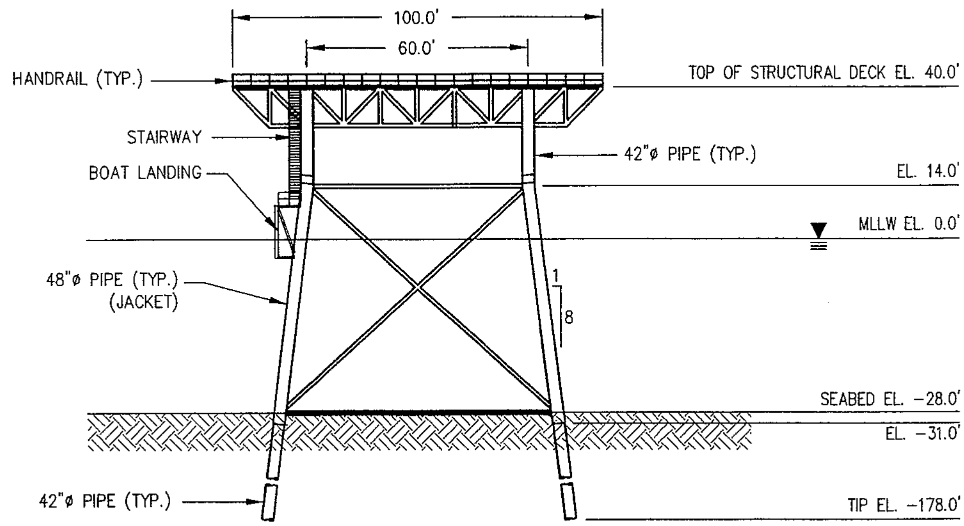
ELEVATION

Scale: (Not to Scale)

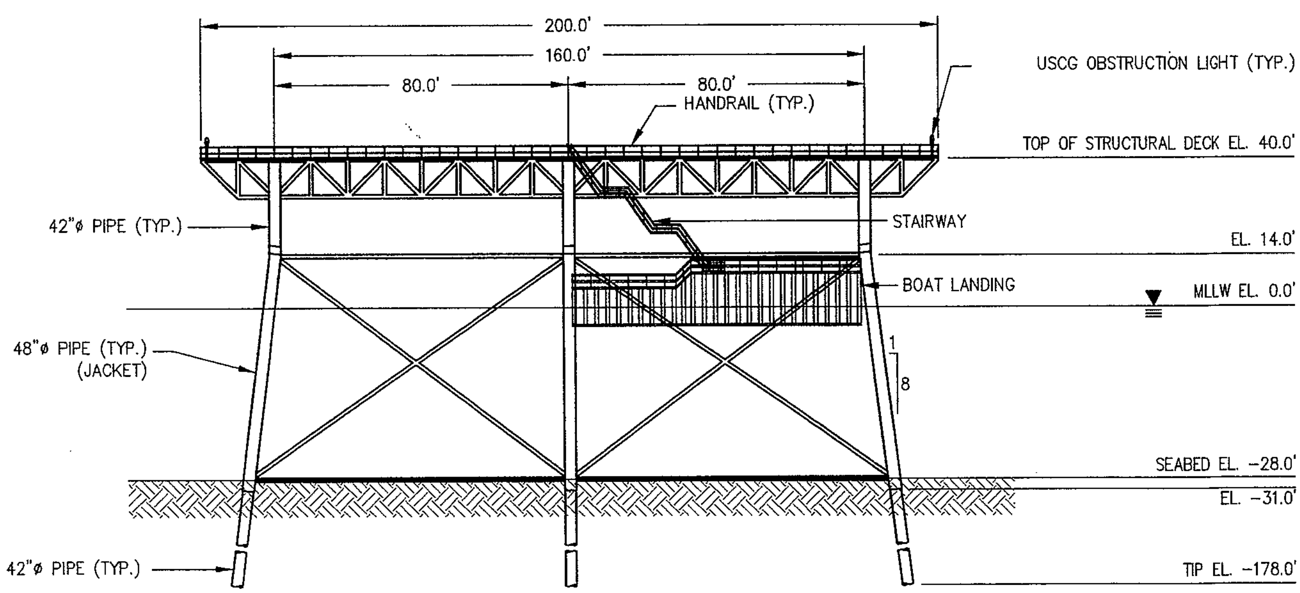
Purpose: Wind Energy Generation and Submarine/ Overland Transmission Cable Project	**Proposed Electric Service Platform Elevation and Plan View** **Cape Wind Project**	**SHEET NO. 6 of 18** **DATE: 02/15/07**
Cape Wind Energy for Life.	At: Yarmouth, Barnstable County, Massachusetts In: Nantucket Sound Applicant: Cape Wind Associates, LLC	**PROJECT NO. E159-504**

ESS Group Inc.

DATE: Jan 11, 2008 - 11:59AM
FILENAME: H:\E159\ACOE 2008\E159-ACOE-08_Fig-06-07.dwg



SIDE ELEVATION



FRONT ELEVATION

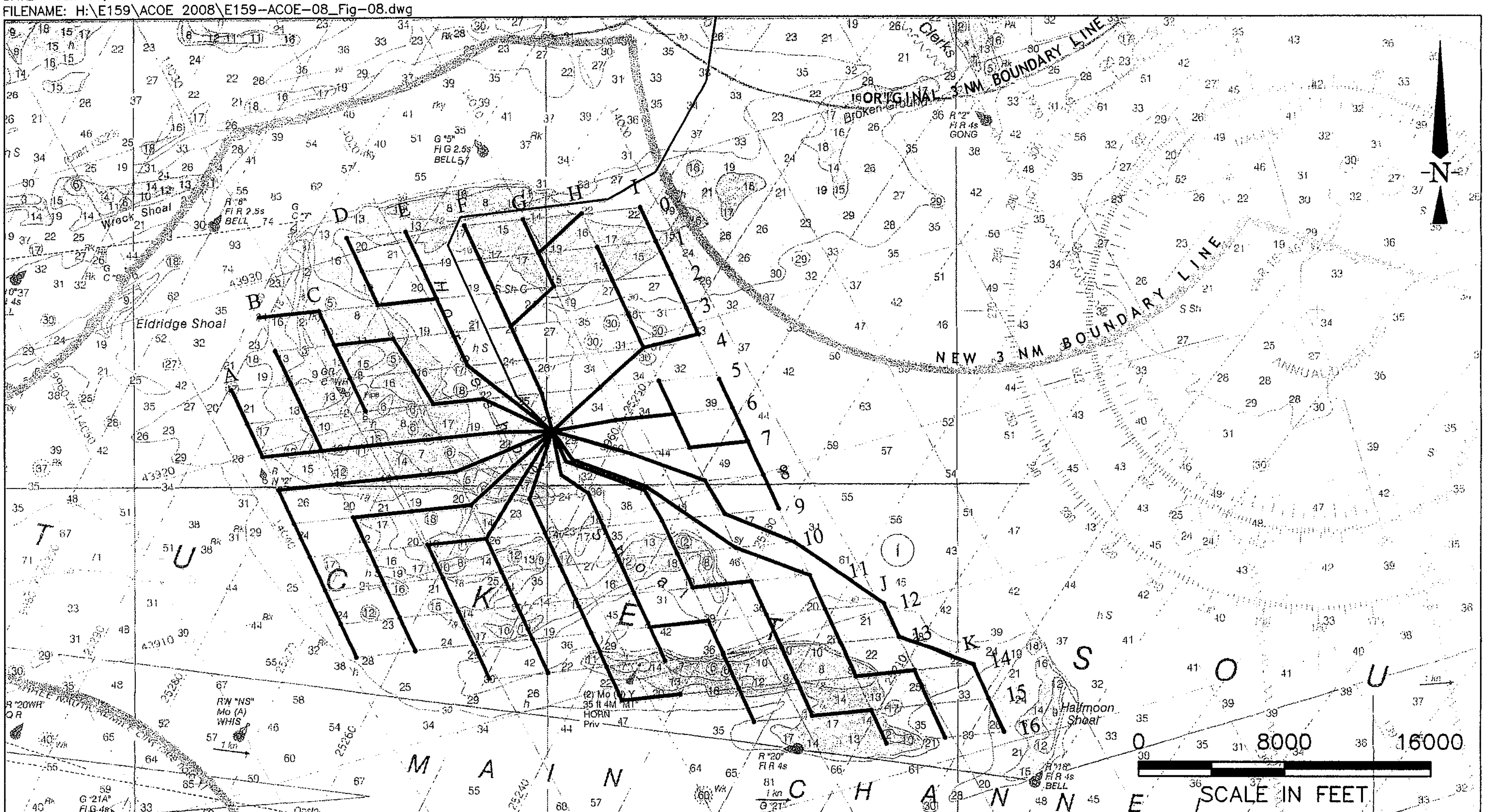
DATE: Jan 11, 2008 - 12:00PM
FILENAME: H:\E159\ACOE 2008\E159-ACOE-08_Fig-06-07.dwg

Scale: (Not to Scale)

Purpose: Wind Energy Generation and Submarine/ Overland Transmission Cable Project	**Proposed Electric Service Platform Foundation and Structural Detail** **Cape Wind Project**	**SHEET NO. 7 of 18** **DATE: 02/15/07**
Cape Wind Energy for Life.	At: Yarmouth, Barnstable County, Massachusetts In: Nantucket Sound Applicant: Cape Wind Associates, LLC	**PROJECT NO. E159-504**

ESS Group Inc.

DATE: Jan 11, 2008 - 12:11PM
FILENAME: H:\E159\ACOE 2008\E159-ACOE-08_Fig-08.dwg

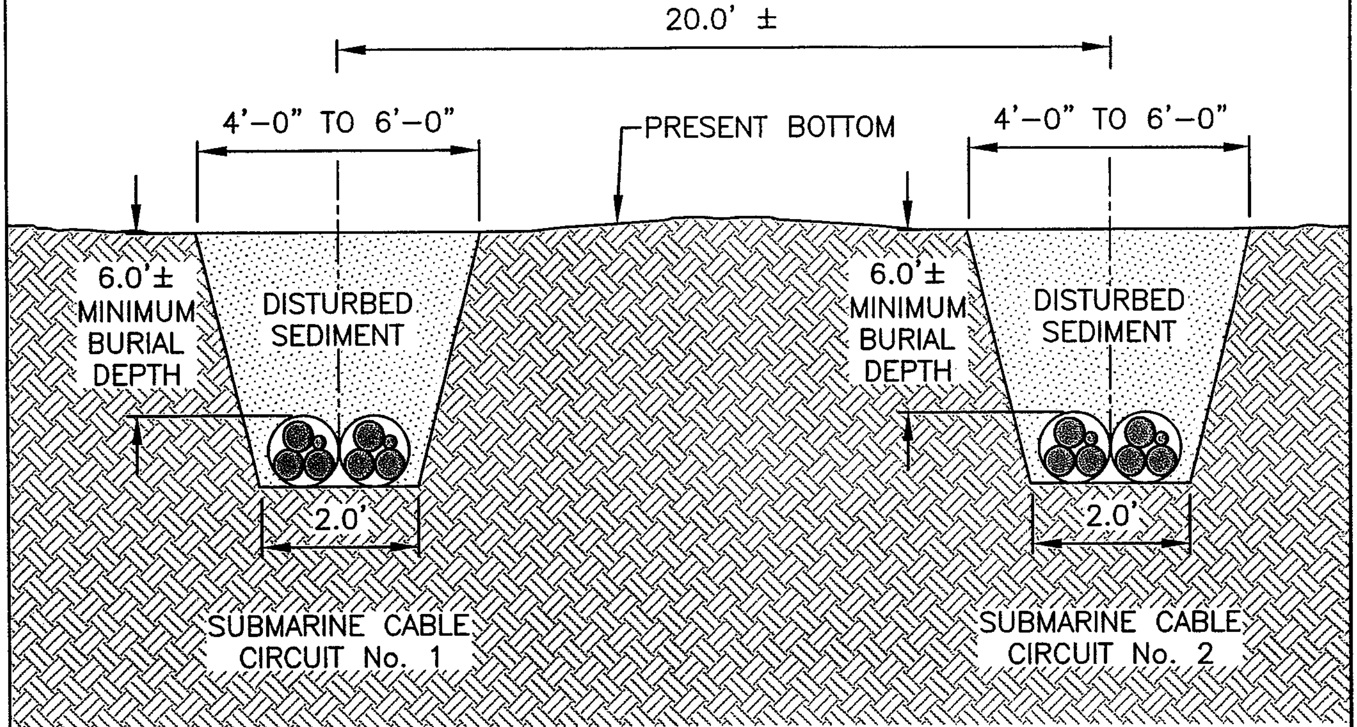


Purpose: Wind Energy Generation and Submarine/ Overland Transmission Cable Project	**Revised Inner-Array Layout** **Nantucket Sound & Approaches - New 3 Mile Boundary** **Cape Wind Project**	**SHEET NO.** **8 of 18**
Cape Wind™ Energy for Life.	At: Yarmouth, Barnstable County, Massachusetts In: Nantucket Sound Applicant: Cape Wind Associates, LLC	**DATE:** **February 15, 2007** **PROJECT NO.** **E159-504**

ESS Group Inc.

Purpose: Wind Energy Generation and Submarine / Overland Transmission Cable Project Source: USGS Topographic Quad Scale: Approx. ——— = 1000′	**Landfall and Cable Route** **Yarmouth, Massachusetts** **CAPE WIND PROJECT**	**Sheet** **9 of 18**
Cape Wind™ Energy for Life.	At: Yarmouth and Barnstable, Barnstable County, Massachusetts In: Nantucket Sound Applicant: Cape Wind Associates, LLC	**Date:** 2/15/07 PROJECT NO. E159-504

ESS Group, Inc.

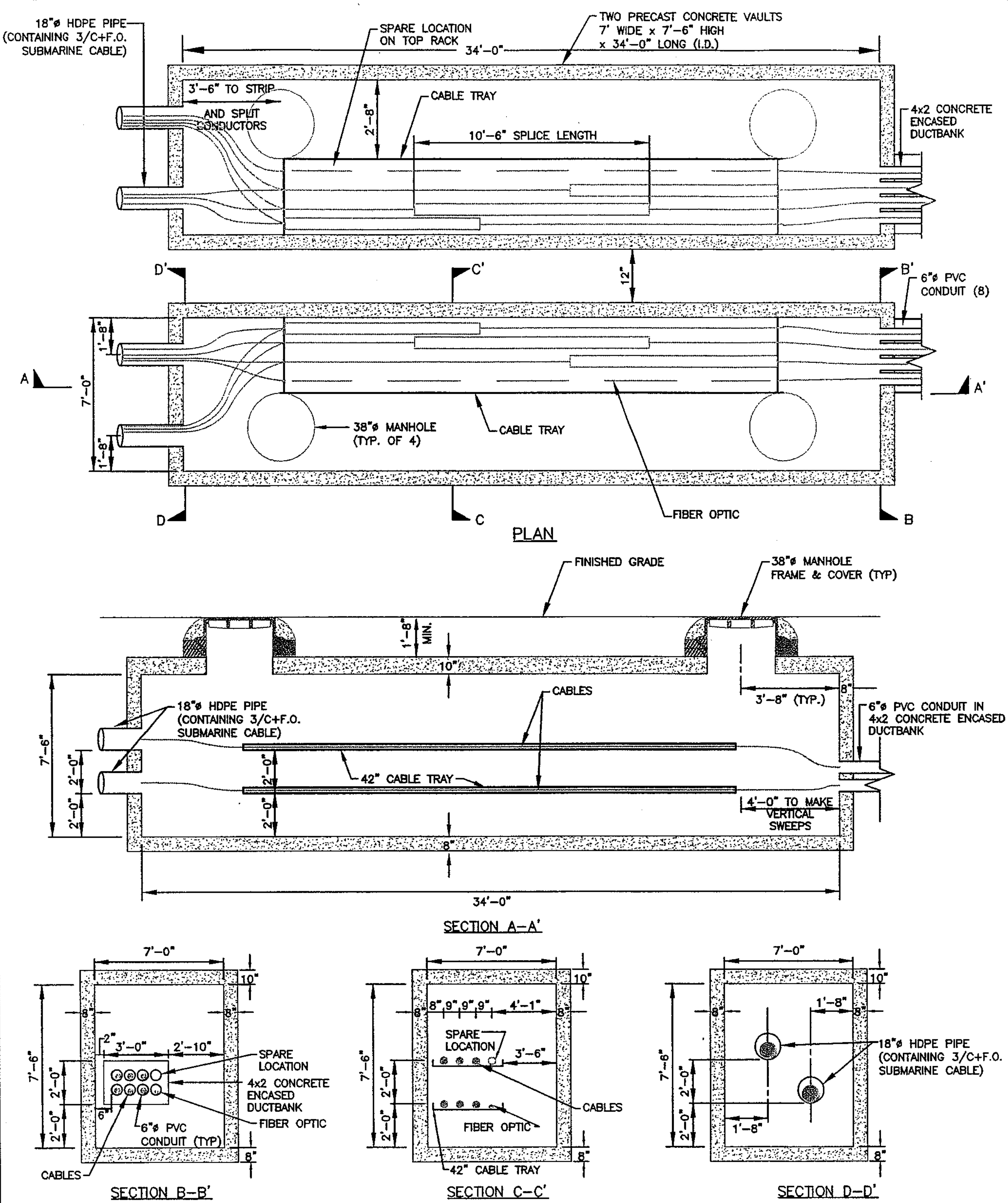


Scale: (Not to Scale)

Purpose: Wind Energy Generation and Submarine/ Overland Transmission Cable Project	**Typical Cross Section of Submarine Cable Trench Using Jet Plow Embedment** **Cape Wind Project**	**SHEET NO. 10 of 18** **DATE: 02/15/07**
Cape Wind Energy for Life.	At: Yarmouth, Barnstable County, Massachusetts In: Nantucket Sound Applicant: Cape Wind Associates, LLC	**PROJECT NO. E159-504**

DATE: Jan 11, 2008 - 12:01PM
FILENAME: H:\E159\ACOE 2008\E159-ACOE-08_Fig-10.dwg

ESS Group Inc.



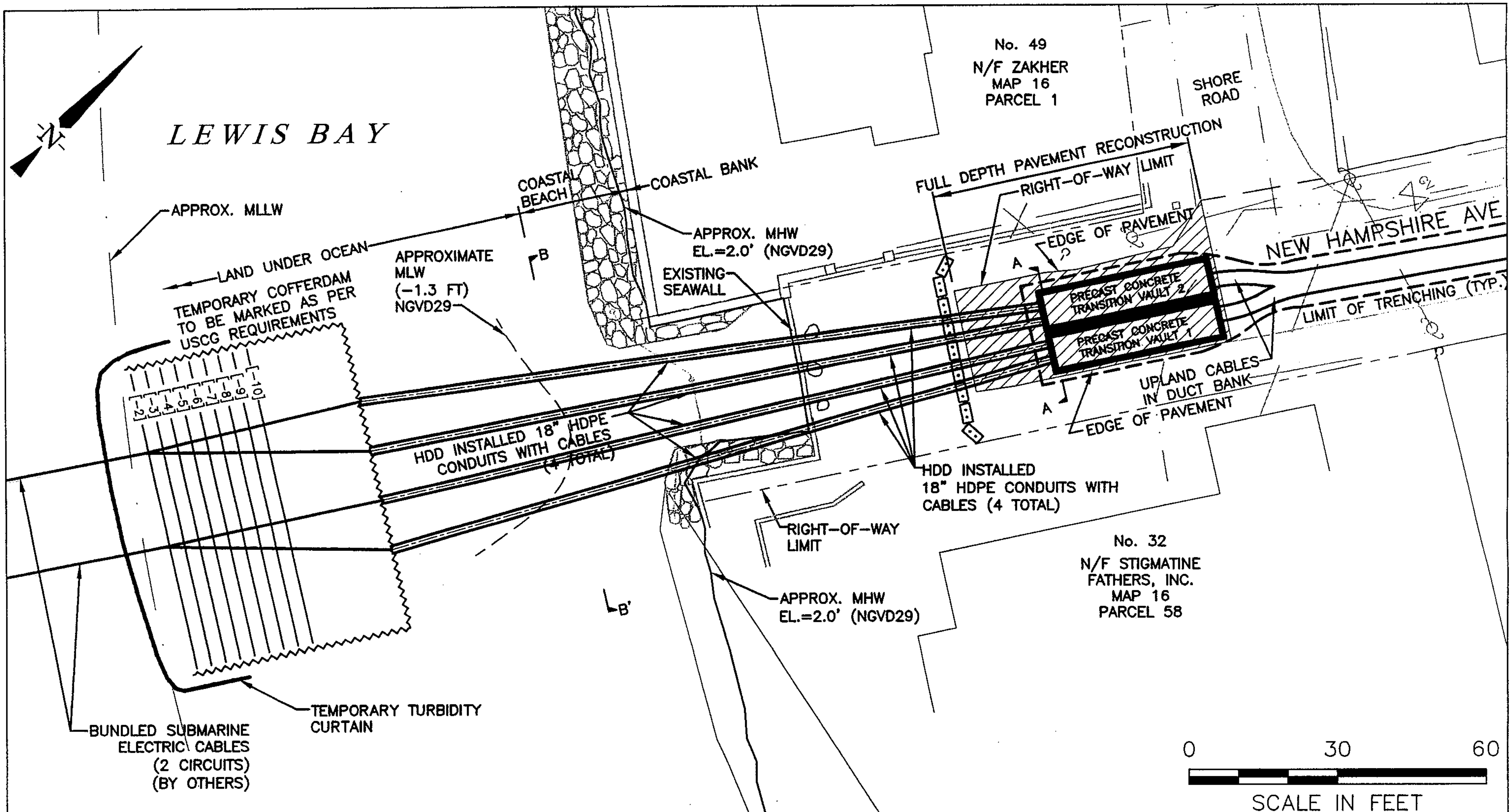
Scale: (Not to Scale)

Purpose: Wind Energy Generation and Submarine/ Overland Transmission Cable Project	**115 kV Landfall Transition Vault** **Cape Wind Project**	**SHEET NO. 11 of 18** **DATE: 02/15/07**
Cape Wind Energy for Life.	At: Yarmouth, Barnstable County, Massachusetts In: Nantucket Sound Applicant: Cape Wind Associates, LLC	**PROJECT NO. E159-504**

DATE: Jan 11, 2008 - 12:01PM
FILENAME: H:\E159\ACOE 2008\E159-ACOE-08_Fig-11.dwg

ESS Group Inc.

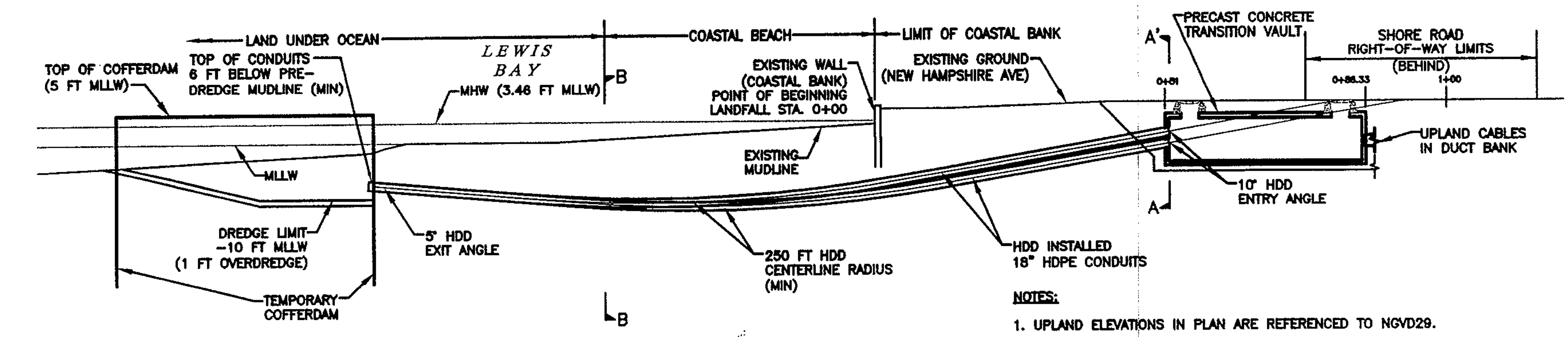
DATE: Jan 11, 2008 - 12:02PM
FILENAME: H:\E159\ACOE 2008\E159-ACOE-08_Fig-12-13-14.dwg



Purpose: Wind Energy Generation and Submarine/ Overland Transmission Cable Project	**Plan View of Landfall Transition Location** **Cape Wind Project**	**SHEET NO. 12 of 18**
Cape Wind™ Energy for Life.	At: Yarmouth, Barnstable County, Massachusetts In: Nantucket Sound Applicant: Cape Wind Associates, LLC	**DATE: February 15, 2007** **PROJECT NO. E159-504**

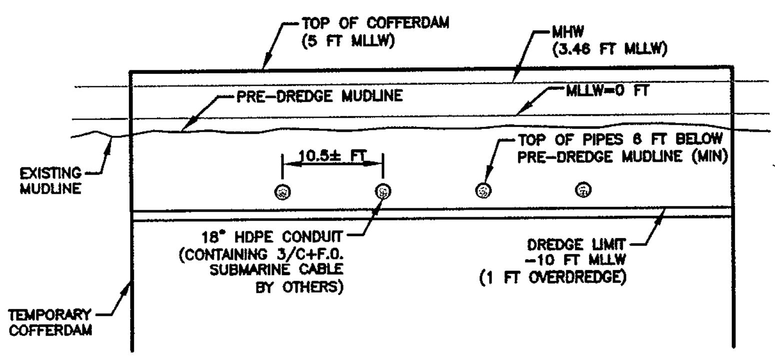
ESS Group Inc.

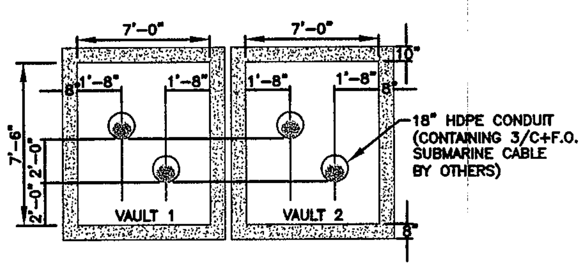
DATE: Jan 11, 2008 - 12:02PM
FILENAME: H:\E159\ACOE 2008\E159-ACOE-08_Fig-12-13-14.dwg



NOTES:

1. UPLAND ELEVATIONS IN PLAN ARE REFERENCED TO NGVD29.
2. THERE IS NO ACCEPTED NGVD29 CONNECTION TO MLLW IN THE PROJECT AREA. RELATIONSHIP BETWEEN MLLW AND NGVD29 APPROXIMATED TO GENERATE PROFILE.
3. EXISTING GROUND ELEVATIONS IN PROFILE ARE ESTIMATED ONLY.
4. ACTUAL RELATIONSHIP MUST BE ESTABLISHED THROUGH SURVEY PRIOR TO CONSTRUCTION.





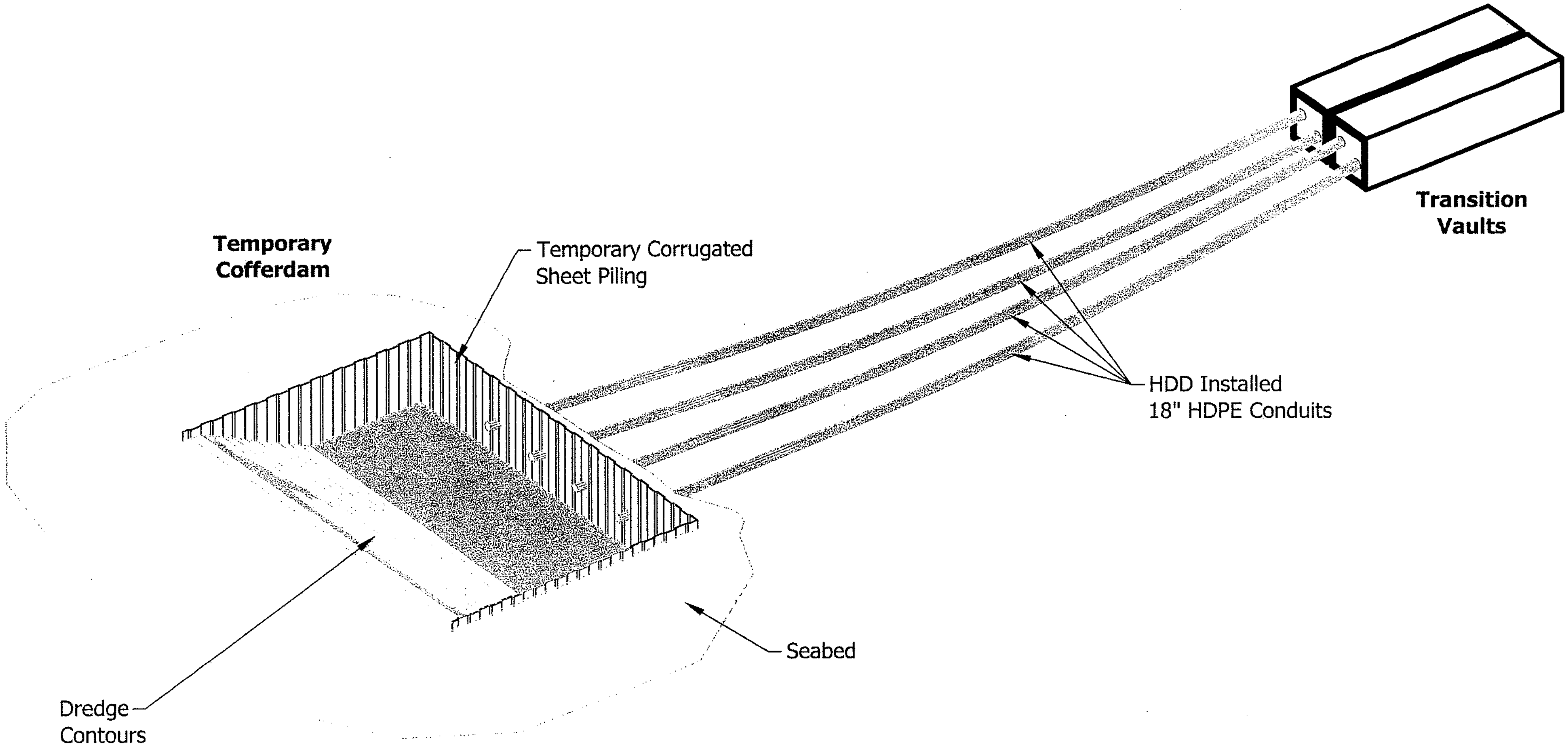
0 30 60
VERT. SCALE IN FEET

0 30 60
HORIZ. SCALE IN FEET

Purpose: Wind Energy Generation and Submarine/ Overland Transmission Cable Project	**Cross Section of Landfall Transition Location** **Cape Wind Project**	**SHEET NO.** **13 of 18**
Cape Wind™ Energy for Life.	At: Yarmouth, Barnstable County, Massachusetts In: Nantucket Sound Applicant: Cape Wind Associates, LLC	**DATE:** **February 15, 2007** **PROJECT NO.** **E159-504**

ESS Group Inc.

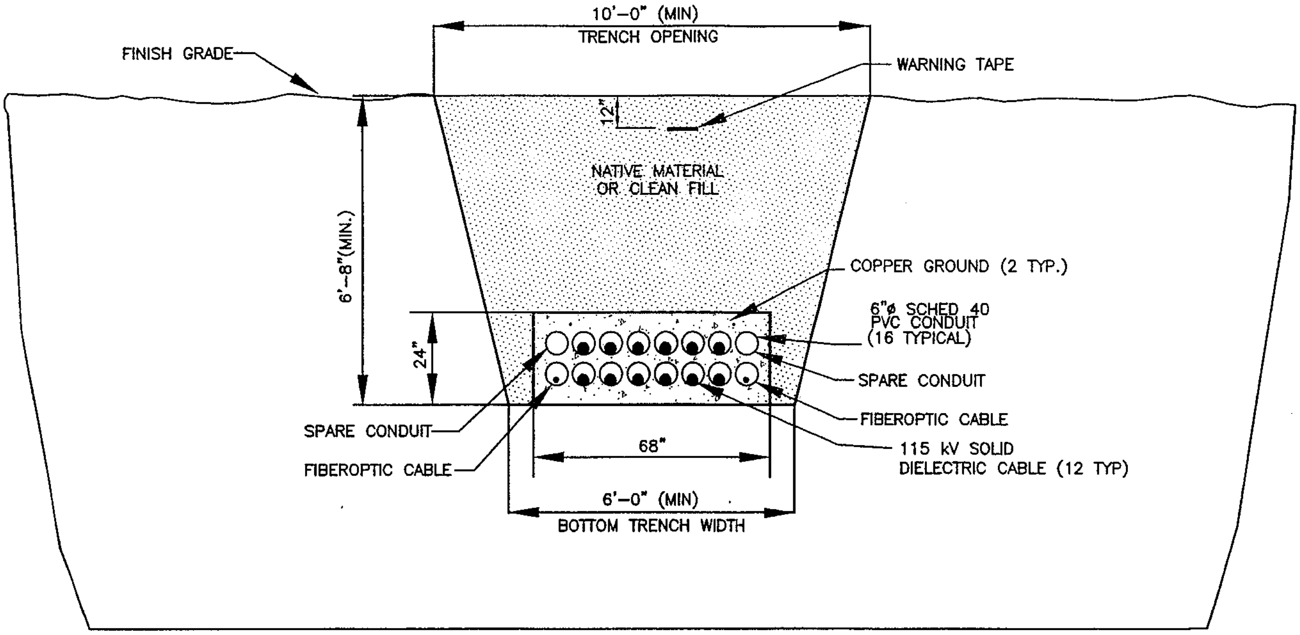
DATE: Jan 11, 2008 - 12:02PM
FILENAME: H:\E159\ACOE 2008\E159-ACOE-08_Fig-12-13-14.dwg



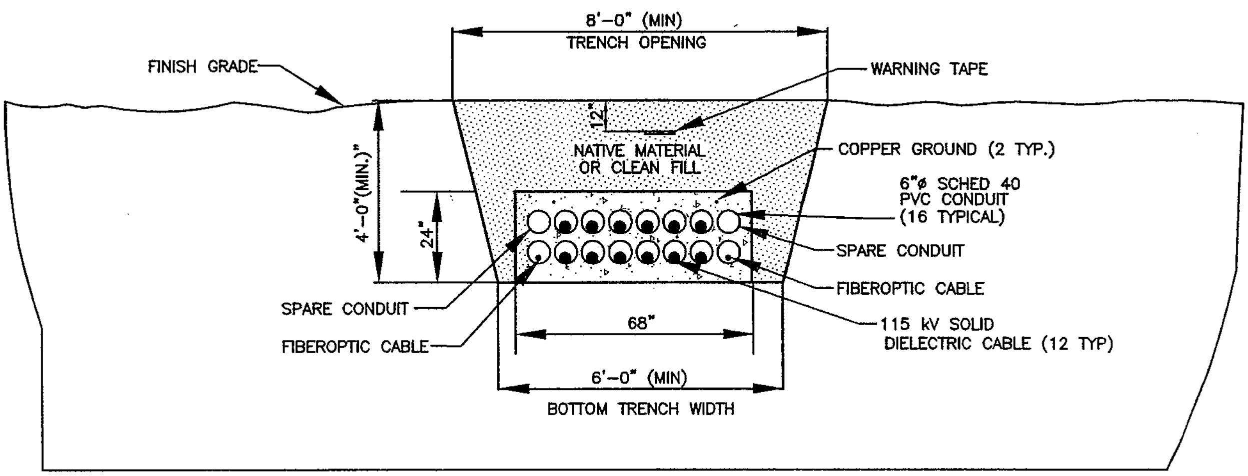
Scale: (Not to Scale)

Purpose: Wind Energy Generation and Submarine/ Overland Transmission Cable Project	**3D View of Landfall Transition Location** **Cape Wind Project**	**SHEET NO.** **14 of 18**
Cape Wind Energy for Life.	At: Yarmouth, Barnstable County, Massachusetts In: Nantucket Sound Applicant: Cape Wind Associates, LLC	**DATE:** **February 15, 2007** **PROJECT NO.** **E159-504**

ESS Group Inc.



UPLAND CABLE TRENCH CROSS-SECTION (IN ROADWAYS)
CONCRETE ENCASED DUCTBANK



UPLAND CABLE TRENCH CROSS SECTION (IN R.O.W.)
CONCRETE ENCASED DUCTBANK

NOTE:
NATIVE MATERIAL TO BE USED ONLY IF DETERMINED TO HAVE APPROPRIATE THERMAL RESISTIVITY AND TO BE ACCEPTABLE IN ACCORDANCE WITH THE SOIL MANAGEMENT PLAN.

Scale: (Not to Scale)

Purpose: Wind Energy Generation and Submarine/ Overland Transmission Cable Project

Typical "8-over-8" Ductbank Cross Section

Cape Wind Project

SHEET NO. 15 of 18

DATE: 02/15/07

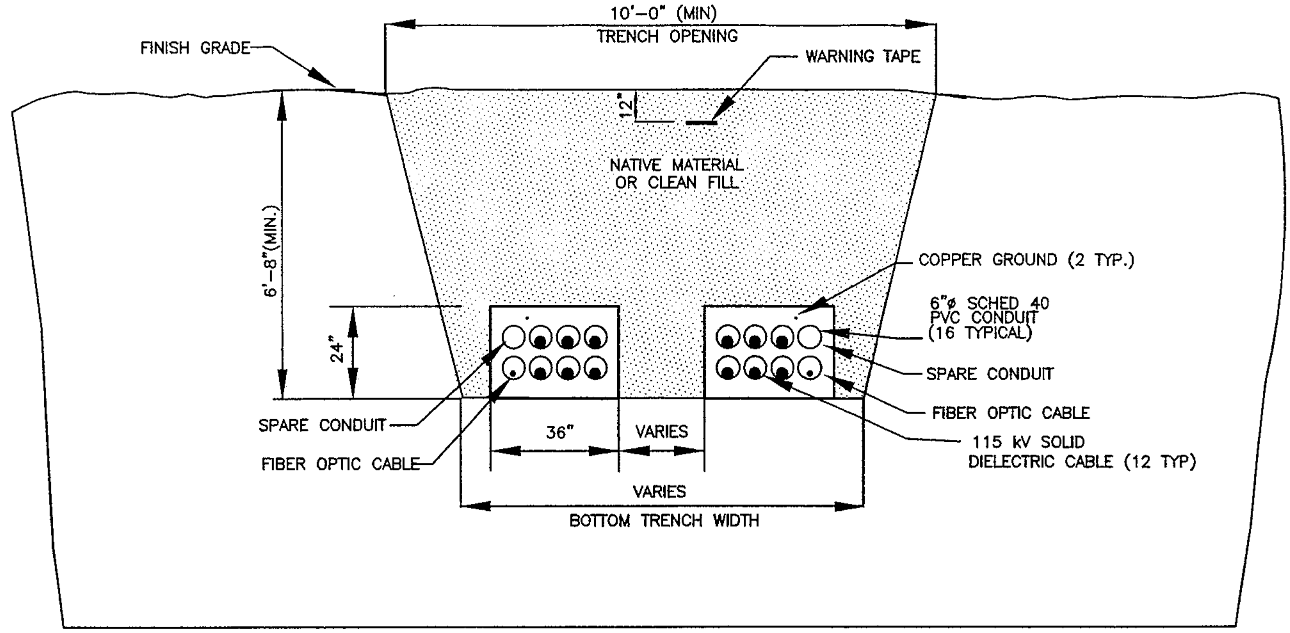
PROJECT NO. E159-504

Cape Wind™ Energy for Life.

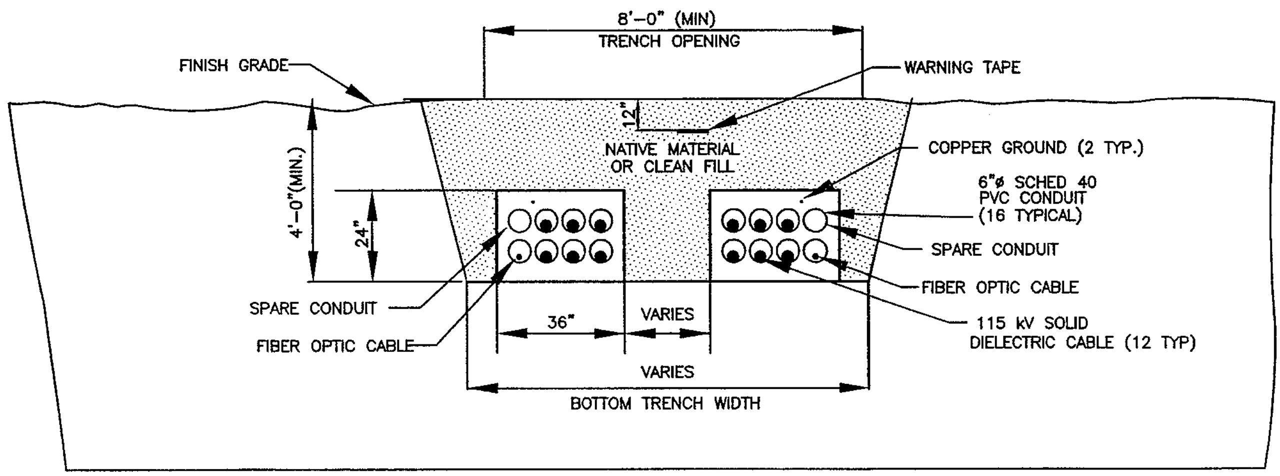
At: Yarmouth, Barnstable County, Massachusetts
In: Nantucket Sound
Applicant: Cape Wind Associates, LLC

ESS Group Inc.

DATE: Jan 11, 2008 - 12:03PM
FILENAME: H:\E159\ACOE 2008\E159-ACOE-08_Fig-15-16-17-18.dwg



UPLAND CABLE TRENCH 4-OVER-4 CROSS-SECTION (IN ROADWAYS)
CONCRETE ENCASED DUCTBANK



UPLAND CABLE TRENCH 4-OVER-4 CROSS SECTION (IN R.O.W.)
CONCRETE ENCASED DUCTBANK

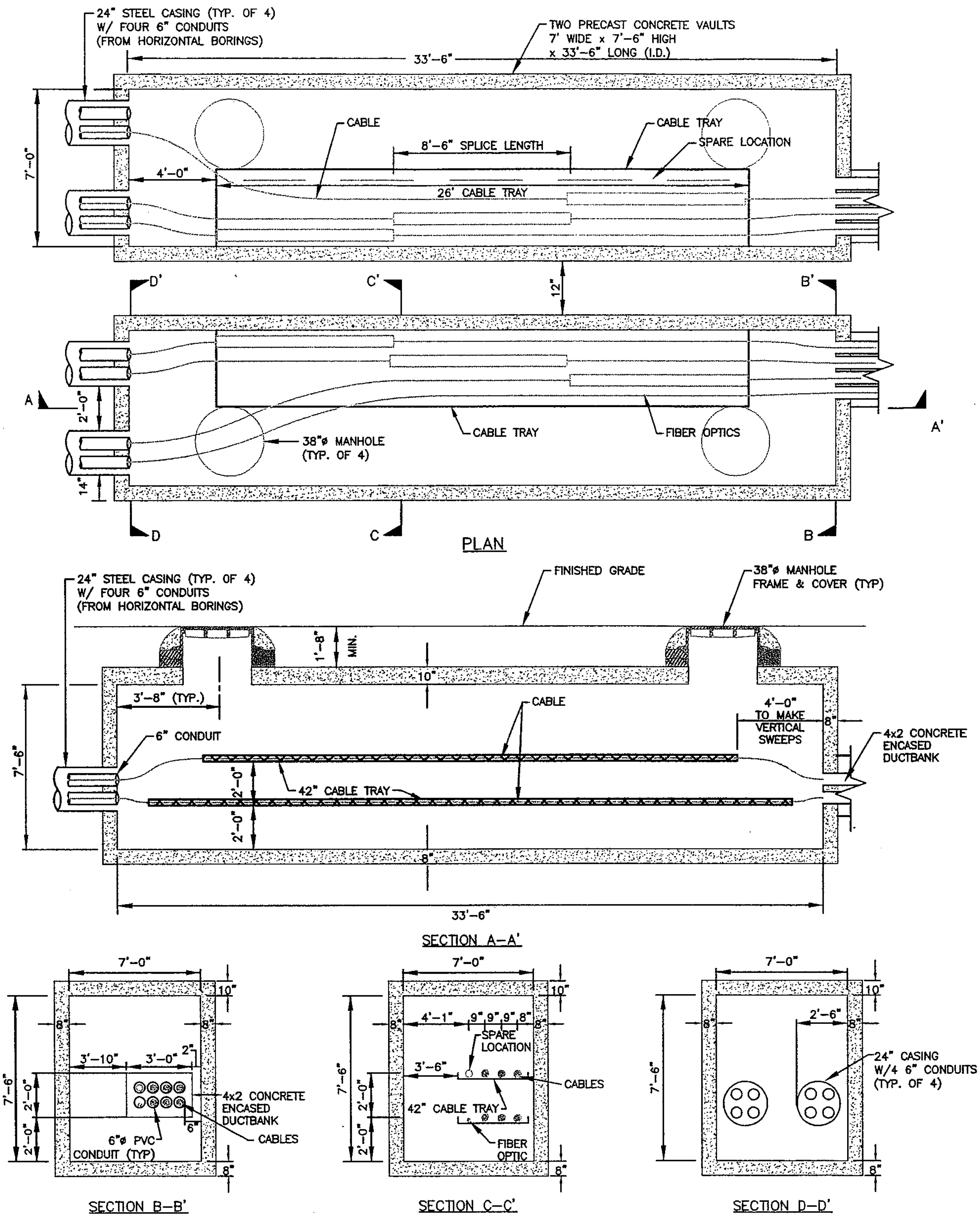
NOTE:
NATIVE MATERIAL TO BE USED ONLY IF DETERMINED TO HAVE APPROPRIATE THERMAL RESISTIVITY AND TO BE ACCEPTABLE IN ACCORDANCE WITH THE SOIL MANAGEMENT PLAN.

Scale: (Not to Scale)

Purpose: Wind Energy Generation and Submarine/ Overland Transmission Cable Project	**Typical "4-over-4" Ductbank Cross Section** **Cape Wind Project**	**SHEET NO. 16 of 18** **DATE: 02/15/07**
Cape Wind Energy for Life.	At: Yarmouth, Barnstable County, Massachusetts In: Nantucket Sound Applicant: Cape Wind Associates, LLC	**PROJECT NO. E159-504**

ESS Group Inc.

DATE: Jan 11, 2008 - 12:03PM
FILENAME: H:\E159\ACOE 2008\E159-ACOE-08_Fig-15-16-17-18.dwg

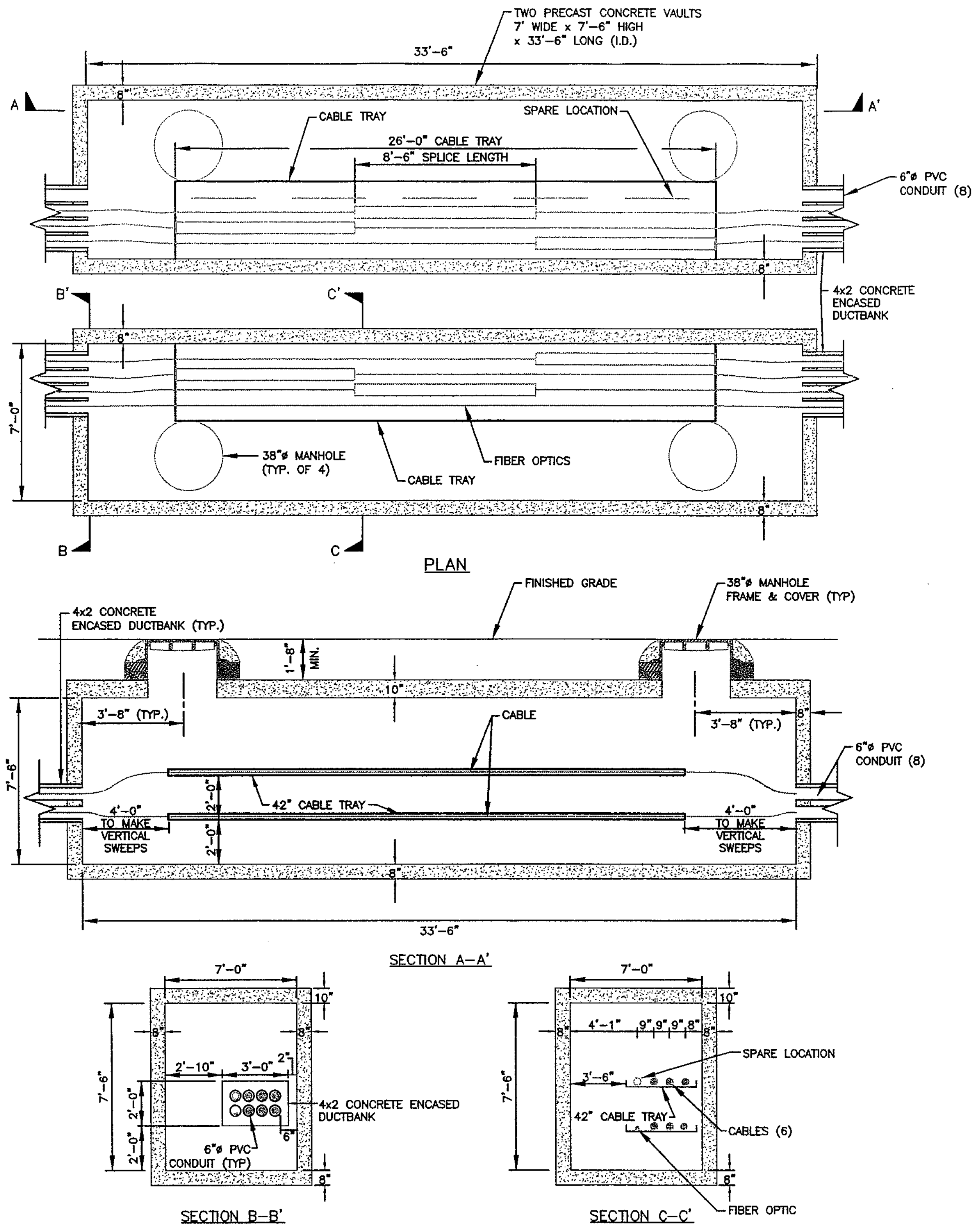


Scale: (Not to Scale)

Purpose: Wind Energy Generation and Submarine/ Overland Transmission Cable Project	**115 kV Upland Transition Vault** **Cape Wind Project**	**SHEET NO. 17 of 18**
		DATE: 02/15/07
Cape Wind™ Energy for Life.	At: Yarmouth, Barnstable County, Massachusetts In: Nantucket Sound Applicant: Cape Wind Associates, LLC	**PROJECT NO. E159-504**

ESS Group Inc.

DATE: Jan 11, 2008 – 12:04PM
FILENAME: H:\E159\ACOE 2008\E159-ACOE-08_Fig-15-16-17-18.dwg



Scale: (Not to Scale)

Purpose: Wind Energy Generation and Submarine/ Overland Transmission Cable Project	**115 kV Upland Splice Vault** **Cape Wind Project**	**SHEET NO. 18 of 18** **DATE: 02/15/07**
Cape Wind™ Energy for Life.	At: Yarmouth, Barnstable County, Massachusetts In: Nantucket Sound Applicant: Cape Wind Associates, LLC	**PROJECT NO. E159-504**

ESS Group Inc.

DATE: Jan 11, 2008 - 12:04PM
FILENAME: H:\E159\ACOE 2008\E159-ACOE-08_Fig-15-16-17-18.dwg

DEPARTMENT OF THE ARMY PERMIT

Permittee Cape Wind Associates, LLC, 75 Arlington, Street, Suite 704, Boston, MA 02116

Permit No. NAE-2004-388

Issuing Office New England District

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description:

The permittee is authorized to construct and maintain an offshore wind energy generating facility consisting of 130 wind turbine generators (WTGs) with a maximum blade height of 440 feet arranged in a grid pattern on Horseshoe Shoal in Nantucket Sound between Cape Cod, Martha's Vineyard and Nantucket. Scour mats or rock armouring will be installed at the base of the turbine monopole (14.75-19.75 foot diameter) foundations, if needed. A 33 kilovolt solid dielectric submarine transmission cable system will be installed by jetplow to transmit electricity from the WTGs to the electric service platform installed within the turbine array. The electric service platform will be a pile supported structure with maximum dimensions of 100 feet by 200 feet. Two 115 kilovolt, alternating current, submarine cable circuits will be installed by jetplow to transmit the electricity to the grid, making landfall at New Hampshire Avenue, Yarmouth, MA.

(continued on page 4)

Project Location:

Nantucket Sound and Lewis Bay between Hyannis/Yarmouth, Martha's Vineyard and Nantucket off the coast of Massachusetts.

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on December 31, 2020. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

1. The permittee shall ensure that a copy of this permit are at the work site (and the project office) authorized by this permit whenever work is being performed, and that all personnel with operation control of the site ensure that all appropriate personnel performing work are fully aware of its terms and conditions. The entire permit shall be made a part of any and all contracts and sub-contracts for work that affects areas of Corps jurisdiction at the site of the work authorized by this permit. This shall be achieved by including the entire permit in the specifications for work. The term "entire permit" means this permit (including its drawings, plans, appendices and other attachments) and also includes permit modifications.

(special conditions continued on Page 4)

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

(X) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

_______________________________ _______________________________

(PERMITTEE) *(DATE)*

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

Philip T. Feir 5 January 2011

(DISTRICT ENGINEER) *(DATE)*

Philip T. Feir
Colonel, Corps of Engineers

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

_______________________________ _______________________________

(TRANSFEREE) *(DATE)*

☆U.S. GOVERNMENT PRINTING OFFICE: 1986 — 717-425

(description continued from page 1)

The landfall transition of the 115 kilovolt submarine transmission lines from water to land at Yarmouth will be through the use of horizontal directional drilling (HDD) to avoid disturbance of the shoreline. A temporary cofferdam will be installed at the seaward end of the HDD borehole. The steel sheetpile cofferdam will enclose an area of approximately 2925 square feet with dimensions of 65 feet wide and 45 feet long. It will be open at one end to allow the installation of the conduits. A temporary turbidity curtain may be used to confine sediments within the work area, if needed. Approximately 840 cubic yards of sediment will be temporarily removed, stored on a barge, and backfilled after the installation is completed. Clean sand will be used to supplement the backfill material as needed to restore the seafloor to preconstruction grade.

The work is described on the enclosed plans entitled "Purpose: Wind Energy Generation and Submarine/Overland Transmission Cable Project," on 18 sheets, and dated "February 15, 2007."

(special conditions continued from Page 2)

If the permit is issued after the construction specifications, but before receipt of bids or quotes, the entire permit shall be included as an addendum to the specifications. If the permit is issued after receipt of bids or quotes, the entire permit shall be included in the contract or sub-contract. Although the permittee may assign various aspects of the work to different contractors or sub-contractors, all contractors and sub-contractors shall be obligated by contract to comply with all environmental protection provisions contained within the entire permit, and no contract or sub-contract shall require or allow unauthorized work in areas of Corps jurisdiction.

2. The permittee shall complete and return the enclosed Compliance Certification Form within one month following the completion of the authorized work.

3. The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

4. Except where stated otherwise, reports, drawings, correspondence and any other submittals required by this permit shall be marked with the words "Permit No. NAE-2004-388" and shall be addressed to "Policy, Analysis and Technical Support Branch, Regulatory Division, U.S. Army Corps of Engineers, 696 Virginia Road, Concord, MA 01742-2751." Documents which are not marked and addressed in this manner may not reach their intended destination and do not comply with the requirements of this permit.

5. A copy of this permit will be provided, prior to the start of any authorized work, to the Director, Defense Mapping Agency, Hydrographic Center, Washington, DC 20390 Attention, Code NS12, and to the National Ocean Service, Office of Coast Survey, N/CS261, 1315 East West Highway, Silver Spring, Maryland 20910–3282.

6. An eelgrass monitoring and mitigation plan will be submitted to, and approved in writing by, the Corps of Engineers prior to the start of the installation of submarine cable between the electric service platform and Yarmouth. This plan will include pre- and post-construction monitoring to determine if any eelgrass has been lost due to the cable installation. A planting plan and schedule to compensate for any disturbed eelgrass will be included.

(special conditions continued on page 5)

7. The permittee shall survey and locate, horizontally and vertically, the National Grid cable authorized by permit number NAE-2004-1533 at all locations where the permittee's installation activities may occur within 500 feet of the National Grid cable. This data will be made available to the Corps and National Grid. Final design plans and installation procedures for work within 150 feet of the National Grid cable shall meet the technical requirements of National Grid and be submitted to the Corps and National Grid for written approval prior to the start of work and will be submitted at least 30 days prior to the scheduled work.

8. The permittee shall submit as-built, full-sized drawings of the authorized work to the Corps of Engineers. The as-built drawing shall include at least one plan view showing horizontal alignment and a profile view showing the vertical alignment of all cables. Plans will include a bar (graphic) scale, the dates of the survey and drawings, and horizontal state plane coordinates and vertical elevation. Show the cable's horizontal state plane coordinates in U.S. survey feet based on NAD 83. Show the vertical elevation as MLLW with a reference to NAVD 88 and document how this information was derived using the latest National Tidal Datum Epoch for that area, typically 1983-2001. Plans will be stamp by a professional engineer or land surveyor registered in the Commonwealth of Massachusetts. Any changes in the location or type of structures requires notification to the Corps and may require a new survey.

9. The permittee shall submit the as-built drawings to the Corps and the National Oceanic and Atmospheric Administration (NOAA) within 60 days of construction completion. The Corps may note the location on future survey drawings and NOAA may use the information for charting purposes. The NOAA address is: "Nautical Data Branch, N/CS26, Station 7349, 1315 East-West Highway, Silver Spring, MD 20910-3282."

10. The permittee will ensure all cables, including the portions within state waters, remain buried in the same manner as required for the inner array cable by the Lease of the Bureau of Offshore Energy Management, Regulation and Enforcement.

RECORD OF DECISION

I. Applicant: Cape Wind Associates, LLC (CWA)

Application Number: NAE-2004-388

This Record of Decision (ROD) incorporates by reference the Corps of Engineers *Cape Wind Energy Project, Draft Environmental Impact Statement, November 2004,* the Minerals Management Service[1] (MMS) *Cape Wind Energy Project, Final Environmental Impact Statement, January 2009* (FEIS), the Mineral Management Service (MMS) *Cape Wind Energy Project, Environmental Assessment and Finding of No New Significant Impact, April 28, 2010*, and the MMS *Record of Decision, Cape Wind Energy Project, Horseshoe Shoal, Nantucket Sound, April 28, 2010*,. The Corps of Engineers has been a cooperating agency with MMS for purposes of complying with the National Environmental Policy Act (NEPA).

II. This permit action is being taken under authority delegated to the District Engineer from the Secretary of the Army and the Chief of Engineers by 33 CFR 325.8, pursuant to:

__X__ Section 404 of the Clean Water Act

__X__ Section 10 of the Rivers and Harbors Act of 1899

Under Section 404 of the Clean Water Act, the Corps of Engineers has jurisdiction to regulate the discharge of dredged or fill material in waters of the United States. The seaward limit of waters of the United States for purposes of Section 404 is the territorial seas, which extend three nautical miles from the baseline defining the territorial sea. 33 C.F.R. § 328.4(a). The baseline is generally the line on the shore reached by the ordinary low tides. 33 C.F.R. § 329.12(a)(1). Here, the only activity subject to Section 404 regulation is the discharge of dredged and fill material associated with the transition of the 115 kV submarine transmission cables from water to land at Lewis Bay in Harwich, MA.

Under Section 10 of the Rivers and Harbors Act of 1899, the Corps of Engineers has jurisdiction to regulate structures and work in and affecting navigable waters of the United States. 33 U.S.C. § 403; 33 C.F.R. § Part 322. As with Section 404, the reach of navigable waters of the United States subject to Section 10 jurisdiction extends to the territorial seas. 33 C.F.R. § 329.12. In addition, the Outer Continental Shelf Lands Act (OCSLA), 43 U.S.C. § 1333(e), extended Corps Section 10 authority to the outer continental shelf (OCS) for the regulation of structures attached to the seabed. Here, the Corps's Section 10 authority extends over all structures and work associated with the project in the territorial seas, and over all structures (including transmission cables) on the outer continental shelf.

III. Description, Location and Purpose of Work:

The project includes work and structures in navigable waters, including the discharge of dredged or fill material, for a proposed wind energy facility consisting of 130 wind turbine generators

[1] On June 18, 2010, the Secretary of the Interior issued Order No. 3302, which changed the name of MMS to the Bureau of Ocean Energy Management, Regulation, and Enforcement ("BOEMRE"). In this document, the Corps refers to the agency by its old name, MMS, to avoid confusion and to be consistent with the NEPA documents for this project that were created before the name change occurred.

located on Horseshoe Shoal in Nantucket Sound between Cape Cod, Martha's Vineyard and Nantucket. The work is described on the plans attached to the Corps January 22, 2008 Public Notice entitled "Purpose: Wind Energy Generation and Submarine/Overland Transmission Cable Project," on 18 sheets dated February 15, 2007. The wind turbine generators (WTG) consist of the 3 rotor blades, transmission system, generator, yaw system, and the control and electrical systems. This is mounted on top of a steel tower supported by a monopole foundation. These will be arranged in a grid pattern 1/3 to 1/2 mile apart. A detailed description of the project can be found in Section 2 of the MMS FEIS.

The electricity produced by each turbine will be transmitted via a 33 kilovolt submarine transmission cable system to the Electric Service Platform centrally located within the turbine array. The electricity will then be transmitted to the mainland via two 115 kilovolt alternating current submarine cable circuits, making landfall at New Hampshire Avenue, Yarmouth, MA.

Several changes to the project proposal have occurred since the original permit application of 2001. The configuration and location of the turbines has changed slightly. In 2004, the state territorial boundary expanded further seaward in this area of Nantucket Sound. Ten of the original turbine locations were within these newly designated state waters, and the project was revised to move these turbines into federal waters. The proposed locations for twenty other turbines have changed to avoid archeologically sensitive areas, potential impacts to commercial fishing, and to reduce the potential for impacts to commercial navigation. See Sheet 3 of the February 15, 2007 plans for the current locations of the turbines. Rock armoring is now proposed as an alternative to the scour mats at the base of the turbine monopole foundations, if needed. The lighting plan has been developed consistent with Federal Aviation Administration (FAA) guidance. While the original application did not include any activities subject to Section 404 review, the applicant has changed the construction method for landfall transition to include backfilling the area within the temporary cofferdam, which would result in the discharge of dredged or fill material requiring a 404 permit. The landfall transition of the 115 kilovolt submarine transmission lines from water to land at Yarmouth will be through the use of horizontal directional drilling (HDD) to avoid disturbance of the shoreline. A temporary cofferdam will be installed at the seaward end of the HDD borehole. The steel sheetpile cofferdam will enclose an area of approximately 2925 square feet with dimensions of 65 feet wide and 45 feet long. It will be open at one end to allow the installation of the conduits. A temporary turbidity curtain may be used may be used to confine sediments within the work area, if needed. Approximately 840 cubic yards of sediment will be temporarily removed, stored on a barge, and backfilled after the installation is completed. Clean sand will be used to supplement the backfill material as needed to restore the seafloor to preconstruction grade. See Sheets 12-14 of the February 15, 2007 plans.

IV. Description of General Environmental Setting: The proposed project would be located on Horseshoe Shoal in Nantucket Sound south of Cape Cod, Massachusetts and landward of the islands of Nantucket and Martha's Vineyard. A detailed description of the affected environment can be found in Section 4 of the FEIS. The offshore location where the wind turbines would be constructed is a dynamic environment subject to naturally high suspended sediment concentrations in near-bottom waters due to strong tidal currents and wind and storm generated waves, particularly in shoal areas. Water depths in the area of Horseshoe Shoal are as shallow as

0.5 ft. mean lower low water (MLLW) to 60 ft. The composition of the seafloor in the project area from Horseshoe Shoal to landfall at Lewis Bay is mainly sand with localized areas of gracial erratic (pebble to boulder sized rock fragments carried by glacial ice), and a concentrated outcrop of possible till (an unstratified glacial deposit that can include clay, silt, sand, cobbles, and boulders). Several areas within the project area have been identified as areas of potential submerged aquatic vegetation, including an eelgrass bed near Egg Island in Lewis Bay. Nantucket Sound is located within the Atlantic flyway, and it attracts many species of waterbirds year-round. In addition to waterbirds, large numbers of terrestrial birds migrate over Horseshoe Shoal in the fall and spring. The project area may be a location where bat species traverse during spring and fall migration. Horseshoe Shoal also provides habitat for numerous shellfish and finfish species, some of which are harvested by commercial and recreational fishermen. Certain species of marine mammals (seal, dolphin, and whale species) and sea turtles can also be found in or around the project area.

The Sound is an essential feature in drawing tourists to the region, and recreation and tourism are the economic base for the region. The coastal areas of the Cape and Islands provide opportunities for swimming, boating, windsurfing, jetskiing, hiking and sightseeing. Local businesses include numerous marinas, boat yards, yacht clubs, waterfront restaurants and the associated accommodations. Charter fishing, whale watching tours, birding, kayaking, scuba diving, canoeing and bicycle tours are available. The transmission line will make land fall at Lewis Bay in Yarmouth. The coastline in this area is a highly developed residential area with some coastal structures, including properties listed or eligible for listing on the National Register of Historic Places, including Traditional Cultural Properties of the Mashpee Wampanoag Tribe and the Wampanoag Tribe of Gay Head (Aquinnah). Nantucket Sound itself has been identified as a Traditional Cultural Property of the Tribes eligible for listing on the National Register. A list of 95 shipwrecks reported lost in the general vicinity of the project area from 1744 to 1990 has been compiled. The Hyannis-Nantucket ferry traverses the area in and out of Hyannis Harbor, and there are three airports located in the vicinity of the proposed action. There are two main shipping channels used by larger vessels in Nantucket Sound, the Main Channel (south of Horseshoe Shoal) and the North Channel (north of Horseshoe Shoal). .

V. Functions and Values Assessment of Resources Impacted: Nantucket Sound is used by fish, shellfish, marine mammals, birds and invertebrates, as set forth in detail in Section 4 of the FEIS. The wind turbine generators would be installed on Horseshoe Shoal; a highly dynamic, sandy area. Water depths on the shoal are from 0.5 to 60 ft MLLW with typical tidal heights of 1 to 4 ft. Red and green macro-algae and some patchy eelgrass were found in the Horseshoe Shoal area. There are hard and soft-bottom benthic habitats, shellfish, meiofauna and plankton in the area. The hard bottom area is primarily along the western border of the WTG array. These areas may be used by macroalgae, sponges, barnacles, mollusks, tunicates, crabs, sea stars, gastropods, and fish such as tautogs. The soft bottom area is primarily unstable sand which is generally used by motile organisms that can avoid the shifting sand or by organisms that can burrow below. The submarine transmission cable will cross a recreational shellfish area. The Town of Yarmouth seeds the area annually, and as a result, quahogs are the most prevalent shellfish. The cable will be installed close to, but not in, eelgrass in Lewis Bay near Egg Island. Eelgrass is submerged aquatic vegetation/ vegetated shallows, a special aquatic site considered to be an area "possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values" by 40 CFR Part 230 (404(b)(1) Guidelines). Eelgrass can provide food and shelter to juvenile fish and invertebrates. The project area is designated Essential Fish Habitat in accordance with the Magnuson-Stevens Fishery Conservation and Management Act for 17 fish and three invertebrates: Atlantic cod, scup, black sea bass, winter flounder, windowpane, summer flounder, yellowtail flounder, Atlantic butterfish, Atlantic mackerel, blue shark, shortfin mako shark, bluefin tuna, king mackerel, Spanish mackerel, cobia, little skate, winter skate, long-finned squid, short-finned squid, and surf clam. This habitat is necessary to these fish for spawning, breeding, feeding, or growth to maturity. Nantucket Sound is a regionally significant area for waterbirds and attracts many species during migration for resting and feeding. Marine birds which may be found in the area include loons, grebes, Wilson's storm-petrels, northern gannets, commorants, common eiders, long-tailed ducks, red-breasted mergansers, goldeneyes, gulls, terns and auks. Marine mammals which may use the open waters of Nantucket Sound include harbor seals, grey seals, hooded seals, Atlantic white-sided dolphin, striped dolphin, short-beaked common dolphin, harbor porpoise, long-finned pilot whale, minke whale, Atlantic spotted dolphin, Risso's dolphin, dwarf sperm whale and pygmy sperm whale. Although there is no designated critical habitat for any endangered species within Nantucket Sound, consultation under the Endangered Species Act (ESA) has been completed for the following species which could be present in the Sound or adjacent coastal areas: North Atlantic right whale, humpback whale, fin whale, loggerhead sea turtle leatherback sea turtle, Kemp's ridley sea turtle, green sea turtle, Northeastern beach tiger beetle, piping plover and roseate tern.

VI. Relationship to Existing Uses: Construction and operation of the facility will affect certain existing uses of the offshore areas in Nantucket Sound. The interaction between the project and existing uses are discussed in more detail at Section 5.3.3.7 of the FEIS. During construction of the facility, vessels, including commercial and recreational fishing vessels, would be precluded from using the immediate vicinity of construction activities. Also, fixed fishing gear would need to be placed outside areas where cable jetting operations would be occurring. A few wind turbine locations would be under construction at any one time, along with the cable jetting operation. After construction of the facility, vessels transiting the area would need to avoid the turbines and electrical service platform (ESP). Most commercial vessels transiting the area are restricted by their draft to the navigation channels outside the locations of the turbines and ESP, so it is smaller draft vessels that would be most affected. The space between turbines (0.39 miles by 0.63 miles) is far wider than the widths of existing channels in the area that are routinely used by commercial vessels. The turbines and ESP would present space use conflicts for commercial and recreational fishing activities and recreational boating, but fishing will not be prohibited within the project area. Fishing vessels would be able to trawl within the turbine array, but would need to avoid the turbines and ESP as they steer their courses. The transmission cable system will be buried at sufficient depths so there would not be an effect to trawling or anchoring in the area. Moderate impacts to marine radar are expected and vessel operators will need to take this into account when transiting the area. Recreational vessels—including sailboat events like the annual Figawi Race—will also be impacted, and will need to use more caution when navigating the turbine array. Construction of the transmission cable facility could affect future pipeline or cable installation projects, and would require coordination before new infrastructure is constructed, but should not prevent additional projects in the future. Those people who value the unbroken ocean horizon—both from shore and on the water--will have a changed view across the Sound when the turbines are visible.

VII. Alternatives Analysis

The analysis of alternatives is an important requirement of both NEPA and USEPA's 404(b) Guidelines, 40 C.F.R. Part 230. However, there is an important distinction between the alternatives analysis under each legal framework. NEPA is a procedural statute, and the alternatives analysis under NEPA is a procedural requirement that does not mandate a substantive result. Unlike NEPA, however, the alternatives analysis of Section 404 does serve a substantive role in several ways, most notably in the identification of the least environmentally damaging practicable alternative (LEDPA), 40 C.F.R. § 230.10(a). Here, the Corps regulates the entire proposed project under Section 10 of the Rivers and Harbors Act of 1899, but only a small piece of the project under Section 404 of the Clean Water Act. As such, the NEPA analysis—and its consideration of alternatives—must address the entire project, but the 404(b) alternatives analysis is much more narrow because the only 404 fill associated with the project occurs in a single location where the submarine transmission cable comes ashore. As such, the 404(b) and LEDPA analysis focuses only on alternatives to the fill associated with the installation of the transmission cable, not the entire project. This is consistent with the 404(b) Guidelines, which contemplate situations where "NEPA documents may address a broader range of alternatives than required to be considered under" the 404(b) alternatives analysis. 40 C.F.R. § 230.10(a)(4).

1. Project Purpose: The project purpose is to develop and operate an alternative energy facility that utilizes the unique wind resources in waters offshore of New England employing a technology that is currently available, technically feasible, and economically viable, that can interconnect with and deliver electricity to the New England Power Pool, and make a substantial contribution to enhancing the region's electrical reliability and achieving the renewable energy requirements under the Massachusetts and regional renewable portfolio standards.

2. NEPA Alternatives Analysis:

The EIS examined several offshore sites in the New England region, configuration alternatives at the proposed Horseshoe Shoal site consisting of a smaller project alternative, a condensed configuration, and phased development, and the no-action alternative. Physical site screening was based upon water depth, extreme storm wave height, distance to the transmission grid, and wind resource availability. Sites screened out due to physical constraints were offshore areas near Portland, ME, Cape Ann, MA, Boston, MA, Nauset, MA, Nantucket Shoals, MA, Phelps Bank, MA, and Block Island, RI. Seven alternatives--the proposed action, no action, a smaller project, condensed configuration, phased development, and alternative sites at Monomoy Shoals and south of Tuckernuck Island—were subjected to detailed analysis in the FEIS, including an analysis of direct, indirect, and cumulative environmental effects.

A. "No Action" Alternative

The no action alternative would preclude the opportunity to develop a new renewable energy source and would not make a significant contribution to meeting the project power demand in the region. The impacts, both positive and negative, associated with the construction/decommission and operation would not occur. Burning of fossil fuels would be the only technology likely to provide New England with the electric generation output at the level of the proposed project. The impacts would vary depending upon whether the fossil fuel is coal, oil or natural gas but all would have air quality impacts and emit CO_2. The "no action" alternative would not meet the purpose and need.

B. Geographic Alternatives

Among the geographic alternatives evaluated, two were evaluated in detail in the Final EIS. The South of Tuckernuck Island alternative would have the same impacts as the proposed project in 22 of the 28 categories evaluated. It would be expected to have less visual impact but more impact to avifauna, subtidal offshore resources, non-ESA marine mammals, fish and Essential Fish Habitat. The Monomoy Shoals alternative would have the same impacts as the proposed project in 20 of the 28 categories. It would be expected to have less impact to visual and cultural resources but more impact to avifauna, subtidal offshore resources, non-ESA marine mammals, fish and essential fish habitat and threatened and endangered species.

C. Minimization Alternatives

Alternatives evaluated to minimize impacts were configuration alternatives at the proposed Horseshoe Shoal site--a smaller project alternative, a condensed configuration, and phased development. The smaller project alternative reduced the impacts to water and air quality, noise, avifauna, subtidal offshore resources, non-ESA marine mammals, fish and Essential Fish Habitat, threatened and endangered species, visual and cultural resources and competing uses. The potential difference in impacts between the smaller project and the proposed project are not significant and not proportional to the reduction in the electric generation capacity. With only half of the generation capacity of the proposed project, the smaller project would not meet the project purpose of making a substantial contribution to enhancing the region's electrical reliability and achieving the state and regional renewable energy requirements. The phased development alternative had some potential for providing an opportunity to make changes in Phase 2 based upon what is learned in Phase 1, however this is uncertain and cannot be quantifiably articulated. A phased approach would result in increased impacts during construction/decommission activities and similar impacts during operation. The foot print of the condensed array would be approximately 16 square miles, 9 square miles less than the proposed project. However, the power production would be measurably reduced. The condensed array alternative would have less impact during construction to water quality, noise, avifauna, subtidal offshore resources, non-ESA marine mammals, fish and Essential Fish Habitat and threatened and endangered species. There would be greater impact to avifauna and threatened and endangered species during operation. Impacts in the other categories would be similar to the proposed project.

D. Environmentally Preferable Alternative

The Council on Environmental Quality (CEQ) NEPA regulations require federal agencies to identify the alternative considered to be environmentally preferable. 40 C.F.R. § 1505.2(b). CEQ has advised that the environmentally preferred alternative is the alternative that causes the least damage to the biological and physical environment, and that best protects, preserves, and enhances historic, cultural, and natural resources. CEQ, Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, Question 6a, 46 Fed. Reg. 18026 (Mar. 23, 1981). In this instance, the smaller project alternative is the environmentally preferred alternative, as it is the alternative with the least impacts to resources in the affected environment, and, unlike the "no action" alternative, will result in electrical generation without emissions and associated environmental consequences that would likely result from facilities that would otherwise produce the electricity created by the action alternatives.

3. 404(b) Alternatives Analysis—Transmission cable alternatives

The 404(b) analysis focuses on the portion of the project where the transmission cables come to shore, as this is the only portion of the project where there will be a discharge of dredged or fill material into waters of the United States. The purpose of the transmission cables is to transport the power from the project's electric service platform to the grid to serve the New England Power Pool. Because the electric service platform is located in Nantucket Sound, the transmission cable must be located in water of the United States to transmit the power to the grid, and is therefore a water-dependent activity.

The transition of the transmission cables from water to land will occur using horizontal directional drilling (HDD) from land to an offshore connection point. Conduits will be placed in the boreholes and the transmission cables will be pulled through the conduits. The offshore end of the HDD will terminate at a pre-excavated pit, which will be within a temporary 65 ft wide by 45 ft long cofferdam enclosing approximately 2925 sq ft. The boreholes will end at an elevation of approximately -10 ft mean lower low water. After construction is completed, the dredged area within the cofferdam will be backfilled with the dredged material, or, if necessary, supplemented with imported clean sandy material. This construction technique is considered the least damaging practicable methodology for the transition of a transmission cable from sea to land, as it will reduce turbidity associated with the dredging and reduces the potential for release of drilling fluids into Lewis Bay when the HDD reaches the connection point. Four alternatives were considered for the interconnection of the two 115 kV electric transmission circuits to the existing grid:

- Connect to NSTAR's 115kV Barnstable Switching Station,
- Connect to NSTAR's 115kV Harwich Substation,
- Connect to NSTAR's 115kV Pine Street Substation in New Bedford,
- Connect to a new 115kV substation on Martha's Vineyard, then proceed to the mainland.

A reasonable range of alternatives for the transmission lines were identified, the costs, technology and logistics of each considered, and the environmental impacts compared. The Barnstable Switching Station, the Harwich Substation, and the New Bedford Substation each would meet the project purpose and are practicable alternatives. The Martha's Vineyard route is not a practicable alternative due to the excessive cost with no corresponding environmental benefit over the other alternatives--it is a longer route with greater environmental impacts, and will result in the same amount of 404 fill occurring where the cable would reach shore. The environmental impacts for any of the other alternatives is mostly temporary and substantially of the same type, just differing in length. Shallow bedrock could be an impediment to cable burial in portions of the New Bedford and Harwich routes, and construction techniques for embedding the cable in such conditions would result in greater environmental impacts than in a sandy bottom environment. The New Bedford route is the longer of the remaining three and presents some additional logistical issues due to the Corps of Engineers New Bedford and Fairhaven navigation channel and hurricane barrier. Impacts due to necessary upgrading of the existing stations would be greater for the Harwich and New Bedford alternatives than at Barnstable. The Harwich route is longer than the Barnstable route. The jetplowing technique is generally recognized as the means of minimizing submarine cable installation impacts. Jet plow operation is not subject to 404 regulation. Moreover, to the extent jet plow operations were subject to 404 regulation, it would be considered the Least Environmentally Damaging Practicable Alternative, as other means of installing transmission cable create greater environmental impacts. Recent modeling indicated that sediment deposition quickly tapers off to below 0.2 inches (5 mm) at between 50 and 100 feet (15-30 m) on either side of the cable trench, and almost all sediment will be deposited within 100 feet of the trench. For any of the routes, it will be necessary to minimize nearshore impacts through the use of HDD technology and avoidance of eelgrass beds.

As the shortest route least likely to encounter a hard bottom environment, the Barnstable Switching Station is the Least Environmentally Damaging Practicable Alternative.

4. Mitigation: Mitigation and monitoring identified in the FEIS and MMS ROD is required through the MMS lease and the conditions of the Massachusetts Environmental Policy Act (MEPA) certificate. These include:

Geology- Preconstruction surveys and monitoring will be done to establish baseline conditions. Installation of scour protection around the wind turbine generators foundations will be accomplished as needed. Post construction monitoring will be done to assess scouring and cable exposure.

Air Quality- Cape Wind is required to purchase Emission Reduction Credits, use ultra low sulfur diesel fuel and limit idling for vessels using the Quonset Point staging set.

Water Quality- The preventive and emergency maintenance requirements of the Operation & Maintenance Plan, the Oil Spill Response Plan (OSRP) and the Stormwater Pollution Prevention Plan will help ensure water quality impacts are avoided.

Electrical and Magnetic Fields- Magnetic flux density will be reduced through the use of three-conductor cables and enclosing the inter-array and offshore transmission high-voltage conductors in a shielded cable.

Coastal and Intertidal Vegetation- Pre- and post construction monitoring of eelgrass beds will be used to determine if, and where, replanting is needed. Vessels will not be anchored in eelgrass. A dive survey will determine the limits of eelgrass in the Egg Island vicinity, which will be avoided. Current aerial photographs will be used to direct the jet-plowing route so as to avoid transient eelgrass beds.

Birds and Bats- An Avian and Bat Monitoring Plan (ABMP) will provide for pre- and post-construction monitoring. The OSRP mentioned above will also address response activities that could occur in Endangered Species habitat. Installation and testing of anti-perching mechanisms are required. Roseate tern or piping plover mortality attributable to the project will be reported within 24 hours. The results of ABMP monitoring efforts will be reported. Lighting, in compliance with Federal Aviation Administration (FAA) and United States Coast Guard (USCG) needs, will be adjusted to minimize potential bird collisions.

Visual Resources– Offshore structures will be painted off-white and no daytime white lighting will be used to minimize visibility. Night time lighting will be in accordance with requirements of FAA and USCG.

Cultural Resources– In addition to the above requirements to minimize visibility, additional preconstruction submarine surveys will be conducted to further archaeological resource assessment. At least one core will be extracted from each WTG location and analyzed for indicators of preserved landscapes, paleosols or cultural habitation. Buffer zones will be established around sites of potential shipwrecks or cultural resources. Predictive modeling and settlement pattern analysis will be used to avoid likely archaeological resources. Certain work will be monitored by a qualified archaeologist and tribal monitor. The *Procedures Guiding the Unanticipated Discovery of Cultural Resources and Human Remains* will be followed.
Airport Facilities and Air Traffic- Lighting of the offshore structures will be in accordance with the lighting plan developed in accordance with the FAA and USCG requirements. Light locations, color, intensity and flashing rate have been developed to minimize impacts will addressing hazards. The helipad lighting will be remotely activated. Construction structures and equipment will be lit at night. Equipment and vessel lights will be down shielded when possible.
Marine Activities and Port Facilities – Monthly status reports on construction activities will be submitted to MMS and USCG. Private Aids to Navigation will be installed and properly marked. Traffic management measures will be adopted with the USCG and a control center established to maintain USCG-required monitoring. Mariners will be educated on navigation safety issues related to the facility. Safety lines, mooring attachments and access ladders will be placed on each WTG as approved by the USCG.
Communications- Certain radio frequencies are not to be used during construction. Watercraft will be advised to respect a two wavelength distance from the construction cranes at the lowest frequency of interest.
Mitigation specifically required for compliance with the Section 404(b)(1) Guidelines is accomplished through the following special condition to the Corps permit:

- An eelgrass monitoring and mitigation plan will be submitted and approved in writing by the Corps of Engineers prior to the start of the submarine cable installation. This plan will include pre- and post-construction monitoring to determine if any eelgrass has been lost due to the cable installation. A planting plan and schedule to compensate for the disturbed eelgrass will be included.

VIII. Impacts to Public Interest Factors:

The decision as to whether to issue a permit is based upon an evaluation of the probably impacts of the proposal and its intended use on the public interest. Evaluation of the probable impact which the project may have on the public interest requires a careful weighing of all the relevant factors. The benefits which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. The decision whether to authorize a proposal, and if so, the conditions under which it will be allowed to occur, is determined by this general balancing process. The decision should reflect the national concern for both protection and utilization of important resources.

Water Quality – Disturbance of sediment during construction activities such as jet plowing and backfilling is expected to result in temporary, localized impacts. The project area is a dynamic environment where high levels of suspended sediment regularly occur at the seafloor, so disturbances and impacts to water quality associated with construction will be consistent with the background environment. MMS has determined, and the Corps agrees, that the probability of an oil spill that could have greater effect on water quality, is very small.

Benthic Flora & Fauna – Minor impacts to soft bottom benthic communities are expected. The majority of the area where construction will occur is sandy bottom habitat subject to regular disturbance by storms, waves, and tidal currents. The species and benthic communities in such areas typically recover quickly from the same types of disturbances that will be caused by construction activities.

Land Use Classification – No effect. The OCS areas of Nantucket Sound where the project is located are not designated as a National Marine Sanctuary or other such classification, but are subject to the general uses of the Outer Continental Shelf Lands Act, including leases for alternative energy projects pursuant to the 2005 Energy Policy Act.

Water Supply and Conservation -- No effect.

Wetlands -- No impacts to wetlands are expected. The onshore portions of the project (transmission line) will not cross any freshwater wetlands and should be sufficiently distant from any wetlands to avoid impacts. No work is proposed in coastal saltmarsh, and by using horizontal directional drilling for cable installation at landfall, impacts to coastal wetland resources will be avoided.

Historical- Adverse impacts are expected for 34 properties eligible for listing on the National Register of Historic Places, including two Historic Landmarks and six Traditional Cultural Properties of the Mashpee Wampanoag Tribe and the Wampanoag Tribe of Gay Head (Aquinnah). The impacts to 33 of these properties, those located on land, are indirect adverse visual effects from the introduction of the wind turbines to the viewshed. Impacts to these properties will be mitigated by the color of paint for the turbines and the lighting scheme. Only one eligible property—Nantucket Sound itself, identified as a Traditional Cultural Property of the Tribes—will be affected by direct physical impacts from the construction of the facility. The impacts to the majority of historical resources identified come in the form of the introduction of the turbines to the visual landscape at a great distance, on the occasions where weather conditions permit them to be observed. None of the properties eligible for listing on the National Register will be so diminished by the impacts of the project as to disqualify them from such listing. For historic and cultural resources on the seabed of Nantucket Sound, identified shipwrecks will be avoided, and surveys will be conducted prior to construction to determine if additional cultural resources must be avoided.

Flooding– no effect

Drainage– no effect

Energy Needs – The project is planned to have a direct influence on the regional energy market. The project will provide additional electricity to the region without using natural gas as an energy source, helping to provide balance to a region heavily dependent on natural gas to provide its increasing demand for energy. The project is viewed as a major and necessary step in advancing renewable energy development nationally, as well as addressing regional and Massachusetts renewable portfolio standards.

Economics – Purchasing of materials and supplies locally and the estimated 391 temporary construction jobs will benefit the local economy. Minor economic effect is expected during operation, with operation and maintenance expenses and associated employment opportunities. In addition, the applicant has agreed to pay $350,000 annually for 20 years to the Town of Yarmouth for the onshore cable connection. It is not expected that the project will affect tourism and its associated economic benefits to the region as the project will be far from land and, for most tourists on the Cape and the Islands, at most times will not be visible.

Circulation Patterns – No effect on overall circulation patterns is expected due to the distance between structures. Some localized scouring at the turbine piles is expected and scour protection and monitoring is likely to be necessary. Sediment will be resuspended during jet plowing and backfilling activities but the effect is expected to be temporary and less than occurs during natural events in the dynamic Nantucket Sound environment or from existing trawling activities.

Air Quality – Construction equipment would create NOx emissions in Rhode Island waters in excess of "de minimis" levels of the Rhode Island State Implementation Plan, but emissions in Massachusetts waters will not exceed the de minimis levels. To ensure conformity with Rhode Island's SIP, MMS is requiring the applicant to purchase Emission Reduction Credits for any year in which projected NOx emissions within Rhode Island exceed 100 tons, which would result in no net increase in NOx emissions from the project. Emissions on the OCS are subject to EPA air permit requirements pursuant to 40 C.F.R. Part 55, and EPA is currently reviewing the applicant's application. After construction is complete, other than the emissions associated with the operation of two maintenance vessels, there will be no emissions associated with the facility. The facility would then be generating electricity from emission-free generators, which in the absence of the project would likely be produced for the New England region by conventional fossil fueled facilities, thus producing some regional air quality benefits.

Aesthetics – Simulations show the structures will be visible from sensitive locations around Nantucket Sound on Cape Cod, Nantucket, and Martha's Vineyard. While the aesthetics of the proposal are subjective, and opinions both favoring and opposed to the visual impact of the facility have been expressed, the change in the viewshed has been one of the most commonly cited public concerns associated with this project. The infrastructure will be miles offshore, and at locations where it can be seen from the shore it will appear small and close to the horizon. The closer a viewer is to the facility; the more highly conspicuous it will appear, so boaters on the water will see more of a change in the aesthetics of the Horseshoe Shoal.

Shore Erosion/Accretion – Horizontal Directional Drilling (HDD) will be employed to avoid impacts to the intertidal and near shore area. The offshore project area is a highly dynamic area of sand waves; no changes in that environment are expected.

Noise -- Construction of the facility would create noise as the monopiles are driven into the seabed. This will not generally be audible (i.e. above existing baseline noise) from land locations. Pile driving will be audible for individuals near construction activities, depending upon the distance and whether the individual is upwind or downwind of the construction. During operation, the turbines will create noise that would not be perceptible from land, and for boaters near the turbines, the sound levels produced by the operating turbines are expected to be lower than existing baseline sound levels. Underwater at the turbines, there would be a slight increase in noise levels above the baseline, but this declines to the baseline level at a distance of 361 ft. from the turbines. Noise impacts are expected to be minor (at locations on the water during construction) to negligible (from land, and during operation).

Wildlife -- Moderate impacts to birds are expected during construction activities and operation of the facility due primarily to collision. There could also be minor habitat modification and disturbance. Impacts to marine mammals, sea turtles, cetaceans and finfish are expected to be minor mostly due to construction vessel activity, habitat disturbance and noise. Moderate impacts to migratory bats are possible, with minor impacts to non-migratory bats.

Mineral Needs -- MMS has reserved the right to authorize mineral and other extractive uses by others within the project area that will not interfere with this project's activities. There is currently a moratorium on oil and gas leasing in this area of the Atlantic, so the project would not impact oil and gas leasing unless this moratorium is lifted. While future sand mining and oil and gas extraction would be more difficult with the project in place, it would still be possible.

Food and Fiber Production – No direct impacts. There is some potential for survey and construction activities to have a minor temporary effect on the benthos, plankton, and fish eggs, but no appreciable alteration in the food chain is expected. Commercial and recreational fishing will be permitted within the turbine array, and the transmission lines will be buried low enough so there will be no expected interference with trawling activities. Fishing vessels will need to exercise more caution within the turbine array to avoid the structures, but it is expected that there will be sufficient space between the turbines to allow trawlers to operate and fish these waters.

Navigation – Minor to moderate impacts, including possible impacts to marine radar, are expected within the wind turbine array. Pursuant to Section 414(a) of the Coast Guard and Maritime Transportation Act of 2006, the USCG developed terms and conditions for operation of the facility to ensure navigational safety. As part of its analysis, the USCG assessed the potential impacts to marine radar from the facility. The Corps concurs with USCG's analysis, and agrees that the USCG mitigation measures incorporated into the MMS approval appropriately address impacts to navigation.

Floodplain Values – No effect.

Recreation -- Moderate impacts to recreational boating and within the project area as users will need to exercise more caution to avoid the turbines and ESP. Minor impacts to fishing are expected, as fishing will not be prohibited in the turbine array, and some benefits can be expected for recreational fishing as some fish species are expected to be attracted to the turbine and ESP piles as plant and invertebrate communities develop on the structures. Indirect effects to shoreline activities such as beachgoing, birdwatching and sightseeing are possible from the introduction of the turbines and ESP to the visual landscape, but this is not expected to prevent these activities from continuing.

General Environmental Concerns – As this was the first major offshore wind project proposed in the United States, concerns have been expressed that the impacts cannot be known with any certainty. Regulatory agencies have relied upon extensive data available from similar projects in Europe, experiences with offshore oil and gas projects in the United States, and site-specific research conducted for this project. The record reflects a thorough consideration of all environmental concerns, and the analysis of the FEIS reveals no expected major environmental impacts.

Safety -- Boaters will need to be more careful within the turbine array. The USCG has issued "Terms and Conditions" to provide for safer conditions.

Property Ownership -- No effect. Cape Wind is obtaining leases from MMS to install the structures and cable system on federal lands on the OCS. An annual payment to the town of Yarmouth will help to compensate for the use of the municipal infrastructure.

Finfish/plankton – Impacts are expected to be short term, localized, and minor during construction due to sediment disturbances. Time of year restrictions will be required by MMS to avoid impacts to winter flounder eggs during spawning in Lewis Bay. During operation of the facility, the turbines and ESP may provide attractive habitat for fish as plant and invertebrate communities develop on the structures.

Aviation – Concerns have been expressed about the impacts of the project on aviation and aviation radar systems. After reviewing the issue extensively, the Federal Aviation Administration (FAA), the federal agency responsible for aviation safety, issued a "no hazard" finding that with modifications to existing radar systems, the project will not constitute a hazard to aviation.

Needs and Welfare of the People – After 9 years of local, state and federal review, the need for a major renewable energy source has been the focus of project advocates nationwide, while the visual impact and navigational space use conflicts for those closest to the project have been the focus of opponents. The benefits are regional while the impacts are local. Thus, the perceived needs and welfare of the people vary depending upon their location. When viewed in this context, however, the production of renewable energy will provide a benefit to all, even those impacted by the project, and as set forth in the FEIS, the local impacts are relatively minor. Mariners will need to exercise more caution, but they will still be able to transit and fish in the Horseshoe Shoal area. The viewshed will be changed, but from land the structures will appear as small intrusions on the visual horizon.

IX. Findings:

1. State Water Quality Certification: Massachusetts Department of Environmental Protection issued the Water Quality Certification August 15, 2008.

2. State Coastal Zone Management Concurrence: Massachusetts Office of Coastal Zone Management has concurred that the project is consistent with the CZM enforceable program policies.

3. Minerals Management Service lease: In a Record of Decision dated April 28, 2010, MMS documented the decision to offer a lease to Cape Wind Associates, LLC (CWA). On October 6, 2010, MMS and CWA signed a lease agreement for the project.

4. Historic and Cultural Resources: National Historic Preservation Act (NHPA) Section 106 and government-to-government (tribal) consultation began with the Corps in 2002 and was our responsibility until 2005. The consultation was completed by MMS when that agency became the lead federal agency pursuant to the Energy Policy Act of 2005. Once MMS was the lead agency, it led the consultation process on behalf of the Corps pursuant to 36 C.F.R. § 800.2(a)(2). MMS hosted consultation meetings including the Corps, other federal agencies, the Massachusetts State Historic Preservation Officer (SHPO), the Tribal Historic Preservation Officers (THPO) and several other interested parties. The Advisory Council on Historic Preservation (ACHP) was represented at some of these meetings. The numerous meetings and efforts of MMS during this consultation process are documented in the MMS ROD.

In December 2008, MMS issued a finding, and the Corps concurred, that the project would result in an adverse effect on 29 historic properties, including one property culturally important to the Mashpee Wampanoag tribe and two National Historic Landmarks. This finding was revised in January 2010 to add Nantucket Sound--considered a Wampanoag traditional cultural property (TCP)--and four individual onshore Wampanoag TCPs. Based on the visual impact assessment, effects to the following National Register listed or eligible historic places are expected: Cotuit Historic District, Wianno Historic District, Hyannis Port Historic District, Edgartown Village Historic District, Nobska Point Light Station, Col. Charles Codman Estate, Wianno Club, Monomoy Point Lighthouse, West Chop Light Station, East Chop Light, Dr. Harrison A. Tucker Cottage, Edgartown Harbor Lighthouse, Cape Poge Light, Nantucket (Great Point) Light, Falmouth Heights Historic District, Ocean Grove Historic District, West Chop Historic District, Maravista Historic District, Menauhant Historic District, Church Street Historic District, Park Avenue Historic District, Champlain Road Historic District, Cottage City Historic District, Vineyard Highlands Historic District, Hithe Cote, Nantucket Cliffs Historic District, Kennedy Compound, and Stage Harbor Light.

The impacts to these 28 identified above-ground historic properties constitute an indirect, adverse visual effect because it will change the character of the properties' setting that contributes to their historic significance and the project will introduce visual elements that are out of character with the historic setting of the properties. However, due to the distance and open viewshed, the integrity of the properties would not be so diminished as to disqualify any of them from eligibility for the National Register.

The project also constitutes an indirect, adverse visual effect for five onshore TCPs of the Wampanoag Tribe of Gay Head (Aquinnah) and the Mashpee Wampanoag Tribe because it will change the character of the properties' physical features from a location where the southeastern horizon is unimpeded, to one in which the horizon is partially obstructed. The project will also introduce visual elements that are out of character with the ceremonial use of the property. The project also constitutes a direct, physical effect on the seabed of Nantucket Sound, a TCP of the Wampanoag Tribe of Gay Head (Aquinnah) and the Mashpee Wampanoag Tribe because the undertaking will introduce elements that are out of character with the property and alter its setting and will change the character of the property's physical features that contribute to its historic and cultural significance to the Tribes. The undertaking also constitutes physical destruction, damage, and alteration of part of the seabed of Nantucket Sound which, according to the Tribes, cannot be mitigated nor reversed once done. After extensive efforts to address the adverse effects of the project with Tribes, ultimately, on March 1, 2010, the Secretary of the Interior notified the ACHP that the agency would terminate consultation as further efforts to agree on a Memorandum of Agreement (MOA) would not be productive. After this, on April 2, 2010, the ACHP provided comments to the Secretary, and the Section 106 process was concluded.

Impacts to historic and archaeological resources associated with the project will be mitigated. The mitigation measures of painting the turbines off white and no daytime white lighting will minimize the visual impact. Archaeological investigations indicated three locations of moderate probability of being historic shipwrecks on Horseshoe Shoal. MMS is requiring that these be avoided by all bottom-disturbing activities. Corps permit conditions will also require that work stop and the Corps be notified of any unexpected finds. MMS is also requiring additional surveys of the entire Wind Turbine Generator Array Field out to 1000 feet beyond the Area of Potential Effect and the transmission cable corridor at a minimum of 300m wide to identify and avoid additional archaeological resources. In addition to these surveys, MMS is requiring that one or more cores be extracted from the location of each Wind Turbine Generator for geotechnical analysis and examinations by an archaeologist, Tribal representatives, and a geoscientist. These surveys and core sampling may result in reconfiguration of the project to avoid impacts to historic and cultural resources. MMS continues to work with the Tribes to determine if the Tribes are amenable to additional mitigation measures, including financial support of up to $200,000 per year from CWA (split between the tribes) for the 21 year project life and up to $3.5 million from a fund administered by MA CZM to mitigate for cultural and/or historical tribal interests.

5. Protected Species: MMS, as the lead federal agency, has completed formal consultation with the United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) on behalf of the Corps as required by Section 7 of the Endangered Species Act (ESA).

USFWS provided a "no jeopardy" opinion in response to the Biological Assessment. This opinion addressed potential impacts to roseate tern, piping plover and the northeastern beach tiger beetle. USFWS concurred that the project was not likely to adversely affect the northeastern beach tiger beetle as it occurs on the periphery of the project area and the low probability of an oil spill attributable to Cape Wind. It has been determined that the project is likely to adversely affect the roseate tern and piping plover but not jeopardize their continued existence, nor adversely modify designated critical habitat of listed species. Injury and mortality due to collision with the wind turbines, their monopole support structures and the electric service platform is the primary expected impact. USFWS provided an Incidental Take Statement estimating that 80-100 roseate terns over the 20 year life of the project are likely to be injured or killed. USFWS estimated that a maximum of 10 piping plovers will likely be taken over the 20 years. USFWS provided reasonable and prudent measures necessary to minimize the incidental take of these two species, and these measures have been adopted by MMS and incorporated as lease conditions. MMS continues to work with Cape Wind to implement the following measures:

Pre- and post- construction monitoring to assess the effects and incidental take associated with the Cape Wind Project
Oil Spill Response Plan
Review of pre-and post-construction monitoring activities, perching deterrents and operational adjustments based on monitoring results
Reporting requirements

In addition, USFWS provided discretionary conservation recommendations which neither MMS nor the Corps plan to adopt. MMS is already using existing authorities to implement some of the recommended conservation measures through research efforts to test technology aimed at improving detection of birds offshore and in flight, and some of the recommended conservation actions are being addressed through mitigation required by the state.

Threatened or endangered species within NMFS jurisdiction which may occur within the project area are right whale, humpback whale, fin whale, loggerhead sea turtle, leatherback sea turtle, Kemp's ridley sea turtle and green sea turtle. NMFS provided a Biological Opinion and Incidental Take Statement through formal consultation. NMFS concluded that the project is not likely to adversely affect right, humpback or fin whales. NMFS concluded that the project may adversely affect loggerhead, Kemp's ridley, leatherback and green sea turtles but is not expected to jeopardize their continued existence. The turtles could be exposed to noise levels during surveys and construction activities which may be high enough to disturb their normal activities and thus be considered harassment. NMFS has estimated that 3-7 turtles during each pile driving and 13-28 turtles during the geophysical survey could be exposed to noise levels sufficient to be harassing. NMFS provided the following reasonable and prudent measures to minimize and monitor the incidental take of these species:

- MMS must ensure that any endangered species monitors contracted by Cape Wind are approved by NMFS.
- During the conduct of pile driving activities related to turbine monopile and electric service platform installation, the 750 meter exclusion zone must be monitored by a NMFS-approved endangered species monitor for at least 60 minutes prior to pile driving.
- During the conduct of the high resolution geophysical survey, the 500 meter exclusion zone must be monitored by a NMFS-approved endangered species monitor for at least 60 minutes prior to the survey.
- Acoustic measurement of the first pile being driven must be conducted to confirm the sound levels modeled by MMS and reported in the Biological Assessment.

- Prior to decommissioning, MMS must provide to NMFS a complete plan for the decommissioning activities.

NMFS also provided discretionary conservation recommendations, which neither MMS nor the Corps will adopt. NMFS recommended additional aerial surveys for sea turtles in Nantucket Sound. MMS is currently working with NMFS and the U.S. Navy on Atlantic coast-wide aerial and vessel surveys for sea turtles and other species, and this will include areas of Nantucket Sound. NMFS also recommended minimizing pile driving to the extent practicable during the June-October timeframe when sea turtles are expected to be in the area. MMS and the Corps believe existing measures will provide adequate protection to sea turtles, and by minimizing pile driving during the summer months the result would be shifting work schedules into winter months, a less safe time to operate in North Atlantic waters.

Subsequent to the completion of the NMFS Biological Opinion, there were unexpected sightings of right whales to the south and west of Martha's Vineyard. MMS re-initiated Section 7 consultation with NMFS to determine if the existing mitigation measures designed to protect sea turtle and marine mammal species would serve to ensure that the project will not likely adversely affect endangered and threatened marine mammal species. In a Biological Opinion dated December 30, 2010, NMFS provided reasonable and prudent measures and terms and conditions that were the same as in the original Biological Opinion which have been incorporated into the requirements of the lease and will be further refined in the Construction and Operations Plan.

The applicant intends to seek a Marine Mammal Protection Act (MMPA) Incidental Harassment Authorization as there is a potential for the taking of non-ESA listed marine mammals. MMS requires that MMPA authorizations and the ESA Incidental Take Statement be in place prior to the start of construction. Moderate impacts to marine mammals are expected due to the pile-driving noise. Vessel activity during operations could cause minor impacts.

6. Essential Fish Habitat: MMS has completed consultation with NMFS on behalf of the Corps regarding the effects of this project on Essential Fish Habitat (EFH) designated under the Magnuson-Stevens Fishery Conservation and Management Act. Appendix H of the FEIS was provided to NMFS as the Final EFH Assessment. Negligible to minor impacts are expect to benthic/demersal habitat, the water column and submerged aquatic vegetation. In accordance with the consultation with NMFS, the following are required in the CWA lease:

- includes a time of year restriction to avoid in water silt producing work during the winter flounder spawning period in Lewis Bay,
- requires soft-start for monopole installation so that fish can leave and avoid noise,
- requires periodic inspection of the scour mats and cables to determine if deterioration is occurring, and if armoring with rock is appropriate,
- requires monitoring of the benthic community recovery and determine if addition studies are necessary,
- requires eelgrass monitoring and replanting as needed.

7. <u>General Conformity Rule</u>. The EPA regulations published as "General Conformity Rule" (58 FR 63214, November 30, 1993) to implement section 176(c) of the Clean Air Act for non-attainment areas and maintenance areas require that Federal actions, unless exempt, conform with the Federally approved state implementation plan. Activities associated with this project that result in emissions in state waters were subject to the relevant State Implementation Plans (SIP). Here, the emissions occurring in Massachusetts were below threshold levels to require a conformity determination, but the projected NOx emissions in Rhode Island for the first year of the construction phase exceed the 100 tons per year threshold. In the conformity determination dated December 2009, MMS determined that Cape Wind construction activities would meet Rhode Island conformity requirements with conditions that would be included in the lease. The lease requires that prior to commencing construction activities Cape Wind shall meet general conformity requirements through purchase of offsets that meet the requirements under RIDEM regulations or a combination of offsets and emission control measures. MMS has also committed to collecting data to calculate emissions to ensure that actual emissions do not exceed the offsets purchased. For emissions on the OCS, the applicant has applied for a permit from EPA for its construction activities, and this air permit application is currently under review. MMS acknowledged that if there are any requirements in the EPA air permit that would affect the assumptions in this analysis or if there are any changes in Cape Wind's construction plan, their conformity determination may need to be revised.

8. <u>Application of 404(b) (1) Guidelines</u>: The final guidelines of the Environmental Protection Agency for the discharge of fill or dredged material (40 CFR 230) as published in the Federal Register, dated 24 December 1980, have been applied in evaluating this permit application. The project does comply with the Section 404(b)(1) Guidelines as there is no less environmentally damaging practicable alternative, and it does not violate water quality or effluent standards, does not jeopardize threatened or endangered species, and does not violate marine sanctuary requirements. The proposed discharge of dredged or fill material will not result in significant degradation of the aquatic ecosystem. Practicable and appropriate measures to minimize potential harm to the aquatic ecosystem are included. With the inclusion of the following special conditions the discharge of dredged or fill material has been found to comply with the guidelines:

An eelgrass monitoring and mitigation plan will be submitted and approved in writing by the Corps of Engineers prior to the start of the submarine cable installation. This plan will include pre- and post-construction monitoring to determine if any eelgrass has been lost due to the cable installation. A planting plan and schedule to compensate for the disturbed eelgrass will be included.

9. <u>Adoption of EIS</u>: The Corps of Engineers has determined that this project constitutes a major Federal action significantly affecting the human environment, and that an Environmental Impact Statement (EIS) is required. The Corps has served as a Cooperating Agency to the MMS in accordance with NEPA, and has provided appropriate input and review comments during the EIS process. The FEIS and associated NEPA documents prepared by MMS, with referenced materials, and comments received in response to them, are hereby adopted in accordance with 40 C.F.R. §1506.3. It is my conclusion that the FEIS and subsequent NEPA documents have

adequately addressed all the relevant environmental issues and considered all reasonable alternatives.

10. Public Involvement and Response to Public Comment: Both the Corps and MMS provided the public with extensive opportunity to learn about the project and to provide comment, both through public meetings and hearings, and through formal public comment periods. These opportunities for public involvement are described below. Through the NEPA process, MMS has appropriately addressed all comments received on the environmental and social impacts associated with the Cape Wind proposal in the FEIS and Environmental Assessment/Finding of No New Significant Impacts documents. In addition to the comments addressed in the FEIS, in response to the 2008 Corps Public Notice, the Corps received several comment letters that raised concerns specific to the Corps and its review process, and these comments are addressed in this section.

a. Public meetings and hearings: The Corps hosted public scoping meetings in Boston and West Yarmouth, MA on March 6 and March 7, 2002, respectively, within the 60 day scoping comment period. Public information meetings were held on November 21, 2002 and October 29, 2003 on Cape Cod and on April 18, 2002 on Martha's Vineyard. The Corps also participated in the Cape & Islands Offshore Wind Stakeholder Process sponsored by the Massachusetts Technology Collaborative between 2002 and 2005 (http://www.masstech.org/offshore/index.htm). After the Corps Draft EIS was released in November 2004, public comment hearings were held on December 6, 2004 in Oak Bluffs, December 7, 2004 in West Yarmouth, December 8, 2004 in Nantucket, and December 16 in Cambridge, MA. After release of its Draft EIS, MMS held public comment hearings in which the Corps participated on March 10, 2008 in West Yarmouth, March 11, 2008 in Nantucket, March 12, 2008 in Oak Bluffs, and March 13, 2008 in South Boston, MA.

b. Comment Periods: On January 30, 2002, the Corps published its notice of intent to prepare an EIS for the Cape Wind proposal in the Federal Register and sought scoping comments for the NEPA process. Upon completion of the Corps Draft EIS, a notice of its availability and request for comments was published in the Federal Register November 9, 2004 and by Public Notice dated November 9, 2004. Subsequently a new Corps Public Notice was issued January 22, 2008 describing the revised permit application to correspond with the project as proposed in the MMS Draft EIS. The Corps Public Notices were sent to all known interested parties and posted on the New England District webpage, and all comments received in response to these Notices are included in our administrative record of this action.

On May 30, 2006, MMS published a notice of intent to prepare a new EIS for the project in the Federal Register, and sought scoping comments for the NEPA process. MMS incorporated the comments received on the original Corps Draft EIS as scoping comments for the MMS Draft EIS. MMS published a notice of the availability of it's DEIS in the Federal Register on January 18, 2008, and sought public comments on the proposal. In response to comments on the MMS Draft EIS, the Corps comment period was extended to March 30, 2008 and the MMS comment period was extended to April 21, 2008.

c. Concerns Raised to Corps:

The Corps and MMS received numerous comments, both for and against the project, during the NEPA review process, and MMS, as lead agency, responded to these comments in Appendix L to the FEIS. Here, we address comments addressed specifically to the Corps (and not to MMS) in response to the 2008 Corps Public Notice that raise issues pertinent to the Corps review of the Section 10/404 permit application. The responses to comments contained in the FEIS are also incorporated here by reference.

1) **Alliance to Protect Nantucket Sound, Hyannis, MA, dated Feb. 21, 2008 and Mar. 31, 2008**[2]

a. Project is not economically viable, socio-economic impacts were not addressed and the economic analysis is incomplete- Corps regulations state that "[w]hen private enterprise makes application for a permit, it will generally be assumed that appropriate economic evaluations have been completed, the proposal is economically viable, and is needed in the marketplace." 33 C.F.R. § 320.4(q). The Corps does not have the expertise or resources to evaluate the economic viability of the wide variety of projects that it reviews through Section 10 and 404 permit applications, so the regulation's presumption is based on a view that individuals and institutions do not typically pursue projects that are known economic "losers." Here, this presumption of economic viability is a rational one based on huge investments of money, time, and effort involved in the planning and construction of this project. Investors and project proponents would not likely undertake such a project if it was not expected to generate a profit or was not needed in the marketplace. To the extent that concerns over the viability/profitability of the venture bear relevance to the Corps public interest review, it is from a concern that an unprofitable venture could go bankrupt, and the structures would remain in the waters of Nantucket Sound unmaintained and become a hazard to navigation. This concern, however, has been addressed by MMS in lease requirements for financial assurances that would ensure removal of the structures in the event of bankruptcy. While the NEPA review did not evaluate the commercial viability of the project, it did evaluate ten alternative locations, and concluded that the proposed site, Horseshoe Shoal, appears to have the greatest economic potential. A small scale project was also evaluated, and was found to have less economic potential with a higher cost of energy. Corps regulations further state that in appropriate cases a permit application review "may make an independent review of the need for the project from the perspective of the overall public interest," as the "economic benefits of many projects are important to the local community and contribute to needed improvements in the local economic base, affecting such factors as employment, tax revenues, community cohesion, community services, and property values." 33 C.F.R. § 320.4(q). Here, potential impacts to the tourism economy of Cape Cod, Martha's Vineyard, and Nantucket caused by the presence of the facility on Horseshoe Shoals were a concern expressed throughout the project review. However, based on the visual impacts assessment, it is not expected that people will stop using the beaches or boating and fishing in and around Nantucket Sound, and impacts to tourism, recreation and fishing are expected to be minor. The applicant will provide annual payments of $350,000 or $7 million over 20 years to the Town of Yarmouth for the land portion of the transmission line. The

[2] The commenter also submitted a letter to the Corps signed by Glen G. Wattley, dated March 23, 2009 after the FEIS was released, reiterating concerns expressed in the earlier comment letters and the treatment of these issues in the FEIS document, and asking the Corps to deny the permit application.

United States will receive payments for the lease in the amount of $88,278 in annual rent prior to production, and a 2 to 7 percent operating fee during production, and the Commonwealth of Massachusetts will receive 27 percent of payments collected. Negligible to minor impacts are expected on the local infrastructure during construction and decommissioning. The impact on the energy industry would be moderate due to the project's substantial impact on meeting Massachusetts's Renewable Energy Portfolio Standards. The project is expected to have negligible to minor impacts on fisheries and benthos, mostly temporary, during construction and decommission.

b. Project will yield nominal air quality or climate change reduction benefits – If fossil fuel plants were to produce the energy anticipated to be produced by the Cape Wind facility, 0.88 million tons of CO_2 would be emitted per year. This project has the potential to reduce the increase in CO_2 by approximately 1 percent. Likewise, NOx emissions associated with fossil fuel electricity generation would be displaced by energy from the facility, with an expected slight reduction of about 1 ton/day (in the 2002 Massachusetts inventory the total NOx emissions from all sources on a summer day in the state was 771.8 tons/day). Concerns were expressed about the Cape Wind project "crowding out" other more desirable renewable energy projects in the Massachusetts Renewable Portfolio Standards program, but this is a policy choice for the Massachusetts legislature to address, not the Corps. The Independent System Operation New England (ISO-NE) and the U.S. Department of Energy have expressed concerns on the over-reliance on natural gas in the region and the need to diversify the energy sources without exacerbating air quality concerns.

c. The Applicant has overstated the needs for power – The regional need for power has been addressed by ISO-NE and by the Energy Facility Siting Board for the Commonwealth of Massachusetts. ISO-NE, the regional transmission manager, has projected that 2100MWs will be needed in the New England Power Pool by 2014. The Department of Energy has stressed, throughout the project review, the need to diversify the regional energy portfolio and strive to include renewable energy sources. Again, Corps regulations presume that permit applicants do not pursue economically irrational projects, and that projects seeking Corps permits are "needed in the market place." 33 C.F.R. § 320.4(q). Here, this presumption is supported by the agencies and entities with expertise in the field stating the needs for power and renewable energy sources in the region.

d. Conservation interests weigh strongly against the project—A general concern was expressed about the project's impacts to Nantucket Sound and the "authentic" Cape Cod scenery and ecology. The various natural and socioeconomic resources potentially impacted by the project are discussed extensively in the FEIS. As to the overall general impact to the "authentic" Cape Cod experience, the presence of the wind turbines and ESP on Horseshoe Shoal are expected to generally have minor impacts on the various natural resources affected. The structures will be visible at various locations on land, but these will be small and close to the horizon to the naked eye, and it is not expected that this minor impact to the viewshed will have a significant impact to recreational and other uses on land.

e. Economic analysis is flawed and does not consider socioeconomic impacts-- The economic analysis was intended to address the economic viability of the technology and provide for comparison of the alternatives. Minor impacts on housing, construction and manufacturing industries, service industries, waste disposal and military activity were discussed in the FEIS. A moderate positive impact to the energy industry is projected. Effects to commercial fisheries, recreation and other factors were evaluated separately, and were generally determined to be minor or negligible.

f. **Comprehensive analysis of impact to aesthetic resources needed**—Aesthetic impacts of the project were given extensive consideration in the review of this project. An extensive visual impact assessment is included in the FEIS. Visual simulations from some of the most sensitive locations were included to demonstrate the expected aesthetic effect from various locations surrounding the project area. The project introduces large manmade structures where there are currently none, and will be visible for several miles in clear weather conditions. This impact was assessed as moderate in the FEIS. Aesthetic perception is highly personal and subjective and a variety of comments have been received. Some people feel the structures will industrialize what they perceive as a pristine area, others find them graceful and interesting like a kinetic sculpture and others feel the surrounding area has already been over developed and this is an inevitable progression. This subject was given extensive consideration during the review process.

g. The project adversely impacts wetlands-- The project is not expected to impact wetlands. The onshore portions of the project (transmission line) will not cross any freshwater wetlands and should be sufficiently distant from any wetlands to avoid impacts. No work is proposed in coastal saltmarsh, and by using horizontal directional drilling for cable installation at landfall, impacts to coastal wetland resources will be avoided.

h. **Historic properties will be adversely affected--** As part of the review of this project, MMS completed a National Historic Preservation Act Section 106 consultation and review on behalf of the Corps. There will be an adverse effect to properties eligible for listing on the National Register of Historic Places, including tribal Traditional Cultural Properties and National Landmarks. MMS, in a letter dated April 28, 2010 to the Advisory Council on Historic Preservation, listed these effects and the proposed mitigation measures. With the exception of physical impacts to Nantucket Sound—considered an eligible property as a tribal Traditional Cultural Property—the impacts to eligible properties are entirely from the indirect impact of the introduction of the turbines to the visual landscape at a great distance, on the occasions where weather conditions permit them to be observed. None of the properties eligible for listing on the National Register will be so diminished by the impacts of the project as to disqualify them from such listing. For historic and cultural resources on the seabed of Nantucket Sound, identified shipwrecks will be avoided, and surveys will be conducted prior to construction to determine if additional cultural resources must be avoided. The commenter suggested that the project cannot be constructed in its proposed location due to adverse effects on National Historic Landmarks, but courts have been clear that the Section 106 process does not require agencies to choose alternatives with less (or no) impacts to 106 resources, but only "to complete the Section 106 consultation process by identifying adverse impacts on historic resources and develop methods to mitigate the identified adverse impacts." Advocates for Transportation Alternatives v. USACE, 453 F. Supp 2d 289, 312 (D. Mass. 2006). That is what occurred here.

i. Fisheries, marine-protected species, avian species, and terrestrial ecology will be seriously harmed and DEIS evaluation of impacts to fisheries, marine-protected species, and birds are insufficient - The FEIS presented extensive analysis of the impacts to the Horseshoe Shoals ecosystem, addressing effects on fisheries, avian species, marine mammals and turtles, including species protected by federal statutes like the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA). The concerns on impacts to fish raised by the commenter—contamination from turbine oil, hydraulic fluid, cooling oil, boat fuel, and sacrificial anodes—were not found to likely have any impacts on fisheries. Indeed, the turbines may become attractive habitat for some species. As for marine mammals and turtles, the FEIS and consultation with NMFS indicates that the mitigation measures for the project are likely to result in negligible to minor impacts. For marine birds, the FEIS revealed the potential for moderate impacts to certain marine birds species from collision with the structures. These impacts will be monitored, and mitigation measures have been developed based on the recommendations of USFWS. As to the impacts on protected marine species, both USFWS and NMFS concluded that the project would not jeopardize the continued existence of any ESA listed species likely to be found in the project area. The applicant will be responsible for securing any necessary MMPA permits for the project. The FEIS discusses and analyzes the impacts of the transmission line after it reaches shore, but there are no wetland fill activities on shore subject to Corps jurisdiction. The impacts from on-shore activities—the installation of a transmission line in an existing right of way--to wildlife are expected to be minor to negligible. The FEIS addressed impacts to the species known to frequent the area and was based upon best available scientific information, including site specific field work conducted by the applicant and others such as Massachusetts Audubon Society. Discussion of the limitations and uncertainties of the data is disclosed and addressed in the FEIS.

The commenter states that the Corps would violate the Migratory Bird Treaty Act (MBTA) by issuance of a permit for this project. The MBTA is a federal criminal statute that prohibits the "take" of migratory birds without appropriate permits. Here, the Corps is not the entity taking the actions that may result in take of migratory birds, it is the applicant (and leaseholder) who will be constructing the wind turbines and ESP on Horseshoe Shoal. Thus, it would not be the Corps but Cape Wind who would be the proper entity to receive a permit pursuant to the MBTA. USFWS administers this statute and issues such permits, but there is currently no permitting regime governing "incidental takes" by which birds are killed unintentionally by structures or activities that are performed without the intent of killing or harming birds (as opposed to activities like hunting or depredation). USFWS has pursued criminal cases against individuals and entities that have "incidentally taken" migratory birds. But in the USFWS Interim Guidelines on Avoiding and Minimizing Wildlife Impacts from Wind Turbines, May 13, 2003 at 2, USFWS has stated that:

> [w]hile it is not possible under the Act to absolve individuals, companies or agencies from liability if they follow these recommended guidelines, the Office of Law Enforcement and Department of Justice have used prosecutorial discretion in the past regarding individuals, companies or agencies who have made good faith efforts to avoid the take of migratory birds.

Presently, USFWS has no similar guidelines covering wind energy facilities in the off-shore environment.

On January 10, 2001, President Clinton issued Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds." 66 Fed. Reg. 3853 (Jan. 17, 2001). The Order creates a more comprehensive strategy for migratory bird conservation by the federal government. This Order requires federal agencies taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations to develop and implement a Memorandum of Understanding (MOU) with USFWS to promote conservation of migratory birds. On June 4, 2009, MMS entered into a MOU with USFWS pursuant to Executive Order 13186 to address the conservation of migratory birds as it implements its mission of developing energy and mineral resources on the OCS. The MOU contains a number of provisions encouraging MMS, within the confines of its statutory, regulatory, and budgetary constraints, "to integrate migratory bird conservation principles, as well as reasonable and feasible conservation measures and management practices into [its] approvals." MOU at Sec. F.1. These include, to varying degrees, avoiding, minimizing, and mitigating adverse impacts to migratory birds. MOU at Sec. F.2, F.5. Here, MMS, on behalf of the Corps and other federal agencies, has worked and continues to work with USFWS to address the impacts of the project on migratory birds. As part of the MMS-issued lease, and consistent with their underlying ROD, the applicant is required to submit a plan addressing any needed conservation measures, for MMS approval. The applicant continues to work with MMS and USFWS to develop an acceptable plan.

j. The project interferes with federal, state, and local land uses—The commenter criticizes the project's use of federal lands on the OCS without "competitive bidding" and suggests the project excludes other uses. However, in EPAct 2005, Congress expressly authorized MMS to make such OCS lands available for alternative energy production leases, and allowed the Cape Wind project to proceed without restarting the process for the applicant. With the passage of EPAct 2005, MMS became the lead agency for this process, and the decision on the proper mechanism for the terms and availability of leases is for MMS, not the Corps. The commenter further suggests that issues regarding the Cape Cod Commission's (CCC) review of the project should prevent the Corps from making a permit decision. Since the time of the comment letter, the issues regarding the interplay between the Massachusetts Energy Facility Siting Board (MEFSB) and the CCC have been resolved by the Massachusetts Supreme Court, which concluded that the MEFSB had properly granted an "all-in-one" permit that overruled the CCC's denial of Cape Wind's application for a Development of Regional Impact approval.

k. Negative effects to navigation, including physical obstruction/collision threat, radar interference, commercial fishing disruption, damage to structures by vessels and ice, interference from transmission cables, and oil spills - There will be some increase in vessel traffic on Horseshoe Shoal during construction activities. However, Horseshoe Shoal is a shallow area limiting the size boats traversing the area, and the project is more than 1100 feet from the Hyannis Harbor Main Channel, which should avoid interference with commercial navigation. Moderate impacts to navigation were noted in the FEIS. Pursuant to Section 414(a) of the Coast Guard and Maritime Transportation Act of 2006, the USCG conducted an extensive and detailed review of the impacts of the project on navigation, and developed terms and conditions for operation of the facility to ensure navigational safety, which are expected to mitigate impacts to navigation and marine radar. These measures, required in the MMS lease, include installation of Private Aids to Navigation, traffic management, status reports to the Coast Guard, establishing a control center, communications with mariners, and providing safety equipment and plan. As part of its review, the U.S. Coast Guard considered various studies on the impacts of the project on marine radar systems, and ultimately concluded that the project would hinder the effectiveness of marine radar for detecting vessels inside the turbine array, but with reasonable care vessels would be able to navigate safely within and in the vicinity of the proposed wind farm, and that the impact of the proposed wind farm on navigation safety is "moderate." The commenter raised concern about the impact of the turbine array on helicopter search and rescue efforts, but the Coast Guard Sector Southeastern New England concluded that there would be negligible impacts to Coast Guard search and rescue efforts in the area of Horseshoe Shoal. The commenter raised concern about navigational impacts to commercial fishing vessels, but as discussed in the FEIS, fishing will not be prohibited in the turbine array, and with the Coast Guard's terms and conditions, the moderate impact to navigation safety will be reduced to an acceptable level. Concerns were also raised about the presence of ice floes in the turbine array, and the risk of ice on the turbine blades causing catastrophic blade failures or jettisoned ice chunks. Severe icing is rare in Nantucket Sound, but should ice floes develop, Coast Guard Sector Southeastern New England monitors conditions and warns mariners. Likewise, the Coast Guard's Terms and Conditions will require the applicant to provide a plan to mitigate the impacts of surface icing. As for ice on turbine rotors, the turbines will have sensors that will shut down the turbines if ice builds up on them making the likelihood of blade failure or jettisoned ice unlikely. The commenter raised concern about the impacts of the transmission cable system on anchoring or fishing gear, but as the Coast Guard concluded, the MMS lease requirement of six foot cable embedment will avoid impacts on navigation or fishing. The commenter expressed concern about potential oil spills associated with the project impacting navigation as vessels would maneuver around spills. As noted in the FEIS, the likelihood of a catastrophic oil spill associated with the proposal is low, and the contingencies associated with such an event are addressed in an Oil Spill Response Plan developed for this project, which both MMS and the Coast Guard have found to be adequate. Concerns were raised about the impacts of the project to air navigation, and the FAA's review of impacts to aviation radar systems. After reviewing the issue extensively, FAA, the federal agency responsible for aviation safety, issued a "no hazard" finding that with modifications to existing radar systems, the project will not constitute a hazard to aviation.

l. An Ocean Dumping Act permit and a NPDES permit are required for the project – The installation of transmission lines on land will require a NPDES General Stormwater Construction Permit, and the applicant must acquire such a permit from USEPA before construction commences. A permit is not required pursuant to the Marine Protection, Research, and Sanctuaries Act (also known as the Ocean Dumping Act), as there is no proposed transportation of dredged material for disposal in ocean waters.

m. The risk of oil spills must be fully evaluated – The NEPA process evaluated the issue of potential releases of dielectric cooling oil, other lubricants, and fuels associated with the project. Two models, HYDROMAP and OILMAP, have been used to assess potential oiled areas and travel times. As the probability of a major oil spill is very small, effects were expected to be negligible. While the likelihood of such events are considered low, the FEIS analyzed the worst case scenarios involving a complete release of all dielectric cooling oil from the ESP. The commenter raised concern over the possibility of oil tankers striking structures in the turbine array. However, as the facility is located in an area of shallow waters where larger vessels cannot transit—and such vessels use existing navigation channels distant from the facility—it is unlikely that the facility will cause oil spills from vessel collisions. As the Coast Guard concluded, with the mitigation measures that MMS will require, the moderate impacts of the facility on navigation will be reduced to an acceptable risk.

n. The project will cause water quality impacts to eelgrass and benthic resources -- Eelgrass at Egg Island has been addressed through the MEFSB requirement for a control impact plan and that the eelgrass location will be marked so that contractors can ensure avoidance during construction. The Corps will also include permit conditions to avoid eelgrass beds and address any impacts that do occur. The benthic habitat impacts are expected to be mostly temporary as these communities have adapted to survival in dynamic sediments. The Material Safety Data Sheet for the external coating for the wind turbine generators and electric service platform is included in Appendix E of the FEIR. There will be an epoxy coating applied at the waterline/splash zone. HDD will be employed to minimize water quality impacts as it involves less re-suspension of sediment than traditional cut and cover construction.

o. Risks to public safety will be severe – The commenter raises concerns over the safety of workers at the facility, the hazard of ice being thrown from turbine blades, and the safety of transmission lines. Workers' safety for a facility on the OCS is addressed in various statutory regimes administered by the Coast Guard and MMS, and if there are safety concerns associated with the construction and operation of the facility, these agencies are responsible for addressing them. As noted above, the turbines will have sensors that will shut them down if ice forms on the blades, making it unlikely that ice will be hurled to nearby vessels. As noted by the Coast Guard, the required six foot depth of the transmission cables makes it unlikely that trawling gear or anchors would strike the cables.

p. Food and fiber production will be affected - The FEIS evaluated the potential for survey and construction activities to have a minor temporary effect on the benthos and plankton but no appreciable alteration in the food chain is expected. It is important to recognize that the impacts raised by the commenter—turbidity from construction disturbance—are a normal event in the dynamic environment of Nantucket Sound. The sandy benthos is regularly disturbed, and quickly settles after such disturbances. The construction activities here will be smaller in duration and impact than the frequent natural events that cause such impacts. To the extent there is concern over the impacts of construction on breeding winter flounder, MMS has imposed time of year restrictions to avoid turbidity when winter flounder eggs and larvae could be impacted. As to the impacts on food production in the form of fishing (commercial and recreational), while trawlers may need to exercise more caution in their fishing activities, such activities will not be prohibited in the turbine array. For recreational anglers, there may be benefits from the presence of the turbines as they may serve as fish attractants.

q. Project interferes with property values – The commenter raises concerns over the decline in property values after construction of the project. It is important to recognize, however, that the Corps public interest factor regarding property ownership is not concerned with property values, but issues relating to the rights of property owners. 33 C.F.R. 320.4(g). However, studies of property values in areas near wind energy facilities constructed in the United States have not shown a decline in property values. While the proposed facility, an offshore wind energy facility, is the first of its kind in the U.S., it is not clear that the presence of turbines and the ESP at such a distance on Nantucket Sound will have any impact on property values on land.

r. The project presents national security concerns – The commenter raises concerns about the impacts of the project on defense, air traffic, and navigation radar systems, as well as Coast Guard operations. The Department of Defense's Missile Defense Agency reviewed the impacts of the project on the PAVE PAWS radar system at Cape Cod Air Force Station and the Upgraded Early Warning Radar at Beale Air Force Base, and determined that the impacts could be readily mitigated. The FAA has reviewed the project and determined that with modifications to aviation radar systems required as part of the MMS lease, the project will not constitute a hazard to aviation. The Coast Guard concluded that while there would be moderate impacts on the operation of marine radar in and near the turbine array, with the mitigation measures the impacts to navigation will be reduced to an acceptable risk. In addition to impacts on navigation and navigation radar, the Coast Guard also considered the impacts of the project on its own operations, and concluded that it would have negligible to no impacts on its missions, and in some instances, may facilitate the success of some operations.

s. The project interferes with recreation – The commenter expresses concern over the impact of the project on beachgoers, birdwatchers, and boaters. Introduction of these structures will result in a noticeable change in the seascape. The effect of the visual impact was considered moderate to recreational resources on shore, but it is not expected that the general public will no longer frequent these areas. The project will be distant from shore, and when visible will appear as small objects on the horizon. It is not expected that this will keep individuals from enjoying beaches or birdwatching. Recreational boaters will need to exercise caution when traversing Horseshoe Shoal to avoid the turbines and ESP, but as noted above, with the required mitigation measures the moderate impacts to navigation will be reduced to an acceptable risk. Moreover, recreational anglers may benefit from the presence of the structures as they may prove to be fish attractants, similar to oil rigs in the Gulf of Mexico have.

t. The project is inconsistent with the need for uniform and comprehensive ocean governance – The commenter's perception of inadequate comprehensive ocean planning is beyond the scope of the decision before the Corps. Such a planning framework would require a congressional remedy. The Corps is not able to halt review of permit applications because such a planning framework does not exist, doing so could arguably represent a usurpation of the legislative/policymaking powers of Congress. Congress has directed MMS to make lands available on the OCS for alternative energy projects, and that is what is before the Corps. MMS has finalized the Renewable Energy Rule to implement the provisions of the Energy Policy Act of 2005. The Cape Wind project will be subject to 30 CFR Part 285 "Renewable Energy and Alternate Uses of Existing Facilities on the Outer Continental Shelf." The intent of these regulations is to provide a comprehensive program to grant leases, easements, and rights-of-way for environmentally responsible renewable energy projects on the OCS. If Congress establishes a planning framework envisioned by the commenter that mandates a moratorium on consideration of such projects while plans are developed, that is for Congress to decide, not the

Corps.

u. The project harms the interests of Indian tribes – MMS conducted the NHPA Section 106 consultation for this project, extensively involving the Mashpee Wampanoag and the Wampanoag Tribe of Gay Head (Aquinnah) in the process. The 106 process has been completed, and impacts to the Tribes' traditional cultural properties have been acknowledged. Mitigation was offered as part of this process, but was not accepted by the Tribes.

v. The project does not satisfy the 404(b)(1) Guidelines – The commenter states that the Corps must deny the application under the 404(b)(1) Guidelines found at 40 C.F.R. Part 230. The Corps does not agree, and the various points raised are addressed below.

1. The project is not the least environmentally damaging practicable alternative (LEDPA) -- The commenter suggests that the Corps cannot issue a Section 404 permit for the project, as there are alternatives that would be less environmentally damaging, such as (unnamed) land-based sites. It is important to recognize, however, that the concept of the LEDPA applies only in the Section 404 permitting context, and here, most of the project is outside the waters of the United States subject to Section 404 permitting. Section 404 of the Clean Water Act only applies to discharges of fill and dredged material occurring in coastal waters to the limit of the territorial seas, which extend three nautical miles[3] from the baseline defining the territorial sea. 33 C.F.R. § 328.4(a). Here, the entire turbine array is outside the territorial sea, and is therefore not subject to Section 404 permitting. The Corps also regulates all structures and work within the territorial seas pursuant to Section 10 of the Rivers and Harbors Act of 1899, and all structures (but not work) on the OCS pursuant to Section 10, and the NEPA analysis conducted for this project appropriately addresses the impacts associated with all these structures and works in both the territorial seas and on the OCS. However, the limited reach of Section 404 jurisdiction to territorial waters is important, as the concept of the LEDPA only arises in a 404 permit review, not Section 10.

It is also important to recognize that the only activity associated with this project that is subject to 404 permitting—the only activity resulting in the discharge of dredged or fill material—is the 2925 sq ft area of discharge of dredged and fill material associated with the transition of the 115 kV submarine transmission cables from water to land at Lewis Bay in Harwich, MA. Thus, the only activity of the project subject to a Section 404 permit is the fill that will be placed inside the cofferdam where the ocean cables reach the horizontal directional drilled conduit from land, and the 404(b) analysis is focused on this activity, not the entire project. Because of the limited scope of the 404 activities in relation to the entire project, it is not appropriate to apply the LEDPA concept to the entire project, but rather only to the small portion of the project subject to Section 404. The NEPA analysis appropriately examined the environmental impacts of all aspects of the project—the components in the territorial sea, the OCS, and uplands, and aspects of the project subject to 404 permitting, Section 10 permitting, MMS lease authority, and areas not subject to federal permitting but part of the overall project.

[3] The FEIS describes the seaward limit of jurisdiction of the Clean Water Act as extending 3.5 miles, a conversion of nautical miles to statute miles.

The use of horizontal directional drilling and the fill associated represents the least environmentally damaging practicable alternative for bringing the transmission cables to landfall. The other practicable method of bringing the cable to land would be cut and cover trenching, which involves much more bottom disturbance, more material rehandling, more turbidity, and it is disruptive for a longer period of time. Resource agencies always recommend jet plow or HDD over cut and cover trenching.

The commenter suggests that a Section 404 permit should be required for all jet plow activity within territorial seas. Contrary to commenter's suggestion, the Corps does not consider jet plowing to be subject to 404 permitting as it does not represent a discharge of dredged or fill material.[4] Jet plowing is a means of laying submarine cables with a jet plow device. The jet plow blade is lowered to the seabed, water pump systems are initiated, and a trench is created from the pressurized water jets. As the jet plow progresses, the cable is simultaneously laid and buried in the trench as the jetted material settles back into the trench behind the jet plow. Because the vast majority of jetted material falls back into the trench at the same time and same location where it had just been excavated, the Corps does not consider this to be a discharge of dredged or fill material. To the extent that some jetted material lands outside the trench, this is the same incidental effect that would occur with a traditional navigational dredging operation, and Corps regulations direct that such incidental movement of materials during dredging operation generally do not require a 404 authorization. As such, the Corps does not consider the jet plow installation method to be subject to 404 permitting. This approach of Section 404 not applying to jet plowing is a consistent Corps practice in the New England District, as evidenced by a permit issued pursuant to Section 10, not Section 404, in 2005 for a power cable from Barnstable to Nantucket installed with jet plowing techniques, permit NAE-2004-1533.

It is important to note, however, that even if the Corps considered jet plow operations to be subject to Section 404 permitting, the proposed transmission cable and its associated jet plow installation in the territorial seas would be considered the LEDPA. The route chosen to Barnstable is the most direct route of the alternatives considered, and would therefore result in the least impacts. Moreover, the use of jet plow in these waters is the least damaging means of installing a utility cable at the distances required. The other practicable alternative to jet plow installation is cut and cover trenching, which involves much more bottom disturbance, more material rehandling, more turbidity, and it is disruptive for a longer period of time. Thus, even if the Corps did subject the entire transmission cable installation to the 404(B) requirements, the jet plow methodology and the route chosen would be considered the LEDPA.

2. The project will cause or contribute to violations of applicable water quality standards – Contrary to the commenter's assertions on water quality standard violations, the Massachusetts Department of Environmental Protection (MA DEP) issued a Water Quality Certification pursuant to Section 401 of the Clean Water Act for the project on August 15, 2008. Under Section 401, applicants are required to receive certification that Clean Water Act discharges will be consistent with state water quality standards. In addition to finding that the discharges associated with the project (ie the cofferdam fill) complied with state water quality standards, the MA DEP also considered non-discharge activities such as the jet plow operation,

[4] The FEIS incorrectly stated that the Corps would require a 404 permit for jet plowing activities. The DEIS correctly stated that the Corps would only require a 404 permit for the fill at the cofferdam.

and found these also to be consistent with state water quality standards.

3. The project will jeopardize the continued existence of endangered or threatened species or will result in the destruction or adverse modification of critical habitat – Contrary to the commenter's assertions on impacts to endangered species and their habitat, the USFWS issued a biological opinion dated November 21, 2008, and NMFS issued biological opinions November 13, 2008 and December 20, 2010, the culmination of the agencies' ESA Section 7 consultation, which concluded that the project would not jeopardize the continued existence of species listed pursuant to the ESA, nor would the project affect designated critical habitat.

4. The proposed discharge would significantly adversely affect aquatic ecosystems- The 404 discharge associated with this project—fill in the 2925 sq. ft. cofferdam—will result in minor to insignificant impacts. The use of horizontal directional drilling is the least damaging means of bringing a cable to landfall, and the impacts of the fill activities will be minimized by use of the cofferdam and time of year restrictions to avoid impacts to winter flounder eggs and larvae. A water-filled temporary dam around the exit point of the horizontal directional drill will act as an underwater "silt fence" to contain any escaping drilling fluid.

5. The project will significantly and adversely affect recreational, aesthetic, and economic values – As discussed in response to the commenter's points on the public interest factors, the project will have some impacts on recreational uses on Horseshoe Shoal and the viewshed, these are not expected to be substantial. Likewise, the economic values of real estate and the tourism industry are not expected to be greatly impacted by the project.

6. The project does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem – The measures to minimize impacts associated with horizontal directional drilling and the fill associated with the cofferdam are adequate. The comments on this point do not provide additional measures that should be imposed, but only seek additional detail on the implementation of the mitigation measures and operations plan, such as who will be operating the equipment and their level of experience. At this point in the permitting process, the level of detail provided is appropriate, and the Corps will ensure that the mitigation is implemented properly as part of its permit oversight.

7. There is insufficient information to determine if the discharge will comply with the 404(B)(1) Guidelines – The Corps believes there is sufficient information to make its permit decision. The NEPA process has provided ample information for the Corps to review the impacts of the project, and the specific 404 discharge associated with the project is not a new or unusual activity. To the contrary, the cofferdam discharge is of the nature and type that the Corps has extensive history reviewing in the New England District, and at the scale involved here, the associated impacts are predictable and minor.

2) Elizabeth Durkee, Oak Bluffs Conservation Agent, dated February 7, 2008

Dispose sand to replenish Oak Bluffs beaches rather than disposal in ocean waters –

The only dredged material being placed in waters of the United States is the material dredged from within the cofferdam where the transmission line reaches the connection with the horizontal directional drill coming from shore. The material may be placed back into the area where it had been dredged in order to cover and protect the cable, and will not be disposed of in ocean disposal areas. The volume (roughly 840 cubic yards of material) would not provide much beach replenishment material, nor would it be cost effective to transport such a small amount of material to Oak Bluffs beaches when fill material would still be needed to cover the cable and backfill the area inside the cofferdam.

3) **Paul Conlin, Pocassett, MA, dated March 16, 2008**

Project should be located on land at Otis AFB – Massachusetts Military Reservation/Otis Air Force Base in Sandwich, MA was evaluated earlier in the review process for this project. The site did have some attributes for an energy generating facility as there is access to surplus transmission capacity and there are large undeveloped portions of this 22,000 acre site. However, it was found that there is an inadequate wind resource for a commercial wind power facility, that structures could interfere with military airspace, that existing unexploded ordinance may exist in the undeveloped areas large enough to accommodate a wind facility, and there are significant environmental resource issues known to exist at the site.

4) **Charles Mansfield, West Falmouth, MA, dated March 22, 2008**

Project should not be located in Nantucket Sound, economic and environmental impacts are uncertain, and political favors being provided to project by state politicians – The environmental and economic impacts are thoroughly documented in the FEIS and reflect the best available information. The interaction of the project proponents and state politicians is beyond the scope of the Corps review of this project.

5) **Oceans Public Trust Initiative, Cindy Lowry, Portland, ME, dated March 28, 2008**

Project violates public trust doctrine and negatively impacts the public interest factors - There are numerous legislative provisions in place for addressing the propriety of allocating use of the public resources in the waters of Nantucket Sound, including state laws such as Massachusetts Chapter 91, and federal laws including Section 10 of the Rivers and Harbors Act, Section 404 of the Clean Water Act, and the Outer Continental Shelf Lands Act as amended by the Energy Policy Act of 2005. These provisions do not prohibit, but do regulate, the use of public resources, and establish procedures by which such public resources can be used by individuals and entities. Congress and the Massachusetts Legislature have set up these frameworks to govern the use of such public trust resources, and agencies like the Corps and MMS are responsible for implementing them. The extensive reviews by state and federal agencies have been conducted to determine whether it is appropriate to allow the proposed use of, and impacts on, the public resources. The commenter raises concerns similar to those addressed in Comment 1 above, and the responses there are incorporated here by reference. The commenter stated that Nantucket Sound contains a Massachusetts state marine sanctuary, but the Massachusetts permitting agencies have issued their authorizations for the cable crossing within state waters. The commenter suggests that these areas "qualify" as a federal marine sanctuary, but neither the state waters nor federal waters where the project is designated as a federal marine sanctuary under the Marine Protection, Research and Sanctuaries Act.

6) Barbara W. Nye, Centerville, MA, dated January 24, 2008

Project consists of too many windmills – The FEIS compared impacts of a smaller project alternative with the proposed project. While some impacts would be lessened others would remain approximately the same. The smaller project alternative and its reduced electric generating capacity would not meet the project purposes of making a substantial contribution to enhancing electric reliability and achieving the regional renewal energy requirements.

7) Clean Power Now Nantucket Chapter, Carl K. Borchert, Nantucket, MA, dated February 17, 2008

Benefits of project outweigh minor negative impacts, wind parks in Denmark are quiet and benign – The FEIS for the project examines the impacts of the project on various resources. Some were determined to be moderate, but most were found to be negligible to minor. The wind parks in Denmark provide some understanding to what can be expected with this project.

8) Charles J. Miller, Monument Beach, MA, dated March 21, 2008

Horseshoe Shoals is foggy in summer, will not be visible to most summer visitors, structures will enhance fishery – The visual impacts of the project have been thoroughly analyzed in the FEIS and accompanying studies. When the structures are visible from shore they will appear as small objects on the horizon, and as the commenter notes, weather conditions will often prevent them from being seen. The impacts of the project on fisheries are discussed in the FEIS. The main impacts will occur during construction, and after the structures are in place they may serve as attractive habitat for fish.

9) National Grid, Hanover, MA, dated March 21, 2008

The transmission lines for the project will cross a 46 kV National Grid cable northwest of Bishops and Clerks reef, installation of the new lines must be done with care to avoid impacting electrical service to Nantucket – The FEIS discusses the National Grid cable and how the two will be "bridged" to allow safe crossing. The Corps will address this through a permit condition that will require coordination with National Grid to ensure that its cable will not be adversely impacted.

10) Rear Admiral John Linnon, East Falmouth, MA, dated March 26, 2008

The project will adversely impact the effectiveness of marine radar systems, forwards copy of report from Dr. Eli Brookner – The Brookner report addresses the impacts of the project on marine radar systems. This report was reviewed by the U.S. Coast Guard in its evaluation of the impacts of the project on navigation and marine radar. The Coast Guard determined that the wind turbine array would impact marine navigation radar, but with the required mitigation measures these impacts would be within an acceptable level of risk.

11) J. Randolph Barrett, Oliver Wyman, Reston, VA, dated March 28, 2008

The project will adversely impact the effectiveness of aviation radar systems, forwards copy of report from Dr. Eli Brookner – The FAA is the federal agency with expertise and responsibility to address potential hazards to aviation. The Brookner report was considered and evaluated as part of their review. The FAA has determined that the structures could cause "clutter" on the existing air traffic control displays and are requiring the applicant to provide upgraded equipment to mitigate this problem. In light of these requirements, the FAA has issued a *Determination of No Hazard to Air Navigation* dated May 17, 2010 and a subsequent *Notice of Denial of Request for Discretionary Review of Determinaton of No Hazard to Air Navigation* dated August 4, 2010.

12) Hyannis Marina, Wayne Kurker, Hyannis, MA, dated March 26, 2008

The project will result in scouring at the base of structures on Horseshoe Shoal, Massachusetts CZM is politically motivated -- The issue of scour at the base of structures has been analyzed and addressed through the NEPA process. Scour mats are the intended means to prevent scour, and tests on these mats have shown success. Rock armoring may be used around the base of the structures if the scour mats are not adequate. With regard to the political motivations of Massachusetts state agencies, this is beyond the purview of the Corps permit review process. Massachusetts CZM has issued a finding of consistency with the state CZM policies, the motivations for such a finding is not a matter for Corps review. The commenter submitted identical comments to the Corps and MMS, and the Corps agrees with the MMS response to these comments.

13) James Liedell, Yarmouth Port, MA, dated February 16, 2008

Changes to project articulated in 2008 Corps Public Notice reduce impacts, DEIS shows little impact from project and environmental management system will benefit public interest – The changes to the project as articulated in the 2008 Public Notice should result in less visual impacts from lighting, but the new horizontal directional drill plan resulted in minor fill activities that were not part of the project before. The mitigation, monitoring, and coordination (pre-construction, construction, and post-construction) required for the project are extensive and the Corps agrees that these will benefit the public interest.

14) Ken Elkstrom, Cambridge, MA, dated March 24, 2008

Proponent overstates energy production from wind in Nantucket Sound, electromagnetic fields from project may inhibit winter chlorophyll blooms in Nantucket Sound – The commenter asserts that the applicant's projections of power generation are overstated, but this is based on the commenter's observations of wind conditions at South Beach on Martha's Vineyard. It is not clear why the wind conditions at South Beach would be more accurate than the wind data captured at the instrument tower on Horseshoe Shoal. The federal agencies have relied heavily upon input from the Independent System Operation New England (ISO-NE) and the U.S. Department of Energy that this project will substantially contribute to enhancing the region's electrical reliability and to achieving the renewable energy portfolio standards. MMS conducted an independent economic analysis to compare the alternatives, and this took into account wind resources and production capacity at various locations. However, as noted above, Corps regulations presume that an applicant will not pursue an economically unviable project. As to the impact of electromagnetic fields from the project on chlorophyll blooms, the FEIS concluded that impacts of electric and magnetic fields would be negligible. The electric field is contained within the grounded metallic shielding of the offshore cables. Peak magnetic flux densities will be directly above the cable, which will be buried six feet below the substrate. This decreases rapidly moving away from the cable. Mobile species will have minimal exposure. Scientific literature indicates there is no anticipated adverse effect from these magnetic fields, and the commenter provides no more than speculation as to whether there will be an impact on chlorophyll blooms. In fact, in the email string that generated the comment, the prompt for the concern about electromagnetic impacts appears to be an email discussing the effect of iron-poor waters on photosynthetic planktons, but this email says nothing about electromagnetic fields creating iron-poor waters.

15) U.S. Fish and Wildlife Service, Michael J. Bartlett, Concord, NH, dated February 20, 2008

Jet plow operation may need regulation under Section 404, a more recent study shows greater sedimentation impacts from jet plow operation. As discussed above, jet plow operation is not subject to 404 regulation. Moreover, to the extent jet plow operations were subject to 404 regulation, it would be considered the LEDPA, as other means of installing transmission cable create greater environmental impacts. As to the sedimentation impacts shown in the newer modeling study on jet plow activities in Nantucket Sound conditions, discussion with the study author revealed that while the results were worded differently in the two reports, the substance of the two reports was not different. Specifically, the author of the report indicated that the more recent model simulation indicated that sediment deposition quickly tapers off to below 0.2 inches (5 mm) at between 50 and 100 feet (15-30 m) on either side of the cable trench, and almost all sediment will be deposited within 100 feet of the trench.

11. <u>General Evaluation</u>:

In November 2001, Cape Wind Associates, LLC submitted a Department of the Army permit application to construct and operate a wind-power facility in federal waters on Horseshoe Shoal in Nantucket Sound, Massachusetts. In December 2001, the Corps determined that an environmental impact statement was required for the Cape Wind Energy Project. A Notice of Intent to prepare the environmental impact statement was published in the Federal Register on January 30, 2002. The Corps of Engineers Draft EIS was released in November 2004. Subsequent to the enactment of the Energy Policy Act of 2005, the Department of the Interior was given authority for issuing leases, easements, or rights-of-way for alternative energy project activities on the Outer Continental Shelf. MMS, an agency within the Department of the Interior, was responsible for implementing these new provisions.

MMS determined that the regulations and requirements under which it would review the proposed action are substantially different than those under which the Corps would have reviewed the proposed action, and a new Draft EIS would need to be prepared. MMS considered public comments on the Corps Draft EIS as scoping comments in preparation of the MMS Draft EIS.

On January 18, 2008, the MMS Draft EIS was made available for review and comment for a total of 90 days. MMS received more than 42,000 comments through its website, emails, hard copy and comments provided at the four public and hard copy mailed comments. Comments were addressed in the Final EIS which was announced in the Federal Register dated January 21, 2009. MMS issued an Environmental Assessment/Finding of No New Significant Impact to evaluate post-FEIS Information and a Record of Decision on April 28, 2010.

As a cooperating agency for purposes of complying with the NEPA, the Corps provided input to the MMS for development of their EIS, and the Corps has relied upon MMS as the lead federal agency to address the federal requirements under Section 7 of the Endangered Species Act, Section 106 of the National Historic Preservation Act, Essential Fish Habitat consultation pursuant to the Magnuson-Stevens Fishery Conservation and Management Act, and the conformity provisions of the Clean Air Act. MMS, through their lease requirements and Construction and Operations Plan (COP), will ensure that the mitigation and monitoring identified through the NEPA process and the various consultations with federal and state agencies and Indian tribes will be accomplished. The MMS NEPA documents and public involvement process have provided an extensive and intensive evaluation of the alternatives and environmental impacts consistent with the Corps regulatory requirements.

The Corps Permit is conditioned to ensure mitigation of any impacts to eelgrass, a special aquatic site, in accordance with the 404(b)1 guidelines:

> An eelgrass monitoring and mitigation plan will be submitted to, and approved in writing by, the Corps of Engineers prior to the start of the installation of submarine cable between the electric service platform and Yarmouth. This plan will include pre- and post-construction monitoring to determine if any eelgrass has been lost due to the cable installation. A planting plan and schedule to compensate for any disturbed eelgrass will be included.

In addition the Corps permit is conditioned to require coordination with National Grid to avoid impacts to electric service to Nantucket when the project transmission lines are being installed across the National Grid cable northwest of Bishops and Clerks reef:

> The permittee shall survey and locate, horizontally and vertically, the National Grid cable authorized by permit number NAE-2004-1533 at all locations where the permittee's installation activities may occur within 500 feet of the National Grid cable. This data will be made available to the Corps and National Grid. Final design plans and installation procedures for work within 150 feet of the National Grid cable shall meet the technical requirements of National Grid and be submitted to the Corps and National Grid for written approval prior to the start of work and will be submitted at least 30 days prior to the scheduled work.

The permit is conditioned to require as-built drawings so that we will have that information on file should there be a Federal Navigation Project or some other project proposed in the vicinity. Additionally, these will be provided to NOAA so that the information can be included on the coastal charts.

> The permittee shall submit as-built, full-sized drawings of the authorized work to the Corps of Engineers. The as-built drawing shall include at least one plan view showing horizontal alignment and a profile view showing the vertical alignment of all cables. Plans will include a bar (graphic) scale, the dates of the survey and drawings, and horizontal state plane coordinates and vertical elevation. Show the cable's horizontal state plane coordinates in U.S. survey feet based on NAD 83. Show the vertical elevation as MLLW with a reference to NAVD 88 and document how the this information was derived using the latest National Tidal Datum Epoch for that area, typically 1983-2001. Plans will be stamp by a professional engineer or land surveyor registered in the Commonwealth of Massachusetts. Any changes in the location or type of structures requires notification to the Corps and may require a new survey.

> The permittee shall submit the as-built drawings to the Corps and the National Oceanic and Atmospheric Administration (NOAA) within 60 days of construction completion. The Corps may note the location on future survey drawings and NOAA may use the information for charting purposes. The NOAA address is: "Nautical Data Branch, N/CS26, Station 7349, 1315 East-West Highway, Silver Spring, MD 20910-3282."

Although MMS has required biennial inspection of the inner array cables to ensure they remain buried, the Corps needs to also ensure that all the cables are inspected and properly maintained:

> The permittee will ensure all cables, including the portions within state waters, remain buried in the same manner as required for the inner array cable by the Lease of the Bureau of Offshore Energy Management, Regulation and Enforcement.

12. <u>Public Interest Review:</u> I have considered all factors relevant to this proposal including cumulative effects. Potential factors included conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, consideration of property ownership and, in general, the needs and welfare of the people. After weighing favorable and unfavorable effects as discussed in this document, I find that this project is not contrary to the public interest and that a Department of the Army permit should be issued.

Philip T. Feir — 5 January 2011

Philip T. Feir
Colonel, Corps of Engineers
District Engineer

Date