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April 20, 2006

BY ELECTRONIC FILING

Magalie Roman Salas, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Re: *Broadwater Energy LLC*, Docket No. CP06-54-000
Broadwater Pipeline LLC, Docket Nos. CP06-55-000 & CP06-56-000

Dear Ms. Salas:

Enclosed for filing in the referenced proceedings are the responses of Broadwater Energy LLC and Broadwater Pipeline LLC to the Commission's Environmental Information Request Nos. 1–29, issued March 31, 2006.

Please do not hesitate to contact me with any questions regarding this submission.

Respectfully submitted,

/s/

Brett A. Snyder

Enclosures

cc: James Martin, FERC (paper & electronic copy)
Cooperating Agencies (paper & electronic copy)
ENTRIX, Inc. (paper & electronic copy)

EIR-1

Request:

Provide updated correspondence with appropriate federal and states agencies, or entities associated with the following issues:

a) Agency comments and/or approvals of the turbidity and sedimentation modeling input parameters and results;
b) Threatened and endangered species consultation including potential impacts and appropriate mitigation for listed species associated with any Project activities including, but not limited to, any onshore facilities and LNG carrier traffic within U.S. jurisdictional waters;
c) Potential impacts to species protected under the Marine Mammal Protection Act;
d) Estimated ichthyoplankton impacts and proposed mitigation measures;
e) Agency comments and/or approvals of air emissions modeling input parameters (including meteorological datasets), results, and mitigation measures;
f) Visual resource analysis;
g) Compatibility of the proposed Broadwater Project with operations and future plans of the Iroquois Gas Transmission System.

Response:

a) No correspondence has been received regarding turbidity and sedimentation or the visual resource analysis.

b-f) Since the filing of Broadwater's FERC applications, Broadwater has received limited correspondence from reviewing agencies regarding resources in proximity to the Project site. Most of the correspondence has been with respect to onshore facilities related to the Project. Attached is correspondence with respect to:

- comments/consultation regarding species of concern at the onshore facilities
- air modeling protocols

Additional Agency comments/consultation regarding species of concern at the Onshore Facilities

Four agency responses have been received regarding the proposed on-shore facilities subsequent to filing of the Broadwater applications. Agency correspondence was received from:

- United States Fish and Wildlife Service, Cortland, NY;
- New York State Department of Environmental Protection, Albany, NY;

- NOAA Fisheries, Gloucester, MA; and
- NOAA Fisheries, Milford, CT.

The USFWS identified the potential for the Federally-listed (threatened) and State-listed (endangered) piping plover (*Charadrius melodus*) and the New York State-listed (threatened) least tern (*Sterna antillarum*) to occur in the project area where suitable habitat for forage breeding, nesting, and/or brooding is present. While both the Port Jefferson and Greenport areas have been identified as supporting suitable forage and nesting habitat for both species, impacts from the project are not anticipated due to the intended use of existing facilities. Onshore facilities at both Port Jefferson and Greenport will be located in previously developed/built up areas away from the preferred habitat of these species. Both species nest on coastal beaches, sand spits at the end of barrier islands, gently sloping fore-dunes, blowout areas behind primary dunes, and in overwash-created bare sand areas cut into or between dunes. Suitable habitat is lacking at both Port Jefferson and Greenport onshore facilities. The potential does exist for these species to forage in proximity to the Port Jefferson and Greenport facilities. However, any onshore activities or increased vessel traffic associated with the Project will be consistent with existing and ongoing marine uses in both ports that these species have adapted to, and as such would not be expected to result in any adverse impact.

The NYSDEC Natural Heritage Program provided data for species of concern occurring within four miles of the Port Jefferson and Greenport facilities. In addition to numerous listings for the piping plover and least tern, data was also provided on two other avian species, the common tern (*Sterna hirundo*) and the black skimmer (*Rynchops niger*), 19 plants species, 13 significant natural communities, one moth species, the coastal barrens buckmoth (*Hemileuca maia* ssp. 5), and one fish species, the Atlantic silverside (*Menidia menidia)*. Due to the collocation of the onshore facilities within the active port areas of these two communities, no impacts to any species of concern are anticipated from the Project. In addition to the specific listings of natural heritage records within four miles of Port Jefferson and Greenport, the NYSDEC also provided a listing of rare plants, rare animals and significant natural communities associated with aquatic systems within 15 miles of the proposed LNG onshore facilities. Again, because the onshore facilities are located in the developed maritime centers, and the FSRU is located a minimum of 9 miles from shore, no impacts to these resources are expected.

Correspondence with NOAA fisheries is consistent with its comments submitted as part of Resource Report 3 filed with the application, and addresses sea turtles, whales, pinnipeds and other marine mammals protected under the Marine Mammal Protection Act of 1972. NOAA also identified the presence of essential fish habitats in proximity to the onshore facilities. Due to the collocation of the onshore facilities in existing maritime communities, no impacts from the development of the onshore facilities are expected.

EIR-1

Additional Correspondence with regarding the air modeling protocols

The revised air dispersion modeling protocol was submitted to the NYSDEC and USEPA Region II on February 16, 2006 via e-mail and hard copy. This protocol was included as Appendix A to Appendix C (Modeling Report) in Resource Report 9 submitted January 31, 2006. In response to the submittal of the protocol via e-mail on February 16, 2006, a request for 2 hard copies of the protocol was received from EPA Region II. Hard copies of the protocol were mailed to EPA Region II and the NYSDEC on February 16, 2006.

On April 11, 2006, a comment letter regarding the revised protocol was received from NYSDEC. Broadwater is evaluating the comment letter and will be responding to the NYSDEC at a later date. The NYSDEC has stated that it will not finalize the review and approval of the protocol until EPA makes a determination with respect to PSD applicability.

g) Attached are the "Supplemental Comments of Iroquois Gas Transmission System, L.P." filed in this docket on April 11, 2006, which address the compatibility of the Broadwater Project with operations and future plans of the Iroquois Gas Transmission System.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

February 10, 2006

Ms. Sara Allen-Mochrie
Senior Biologist
Ecology & Environment, Inc.
Buffalo Corporate Center
368 Pleasant View Drive
Lancaster, NY 14086

Dear Ms. Allen-Mochrie:

This responds to your January 5, 2006, letter requesting information on the presence of Federally-listed threatened or endangered species in the vicinity of two onshore facilities that would be utilized during the construction and operation of the proposed Broadwater Energy Project. These facilities would be located in the southern portion of Port Jefferson Harbor, Port Jefferson, Town of Brookhaven, and in Greenport Harbor, Greenport, Town of Southold, Suffolk County, New York.

These comments pertaining to Federally-listed threatened and/or endangered species under U.S. Fish and Wildlife Service (Service) jurisdiction are provided as technical assistance pursuant to the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*). We understand that authorization from the Federal Energy Regulatory Commission and permits from the U.S. Army Corps of Engineers (Corps) will be required to complete this project. Please be aware that Federal agencies have responsibilities under ESA Section 7(a)(2) to consult with the Service regarding actions they may undertake that may affect Federally-listed species or "critical habitat," and to confer with the Service regarding projects that may affect Federally-proposed species or proposed "critical habitat." By copy of this letter, we will inform them of the technical assistance we have provided thus far on this project. Please refer to information in this letter's section on coordination and consultation for more details regarding this process.

There is potential for the Federally-listed (threatened) and State-listed (endangered) piping plover (*Charadrius melodus*) and the New York State-listed (threatened) least tern (*Sterna antillarum)* to occur within the project area where suitable habitat for foraging, breeding, nesting, and/or brooding is present.

Listed Species

The piping plover is known to occur within two miles of the project sites, consistently nesting on beaches adjacent to the project area (New York State Department of Environmental Conservation 1998-2005). From 1998 to 2005, there were approximately 63 pairs of breeding piping plovers

in the Port Jefferson and Greenport areas. In addition, the Port Jefferson and Greenport areas support suitable foraging and nesting habitat for the New York State-listed threatened least tern (*Sterna antillarum*). Between 1998 and 2003, approximately 430 pairs of least terns were observed utilizing the project area for foraging, breeding, nesting, and brooding (New York State Department of Environmental Conservation 1998-2003).

Piping plovers are small, sand-colored shorebirds approximately 7 inches (in) (17 centimeters [cm]) long with a wingspread of about 15 in (38 cm). The least tern is the smallest American tern, weighing about 1 ounce (28 gm) and measuring about 9 in (23 cm) in length. It is identified in spring and summer by a white forehead contrasting with a black crown and nape. Its body is slate grey above and white below, with the pointed wings and forked tail characteristic of most terns. The bill and feet are yellow. Both piping plover and least tern nests are scraped in sand, shell, or gravel, and may be sparingly lined with small shells or other debris. Piping plovers are commonly found nesting in association with least terns.

Both species nest on coastal beaches, sand spits at the end of barrier islands, gently sloping fore-dunes, blowout areas behind primary dunes, and in overwash-created bare sand areas cut into or between dunes. They may also nest on areas where suitable dredged material has been deposited. Eggs are commonly laid in clutches of 4 and 2, respectively, from May through June (occasionally early July), and are incubated by both sexes for approximately 27-30 days for the piping plover, and 21 days for the least tern. The young fledge in approximately 25-35 days for the piping plover, whereas fledging occurs within 19-20 days for the least tern. The least tern is very defensive in the colony, with adults screaming and diving at intruders. Chicks may move hundreds of feet from the nest site during their first week of life and may increase their foraging range up to 3,280 feet (ft) (1 kilometer) before they fledge. Depending on the date of hatching, flightless chicks may be present from mid-May until late August, although most fledge by the end of July. By late August and early September, piping plovers and least terns leave their northern breeding grounds to head for wintering areas (Peterson *et al.* 1988; U.S. Fish and Wildlife Service 1996).

Process for Continuing ESA Technical Assistance and Consultation

As mentioned above, because the project needs authorization in whole or in part, by at least one Federal agency, further consultation between the Service and that Federal agency pursuant to the ESA may be necessary. If more than one Federal agency is involved, then a lead Federal agency needs to be established by those agencies, and contact made with us with respect to which agency is the lead.

ESA Section 7(a)(2) requires that Federal agencies must insure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species, or result in the destruction or adverse modification of designated critical habitat. In fulfilling these requirements, each agency must use the best scientific and commercial data available. To get to this determination, the process typically begins as technical assistance (information exchange, informal discussions) and may end as informal or formal consultation. Determining whether Federally-listed species are present in the project area is the first step. Please note that marine species are under the jurisdiction of the National Oceanic and Atmospheric Administration/ Fisheries (NOAA/F); all other listed species are under our jurisdiction. By copy of this letter we are providing you, as well as the Federal agencies which we anticipate would be involved, with information that listed species may be present.

The next step requires that the lead Federal agency prepare a biological assessment (BA) to determine if the proposed project may affect the species or their habitat if the project is considered a "major Federal construction activity." The definition of a major Federal construction activity is one requiring an Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act. If the project did not require an EIS, a biological evaluation (BE) would be the tool used to exchange information between Federal action agencies and the Service(s) (the Service and NOAA/F) regarding potential project impacts on listed species. The BA is completed within a time period mutually agreed upon by the Federal agency and the Service before any contract for construction is entered into and before construction is begun. Areas that should be avoided or critically considered, as well as opportunities for conserving these resources, are considered during formulation of alternative plans (ER 1105-2-100).

Contents of Biological Assessment or Biological Evaluation

The BA or BE should identify project activities that might result in adverse impacts to the piping plover and/or its habitat. The contents of the assessment are discretionary, but generally include results of on-site inspections confirming the presence of listed species and an analysis of the likely effects of the action on the species or habitat, based on biological studies, review of the literature, and the views of species experts. The assessment also describes any known unrelated future non-Federal activities reasonably certain to occur within the action area that are likely to affect the species. A wealth of information on piping plover biology, and on the evaluation of potential project impacts on plovers can be found in the Service's Atlantic Coast Piping Plover Population Revised Recovery Plan (U.S. Fish and Wildlife Service 1996). A copy of the recovery plan and additional information on the species can be found at the Atlantic Coast population, piping plover website at http://pipingplover.fws.gov/. For more information about the Service's Endangered Species program, we also recommend that you check our website at: http://nyfo.fws.gov/es/list.htm. This information, in the form of a BA or BE, should be provided to this office. The BA/BE will be used to evaluate potential impacts to the piping plover or its habitat, and to determine the need for further coordination or consultation pursuant to the ESA.

Project plans and information described above regarding the piping plover and least tern should also be coordinated with the New York State Department of Environmental Conservation (NYSDEC). The NYSDEC contact for the piping plover and least tern is Mr. James Gilmore, New York State Department of Environmental Conservation, 1 Hunter's Point Plaza, 47-40 21st Street, Long Island City, NY 11101-5407 (telephone: [718] 482-6464).

Continuing Consultation After Biological Assessment/Biological Evaluation Is Completed

If the BA indicates that the proposed project(s) may affect a listed species or critical habitat, the lead Federal agency will request formal consultation with the Service(s) (the Service and NOAA/F). If the assessment determines that the alternative plan(s) is not likely to adversely affect the species or critical habitat, then the lead Federal agency may request informal consultation with the Service(s) to receive their written concurrence with the determination of no adverse effects. If the Service(s) do not concur with the "no adverse effects" determination, we will request that the lead Federal agency initiate formal consultation (ER 1105-2-100).

The finding by the lead Federal agency that a proposed construction or operational activity will negatively impact an endangered or threatened species, or its critical habitat, will initiate the preparation of a biological opinion by the Service. This biological opinion will include a detailed discussion of the effects of the proposed action on the species or its critical habitat, as outlined in

the lead Federal agency's BA/BE, and a summary of the information upon which the opinion is based. The biological opinion will also include a determination of whether the proposed action is likely to jeopardize the continued existence of a listed species or adversely modify designated critical habitat. If a jeopardy decision is reached, the Service(s) will suggest reasonable and prudent alternatives for the proposed action, if any are possible. The lead Federal agency is required to carefully consider the reasonable and prudent measures to protect and conserve the species and critical habitat. The biological opinion may also include a conservation plan, which the lead Federal agency is not required to implement, but should consider, to see if the plan, or portions of the plan, may be implementable.

Timing for Coordination and Consultation

The timing for initiation of consultation is critical. Pursuant to 50 CFR Part 402.09, the lead Federal agency and any applicant working with that agency shall make no irreversible or irretrievable commitment of resources with respect to the agency action which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternatives which would avoid violating Section 7 (a)(2) of the ESA. This prohibition is in force during the consultation process and continues until the requirements of Section 7 (a)(2) are satisfied.

The ESA and Section 7 regulations require that **formal consultation** be concluded within 90 calendar days of initiation, and regulations require that the biological opinion be delivered to the action agency within 45 days after the conclusion of formal consultation. Thus, the statutory time frame for completing formal consultation is 135 days after receipt of all pertinent project information. As provided in 50 CFR Part 402.14 (c), a written request to initiate formal consultation would be submitted to the Service and would include the following:

1) A description of the action being considered;
2) A description of the specific area that may be affected by the action;
3) A description of the any listed species or critical habitat that may be affected by the action;
4) A description of the manner in which the action may affect any listed species or critical habitat, and an analysis of cumulative effects;
5) Relevant reports including any environmental impact statements, environmental assessment, or biological assessment prepared on the proposal; and
6) Any other relevant studies or other information available on the action, the affected listed species, or critical habitat.

An incidental take statement is provided to exempt action agencies and their permittees from the ESA Section 9 prohibitions against unauthorized take if they comply with the reasonable and prudent measures and implementing terms and conditions of incidental take statements. In order to be considered in an incidental take statement, any taking associated with an agency's action must meet three criteria. The taking must:

- not be likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat;
- result from an otherwise lawful activity; and
- be incidental to the purpose of the action.

Except for the piping plover and occasional transient individuals, no other Federally-listed or proposed threatened or endangered species under our jurisdiction are known to exist in the

respective project impact areas. In addition, no habitat in the project impact areas is currently designated or proposed "critical habitat" in accordance with provisions of the ESA. If the proposed Broadwater Energy Project is not completed within one year from the date of this letter, we recommend that you contact us to ensure that listed species presence/absence information for the proposed project is current.

Finally, as discussed, the above comments pertaining to endangered species under our jurisdiction are provided as technical assistance pursuant to the ESA. This response does not preclude additional Service comments under the Fish and Wildlife Coordination Act or other legislation. If you require additional information or assistance please contact Jill Olin of our Long Island Field Office at (631) 581-2941.

Sincerely,

David A. Stilwell

David A. Stilwell
Field Supervisor

Literature Cited

New York State Department of Environmental Conservation. Long Island Colonial Waterbird and Piping Plover Survey. 1998-2005. Stony Brook, New York.

Peterson, D. M. 1988. Least tern, *Sterna antillarum*. Pages 182-183 in R. F. Andrle and J. R. Carroll, Eds. *The Atlas of Breeding Birds in New York State*. Cornell Univ. Press, Ithaca, NY. 551 pp.

U.S. Fish and Wildlife Service. 1996. Piping Plover (*Charadrius melodus*) Atlantic Coast Population Revised Recovery Plan. Hadley, MA. 245 pp.

cc: NYSDEC, Long Island City, NY (J. Gilmore)
NYSDEC, Stony Brook, NY (Environmental Permits)
NYSDEC, Albany, NY (Natural Heritage Program)
FERC, Washington, DC (M. Salas)
COE, New York, NY
NOAA/F, Milford, CT

New York State Department of Environmental Conservation
Division of Fish, Wildlife & Marine Resources
New York Natural Heritage Program
625 Broadway, 5th floor, Albany, New York 12233-4757
Phone: (518) 402-8935 • **FAX:** (518) 402-8925
Website: www.dec.state.ny.

Denise M. Sheehan
Commissioner

February 16, 2006

Sara Allen Mochrie
Ecology and Environment, Inc
Buffalo Corporate Center
368 Pleasant View Drive
Lancaster, NY 14086

Dear Ms. Mochrie:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to an Environmental Assessment for the proposed FERC Application - construction of Marine Liquified Natural Gas Terminal and Pipeline, area as indicated on the map you provided, located in Greenport, Long Island.

Enclosed is a report of rare or state-listed animals and plants, significant natural communities, and other significant habitats, which our databases indicate occur, or may occur, on your site or in the immediate vicinity of your site. The information contained in this report is considered sensitive and may not be released to the public without permission from the New York Natural Heritage Program.

PLEASE NOTE: Your request concerning Significant/Critical Fisheries Areas existing within 15 miles of onshore areas, should be directed to Fisheries Manager, Region 1, Stony Brook - (631) 444-0280

The presence of rare species may result in this project requiring additional permits, permit conditions, or review. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, at the enclosed address.

For most sites, comprehensive field surveys have not been conducted; the enclosed report Ponly includes records from our databases. We cannot provide a definitive statement on presence or absence of all rare or state-listed species or significant natural communities. This information should not be substituted for on-site surveys that may be required for environmental impact assessment.

Our databases are continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

Sincerely,

Nicholas Conrad

Nicholas B. Conrad Information Services
NY Natural Heritage Program

Enc.
cc: Reg. 1, Wildlife Mgr.
Reg. 1, Fisheries Mgr.

Natural Heritage Report on Rare Species and Ecological Communities

NY Natural Heritage Program, NYS DEC, 625 Broadway, 5th Floor,
Albany, NY 12233-4757
(518) 402-8935

within 4 miles of Port Jefferson proposed facility

County: **Suffolk**
Town: **Brookhaven**

Location: **Cedar Beach Mount Sinai Harbor**

BIRDS

Charadrius melodus
Piping Plover
NY Legal Status: Endangered
Federal Listing: Endangered
NYS Rank: Vulnerable
Global Rank: Vulnerable
Office Use 10725

Location: **Flax Pond Beach**

BIRDS

Charadrius melodus
Piping Plover
NY Legal Status: Endangered
Federal Listing: Endangered
NYS Rank: Vulnerable
Global Rank: Vulnerable
Office Use 5006

Sterna antillarum
Least Tern
NY Legal Status: Threatened
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Apparently secure
Office Use 4932

Sterna hirundo
Common Tern
NY Legal Status: Threatened
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Demonstrably secure
Office Use 9680

Location: **Mount Misery Point**

BIRDS

Charadrius melodus
Piping Plover
NY Legal Status: Endangered
Federal Listing: Endangered
NYS Rank: Vulnerable
Global Rank: Vulnerable
Office Use 7414

Sterna antillarum
Least Tern
NY Legal Status: Threatened
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Apparently secure
Office Use 1607

Port Jefferson - 4 mi

County: **Suffolk**
Town: **Brookhaven**

Location: **Mount Misery Point**

BIRDS

Sterna hirundo
Common Tern
NY Legal Status: Threatened
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Demonstrably secure
Office Use 3310

Location: **Old Field**

VASCULAR PLANTS

Liatris scariosa var. novae-angliae
Northern Blazing-star
NY Legal Status: Threatened
Federal Listing:
NYS Rank: Imperiled
Global Rank: G5?T3
Office Use 7696 SC

Location: **Old Field Beach**

BIRDS

Charadrius melodus
Piping Plover
NY Legal Status: Endangered
Federal Listing: Endangered
NYS Rank: Vulnerable
Global Rank: Vulnerable
Office Use 1609 SL

Sterna antillarum
Least Tern
NY Legal Status: Threatened
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Apparently secure
Office Use 2941 SL

Sterna hirundo
Common Tern
NY Legal Status: Threatened
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Demonstrably secure
Office Use 1623 SL

Location: **Old Field Road**

VASCULAR PLANTS

Tripsacum dactyloides
Northern Gamma Grass
NY Legal Status: Threatened
Federal Listing:
NYS Rank: Imperiled
Global Rank: Demonstrably secure
Office Use 5320 SL

Location: **South Setauket Pine Barrens**

Port Jefferson - 4 mi

Natural Heritage Report on Rare Species and Ecological Communities

County: **Suffolk**
Town: **Brookhaven**
Location: South Setauket Pine Barrens

MOTHS

Hemileuca maia ssp. 5
Coastal Barrens Buckmoth

Office Use: 7718

NY Legal Status: Unlisted, Special Concern
NYS Rank: Imperiled
Federal Listing:
Global Rank: Imperiled
SL

VASCULAR PLANTS

Lechea tenuifolia
Slender Pinweed

Office Use: 10566

NY Legal Status: Threatened
NYS Rank: Imperiled
Federal Listing:
Global Rank: Demonstrably secure
SC

COMMUNITIES

Pitch-pine-oak-heath woodland

Office Use: 5645

NY Legal Status: Unlisted
NYS Rank: Imperiled
Federal Listing:
Global Rank: Vulnerable
SL

Location: **West Meadow Beach**

BIRDS

Charadrius melodus
Piping Plover

Office Use: 5576

NY Legal Status: Endangered
NYS Rank: Vulnerable
Federal Listing: Endangered
Global Rank: Vulnerable

Sterna antillarum
Least Tern

Office Use: 8188

NY Legal Status: Threatened
NYS Rank: Vulnerable
Federal Listing:
Global Rank: Apparently secure

17 Records Processed

BW005755

Natural Heritage Report on Rare Species and Ecological Communities

NY Natural Heritage Program, NYS DEC, 625 Broadway, 5th Floor,
Albany, NY 12233-4757
(518) 402-8935

within 4 miles of Greenport proposed facility

County: **Suffolk**
Town: **Shelter Island**

Location: **Crab Creek**

BIRDS

Charadrius melodus
Piping Plover
NY Legal Status: Endangered
Federal Listing: Endangered
NYS Rank: Vulnerable
Global Rank: Vulnerable
Office Use: 10560

Sterna antillarum
Least Tern
NY Legal Status: Threatened
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Apparently secure
Office Use: 4981

VASCULAR PLANTS

Polygonum glaucum
Seabeach Knotweed
NY Legal Status: Rare
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Vulnerable
Office Use: 11236

Location: **Gardiners Bay Shelter Island, Shelter Island Sound**

COMMUNITIES

Marine Eelgrass Meadow
NY Legal Status: Unlisted
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Demonstrably secure
Office Use: 6303 S

Location: **Lower Beach**

BIRDS

Sterna antillarum
Least Tern
NY Legal Status: Threatened
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Apparently secure
Office Use: 5249

VASCULAR PLANTS

Polygonum glaucum
Seabeach Knotweed
NY Legal Status: Rare
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Vulnerable
Office Use: 11223

BW005756

County: **Suffolk**
Town: **Shelter Island**

Location: **Lower Beach, Ram Island**

BIRDS

Charadrius melodus
Piping Plover

NY Legal Status: Endangered
Federal Listing: Endangered
NYS Rank: Vulnerable
Global Rank: Vulnerable
Office Use: 4470

Location: **Mashomack**

COMMUNITIES

Highbush Blueberry Bog Thicket

NY Legal Status: Unlisted
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Apparently secure
Office Use: 2636 SL

Coastal Oak-Beech Forest

NY Legal Status: Unlisted
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Apparently secure
Office Use: 7947 SL

Maritime Post Oak Forest

NY Legal Status: Unlisted
Federal Listing:
NYS Rank: Imperiled
Global Rank: Vulnerable
Office Use: 4164

Successional Maritime Forest

NY Legal Status: Unlisted
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Apparently secure
Office Use: 6164

Location: **Miss Annies Creek**

FISH

Menidia menidia
Atlantic Silverside

NY Legal Status: Unlisted
Federal Listing:
NYS Rank: Imperiled
Global Rank: Demonstrably secure
Office Use: 11193

VASCULAR PLANTS

County: **Suffolk**
Town: **Shelter Island**

Location: **Miss Annies Creek**

VASCULAR PLANTS

Fimbristylis castanea
Marsh Fimbry
NY Legal Status: Threatened
Federal Listing:
NYS Rank: Imperiled
Global Rank: Demonstrably secure
Office Use: 7964 SL

COMMUNITIES

Saltwater Tidal Creek
NY Legal Status: Unlisted
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Apparently secure
Office Use: 10539 S

Location: **Shell Beach**

BIRDS

Charadrius melodus
Piping Plover
NY Legal Status: Endangered
Federal Listing: Endangered
NYS Rank: Vulnerable
Global Rank: Vulnerable
Office Use: 7609

Sterna antillarum
Least Tern
NY Legal Status: Threatened
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Apparently secure
Office Use: 3907

VASCULAR PLANTS

Polygonum glaucum
Seabeach Knotweed
NY Legal Status: Rare
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Vulnerable
Office Use: 10218

Location: **Upper Beach**

VASCULAR PLANTS

Polygonum glaucum
Seabeach Knotweed
NY Legal Status: Rare
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Vulnerable
Office Use: 11222

Location: **Upper Beach, Menhaden Lane**

BIRDS

County: **Suffolk**
Town: **Shelter Island**

Location: **Upper Beach, Menhaden Lane**

Charadrius melodus
Piping Plover

Office Use: 5570

NY Legal Status: Endangered
Federal Listing: Endangered
NYS Rank: Vulnerable
Global Rank: Vulnerable

Sterna antillarum
Least Tern

Office Use: 6862

NY Legal Status: Threatened
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Apparently secure

Town: **Shelter Island, Southampton**

Location: **Mashomack**

COMMUNITIES

Maritime Beach

Office Use: 699

NY Legal Status: Unlisted
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Demonstrably secure
SL

Coastal Oak-Hickory Forest

Office Use: 1645

NY Legal Status: Unlisted
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Apparently secure
SL

Town: **Southold**

Location: **Arshamonaque Wetland, Moores Woods**

VASCULAR PLANTS

Populus heterophylla
Swamp Cottonwood

Office Use: 3347

NY Legal Status: Threatened
Federal Listing:
NYS Rank: Imperiled
Global Rank: Demonstrably secure
SL

Location: **Arshamonque Wetland**

COMMUNITIES

County: **Suffolk**
Town: **Southold**

Location: **Arshamonque Wetland**

COMMUNITIES

				Office Use
Red Maple-Sweetgum Swamp	**NY Legal Status:** Unlisted	**NYS Rank:**	Critically imperiled	8501
	Federal Listing:	**Global Rank:**	Apparently secure	SL

Location: **Conkling Point**

BIRDS

				Office Use
Charadrius melodus **Piping Plover**	**NY Legal Status:** Endangered	**NYS Rank:**	Vulnerable	10543
	Federal Listing: Endangered	**Global Rank:**	Vulnerable	

				Office Use
Sterna antillarum **Least Tern**	**NY Legal Status:** Threatened	**NYS Rank:**	Vulnerable	1798
	Federal Listing:	**Global Rank:**	Apparently secure	

				Office Use
Sterna hirundo **Common Tern**	**NY Legal Status:** Threatened	**NYS Rank:**	Vulnerable	6372
	Federal Listing:	**Global Rank:**	Demonstrably secure	

Location: **East Marion**

VASCULAR PLANTS

				Office Use
Angelica lucida **Seacoast Angelica**	**NY Legal Status:** Endangered	**NYS Rank:**	Imperiled	375
	Federal Listing:	**Global Rank:**	Demonstrably secure	SC

				Office Use
Atriplex glabriuscula **Seaside Orach**	**NY Legal Status:** Endangered	**NYS Rank:**	Critically imperiled	4715
	Federal Listing:	**Global Rank:**	Apparently secure	SC

County: **Suffolk**
Town: **Southold**

Location: **East Marion**

VASCULAR PLANTS

Digitaria filiformis
Slender Crabgrass
NY Legal Status: Threatened
Federal Listing:
NYS Rank: Imperiled
Global Rank: Demonstrably secure
Office Use: 4401 SC

Erechtites hieraciifolia var. megalocarpa
Fireweed
NY Legal Status: Endangered
Federal Listing:
NYS Rank: Imperiled
Global Rank: Imperiled
Office Use: 2160 SL

Ligusticum scothicum ssp. scothicum
Scotch Lovage
NY Legal Status: Endangered
Federal Listing:
NYS Rank: Critically imperiled
Global Rank: Vulnerable
Office Use: 9576 S

Symphyotrichum subulatum var. subulatum
Saltmarsh Aster
NY Legal Status: Threatened
Federal Listing:
NYS Rank: Imperiled
Global Rank: Demonstrably secure
Office Use: 2933 SL

Location: **Gull Pond West**

BIRDS

Charadrius melodus
Piping Plover
NY Legal Status: Endangered
Federal Listing: Endangered
NYS Rank: Vulnerable
Global Rank: Vulnerable
Office Use: 5884

Sterna antillarum
Least Tern
NY Legal Status: Threatened
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Apparently secure
Office Use: 1797

Sterna hirundo
Common Tern
NY Legal Status: Threatened
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Demonstrably secure
Office Use: 296 SL

VASCULAR PLANTS

County: **Suffolk**
Town: **Southold**

Location: **Gull Pond West**

VASCULAR PLANTS

Polygonum glaucum
Seabeach Knotweed

NY Legal Status: Rare
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Vulnerable

Office Use
2704
M

Location: **Harbor Road Orient**

VASCULAR PLANTS

Polygonum glaucum
Seabeach Knotweed

NY Legal Status: Rare
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Vulnerable

Office Use
10767

Location: **Hashamomuck Beach**

BIRDS

Charadrius melodus
Piping Plover

NY Legal Status: Endangered
Federal Listing: Endangered
NYS Rank: Vulnerable
Global Rank: Vulnerable

Office Use
11366

Location: **Inlet Pond**

VASCULAR PLANTS

Bolboschoenus maritimus ssp. paludosus
Seaside Bulrush

NY Legal Status: Endangered
Federal Listing:
NYS Rank: Imperiled
Global Rank: GNRQ

Office Use
1323
SL

Location: **Moores Woods**

VASCULAR PLANTS

Carex typhina
Cat-tail Sedge

NY Legal Status: Threatened
Federal Listing:
NYS Rank: Imperiled
Global Rank: Demonstrably secure

Office Use
6813
M

County: **Suffolk**
Town: **Southold**

Location: **Moores Woods**

VASCULAR PLANTS

Polygonum hydropiperoides var. opelousanum
Opelousa Smartweed
NY Legal Status: Threatened
Federal Listing:
NYS Rank: Imperiled
Global Rank: Not ranked
Office Use 994

Polygonum setaceum
Swamp Smartweed
NY Legal Status: Endangered
Federal Listing:
NYS Rank: Critically imperiled
Global Rank: Demonstrably secure
Office Use 6182

Tipularia discolor
Cranefly Orchid
NY Legal Status: Endangered
Federal Listing:
NYS Rank: Critically imperiled
Global Rank: Apparently secure
Office Use 713 SC

Location: **Orient**

VASCULAR PLANTS

Ligusticum scothicum ssp. scothicum
Scotch Lovage
NY Legal Status: Endangered
Federal Listing:
NYS Rank: Critically imperiled
Global Rank: Vulnerable
Office Use 10023

Location: **Orient Beach**

BIRDS

Charadrius melodus
Piping Plover
NY Legal Status: Endangered
Federal Listing: Endangered
NYS Rank: Vulnerable
Global Rank: Vulnerable
Office Use 2150

VASCULAR PLANTS

Plantago maritima var. juncoides
Seaside Plantain
NY Legal Status: Threatened
Federal Listing:
NYS Rank: Imperiled
Global Rank: Demonstrably secure
Office Use 10707

County: **Suffolk**
Town: **Southold**

Location: **Orient Beach**

VASCULAR PLANTS

Polygonum glaucum
Seabeach Knotweed
NY Legal Status: Rare
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Vulnerable
Office Use 8320

Salicornia bigelovii
Dwarf Glasswort
NY Legal Status: Threatened
Federal Listing:
NYS Rank: Imperiled
Global Rank: Demonstrably secure
Office Use 6513 S

COMMUNITIES

High Salt Marsh
NY Legal Status: Unlisted
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Apparently secure
Office Use 4739

Maritime Beach
NY Legal Status: Unlisted
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Demonstrably secure
Office Use 2858

Coastal Salt Pond
NY Legal Status: Unlisted
Federal Listing:
NYS Rank: Critically imperiled
Global Rank: Apparently secure
Office Use 3773

Maritime Red Cedar Forest
NY Legal Status: Unlisted
Federal Listing:
NYS Rank: Critically imperiled
Global Rank: Vulnerable
Office Use 6868

Location: **Paradise Beach Point**

BIRDS

Charadrius melodus
Piping Plover
NY Legal Status: Endangered
Federal Listing: Endangered
NYS Rank: Vulnerable
Global Rank: Vulnerable
Office Use 8049

County: **Suffolk**
Town: **Southold**

Location: **Paradise Beach Point**

BIRDS

Sterna antillarum
Least Tern

NY Legal Status: Threatened
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Apparently secure

Office Use 728

Location: **Pond East Of Hashamomuck Pond**

VASCULAR PLANTS

Myriophyllum pinnatum
Green Parrot's-feather

NY Legal Status: Endangered
Federal Listing:
NYS Rank: Critically imperiled
Global Rank: Demonstrably secure

Office Use 10612

Location: **Port Of Egypt**

BIRDS

Charadrius melodus
Piping Plover

NY Legal Status: Endangered
Federal Listing: Endangered
NYS Rank: Vulnerable
Global Rank: Vulnerable

Office Use 3942

Rynchops niger
Black Skimmer

NY Legal Status: Protected, Special Concern
Federal Listing:
NYS Rank: Imperiled
Global Rank: Demonstrably secure

Office Use 266

Sterna antillarum
Least Tern

NY Legal Status: Threatened
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Apparently secure

Office Use 6184

Sterna hirundo
Common Tern

NY Legal Status: Threatened
Federal Listing:
NYS Rank: Vulnerable
Global Rank: Demonstrably secure

Office Use 3000

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60 Records Processed

New York Natural Heritage Report

on Rare Plants, Rare Animals, and Significant Natural Communities

Associated with aquatic systems within 15 miles of proposed LNG onshore facilities

Prepared February, 2006 from the Biodiversity Databases of the New York Natural Heritage Program, NYS DEC, 625 Broadway, Albany, NY, 12233-4757.

Last documented since 1980

SCIENTIFIC NAME	COMMON NAME	NY STATE LISTING	Number of Locations
Within 15 miles of Port Jefferson proposed facility			
Amphibians			
Ambystoma tigrinum	Tiger Salamander	Endangered	60
Reptiles			
Kinosternon subrubrum	Eastern Mud Turtle	Endangered	1
Birds			
Podilymbus podiceps	Pied-billed Grebe	Threatened	1
Ardea alba	Great Egret	Protected	1
Sterna dougallii	Roseate Tern	Endangered	1
Sterna hirundo	Common Tern	Threatened	7
Sterna antillarum	Least Tern	Threatened	12
Fish			
Aphredoderus sayanus	Pirate Perch		2
Enneacanthus obesus	Banded Sunfish	Threatened	1
Etheostoma fusiforme	Swamp Darter	Threatened	1
Dragonflies and Damselflies			
Anax longipes	Comet Darner		1
Enallagma laterale	New England Bluet		1
Enallagma recurvatum	Pine Barrens Bluet	Threatened	5
Enallagma minusculum	Little Bluet	Threatened	1
Enallagma pictum	Scarlet Bluet	Threatened	2
Nehalennia integricollis	Southern Sprite	Special Concern	1
Plants			
Coreopsis rosea	Rose Coreopsis	Rare	21
Gamochaeta purpurea	Purple Everlasting	Endangered	1
Hypericum denticulatum	Coppery St. John's-wort	Endangered	1
Crassula aquatica	Water Pigmyweed	Endangered	1
Elatine americana	American Waterwort	Endangered	1

Proserpinaca pectinata	Comb-leaved Mermaid-weed	Threatened	11
Stachys hyssopifolia	Rough Hedge-nettle	Threatened	7
Utricularia striata	Fibrous Bladderwort	Threatened	6
Utricularia juncea	Rush Bladderwort	Threatened	9
Utricularia radiata	Small Floating Bladderwort	Threatened	12
Rotala ramosior	Tooth-cup	Threatened	3
Ludwigia sphaerocarpa	Globe-fruited Ludwigia	Threatened	10
Polygonum careyi	Carey's Smartweed	Threatened	3
Polygonum hydropiperoides var. *opelousanum*	Opelousa Smartweed	Threatened	3
Hottonia inflata	Featherfoil	Threatened	1
Oldenlandia uniflora	Clustered Bluets	Endangered	4
Viola primulifolia	Primrose-leaf Violet	Threatened	2
Sagittaria teres	Quill-leaf Arrowhead	Endangered	6
Orontium aquaticum	Golden Club	Threatened	1
Carex bullata	Button Sedge	Endangered	2
Carex buxbaumii	Brown Bog Sedge	Threatened	1
Eleocharis engelmannii	Engelmann's Spikerush	Endangered	1
Eleocharis equisetoides	Knotted Spikerush	Threatened	3
Eleocharis tenuis var. *pseudoptera*	Slender Spikerush	Endangered	1
Eleocharis tricostata	Three-ribbed Spikerush	Endangered	6
Eleocharis tuberculosa	Long-tubercled Spikerush	Threatened	2
Eleocharis ovata	Blunt Spikerush	Endangered	2
Lipocarpha micrantha	Dwarf Bulrush	Endangered	3
Rhynchospora inundata	Drowned Horned Rush	Threatened	2
Rhynchospora scirpoides	Long-beaked Bald-rush	Rare	13
Rhynchospora nitens	Short-beaked Bald-rush	Threatened	11
Bolboschoenus novae-angliae	Saltmarsh Bulrush	Endangered	2
Scleria pauciflora var. *caroliniana*	Few-flowered Nutrush	Endangered	2
Scleria triglomerata	Whip Nutrush	Threatened	2
Lachnanthes caroliana	Carolina Redroot	Endangered	3
Iris prismatica	Slender Blue Flag	Threatened	1
Uvularia puberula	Mountain Bellwort	Endangered	2
Dichanthelium wrightianum	Wright's Panic Grass	Endangered	1
Digitaria filiformis	Slender Crabgrass	Threatened	1

Natural Communities

High salt marsh	2
Low salt marsh	1
Brackish tidal marsh	2
Freshwater tidal marsh	1
Coastal plain pond	2
Marine rocky intertidal	1
Coastal plain pond shore	33
Coastal plain poor fen	2

Within 15 miles of Greenport proposed facility

Amphibians			
Ambystoma tigrinum	Tiger Salamander	Endangered	21
Reptiles			
Kinosternon subrubrum	Eastern Mud Turtle	Endangered	1
Birds			
Ardea alba	Great Egret	Protected	3
Egretta thula	Snowy Egret	Protected	2
Plegadis falcinellus	Glossy Ibis	Protected	2
Circus cyaneus	Northern Harrier	Threatened	1
Sterna dougallii	Roseate Tern	Endangered	5
Sterna hirundo	Common Tern	Threatened	18
Sterna antillarum	Least Tern	Threatened	50
Rynchops niger	Black Skimmer	Special Concern	4
Tyto alba	Barn Owl	Protected	1
Asio flammeus	Short-eared Owl	Endangered	1
Ammodramus maritimus	Seaside Sparrow	Special Concern	1
Fish			
Menidia beryllina	Inland Silverside		11
Menidia menidia	Atlantic Silverside		8
Dragonflies and Damselflies			
Libellula needhami	Needham's Skimmer		1
Enallagma laterale	New England Bluet		2
Enallagma recurvatum	Pine Barrens Bluet	Threatened	1
Enallagma pictum	Scarlet Bluet	Threatened	1
Ischnura ramburii	Rambur's Forktail		4
Plants			
Hydrocotyle verticillata	Whorled-pennywort	Endangered	1
Lilaeopsis chinensis	Eastern Grasswort	Threatened	3
Coreopsis rosea	Rose Coreopsis	Rare	9
Eupatorium album var. *subvenosum*	White Boneset	Threatened	1
Eupatorium leucolepis var. *leucolepis*	White Boneset	Endangered	2
Eupatorium rotundifolium var. *ovatum*	Round-leaf Boneset	Endangered	2
Solidago sempervirens var. *mexicana*	Seaside Goldenrod	Endangered	1
Solidago latissimifolia	Coastal Goldenrod	Endangered	2
Ageratina aromatica var. *aromatica*	Small White Snakeroot	Endangered	1
Symphyotrichum subulatum var. *subulatum*	Saltmarsh Aster	Threatened	2
Salicornia bigelovii	Dwarf Glasswort	Threatened	4
Hypericum adpressum	Creeping St. John's-wort	Endangered	9

Sabatia campanulata	Slender Marsh-pink	Endangered	1
Myriophyllum pinnatum	Green Parrot's-feather	Endangered	1
Utricularia striata	Fibrous Bladderwort	Threatened	1
Utricularia radiata	Small Floating Bladderwort	Threatened	1
Rotala ramosior	Tooth-cup	Threatened	3
Ludwigia sphaerocarpa	Globe-fruited Ludwigia	Threatened	5
Polygonum hydropiperoides var. *opelousanum*	Opelousa Smartweed	Threatened	3
Polygonum setaceum	Swamp Smartweed	Endangered	1
Hottonia inflata	Featherfoil	Threatened	2
Potentilla anserina ssp. *egedii*	Silverweed	Threatened	4
Oldenlandia uniflora	Clustered Bluets	Endangered	2
Carex hormathodes	Marsh Straw Sedge	Threatened	2
Carex typhina	Cat-tail Sedge	Threatened	1
Cyperus polystachyos var. *texensis*	Coast Flatsedge	Endangered	2
Cyperus retrorsus var. *retrorsus*	Retrorse Flatsedge	Endangered	1
Eleocharis equisetoides	Knotted Spikerush	Threatened	4
Eleocharis fallax	Creeping Spikerush	Endangered	2
Eleocharis halophila	Salt-marsh Spikerush	Threatened	1
Eleocharis tenuis var. *pseudoptera*	Slender Spikerush	Endangered	1
Eleocharis tuberculosa	Long-tubercled Spikerush	Threatened	5
Fimbristylis caroliniana	Carolina Fimbry		1
Fimbristylis castanea	Marsh Fimbry	Threatened	4
Rhynchospora scirpoides	Long-beaked Bald-rush	Rare	11
Rhynchospora nitens	Short-beaked Bald-rush	Threatened	5
Bolboschoenus maritimus var. *paludosus*	Seaside Bulrush	Endangered	1
Scleria triglomerata	Whip Nutrush	Threatened	1
Lachnanthes caroliana	Carolina Redroot	Endangered	1
Iris prismatica	Slender Blue Flag	Threatened	4
Juncus scirpoides	Scirpus-like Rush	Endangered	1
Juncus biflorus	Large Grass-leaved Rush	Endangered	1
Lemna perpusilla	Minute Duckweed	Endangered	1
Aletris farinosa	Stargrass	Threatened	1
Amphicarpum purshii	Peanut Grass	Endangered	1
Chasmanthium laxum	Slender Spikegrass	Endangered	1

Natural Communities

High salt marsh	2
Low salt marsh	1
Coastal salt pond	5
Brackish intertidal shore	1
Saltwater tidal creek	4
Coastal plain pond	1
Marine eelgrass meadow	1
Coastal plain pond shore	14
Sea level fen	2

USERS GUIDE TO NY NATURAL HERITAGE DATA

New York Natural Heritage Program, 625 Broadway, 5th Floor, Albany, NY 12233-4757 phone: (518) 402-8935

NATURAL HERITAGE PROGRAM: The NY Natural Heritage Program is a partnership between the NYS Department of Environmental Conservation (NYS DEC) and The Nature Conservancy. Our mission is to enable and enhance conservation of rare animals, rare plants, and significant communities. We accomplish this mission by combining thorough field inventories, scientific analyses, expert interpretation, and the most comprehensive database on New York's distinctive biodiversity to deliver the highest quality information for natural resource planning, protection, and management.

DATA SENSITIVITY: The data provided in the report are ecologically sensitive and should be treated in a sensitive manner. The report is for your in-house use and should **not** be released, distributed or incorporated in a public document without prior permission from the Natural Heritage Program.

EO RANK: A letter code for the quality of the occurrence of the rare species or significant natural community, based on population size or area, condition, and landscape context.

A-E = Extant: A=Excellent, B=Good, C=Fair, D=Poor, E=Extant but with insufficient data to assign a rank of A-D.
F = Failed to find. Did not locate species during a limited search, but habitat is still there and further field work is justified.
H = Historical. Historical occurrence without any recent field information.
X = Extirpated. Field/other data indicates element/habitat is destroyed and the element no longer exists at this location.
U = Extant/Historical status uncertain.
Blank = Not assigned.

LAST REPORT: The date that the rare species or significant natural community was last observed at this location, as documented in the Natural Heritage databases. The format is most often YYYY-MM-DD.

NY LEGAL STATUS – Animals:

Categories of Endangered and Threatened species are defined in New York State Environmental Conservation Law section 11-0535. Endangered, Threatened, and Special Concern species are listed in regulation 6NYCRR 182.5.

E - Endangered Species: any species which meet one of the following criteria:
- Any native species in imminent danger of extirpation or extinction in New York.
- Any species listed as endangered by the United States Department of the Interior, as enumerated in the Code of Federal Regulations 50 CFR 17.11.

T - Threatened Species: any species which meet one of the following criteria:
- Any native species likely to become an endangered species within the foreseeable future in NY.
- Any species listed as threatened by the U.S. Department of the Interior, as enumerated in the Code of the Federal Regulations 50 CFR 17.11.

SC - Special Concern Species: those species which are not yet recognized as endangered or threatened, but for which documented concern exists for their continued welfare in New York. Unlike the first two categories, species of special concern receive no additional legal protection under Environmental Conservation Law section 11-0535 (Endangered and Threatened Species).

P - Protected Wildlife (defined in Environmental Conservation Law section 11-0103): wild game, protected wild birds, and endangered species of wildlife.

U - Unprotected (defined in Environmental Conservation Law section 11-0103): the species may be taken at any time without limit; however a license to take may be required.

G - Game (defined in Environmental Conservation Law section 11-0103): any of a variety of big game or small game species as stated in the Environmental Conservation Law; many normally have an open season for at least part of the year, and are protected at other times.

NY LEGAL STATUS – Plants:

The following categories are defined in regulation 6NYCRR part 193.3 and apply to NYS Environmental Conservation Law section 9-1503.

E - Endangered Species: listed species are those with:
- 5 or fewer extant sites, or
- fewer than 1,000 individuals, or
- restricted to fewer than 4 U.S.G.S. 7 ½ minute topographical maps, or
- species listed as endangered by U.S. Dept. of Interior, as enumerated in Code of Federal Regulations 50 CFR 17.11.

T - Threatened: listed species are those with:
- 6 to fewer than 20 extant sites, or
- 1,000 to fewer than 3,000 individuals, or
- restricted to not less than 4 or more than 7 U.S.G.S. 7 and ½ minute topographical maps, or
- listed as threatened by U.S. Department of Interior, as enumerated in Code of Federal Regulations 50 CFR 17.11.

National Marine Fisheries Service
Habitat Conservation Division
Milford Field Office, 212 Rogers Avenue
Milford, Connecticut 06460

FAX
REC'D/BFLO
APR 03 2006
13:20
ECOLOGY & ENVIRONMENT
AO

TO: Sara Allen-Mochrie
Senior Biologist
Ecology & Environment, Inc.
Buffalo Corporate Center
368 Pleasant View Drive
Lancaster, New York 14086

DATE: 3 March 2006

SUBJECT: **Broadwater Energy Proposal for Onshore Facilities in Port Jefferson and Greenport Harbors, Suffolk County, New York**

Diane Rusanowsky
(Reviewing Biologist)

Thank you for notifying this office of the subject marina expansion proposal. We have completed our review of the materials provided and offer the following *preliminary* comments pursuant to the Endangered Species Act, the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act:

Endangered and Threatened Species

A species list request already was sent by Ecology & Environment to Mary Colligan, Assistant Regional Administrator for Protected Resources by EEA on 5 January, 2006. It is our understanding that a reply already has been generated regarding protected marine resource issues. The EEA request subsequently was forwarded to the Habitat Conservation Division for review, resulting in this response with regard to other trust resources for which NOAA/F is responsible.

Fish and Wildlife Coordination Act Species

__XX__ The following may be present in the general project area: Resident or seasonally transient fish and invertebrates; forage and benthic species; tidal wetlands

Please contact the appropriate Regional Office of the New York State Department of Environmental Conservation to confirm the presence of specific aquatic populations of concern. Habitat use by some species or life stages may be seasonal (e.g. over-wintering.)

Essential Fish Habitat

__XX__ Aquatic habitats in the project vicinity have been designated as Essential Fish Habitat (EFH) for one or more species. When details of the project are made available and permit applications have been made, conservation recommendations may be given. For a listing of EFH and further information, please go to our website at: http://www.nero.nmfs.gov/ro/doc/webintro.html . Based on the information provided to date, we conclude that a full EFH assessment will be necessary for all project elements [both offshore and onshore].

_____ No EFH presently designated in the immediate project area; however, impacts to anadromous fish populations would constitute an indirect adverse affect to piscivorous species for which EFH has been designated.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
Gloucester, MA 01930-2298

Sara Allen-Mochrie
Ecology & Environment, Inc.
368 Pleasant View Drive
Lancaster, NY 14086

FEB -6 2006

Dear Ms. Allen-Mochrie:

This responds to your letter dated January 5, 2006 requesting information on the presence of any species listed as threatened or endangered under the Endangered Species Act of 1973 (ESA), as amended, in the vicinity of the onshore components of the proposed Broadwater Liquefied Natural Gas (LNG) project in Port Jefferson and Greenport, NY. In previous correspondence with Laurie Weaver of your office dated August 16, 2005, NOAA's National Marine Fisheries Service (NMFS) provided information on the presence of federally listed species at the proposed Broadwater LNG terminal site in the waters of Long Island Sound. The following information applies only to threatened and endangered species that occur within 5 miles of the proposed onshore areas as requested in your letter. However, please be aware that for purposes of section 7 consultation under the ESA, the effects of all of the components of a proposed action must be evaluated together.

Four species of federally threatened or endangered sea turtles under the jurisdiction of NMFS may be found seasonally in New York waters: loggerhead (*Caretta caretta*), Kemp's ridley (*Lepidochelys kempii*), leatherback (*Dermochelys coriacea*), and green (*Chelonia mydas*) sea turtles. The federally threatened loggerhead and endangered Kemp's ridley sea turtles are the most common sea turtle species in northeast nearshore waters. The general trend is for sea turtles to migrate to the area in early summer (typically in May when water temperatures reach 11°C) and return south when the water temperature decreases around October/November. The three species of chelonid turtles found in the northeast are typically small juveniles that remain very briefly in open ocean waters and spend most of their time during the summer months foraging in shallow harbors and estuarine waters. Very little site-specific sighting and density data are available for sea turtles in Long Island Sound—most of our knowledge about sea turtle presence in the Sound comes from stranding data. For example, from November to March in 1985 through 1988, 130 cold-stunned turtles were collected along the Long Island shoreline, including 97 Kemp's ridleys.

Endangered leatherback sea turtles are located in New York waters during the warmer months as well, although they tend to be more pelagic and do not frequent shallow harbors and bays. Concentrations of leatherbacks have been observed during the summer off the south shore of Long Island and off New Jersey. Leatherbacks in these waters are thought to be pursuing their preferred jellyfish prey.

North Atlantic right whales (*Eubalaena glacialis*), humpback whales (*Megaptera novaeangliae*), and fin whales (*Balaenoptera physalus*) may all be found seasonally in New York waters. North Atlantic right, humpback, and fin whales have all been documented transiting past the entrance to Long Island Sound (south and east of Block Island Sound) and along the south side of Long

Island. However, the presence of these species in the waters of Long Island Sound within five miles of the proposed onshore facility locations would be very rare.

Section 7(a)(2) of the ESA states that each Federal agency shall, in consultation with the Secretary, insure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. Because federally listed sea turtles may be seasonally present in the project area, any discretionary federal action that may affect these species must undergo section 7 consultation. The federal action agency, in this case the Federal Energy Regulatory Commission (FERC), is responsible for initiating section 7 consultation. Once project details are established, FERC should commence the consultation process by submitting a biological assessment of the project's effects on listed species and a letter requesting that consultation be initiated to the attention of the Endangered Species Coordinator, NOAA Fisheries Service, Northeast Regional Office, One Blackburn Drive, Gloucester, MA 01930. After reviewing this information, NMFS will then be able to conduct a consultation under section 7 of the ESA.

While not protected under the ESA, several other species of marine mammals are present in Long Island Sound. These include several pinniped species, with the harbor seal (*Phoca vitulina*) and gray seal (*Halichoerus grypus*) being the most abundant. All marine mammals are protected under the Marine Mammal Protection Act of 1972 (MMPA). If it is felt that this project has the potential to take non-ESA listed marine mammals through injury, harassment, or mortality, then the applicants are responsible for obtaining an incidental take permit from NMFS. For more information about the permitting process, please visit http://www.nmfs.noaa.gov/pr/permits/.

Consultation for Essential Fish Habitat (EFH) under the Magnuson-Stevens Fishery Conservation and Management Act may be necessary for this project due to the potential for the project activities to disturb the sea floor. Additional information can be found on the NMFS Habitat Conservation Division website at http://www.nero.noaa.gov/ro/doc/webintro.html. Questions regarding EFH assessments in this area can be directed to Diane Rusanowsky at (203) 882-6571.

We look forward to continued coordination with your office throughout the consultation process. Should you have any questions about this information, please contact Kristen Koyama at (978) 281-9300 ext. 6531.

Sincerely,

Mary A. Colligan
Assistant Regional Administrator
for Protected Resources

cc: Rusanowsky, F/NER4
Bolen, F/PR1

File Code: Sec 7 ACOE Broadwater LNG

ecology and environment, inc.
International Specialists in the Environment
BUFFALO CORPORATE CENTER
368 Pleasant View Drive, Lancaster, New York 14086
Tel: 716/684-8060, Fax: 716/684-0844

February 16, 2006

Mr. Leon Sedefian
New York State Department of Environmental Conservation
Division of Air Resources, Bureau of Stationary Sources
625 Broadway
Albany, New York 12233

Ms. Anna Maria Coulter
United States Environmental Protection Agency - Region II
290 Broadway
New York, New York 10007-1866

Re: Revised Air Modeling Protocol for the Broadwater LNG Project

Dear Mr. Sedefian and Ms. Coulter:

Enclosed is a revised modeling protocol for the proposed Broadwater LNG Floating Storage and Regasification Unit (FSRU) in Long Island Sound. The protocol has been significantly revised to reflect your comments and suggestions from review of the May and October 2005 draft protocols and from meetings. Your comments have helped guide the modeling approach and I appreciate your review comments.

This submittal consists of a revised protocol document and a compilation of DEC and EPA comments to date, with responses to those comments. The protocol has also been revised to be consistent with the responses to comments.

Perhaps the most important issue is the adequacy of the overwater meteorological data set. As you have indicated in your comments, data recovery from the Central Long Island Sound Buoy (Buoy 44039) for the data period proposed in our earlier protocols does not meet the EPA modeling guidance requirement of 90% data completeness prior to filling-in of missing data. Conversations with a meteorologist at the National Data Buoy Center and another meteorologist at a firm that supplies meteorological data for modeling indicate that data recovery varies from buoy to buoy and seasonally due to the effects of weather on instrumentation and data transmission to shore. From installation of the Buoy 44039 in late 2002 through the end of 2004, raw data capture generally did not meet the 90% threshold due to a combination of data transmission and sensor difficulties.

We have worked closely with the operator of the buoy (University of Connecticut) to evaluate available data for a data set meeting the 90% data capture threshold. As a result, we have selected a new 12-month data period, extending from December 2004 to December 2005 that has significantly better data recovery statistics. As you recall, the previous data set did not achieve the raw data recovery threshold due to satellite transmission problems. We have found that a data logger is used on the buoy to maintain a backup copy of the raw data should satellite transmission of raw data be disrupted. The backup data is a record of the raw data collected from the instruments on Buoy 44039; thus using the backup data to complete missing data that was not properly transmitted is proposed as an acceptable procedure prior to applying the 90% raw data recovery threshold test.

Data recovery for the new data set exceeds 90% for the first three quarters, but is less than 90% for the final quarter, September 2005 through December 2005. Data recovery on a 12-month basis is 90% for all parameters except water temperature, which has an overall data recovery of 89%. During most of September and October 2005, the buoy was removed from Long Island Sound for upgrading of meteorological and oceanographic instrumentation. We have explored several possibilities to address the lapse in data that this activity caused and have conducted a sensitivity test on model results using three meteorological data sets to examine how the results are affected by the meteorological data substitution procedures. The rationale for this approach is to complete the data set with meteorological conditions from the same time of year such that the fall season is adequately reflected in the data set and that model results are reliable using either nearby or site-specific-prior-year data substitution. We have developed three data substitution scenarios whereby data are substituted for this outage period as follows:

Substitution Method	Scenario 1	Scenario 2	Scenario 3
Primary	Use data for the same year, month, day and hour from Western Long Island Sound Buoy (Buoy 44040) for air and water temperature and relative humidity and from the Bridgeport Sikorsky Airport for wind speed and direction.	Use data for the same month, day and hour, but different year (2003) from Buoy 44039 for all parameters.	Use data for the same month, day and hour, but different year (2004) from Buoy 44039 for all parameters.
Secondary	Use data for the same month, day and hour, but different year (2003) from Buoy 44039 for all parameters.	Use data for the same month, day and hour, but different year (2002) from Buoy 44039 for all parameters.	Use data for the same month, day and hour, but different year (2002) from Buoy 44039 for all parameters.

For each scenario, the overland meteorological data file was modified to include the mixing height and Islip surface data corresponding in time to the overwater data substituted from other years.

Initial test OCD runs indicate no differences between the scenarios for maximum annual NO_2 and PM_{10} concentrations, maximum 24-hour PM_{10} concentration, or maximum 8-hour CO concentration. The maximum 1-hour CO concentrations for Scenarios 1 and 2 were equal; the maximum 1-hour CO concentration for Scenario 3 was less than 2% higher than for the other two scenarios.

We propose that this sensitivity analysis be used to demonstrate the adequacy of the meteorological data set for modeling purposes. The results of the sensitivity analysis will be fully documented in a supplement to the most recent modeling study report. The current modeling study report and the supplement will be submitted with the air permit application package.

Regarding the applicability of PSD, to date Broadwater has not received official notice from USEPA regarding applicability of PSD to the project. We understand that USEPA is continuing to review the emission data and applicability of PSD and will issue a determination in the near future.

If you have any questions regarding this submittal, please feel free to contact me at 716-684-8060, extension 2572.

Sincerely,

Bruce Wattle

Bruce Wattle
Air Quality Meteorologist
Ecology & Environment, Inc.

Enclosure

Wattle, Bruce

From: Coulter.Annamaria@epamail.epa.gov
Sent: Thursday, February 16, 2006 2:31 PM
To: Wattle, Bruce
Cc: Leon Sedefian
Subject: RE: Revised Broadwater LNG Modeling Protocol

We would need 2 hard copies so that one could go into the administrative record.

It should go to
Steven C. Riva,
Chief Air Permitting Section
U.S. Environmental Protection Agency, Region 2 Office 290 Broadway, 25th Floor New York, NY 10007-1866

Thanks,
Annamaria Coulter

"Wattle, Bruce" <BWattle@ene.com> 02/16/2006 02:23 PM

To: Annamaria Coulter/R2/USEPA/US@EPA
cc: Leon Sedefian <lxsedefi@gw.dec.state.ny.us>
Subject: RE: Revised Broadwater LNG Modeling Protocol

If you would like, sure. Is the mailing address on the cover correct for you?

Thanks
Bruce

-----Original Message-----
From: Coulter.Annamaria@epamail.epa.gov
[mailto:Coulter.Annamaria@epamail.epa.gov]
Sent: Thursday, February 16, 2006 2:15 PM
To: Wattle, Bruce
Cc: Leon Sedefian
Subject: Re: Revised Broadwater LNG Modeling Protocol

Bruce,
Will you also be submitting hard copies?

"Wattle, Bruce" <BWattle@ene.com>

To

02/16/2006 01:58 PM

Leon Sedefian <lxsedefi@gw.dec.state.ny.us>, Annamaria Coulter/R2/USEPA/US@EPA

cc

Subject
Revised Broadwater LNG Modeling Protocol

Attached to this e-mail are a cover letter and revised modeling protocol document for the Broadwater project. The protocol attached here is the same as the protocol included in the January 31, 2006 FERC filing. I thought it would be a good idea to submit directly to both of you also.

Best regards,

Bruce Wattle, Q.E.P., C.C.M.
Ecology & Environment, Inc.
368 Pleasant View Drive
Lancaster NY 14086
voice 716-684-8060, ext 2572
fax 716-684-0844
bwattle@ene.com

[attachment "Air Model Protocol 1_25_06.pdf" deleted by Annamaria Coulter/R2/USEPA/US]
[attachment "Protocol letter Feb 16 2005 on Letterhead.pdf" deleted by Annamaria Coulter/R2/USEPA/US]

Wattle, Bruce

From: Wattle, Bruce

Sent: Tuesday, February 28, 2006 10:01 AM

To: 'riva.steven@epa.gov'

Subject: re:Broadwater - Air

Hello Steve: If you wouldn't mind taking a moment, an update on the status of review of the PSD questions would be most welcome. Last time that Frank Jon and I spoke (about 3 weeks ago) he indicated EPA will require we include carrier emissions associated with pumping the LNG over to the FSRU, but excluding hoteling related emissions. He did not give an indication where the 250 vs. 100 tpy question will come out as I think that was still being evaluated.

If you could indicate when you think a formal letter will be coming regarding these questions, it will help answer questions from other agencies and provide info to the Project's overall schedule.

Thanks and best regards,

Bruce Wattle, Q.E.P., C.C.M.
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voice 716-684-8060, ext 2572
fax 716-684-0844
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Wattle, Bruce

From: Wattle, Bruce
Sent: Wednesday, February 08, 2006 2:30 PM
To: 'jon.frank@epa.gov'
Cc: 'Sandra Barnett'; 'Booher, Martin T.'; Donnelly, Mike
Subject: Broadwater SIC code

Frank: Sorry to not reply to you sooner on your question from last Thursday about the SIC code. Although Broadwater has not settled on a SIC code, SIC 4491 (Marine Cargo Handling) appears to be the most practical, reasonable and relevant code. Other LNG projects in various stages of development also show use of this code. We have seen that LNG projects in the Gulf Region (EPA Region 6) have been classified under SIC code 4491. EPA Region 6 consistently has applied the 250 TPY threshold when determining if LNG receiving/regasification terminals are subject to PSD permitting requirements. In doing so, EPA Region 6 has relied on a memorandum issued by EPA Headquarters on July 31, 2003 that concludes that LNG terminals classified under SIC code 4491 are not within the "fuel conversion" source category subject to the 100 TPY PSD applicability threshold.

Also attached is a copy of the July 31, 2003 memorandum.

Take care,

Bruce Wattle, Q.E.P., C.C.M.
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Wattle, Bruce

From: Wattle, Bruce
Sent: Wednesday, January 18, 2006 3:02 PM
To: Sandra Barnett
Cc: Donnelly, Mike
Subject: EPA Region II contact Summary

Sandra: Below is a summary of what we discussed late this morning.

Frank Jons, staff engineer at EPA Region II reviewing Broadwater's air quality information, called this morning (1/18/06). He stated that EPA HQ has decided and verbally informed him that LNG carrier emissions that are associated with the % of the power used to operate the LNG pumps on a LNG carrier must be counted toward PSD applicability as "dockside" emission. The % of the power generated on the carrier that is used for hotelling emissions do not count.

Frank also discussed with me PSD threshold applicability (e.g. 100 vs. 250 tpy). I walked him through our analysis presented in RR9 and reminded him that it follows the example shown in the New Source Review Guidance manual (i.e. the coal cleaning plant example wherein the plant is treated as a 250 tpy threshold source, but the process heaters used at the plant are subject to the 100 tpy threshold). He seemed to understand the approach. It appears from talking with him that the threshold question will be decided at the Region II level.

He indicated that the EPA HQ decision is unofficial until we receive a letter from EPA. I asked, and he confirmed, that the letter we receive from EPA Region II will discuss the LNG Carrier emissions determination and the PSD threshold evaluation. We will then have a written statement from EPA on these issues and we can move forward accordingly. We could have a letter from EPA by the end of next week (1/27/06), depending on how much internal EPA review time is taken for the letter.

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Wattle, Bruce

From: Wattle, Bruce
Sent: Wednesday, December 07, 2005 4:43 PM
To: Donnelly, Mike
Cc: VanKerkhove, Paul
Subject: EPA Region II Discussions today

Mike: I spoke with Anna Maria Coulter and Steve Riva, in separate calls, this afternoon.

Basically, Anna Maria deferred to what Leon said and concurred that using a 12 month period that is not a calendar year is ok as long as the raw data recovery meets the minimum 90%. I spoke to her about my contact with the National Data Buoy Center guy and another meteorologist from Trinity Consultants about their experience with raw data recovery % (that it varies greatly by buoy type, location, season, number of severe weather events in a year, etc.) and that in some states, acceptance of less than 90% was given. She was pretty quiet on the other end and had no reply or insight to offer on this (such as they might consider less than 90%....). She said the Regions have been having some conference calls on modeling issues associated with offshore LNG because of the number of projects out there; EPA is attempting to coordinate their approach to these but they are in catch-up mode (my opinion and as is typical, they get no heads up that a push of projects of a certain type are coming in the pipe so they don't get a chance to prepare ahead of time). I asked her if she knew if the new OCD/CALPUFF version of the model was out yet from MMS, but she did not know. That brought from her the question to me if we had considered using "MM5" data in our analysis. MM5 data is hourly meteorological data used as input to a meteorological forecast model – funny thing about this is that the data at the grid points is interpolated from existing surface data stations (most likely over land stations), unless there happens to be a overlapping grid point with a surface station location. The MM5 data might include the buoy data, but if the buoy is not operating, the data for a grid point nearest the buoy site would be interpolated from land based data, so that wouldn't necessarily be any different than us proposing to use Bridgeport CT to substitute for the buoy. It also does not get us water temperature data as far as I know. She does expect either a response letter to their initial comment letter or a revised protocol. I said that we would do one or the other when we resolve meteorological data.

Steve Riva called back in response to my voice mail from earlier today. His staffer Frank Jons (he was at our April meeting but said nothing) is doing the review. EPA has nothing official yet, but Steve is definitely leaning in the direction of requiring LNG carrier emissions to be included in the PSD analysis. The regions are continuing to have discussions with EPA HQ, and he acknowledged that there are varying approaches from different regions. I explained that this might be due to some projects using dedicated ships that they own, whereas others, such as Broadwater, buy LNG on the open market and supplied by non-Broadwater owned vessels. He did not expect HQ to issue written guidance – it would be a verbal directive – and he didn't know when that might come. He said that given the energy security issues and the philosophy of the current administration, he was not sure his view would be concurred at HQ. I said if PSD is to include the Carriers, they are not under control of the project, and there is no mechanism to make a vendor that is delivering LNG to you comply with a permit condition (i.e. apply BACT). Steve said that of course you could not expect add-on controls to be required for a LNG carrier not owned by Broadwater; he asked why the LNG carrier could not burn LNG at berth just as it does at sea. I replied that it was a business/contractual issue. I recommend that Broadwater revisit this and develop an approach (I remember Mark Hodgson saying it was technically feasible to burn gas while docked, but the question of how to meter what is burned vs. what goes to the FSRU was the question). If PSD is applicable, the I expect that Steve will want BACT to an emission rate consistent with LNG carriers using gas while docked, not bunker oil. Steve concluded by saying that Frank Jons had not completed his analysis of the Resource Report, and that 'Frank needs to get this done, so I will push him on it so we can move forward' (not an exact quote, but that's the gist of what he said).

Bruce

Wattle, Bruce

From: Wattle, Bruce
Sent: Monday, October 24, 2005 10:32 AM
To: Donnelly, Mike
Cc: Kane, Michael
Subject: EPA - Air and PSD - Broadwater

Mike: Steve Riva returned my call this morning from the message I left him on Friday. He confirmed that their modeler (Anna Maria Coulter) is on travel for the next two weeks so she will not be able to address the modeling/met data questions until she returns. Steve indicated she is the only person on staff at Region II that can address this issue. I will continue looking at options on the met data questions that DEC brought up last Thursday and probably interact with DEC, but concurrence from EPA will be delayed until after November 7.

We then spoke about PSD applicability. I asked him if he needed a formal letter from the project specifically addressing the PSD applicability question and laying out our interpretation of PSD applicability and formally asking EPA to make its PSD applicability determination. I indicated that the Resource Report document that he should have received (he acknowledged he did have it; it was lying on his floor along with 6 other reports that are waiting assignment to reviewers) contains our analysis of PSD applicability. He said that as long as what is in the report is what the project has developed as its position on PSD applicability, then they (EPA) will review it in that context; they will evaluate it and write a response letter on the PSD applicability questions. He said his position is that the LNG carriers should be included in the applicability analysis, but that is not to be taken as an official EPA position; he will get EPA headquarters involved as he indicated in a previous conversation I had with him on this topic. So based on this conversation, the project would not have to submit a formal PSD applicability letter, EPA will take it from the info in the submitted resource report.

Bob Alessi should be prompted to advise if this approach is ok or if he wants to do a more formal or more detailed letter to EPA.

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bwattle@ene.com

Wattle, Bruce

From: Wattle, Bruce
Sent: Tuesday, July 19, 2005 1:37 PM
To: Donnelly, Mike; VanKerkhove, Paul
Cc: Kane, Michael
Subject: Phone con with Steven Riva at EPA

Mike: I spoke with Steve Riva, Chief of the Permitting Section, Air Programs Branch, EPA Region 2 in NYC today (July 19, 2005). We discussed the question of whether to include LNG carrier emissions in the PSD applicability analysis.

He gave me a heads up/way he is leaning discussion, but it was not an official EPA policy decision. The discussion points were:

- He will not commit EPA resources to make a decision until he receives our application (air permit application);
- He has been participating with EPA Region I discussion on the same topic. Steve said Region I is inclined to include LNG Carrier emissions that occur while docked/on station/anchored next to a regasification facility. Emissions due to propulsion to get to the facility are not included;
- Steve gave the example of how Region II currently looks at transport related emissions – he and I discussed the example of a ship docking in port or a tractor-trailer tanker driving up to unload product to a shore based tank farm. Currently, Region II counts only the emissions during the unloading process, which in the example case includes the vapor displacement from the action of filling the tanks onshore. IF the ship docked or the tanker truck had to run its engine to provide power to unload the product, those would be counted also. However, Region II has not reviewed a case with the transport vehicle needing to operate while unloading, usually shore power is used to pump material from the transport vessel to the tank facility.
- Steve said we can make our argument why or why not to include the LNG carrier emissions in our permit application and cite research, literature, prior decisions by other EPA regions, etc. I suggested that we'd like to not wait to do this in the permit application but instead do it in a letter to EPA requesting a PSD applicability determination (this is a common approach in dealing with questions like this and there is precedent for it). Steve reiterated that he would prefer to evaluate our permit application to make this determination, but my feeling is that is too far down the road – we'd want a determination before going the PSD route.
- Steve said that the decision will not be made by Region II since these projects have national implications, so it is a decision that will be made at HQ (regardless of the fact that some EPA regions seem to already have given guidance to not include LNG Carrier emissions (e.g. Region 9 for Cabrillo).
- What he would like to see is a worse case emission analysis that shows PSD is not applicable because, if I "read" him correctly, he was saying between the lines, he knows the project is controversial (due to other aspects) and would rather not get drawn into it. I agreed that we also would like to see the air analysis result in nonapplicability of PSD.

I thought, based on our meeting with EPA a couple of months ago, that EPA Region II was working towards a decision (if you recall during our meeting they referred to another project for which the same decision had to be made; my impression was that that decision was pending soon). My recommendation is that we confer with Bob Alessi at LLGM on a strategy on where to go from here, but I favor taking the time now to draft a letter to EPA laying out our data, research, citing precedent in other EPA regions, and rationale for not including the LNG Carrier emissions in the PSD applicability evaluation and formally requesting a PSD applicability determination before we file a permit application.

Bruce

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Broadwater Energy LLC	)	Docket No. CP06-54-000
	)	
Broadwater Pipeline LLC	)	Docket Nos. CP06-55-000 and CP06-56-000
	)	
	)	
Broadwater LNG Project	)	Docket No. PF05-4-000

SUPPLEMENTAL COMMENTS OF
IROQUOIS GAS TRANSMISSION SYSTEM, L.P.

Iroquois Gas Transmission System, L.P. ("Iroquois"), an intervenor in this proceeding, respectfully submits its supplemental comments in the captioned proceedings. As stated in its Motion for Leave to Intervene and Comments, filed March 10, 2006 in Docket Nos. CP06-54, CP06-55, and CP06-56 ("Intervention Motion"), Iroquois submits these comments to report on its resolution of certain issues raised by Iroquois in the pre-filing phase of this proceeding.

BACKGROUND

On October 7, 2005, Iroquois submitted comments in the scoping phase of the Docket No. PF05-4 pre-filing proceeding ("October 7 Letter"). As the interstate gas pipeline system with which the applicant Broadwater Energy's proposed LNG terminal and Broadwater Pipeline's proposed pipeline project would interconnect, Iroquois raised a number of questions and concerns regarding the Broadwater project. After submitting its October 7 Letter, Iroquois Pipeline Operating Company ("IPOC"), Iroquois' operator,

continued to discuss the proposed LNG terminal and pipeline project with representatives of Broadwater.

Following months of discussion, negotiation, and information exchange, Iroquois reported, in its Intervention Motion, that "IPOC and Broadwater have reached agreement on either the resolution of the outstanding issues or the establishment of a process for resolving them at an appropriate time in the future." Iroquois also indicated that the agreement reached with Broadwater "is currently awaiting approval by the Iroquois Management Committee" and that "[o]nce such approval has been reached, Iroquois will file supplemental comments in this proceeding on the resolution of the specific issues raised in the October 7 letter[.]" Iroquois hereby notifies the Commission that the Iroquois Management Committee has now approved the agreements reached between Iroquois and the applicants in these proceedings, Broadwater Energy LLC ("Broadwater Energy") and Broadwater Pipeline LLC ("Broadwater Pipeline") (together, "Broadwater" or "the Broadwater Entities"), and Iroquois submits information herein describing the resolution of its previously identified issues.

DESCRIPTION OF ISSUES RESOLUTION

- **Scope and Configuration of Project**

In its October 7 Letter, Iroquois expressed concerns regarding the lack of information pertaining to the anticipated markets for LNG to be delivered by Broadwater and the uncertainties regarding the need for additional facilities for Iroquois to expand or reconfigure its system in order to accommodate this new supply source and make deliveries to incremental markets.

Broadwater has assured Iroquois that its project as currently designed does not depend upon any expansion or reconfiguration of Iroquois' facilities. Based upon these assurances, Iroquois' new facilities construction activities associated with this project would be limited to the tap facilities and only those ancillary facilities that are required to measure, monitor and, to the extent necessary, address gas quality and interchangeability issues associated with the introduction of re-vaporized LNG from Broadwater (for more detail regarding the last point, see the following discussion). Any construction activities to expand Iroquois' main line or construct new lateral facilities would be undertaken independently as part of a future Iroquois expansion project and would be subject to Commission review and approval at such time.

- **Gas Quality and Interchangeability Issues**

In its October 7 Letter, Iroquois noted that it would likely be required to amend its tariff in order to address gas quality and interchangeability issues associated with its receipt of re-vaporized LNG from Broadwater, and expressed concern about the uncertain scope of potential new facilities that might be required to address the introduction of re-vaporized LNG into Iroquois' system.

Iroquois and Broadwater have jointly acknowledged the need for Iroquois' tariff to be modified to address issues pertaining to Iroquois' receipt and transportation of re-vaporized LNG. They have further agreed to work together and with Iroquois' existing and potential customers, parties whose facilities interconnect with the Iroquois system, and other stakeholders to develop any new tariff requirements determined to be necessary to address the introduction of re-vaporized LNG into Iroquois' system. Iroquois also has the right to defer its receipt of re-vaporized LNG from Broadwater until such time as the

new tariff provisions have become effective and any ancillary facilities Iroquois needs to install to address the introduction of Broadwater LNG into its system have been installed and made operational. Broadwater further has committed to comply with the pipeline's gas quality tariff provisions in effect at the time its deliveries are made.

With respect to facilities needed to address the introduction of re-vaporized LNG into Iroquois' system, a significant portion of such facilities will be constructed and operated by Broadwater and located on the FSRU. Any Iroquois-constructed facilities are presently anticipated to be minor (*i.e.*, gas chromatographs and other measurement and monitoring equipment, as well as possible heating facilities) and constructed at existing Iroquois facility locations pursuant to blanket construction authority.

- **Pipeline Design**

In its October 7 Letter, Iroquois raised the concern that, as described in Broadwater's initial pre-filing documentation, Broadwater's lateral pipeline facility was designed using a different, and lower, pipe class designation than the existing Iroquois sub-sea system.

As reflected in Broadwater's Resource Reports, Broadwater has agreed to construct its lateral pipeline facility to meet the same pipe class specifications as the Iroquois system.

- **Lack of Metering Facilities at Interconnection Point**

In its October 7 Letter, Iroquois noted its concern regarding Broadwater's proposed design which includes metering facilities on the FSRU (*i.e.*, at the point of origin of the Broadwater pipeline lateral), but not at its proposed point of interconnection with the Iroquois subsea pipeline system. While Iroquois acknowledged that this design

has obvious environmental benefits, such design raises commercial issues regarding measurement and responsibility for losses on the 22-mile lateral.

Prior to Iroquois' receipt of the gas, Iroquois and Broadwater will enter into future contractual arrangements, such as an Operational Balancing Agreement and an Operations and Maintenance Agreement, that will address the issue of metering and responsibility for gas losses.

- **Flow Control Valve Operation**

In its October 7 Letter, Iroquois raised questions regarding statements made by Broadwater in its draft Environmental Resource Report 11 pertaining to the ability to shut down and isolate the Broadwater system by shutting in the entire Iroquois subsea pipeline system.

In its revised Resource Reports 1 and 11 and other correspondence in this proceeding, Broadwater has clarified that it has and will avail itself of several security and safety procedures to isolate the Broadwater system in the event of an emergency circumstance that would not require the shut-in of the Iroquois pipeline system. In addition, Broadwater has agreed that its facilities design will include multiple shut-in valves to enhance controls in an emergency situation and has agreed to work with Iroquois to achieve a mutually agreeable final design for the interconnection facilities. Finally, Broadwater and Iroquois have agreed to a process for negotiation and execution of the aforementioned Operations and Maintenance Agreement, which will address, among other things, procedures for handling emergency situations where re-vaporized LNG must be isolated from the Iroquois system.

Based on the foregoing agreements and understandings, Iroquois believes that the issues raised in its October 7 Letter have been addressed satisfactorily by Broadwater.

Respectfully submitted,

IROQUOIS PIPELINE OPERATING COMPANY
as agent for
IROQUOIS GAS TRANSMISSION SYSTEM, L.P.

/s/ Jeffrey A. Bruner

Jeffrey A. Bruner
General Counsel
Paul W. Diehl
Senior Attorney
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April 11, 2006

Certificate of Service

On this, the 11th day of April, 2006, a true and correct copy of the foregoing Supplemental Comments of Iroquois Gas Transmission System, L.P. was served, either electronically or by U.S. mail, postage prepaid, to the representatives of the applicants, Broadwater Energy LLC and Broadwater Pipeline LLC, and to every other party listed on the official service list compiled by the Commission for these proceedings.

Dated at Washington, D.C. this 11th day of April, 2006.

/s/ Gabe S. Sterling III
Gabe S. Sterling III
Troutman Sanders LLP

Submission Contents

EIR-2

Request:

Provide the updated plans or a status update for the plans listed below including status of approval by applicable agencies:

a) Spill Prevention Control and Countermeasures Plan;
b) Broadwater's Wetland and Waterbody Construction and Mitigation Procedures;
c) Contingency construction plans across Stratford Shoal;
d) Hydrostatic testing protocol;
e) Water quality monitoring plan;
f) Unanticipated Discovery Plan;
g) Color scheme for the FSRU hull and above-deck structures, and the YMS;
h) Emergency Response Plan; and
i) Operation and Maintenance Plan.

Response:

a) **Spill Prevention Control and Countermeasures Plan** - A generic Spill Prevention Control and Countermeasures plan was filed with Resource Report 2 and was also included in the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges, a copy of which was filed with the Commission on March 31, 2006. To date, Broadwater has not received agency comments on the content of this plan. The SPCCC plan will be updated and finalized after detailed design to reflect specific spill control and response measures that will be implemented during facility operation.

b) **Wetland and Waterbody Construction and Mitigation Procedures** – Broadwater's Wetland and Waterbody Construction and Mitigation Procedures are attached to this response. As indicated in Resource Report No. 2 Section 2.4, Broadwater is adopting the FERC Procedures with specific variance requests to reflect the construction circumstances presented in the Long Island Sound.

c) **Stratford Shoal Contingency Plan** – Broadwater submitted a contingency plan as Appendix C to Resource Report No. 1. Broadwater anticipates conducting a trial plow of the shoal during the October 2008 to April 2009 period. The contingency plan will be updated to reflect the results of the trial plow.

d), e) **Hydrostatic testing protocol and Water quality monitoring plan** – Broadwater has incorporated an outline of hydrostatic test protocols of the pipeline in the NYSDEC SPDES Industrial Permit Application for the Project, a copy of which was filed in this docket on March 31, 2006, and was included in Section 2.5.1 of Resource Report 2. Water quality monitoring efforts during construction were detailed in Section 1.5.3.3.5 of Resource Report No. 1. Broadwater anticipates that these plans may be further refined

through consultation with NYSDEC during the course of the SPDES and Section 401 water quality permitting processes.

f) **Unanticipated Discovery Plan** – Resource Report No. 4, which was submitted to SHPO for review and comment, contains Broadwater's Unanticipated Discoveries Plan. As indicated in its December 22, 2005 letter, SHPO did not identify any concerns regarding this Plan, and as such, Broadwater believes that SHPO's overall acceptance of the report incorporates review and approval of the Unanticipated Discovery Plan. Broadwater's response to EIR 11 describes the status of the issues related to the NY SHPO's December 22, 2005 letter to Ecology and Environment.

g) **Color scheme for the FSRU hull and above-deck structures, and the YMS** – The color scheme of the FSRU hull, above-deck structures, and the YMS will be finalized during detailed design engineering of the facilities.

h), i) **Emergency Response Plan and Operation and Maintenance Plan** – A Letter of Recommendation from the USCG is required for the Project. Any conditions imposed by the Letter of Recommendation will be incorporated within a Vessel Management and Emergency Plan (Operating Plan). While specific USCG conditions are still to be determined, Broadwater outlined specific procedures in Section 1.6.1 of Resource Report No. 1, which at a minimum would be incorporated into the Plan.

WETLAND AND WATERBODY CONSTRUCTION AND MITIGATION PROCEDURES

Table of Contents

I. Applicability

A. The intent of these Procedures is to assist applicants by identifying baseline mitigation measures for minimizing the extent and duration of project-related disturbance on wetlands and waterbodies. The project sponsors should specify in their applications for a FERC Certificate (Certificate) any individual measures in these Procedures they consider unnecessary, technically infeasible, or unsuitable due to local conditions and to fully describe any alternative measures they would use. Applicants should also explain how those alternative measures would achieve a comparable level of mitigation.

Once a project is certificated, further changes can be approved. Any such changes from the measures in these Procedures (or the applicant's approved procedures) will be approved by the Director of the Office of Energy Projects (Director), upon the applicant's written request, if the Director agrees that an alternative measure:

1. provides equal or better environmental protection;

2. is necessary because a portion of these Procedures is infeasible or unworkable based on project-specific conditions; or

3. is specifically required in writing by another Federal, state, or Native American land management agency for the portion of the project on its land or under its jurisdiction.

Any requirements in these Procedures to file material with the Secretary of the FERC (Secretary) do not apply to projects undertaken under the provisions of the blanket certificate program. This exemption does not apply to a request for alternative measures. Project-related impacts on non-wetland areas are addressed in the staff's Upland Erosion Control, Revegetation, and Maintenance Plan (Plan).

B. Definitions

1. "Waterbody" includes any natural or artificial stream, river, or drainage with perceptible flow at the time of crossing, and other permanent waterbodies such as ponds and lakes:
   a. "minor waterbody" includes all waterbodies less than or equal to 10 feet wide at the water's edge at the time of crossing;
   b. "intermediate waterbody" includes all waterbodies greater than 10 feet wide but less than or equal to 100 feet wide at the water's edge at the time of crossing; and
   c. "major waterbody" includes all waterbodies greater than 100 feet wide at the water's edge at the time of crossing.

2. "Wetland" includes any area that is not in actively cultivated or rotated cropland and that satisfies the requirements of the current Federal methodology for identifying and delineating wetlands.

II. Preconstruction Filing

A. The following information shall be filed with the Secretary prior to the beginning of construction:

1. the hydrostatic testing information specified in section VII.B.3. and a wetland delineation report as described in section VI.A.1., if applicable; and

2. a schedule identifying when trenching or blasting would occur within each waterbody greater than 10 feet wide, or within any designated coldwater fishery. The project sponsor shall revise the schedule as necessary to provide FERC staff at least 14 days advance notice. Changes within this last 14-day period must provide for at least 48 hours advance notice.

B. The following site-specific construction plans required by these Procedures must be filed with the Secretary for the review and written approval by the Director:

1. plans for extra work areas that would be closer than 50 feet from a waterbody or wetland;

2 plans for major waterbody crossings;

3. plans for the use of a construction right-of-way greater than 75 feet wide in wetlands; and

4. plans for horizontal directional drill (HDD) "crossings" of wetlands or waterbodies.

III. Environmental Inspectors

A. At least one Environmental Inspector having knowledge of the wetland and waterbody conditions in the project area is required for each construction spread. The number and experience of Environmental Inspectors assigned to each construction spread should be appropriate for the length of the construction spread and the number/significance of resources affected.

B. The Environmental Inspector's responsibilities are outlined in the Upland Erosion Control, Revegetation, and Maintenance Plan (Plan).

IV. Preconstruction Planning

A. A copy of the Stormwater Pollution Prevention Plan (SWPPP) prepared for compliance with the U.S. Environmental Protection Agency's (EPA) National Stormwater Program General Permit requirements must be available in the field on each construction spread. The SWPPP shall contain Spill Prevention and Response Procedures that meet the requirements of state and Federal agencies.

1. It shall be the responsibility of the project sponsor and its contractors to structure their operations in a manner that reduces the risk of spills or the accidental exposure of fuels or hazardous materials to waterbodies or wetlands. The project sponsor and its contractors must, at a minimum, ensure that:
   a. all employees handling fuels and other hazardous materials are properly trained;
   b. all equipment is in good operating order and inspected on a regular basis;
   c. fuel trucks transporting fuel to on-site equipment travel only on approved access roads;
   d. all equipment is parked overnight and/or fueled at least 100 feet from a waterbody or in an upland area at least 100 feet from a wetland boundary. These activities can occur closer only if the Environmental Inspector finds, in advance, no reasonable alternative and the project sponsor and its contractors have taken appropriate steps (including secondary containment structures) to prevent spills and provide for prompt cleanup in the event of a spill;

***Broadwater Variance Request**: The marine activities associated with the construction of the marine pipeline and installation of the tower that will be used to moor the FSRU and secure the sendout pipeline will occur on a 24-hour basis. As such some refueling of equipment will occur on-water due to the infeasibility of returning to shore to conduct these operations. Broadwater will prepare a Project-specific Spill Prevention Control and Countermeasure (SPCC) plan to address potential spills of fuels and hazardous materials.*

   e. hazardous materials, including chemicals, fuels, and lubricating oils, are not stored within 100 feet of a wetland, waterbody, or designated municipal watershed area, unless the location is designated for such use by an appropriate governmental authority. This applies to storage of these materials and does not apply to normal operation or use of equipment in these areas; and

***Broadwater Variance Request**: To ensure efficient operations, Broadwater will be required to store chemicals, fuels, and lubricating oils on the specific lay barges used during construction. Broadwater will prepare a Project-specific SPCC plan to address potential spills of fuels and hazardous materials.*

   f. concrete coating activities are not performed within 100 feet of a wetland or waterbody boundary, unless the location is an existing industrial site designated for such use.

2. The project sponsor and its contractors must structure their operations in a manner that provides for the prompt and effective cleanup of spills of fuel and other hazardous materials. At a minimum, the project sponsor and its contractors must:
   a. ensure that each construction crew (including cleanup crews) has on hand sufficient supplies of absorbent and barrier materials to allow the rapid containment and recovery of spilled materials and knows the procedure for reporting spills;
   b. ensure that each construction crew has on hand sufficient tools and material to stop leaks;
   c. know the contact names and telephone numbers for all local, state, and Federal agencies (including, if necessary, the U. S. Coast Guard and the National Response Center) that must be notified of a spill; and
   d. follow the requirements of those agencies in cleaning up the spill, in excavating and disposing of soils or other materials contaminated by a spill, and in collecting and disposing of waste generated during spill cleanup.

B. Agency Coordination

The project sponsor must coordinate with the appropriate local, state, and Federal agencies as outlined in these Procedures and in the Certificate.

V. Waterbody Crossings

A. Notification Procedures And Permits

1. Apply to the U.S. Army Corps of Engineers (COE), or its delegated agency, for the appropriate wetland and waterbody crossing permits.

2. Provide written notification to authorities responsible for potable surface water supply intakes located within 3 miles downstream of the crossing at least 1 week before beginning work in the waterbody, or as otherwise specified by that authority.

3. Apply for state-issued waterbody crossing permits and obtain individual or generic section 401 water quality certification or waiver.

4. Notify appropriate state authorities at least 48 hours before beginning trenching or blasting within the waterbody, or as specified in state permits.

B. Installation

1. Time Window for Construction

Unless expressly permitted or further restricted by the appropriate state agency in writing on a site-specific basis, instream work, except that required to install or remove equipment bridges, must occur during the following time windows:

a. coldwater fisheries - June 1 through September 30; and
b. coolwater and warmwater fisheries - June 1 through November 30.

***Broadwater Variance Request**: The construction period for the proposed marine pipeline is anticipated to begin in October 2009 and end in April 2010. Installation of the stationary tower structure that will be used to moor the FSRU and secure the send-out pipeline is anticipated to occur in the late summer/fall of 2010. It is anticipated that the facility would be operational by the end of 2010. The proposed Project schedule has been developed to avoid the most sensitive biological time windows recognized in the Sound.*

2. Extra Work Areas

a. Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet away from water's edge, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land.
b. The project sponsor shall file with the Secretary for review and written approval by the Director, a site-specific construction plan for each extra work area with a less than 50-foot setback from the water's edge, (except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land) and a site-specific explanation of the conditions that will not permit a 50-foot setback.
c. Limit clearing of vegetation between extra work areas and the edge of the waterbody to the certificated construction right-of-way.
d. Limit the size of extra work areas to the minimum needed to construct the waterbody crossing.

3. General Crossing Procedures
   a. Comply with the COE, or its delegated agency, permit terms and conditions.
   b. Construct crossings as close to perpendicular to the axis of the waterbody channel as engineering and routing conditions permit.
   c. If the pipeline parallels a waterbody, attempt to maintain at least 15 feet of undisturbed vegetation between the waterbody (and any adjacent wetland) and the construction right-of-way.
   d. Where waterbodies meander or have multiple channels, route the pipeline to minimize the number of waterbody crossings.
   e. Maintain adequate flow rates to protect aquatic life, and prevent the interruption of existing downstream uses.
   f. Waterbody buffers (extra work area setbacks, refueling restrictions, etc.) must be clearly marked in the field with signs and/or highly visible flagging until construction-related ground disturbing activities are complete.

4. Spoil Pile Placement and Control
   a. All spoil from minor and intermediate waterbody crossings, and upland spoil from major waterbody crossings, must be placed in the construction right-of-way at least 10 feet from the water's edge or in additional extra work areas as described in section V.B.2.

***Broadwater Variance Request**: As the Project will entail the installation of facilities in a marine environment, material excavated by the subsea plow will be deposited adjacent to the trench.*

   b. Use sediment barriers to prevent the flow of spoil or heavily silt-laden water into any waterbody.

***Broadwater Variance Request**: As the Project will entail the installation of facilities in a marine environment, with significant tidal fluctuation, no sediment barriers are proposed. Modeling conducted by Broadwater has demonstrated that impacts resulting from construction will be temporary in nature and not significant.*

5. Equipment Bridges
   a. Only clearing equipment and equipment necessary for installation of equipment bridges may cross waterbodies prior to bridge installation. Limit the number of such crossings of each waterbody to one per piece of clearing equipment.
   b. Construct equipment bridges to maintain unrestricted flow and to prevent soil from entering the waterbody. Examples of such bridges include:
      (1) equipment pads and culvert(s);
      (2) equipment pads or railroad car bridges without culverts;
      (3) clean rock fill and culvert(s); and
      (4) flexi-float or portable bridges.

      Additional options for equipment bridges may be utilized that achieve the performance objectives noted above. Do not use soil to construct or stabilize equipment bridges.

c. Design and maintain each equipment bridge to withstand and pass the highest flow expected to occur while the bridge is in place. Align culverts to prevent bank erosion or streambed scour. If necessary, install energy dissipating devices downstream of the culverts.

d. Design and maintain equipment bridges to prevent soil from entering the waterbody.

e. Remove equipment bridges as soon as possible after permanent seeding unless the COE, or its delegated agency, authorizes it as a permanent bridge.

f. If there will be more than 1 month between final cleanup and the beginning of permanent seeding and reasonable alternative access to the right-of-way is available, remove equipment bridges as soon as possible after final cleanup.

6. Dry-Ditch Crossing Methods

a. Unless approved otherwise by the appropriate state agency, install the pipeline using one of the dry-ditch methods outlined below for crossings of waterbodies up to 30 feet wide (at the water's edge at the time of construction) that are state-designated as either coldwater or significant coolwater or warmwater fisheries.

b. Dam and Pump

(1) The dam-and-pump method may be used without prior approval for crossings of waterbodies where pumps can adequately transfer streamflow volumes around the work area, and there are no concerns about sensitive species passage.

(2) Implementation of the dam-and-pump crossing method must meet the following performance criteria:

(i) use sufficient pumps, including on-site backup pumps, to maintain downstream flows;

(ii) construct dams with materials that prevent sediment and other pollutants from entering the waterbody (e.g., sandbags or clean gravel with plastic liner);

(iii) screen pump intakes;

(iv) prevent streambed scour at pump discharge; and

(v) monitor the dam and pumps to ensure proper operation throughout the waterbody crossing.

c. Flume Crossing. The flume crossing method requires implementation of the following steps:

(1) install flume pipe after blasting (if necessary), but before any trenching;

(2) use sand bag or sand bag and plastic sheeting diversion structure or equivalent to develop an effective seal and to divert stream flow through the flume pipe (some modifications to the stream bottom may be required in to achieve an effective seal);

(3) properly align flume pipe(s) to prevent bank erosion and streambed scour;

(4) do not remove flume pipe during trenching, pipelaying, or backfilling activities, or initial streambed restoration efforts; and

(5) remove all flume pipes and dams that are not also part of the equipment bridge as soon as final cleanup of the stream bed and bank is complete.

d. Horizontal Directional Drill (HDD). To the extent they were not provided as part of the pre-certification process, for each waterbody or wetland that would be crossed using the HDD method, provide a plan that includes:
   (1) site-specific construction diagrams that show the location of mud pits, pipe assembly areas, and all areas to be disturbed or cleared for construction;
   (2) a description of how an inadvertent release of drilling mud would be contained and cleaned up; and
   (3) a contingency plan for crossing the waterbody or wetland in the event the directional drill is unsuccessful and how the abandoned drill hole would be sealed, if necessary.

7. Crossings of Minor Waterbodies

Where a dry-ditch crossing is not required, minor waterbodies may be crossed using the open-cut crossing method, with the following restrictions:

a. except for blasting and other rock breaking measures, complete instream construction activities (including trenching, pipe installation, backfill, and restoration of the streambed contours) within 24 hours. Streambanks and unconsolidated streambeds may require additional restoration after this period;
b. limit use of equipment operating in the waterbody to that needed to construct the crossing; and
c. equipment bridges are not required at minor waterbodies that do not have a state-designated fishery classification (e.g., agricultural or intermittent drainage ditches). However, if an equipment bridge is used it must be constructed as described in section V.B.5.

8. Crossings of Intermediate Waterbodies

Where a dry-ditch crossing is not required, intermediate waterbodies may be crossed using the open-cut crossing method, with the following restrictions:

a. complete instream construction activities (not including blasting and other rock breaking measures) within 48 hours, unless site-specific conditions make completion within 48 hours infeasible;
b. limit use of equipment operating in the waterbody to that needed to construct the crossing; and
c. all other construction equipment must cross on an equipment bridge as specified in section V.B.5.

9. Crossings of Major Waterbodies

Before construction, the project sponsor shall file with the Secretary for the review and written approval by the Director a detailed, site-specific construction plan and scaled drawings identifying all areas to be disturbed by construction for each major waterbody crossing (the scaled drawings are not required for any off-

shore portions of pipeline projects). This plan should be developed in consultation with the appropriate state and Federal agencies and should include extra work areas, spoil storage areas, sediment control structures, etc., as well as mitigation for navigational issues.

The Environmental Inspector may adjust the final placement of the erosion and sediment control structures in the field to maximize effectiveness.

10. Temporary Erosion and Sediment Control

Install sediment barriers (as defined in section IV.F.2.a. of the Plan) immediately after initial disturbance of the waterbody or adjacent upland. Sediment barriers must be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration of adjacent upland areas is complete. Temporary erosion and sediment control measures are addressed in more detail in the Plan; however, the following specific measures must be implemented at stream crossings:

a. install sediment barriers across the entire construction right-of-way at all waterbody crossings, where necessary to prevent the flow of sediments into the waterbody. In the travel lane, these may consist of removable sediment barriers or driveable berms. Removable sediment barriers can be removed during the construction day, but must be re-installed after construction has stopped for the day and/or when heavy precipitation is imminent;
b. where waterbodies are adjacent to the construction right-of-way, install sediment barriers along the edge of the construction right-of-way as necessary to contain spoil and sediment within the construction right-of-way; and
c. use trench plugs at all waterbody crossings, as necessary, to prevent diversion of water into upland portions of the pipeline trench and to keep any accumulated trench water out of the waterbody.

11. Trench Dewatering

Dewater the trench (either on or off the construction right-of-way) in a manner that does not cause erosion and does not result in heavily silt-laden water flowing into any waterbody. Remove the dewatering structures as soon as possible after the completion of dewatering activities.

C. Restoration

1. Use clean gravel or native cobbles for the upper 1 foot of trench backfill in all waterbodies that contain coldwater fisheries.

2. For open-cut crossings, stabilize waterbody banks and install temporary sediment barriers within 24 hours of completing instream construction activities. For dry-ditch crossings, complete streambed and bank stabilization before returning flow to the waterbody channel.

3. Return all waterbody banks to preconstruction contours or to a stable angle of repose as approved by the Environmental Inspector.

4. Application of riprap for bank stabilization must comply with COE, or its delegated agency, permit terms and conditions.

5. Unless otherwise specified by state permit, limit the use of riprap to areas where flow conditions preclude effective vegetative stabilization techniques such as seeding and erosion control fabric.

6. Revegetate disturbed riparian areas with conservation grasses and legumes or native plant species, preferably woody species.

7. Install a permanent slope breaker across the construction right-of-way at the base of slopes greater than 5 percent that are less than 50 feet from the waterbody, or as needed to prevent sediment transport into the waterbody. In addition, install sediment barriers as outlined in the Plan. In some areas, with the approval of the Environmental Inspector, an earthen berm may be suitable as a sediment barrier adjacent to the waterbody.

8. Sections V.C.3. through V.C.6. above also apply to those perennial or intermittent streams not flowing at the time of construction.

D. Post-Construction Maintenance

1. Limit vegetation maintenance adjacent to waterbodies to allow a riparian strip at least 25 feet wide, as measured from the waterbody's mean high water mark, to permanently revegetate with native plant species across the entire construction right-of-way. However, to facilitate periodic pipeline corrosion/leak surveys, a corridor centered on the pipeline and up to 10 feet wide may be maintained in a herbaceous state. In addition, trees that are located within 15 feet of the pipeline that are greater than 15 feet in height may be cut and removed from the permanent right-of-way.

2. Do not use herbicides or pesticides in or within 100 feet of a waterbody except as allowed by the appropriate land management or state agency.

VI. Wetland Crossings

A. General

1. The project sponsor shall conduct a wetland delineation using the current Federal methodology and file a wetland delineation report with the Secretary before construction. This report shall identify:
   a. by milepost all wetlands that would be affected;
   b. the National Wetlands Inventory (NWI) classification for each wetland;
   c. the crossing length of each wetland in feet; and
   d. the area of permanent and temporary disturbance that would occur in each wetland by NWI classification type.

   The requirements outlined in this section do not apply to wetlands in actively cultivated or rotated cropland. Standard upland protective measures, including workspace and topsoiling requirements, apply to these agricultural wetlands.

2. Route the pipeline to avoid wetland areas to the maximum extent possible. If a wetland cannot be avoided or crossed by following an existing right-of-way, route the new pipeline in a manner that minimizes disturbance to wetlands. Where looping an existing pipeline, overlap the existing pipeline right-of-way with the new construction right-of-way. In addition, locate the loop line no more than 25 feet away from the existing pipeline unless site-specific constraints would adversely affect the stability of the existing pipeline.

3. Limit the width of the construction right-of-way to 75 feet or less. Prior written approval of the Director is required where topographic conditions or soil limitations require that the construction right-of-way width within the boundaries of a federally delineated wetland be expanded beyond 75 feet. Early in the planning process the project sponsor is encouraged to identify site-specific areas where existing soils lack adequate unconfined compressive strength that would result in excessively wide ditches and/or difficult to contain spoil piles.

4. Wetland boundaries and buffers must be clearly marked in the field with signs and/or highly visible flagging until construction-related ground disturbing activities are complete.

5. Implement the measures of sections V. and VI. in the event a waterbody crossing is located within or adjacent to a wetland crossing. If all measures of sections V. and VI. cannot be met, the project sponsor must file with the Secretary a site-specific crossing plan for review and written approval by the Director before construction. This crossing plan shall address at a minimum:
   a. spoil control;
   b. equipment bridges;
   c. restoration of waterbody banks and wetland hydrology;
   d. timing of the waterbody crossing;
   e. method of crossing; and
   f. size and location of all extra work areas.

Do not locate aboveground facilities in any wetland, except where the location of such facilities outside of wetlands would prohibit compliance with U.S. Department of Transportation regulations.

B. Installation

1. Extra Work Areas and Access Roads
   a. Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet away from wetland boundaries, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land.
   b. The project sponsor shall file with the Secretary for review and written approval by the Director, a site-specific construction plan for each extra work area with a less than 50foot setback from wetland boundaries (except where adjacent upland consists of actively cultivated or rotated cropland or other disturbed land) and a site-specific explanation of the conditions that will not permit a 50foot setback.
   c. Limit clearing of vegetation between extra work areas and the edge of the wetland to the certificated construction right-of-way.
   d. The construction right-of-way may be used for access when the wetland soil is firm enough to avoid rutting or the construction right-of-way has been appropriately stabilized to avoid rutting (e.g., with timber riprap, prefabricated equipment mats, or terra mats).

      In wetlands that cannot be appropriately stabilized, all construction equipment other than that needed to install the wetland crossing shall use access roads located in upland areas. Where access roads in upland areas do not provide reasonable access, limit all other construction equipment to one pass through the wetland using the construction right-of-way.
   e. The only access roads, other than the construction right-of-way, that can be used in wetlands without Director approval, are those existing roads that can be used with no modification and no impact on the wetland.

2. Crossing Procedures
   a. Comply with COE, or its delegated agency, permit terms and conditions
   b. Assemble the pipeline in an upland area unless the wetland is dry enough to adequately support skids and pipe.
   c. Use "push-pull" or "float" techniques to place the pipe in the trench where water and other site conditions allow.
   d. Minimize the length of time that topsoil is segregated and the trench is open.
   e. Limit construction equipment operating in wetland areas to that needed to clear the construction right-of-way, dig the trench, fabricate and install the pipeline, backfill the trench, and restore the construction right-of-way.
   f. Cut vegetation just aboveground level, leaving existing root systems in place, and remove it from the wetland for disposal.
   g. Limit pulling of tree stumps and grading activities to directly over the trenchline. Do not grade or remove stumps or root systems from the rest of the construction right-of-way in wetlands unless the Chief Inspector and Environmental Inspector determine that safety-related construction con-

straints require grading or the removal of tree stumps from under the working side of the construction right-of-way.

h. Segregate the top 1 foot of topsoil from the area disturbed by trenching, except in areas where standing water is present or soils are saturated or frozen. Immediately after backfilling is complete, restore the segregated topsoil to its original location.

i. Do not use rock, soil imported from outside the wetland, tree stumps, or brush riprap to support equipment on the construction right-ofway.

j. If standing water or saturated soils are present, or if construction equipment causes ruts or mixing of the topsoil and subsoil in wetlands, use low-ground-weight construction equipment, or operate normal equipment on timber riprap, prefabricated equipment mats, or terra mats.

k. Do not cut trees outside of the approved construction work area to obtain timber for riprap or equipment mats.

l. Attempt to use no more than two layers of timber riprap to support equipment on the construction right-of-way.

m. Remove all project-related material used to support equipment on the construction right-ofway upon completion of construction.

3. Temporary Sediment Control

Install sediment barriers (as defined in section IV.F.2.a. of the Plan) immediately after initial disturbance of the wetland or adjacent upland. Sediment barriers must be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench). Except as noted below in section VI.B.3.c., maintain sediment barriers until replaced by permanent erosion controls or restoration of adjacent upland areas is complete. Temporary erosion and sediment control measures are addressed in more detail in the Plan.

a. Install sediment barriers across the entire construction right-of-way at all wetland crossings where necessary to prevent sediment flow into the wetland. In the travel lane, these may consist of removable sediment barriers or driveable berms. Removable sediment barriers can be removed during the construction day, but must be re-installed after construction has stopped for the day and/or when heavy precipitation is imminent

b. Where wetlands are adjacent to the construction right-of-way and the right-of-way slopes toward the wetland, install sediment barriers along the edge of the construction right-of-way as necessary to prevent sediment flow into the wetland.

c. Install sediment barriers along the edge of the construction right-of-way as necessary to contain spoil and sediment within the construction right-of-way through wetlands. Remove these sediment barriers during right-of-way cleanup.

4. Trench Dewatering

Dewater the trench (either on or off the construction right-of-way) in a manner that does not cause erosion and does not result in heavily silt-laden water flowing into any wetland. Remove the dewatering structures as soon as possible after the completion of dewatering activities.

C. Restoration

1. Where the pipeline trench may drain a wetland, construct trench breakers and/or seal the trench bottom as necessary to maintain the original wetland hydrology.

2. For each wetland crossed, install a trench breaker at the base of slopes near the boundary between the wetland and adjacent upland areas. Install a permanent slope breaker across the construction right-of-way at the base of a slopes greater than 5 percent where the base of the slope is less than 50 feet from the wetland, or as needed to prevent sediment transport into the wetland. In addition, install sediment barriers as outlined in the Plan. In some areas, with the approval of the Environmental Inspector, an earthen berm may be suitable as a sediment barrier adjacent to the wetland.

3. Do not use fertilizer, lime, or mulch unless required in writing by the appropriate land management or state agency.

4. Consult with the appropriate land management or state agency to develop a project-specific wetland restoration plan. The restoration plan should include measures for re-establishing herbaceous and/or woody species, controlling the invasion and spread of undesirable exotic species (e.g., purple loosestrife and phragmites), and monitoring the success of the revegetation and weed control efforts. Provide this plan to the FERC staff upon request.

5. Until a project-specific wetland restoration plan is developed and/or implemented, temporarily revegetate the construction right-of-way with annual ryegrass at a rate of 40 pounds/acre (unless standing water is present).

6. Ensure that all disturbed areas successfully revegetate with wetland herbaceous and/or woody plant species.

7. Remove temporary sediment barriers located at the boundary between wetland and adjacent upland areas after upland revegetation and stabilization of adjacent upland areas are judged to be successful as specified in section VII.A.5. of the Plan.

D. Post-Construction Maintenance

1. Do not conduct vegetation maintenance over the full width of the permanent right-of-way in wetlands. However, to facilitate periodic pipeline corrosion/leak surveys, a corridor centered on the pipeline and up to 10 feet wide may be maintained in a herbaceous state. In addition, trees within 15 feet of the pipeline that are greater than 15 feet in height may be selectively cut and removed from the permanent right-of-way.

2. Do not use herbicides or pesticides in or within 100 feet of a wetland, except as allowed by the appropriate land management agency or state agency.

3. Monitor and record the success of wetland revegetation annually for the first 3 years after construction or until wetland revegetation is successful. At the end of 3

years after construction, file a report with the Secretary identifying the status of the wetland revegetation efforts. Include the percent cover achieved and problem areas (weed invasion issues, poor revegetation, etc.). Continue to file a report annually until wetland revegetation is successful.

4. Wetland revegetation shall be considered successful if the cover of herbaceous and/or woody species is at least 80 percent of the type, density, and distribution of the vegetation in adjacent wetland areas that were not disturbed by construction. If revegetation is not successful at the end of 3 years, develop and implement (in consultation with a professional wetland ecologist) a remedial revegetation plan to actively revegetate the wetland. Continue revegetation efforts until wetland revegetation is successful.

VII. Hydrostatic Testing

A. Notification Procedures and Permits

1. Apply for state-issued water withdrawal permits, as required.

2. Apply for National Pollutant Discharge Elimination System (NPDES) or state-issued discharge permits, as required.

3. Notify appropriate state agencies of intent to use specific sources at least 48 hours before testing activities unless they waive this requirement in writing.

B. General

1. Perform non-destructive testing of all pipeline section welds or hydrotest the pipeline sections, before installation under waterbodies or wetlands.

2. If pumps used for hydrostatic testing are within 100 feet of any waterbody or wetland, address the operation and refueling of these pumps in the project's Spill Prevention and Response Procedures.

3. The project sponsor shall file with the Secretary before construction a list identifying the location of all waterbodies proposed for use as a hydrostatic test water source or discharge location.

C. Intake Source and Rate

1. Screen the intake hose to prevent entrainment of fish.

2. Do not use state-designated exceptional value waters, waterbodies which provide habitat for federally listed threatened or endangered species, or waterbodies designated as public water supplies, unless appropriate Federal, state, and/or local permitting agencies grant written permission.

3. Maintain adequate flow rates to protect aquatic life, provide for all waterbody uses, and provide for downstream withdrawals of water by existing users.

4. Locate hydrostatic test manifolds outside wetlands and riparian areas to the maximum extent practicable.

D. Discharge Location, Method, and Rate

1. Regulate discharge rate, use energy dissipation device(s), and install sediment barriers, as necessary, to prevent erosion, streambed scour, suspension of sediments, or excessive streamflow.

2. Do not discharge into state-designated exceptional value waters, waterbodies which provide habitat for federally listed threatened or endangered species, or waterbodies designated as public water supplies, unless appropriate Federal, state, and local permitting agencies grant written permission.

EIR-3

Request:

Provide an updated summary of the status of all federal, state, and local government permits. Include all written correspondence to and from the agency, the agency and individual contacted, the date Broadwater submitted the application (or a timetable for the application's submission), and whether or not Broadwater has received a permit. If the permit has been received, provide a copy of it including all conditions or stipulations attached to the permits received.

Response:

Broadwater has coordinated closely with the specific resource agencies during the development of the requisite applications for the Broadwater project. Table 3-1 provides the status of the applications Broadwater anticipates submitting. All applications have or will be filed with FERC for inclusion in the FERC dockets. Broadwater has not received any permits or authorizations for the project to date.

Table 3-1
Broadwater Permit Status

Permit	Submittal Date	Agency	Primary Contacts
Joint Permit Application: - Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act - Navigable Waters and 401 Water Quality Certification	March 24, 2006	USACE NYSDEC	Russell Smith Mike Visichelli Jeff Gregg
Submerged Lands lease/easement	To be filed by June 2006	NYSOGS	Alan Bauder
SPDES General Permit Application for Stormwater Discharges	March 24, 2006	NYSDEC	Jeff Gregg Al Fuchs
SPDES Industrial Permit Application	March 24, 2006	NYSDEC	Jeff Gregg Al Fuchs
Coastal Zone Consistency Determination	April 4, 2006	NYSDOS	Steve Resler Jeff Zappieri Bridget Sasko
Certificate to Construct and Operate Air Contamination Sources	Anticipated Submittal Date – April 28, 2006	NYSDEC	Leon Sedefian Randy Orr
Hazardous Substances Bulk Storage Permit	Will be submitted pursuant to final design	NYSDEC	Nick Acampora
Petroleum Bulk Storage Permit	Will be submitted pursuant to final design	NYSDEC	Nick Acampora

Agency correspondence is attached.

NEW YORK STATE DEPARTMENT OF STATE
DIVISION of COASTAL RESOURCES
41 STATE STREET
ALBANY, NEW YORK 12231-0001 USA
Phone: (518) 474-6000
FAX: (518) 473-2464

FAX MESSAGE

FAX RECEIVED
APR 12 2005
TIME: 16:17

TO: Sarah Allen

FAX NUMBER: 716-684-0844

FROM: Jeff Zappieri

DATE: 4/12/05

MESSAGE:

Number of sheets (including this cover sheet): 2

The original of this document will be sent by:

[ ] this will be the only form of delivery
[ ] overnight mail
[ ] ordinary mail

STATE OF NEW YORK
DEPARTMENT OF STATE
41 STATE STREET
ALBANY, NY 12231-0001

GEORGE E. PATAKI
GOVERNOR

RANDY A. DANIELS
SECRETARY OF STATE

April 12, 2005

Murray Sondergard
Broadwater Energy
30 West Main Street, Suite 301
Riverhead, NY 11901

Re: F-2005-0252
U.S. Army Corps of Engineers/New York District Permit Application - Broadwater Energy - Conduct sediment sampling Long Island Sound, Towns of Smithtown, Brookhaven, and Riverhead Suffolk County

General Concurrence

Dear Mr. Sondergard:

The Department of State received your Federal Consistency Assessment Form and consistency certification and supporting information for this proposal on March 22, 2005.

The Department of State has determined that this proposal meets the Department's general consistency concurrence criteria. Therefore, further review of the proposed activity by the Department of State, and the Department's concurrence with an individual consistency certification, are not required.

When communicating with us regarding this matter, please contact us at (518) 474-6000 and refer to our file #F-2005-0252.

Sincerely,

Jeff Zappieri
Supervisor of Consistency Review and Analysis
Division of Coastal Resources

sm
cc: COE/New York District - Michael Vissichelli
NYS DEC Region 1- John Pavacic

From: Allen-Mochrie, Sara [SAllen-Mochrie@ene.com]
Sent: Tuesday, April 12, 2005 3:30 PM
To: Sandra Barnett
Cc: Donnelly, Mike; Kane, Michael; Weaver, Laurie
Subject: Approval from DOS - Jeff Zappieri

Importance: High

<<DOS Approval of Sampling 4_12_05.pdf>>

Sandra,

After a phone call to Jeff Zappieri today at DOS explaining the need for this approval in order for us to begin the sampling effort on April 15, he called back right away and apologized for not getting back to us sooner. He in turn immediately faxed the approval which I have attached.

He also called to ensure we received his fax and indicated that he had no additional comments to the current sampling plan other than what NYSDEC had already provided.

Contact me if you have any questions.

Thanks,
Sara

Sara L. Allen-Mochrie
Senior Biologist
Ecology & Environment, Inc.
368 Pleasantview Drive
Lancaster, NY 14086
(716) 684-8060 *work*
(716) 684-0844 *fax*
(716) 984-0349 *cell*
sallen-mochrie@ene.com

From: Kane, Michael [MKane@ene.com]
Sent: Tuesday, August 02, 2005 10:54 AM
To: Sandra Barnett; Alessi, Robert J.
Cc: Donnelly, Mike
Subject: FW: Feedback from Visual Meeting

How is your availability for Wed 8/31? We discussed potential subject area agenda topics to include air quality and water quality - however doing it this way potentially may require additional resource areas experts (i.e. Bruce Wattle and Sara Allen) attend. They definitely can be present and make technical presentations in these areas, if that's appropriate.

Please get back to me with your thoughts.

Thanks, Mike

-----Original Message-----
From: Jeffrey Zappieri [mailto:JZAPPIER@dos.state.ny.us]
Sent: Tuesday, August 02, 2005 12:27 PM
To: Kane, Michael
Subject: Re: Feedback from Visual Meeting

Mike
All 3 days work for us as of now. Steve is available only unil 3 on Tuesday; otherwise everything's open. Let's firm up as soon as possible. Thanks.
Jeff

>>> "Kane, Michael" <MKane@ene.com> 8/2/2005 11:21:08 AM >>>
Jeff/Bridget-

Good morning. Thanks again for coordinating the meeting Broadwater last week. Overall, I thought it was very productive and will help to improve the visual assessment for the project. At the meeting we discussed obtaining DOS' written comments on the visual assessment and I wanted to follow up with a request for those comments. I know how busy things are for you so please advise at your convenience on when we might be able to expect those comments.

Please call me with any additional questions.

Regarding the next Broadwater meeting, how does the week of 8/29 look
-
say Wednesday 8/31? Subject area to be covered in the meeting to come.

Thanks again.

Regards, Mike Kane

Mike Kane
Ecology and Environment, Inc.
368 Pleasantview Drive
Lancaster, New York 14086
716-684-8060
mkane@ene.com

From: Kane, Michael [MKane@ene.com]
Sent: Tuesday, August 02, 2005 9:21 AM
To: jzappier@dos.state.ny.us; Bridget Kennedy
Cc: Donnelly, Mike
Subject: Feedback from Visual Meeting

Jeff/Bridget-

Good morning. Thanks again for coordinating the meeting Broadwater last week. Overall, I thought it was very productive and will help to improve the visual assessment for the project. At the meeting we discussed obtaining DOS' written comments on the visual assessment and I wanted to follow up with a request for those comments. I know how busy things are for you so please advise at your convenience on when we might be able to expect those comments.

Please call me with any additional questions.

Regarding the next Broadwater meeting, how does the week of 8/29 look - say Wednesday 8/31? Subject area to be covered in the meeting to come.

Thanks again.

Regards, Mike Kane

Mike Kane
Ecology and Environment, Inc.
368 Pleasantview Drive
Lancaster, New York 14086
716-684-8060
mkane@ene.com

From: Kane, Michael [MKane@ene.com]
Sent: Monday, February 06, 2006 1:09 PM
To: Kristine Delkus; Sandra Barnett
Cc: Donnelly, Mike
Subject: FW: Proposed agenda for next week's meeting.

From: Kane, Michael
Sent: Monday, February 06, 2006 3:07 PM
To: 'Jeffrey Zappieri'; Bridget Sasko
Cc: Donnelly, Mike
Subject: Proposed agenda for next week's meeting.

Jeff/Bridget:
Thanks again for agreeing to meet with Mike and I to discuss the Broadwater project and, more particularly, the preparation of the coastal zone consistency determination (CZCD) that will be submitted to the Department of State. As you know, Broadwater has requested this meeting to obtain the Department's assistance and clarification in identifying the contents and scope of its coastal zone analysis and to inquire about issues that may be of interest or concern to the Department to ensure that these issues are addressed in Broadwater's CZCD.

In an effort to maximize our time and focus our discussion, we propose the following as a preliminary working agenda for Thursday afternoon's meeting:

- Overview of the LIS CMP policies applicable to the project, as well as confirmation of the LWRPs and HMPs that the Department has identified as relevant to Broadwater's analysis;
- Feedback/guidance regarding Broadwater's assessment of marine uses impacts in Long Island Sound (including identification of any additional data sources that Broadwater is not currently using and/or aware of that DOS believes must be addressed); and
- Feedback/guidance on specific study methodologies that DOS will require of Broadwater for economic impact studies/analyses (e.g. economic impact of project on commercial fisheries, recreation, tourism, etc.).

If there are additional topics that you would like to cover, please let us know.
Thanks and we look forward to the meeting on Thursday.
Mike

From: Kane, Michael [MKane@ene.com]
Sent: Wednesday, March 29, 2006 2:13 PM
To: Jeffrey Zappieri
Cc: Sandra Barnett; Donnelly, Mike
Subject: Response to Your Questions Regarding Broadwater Project

Follow Up Flag: Follow up
Flag Status: Purple

Jeff:
I talked with Sandra Barnett from Broadwater and she advised me that they are uncertain as to exactly when the USCG will be issuing their Broadwater-specific preliminary suitability assessment for the Project. She did say Broadwater expects it relatively soon (1-2 month timeframe) (While I'm fairly certain you have this - Sandra also advised me to inform you that last year the USCG conducted a *preliminary* ports and waterways safety assessment (PAWSA) - see link/info below. The PAWSA was focused sound -wide but Broadwater was a component of the analysis).

Sandra and I agreed that the best course of action to gain a better understanding of the timeline for release of this study and gaining an understanding of how the Project will go forward from this point is to contact Jim Martin at FERC.

On the coastal zone document it is my understanding that it is not likely to be submitted this week but sometime in the near future. It is also my understanding that DOS will be contacted in advance of the submission to notify that it is coming.

Please feel to call me with additional questions.
Thanks,
Mike
Mike Kane
Ecology and Environment, Inc.
368 Pleasantview Drive
Lancaster, New York 14086
716-684-8060
mkane@ene.com

From: Alessi, Robert J. [Ralessi@llgm.com]
Sent: Wednesday, March 29, 2006 11:05 AM
To: Bauder, Alan
Cc: Pohl, Thomas; Sheifer, Charles
Subject: RE: Broadwater Energy LLC
Mr. Bauder, thank you for your prompt and clear email. We will be in further communication with you and your agency on this matter. Bob.

Robert J. Alessi
Partner
LeBoeuf, Lamb, Greene & MacRae LLP
99 Washington Avenue, Suite 2020
Albany, NY 12210
125 West 55th Street (LLG&M NYC Office)
New York, NY 10019-5389
Direct: +1 518 626 9400
General: +1 518 626 9000
Fax: +1 518 626 9010
Mobile: +1 518 469 7075
Robert.Alessi@llgm.com
www.llgm.com

From: Bauder, Alan [mailto:alan.bauder@ogs.state.ny.us]
Sent: Wednesday, March 29, 2006 9:25 AM
To: Alessi, Robert J.
Cc: Pohl, Thomas; Sheifer, Charles
Subject: Broadwater Energy LLC

Dear Mr.. Alessi;

Thank you for forwarding the United States Corp. of Engineers permit application to our attention. We are aware that you will be making an easement application to the Office of General Services in the near future.

Recent legislation requires that the attached three documents be completed and returned to this office prior to any formal contact an not more than 30 days from application.

If you have any questions or concerns, please contact Thomas A Pohl, Esq.. or myself.

Thank you for you attention to this matter.

Alan C. Bauder

Submerged Lands and

Natural Resources Manager

(518) 474-2195

E-Mail Alan.Bauder@ogs.state.ny.us

••

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF:
Regulatory Branch

APR 07 2006

SUBJECT: Application Number 2006-00265-L6 by Broadwater Energy LLC

Broadwater Energy LLC
c/o Robert J. Alessi, Esq.
LeBoeuf, Lamb, Greene & MacRae LLP
99 Washington Avenue, Suite 2020
Albany, NY 12210-2820

Dear Sir/Madam:

The New York District of the U.S. Army Corps of Engineers (USACE) has received your application for a Department of the Army permit pursuant to:

[X] Section 10 of the Rivers and Harbors Act of 1899

[X] Section 404 of the Clean Water Act

[ ] Section 103 of the Marine Protection, Research & Sanctuaries Act of 1972.

USACE is reviewing your application to determine its completeness and will notify you should we need additional information. Please use the above referenced application number when requesting information concerning your application. This number will be used on any further correspondence.

You are advised not to undertake any activity in connection with the proposed work in waters of the United States until the required Department of the Army authorization has been obtained.

If you should have any questions in regards to your application please contact Russell Smith of my staff at (917) 790-8519.

Sincerely,

Michael G. Vissichelli
Chief, Eastern Permits Section

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

APR 14 2006

REPLY TO
ATTENTION OF:
Regulatory Branch

SUBJECT: Application No. 2006-00265-L6 by Broadwater Energy LLC

Broadwater Energy LLC
c/o LeBoeuf, Lamb, Greene & MacRae LLP
ATTN: Robert J. Alessi, Esq.
99 Washington Avenue, Suite 2020
Albany, NY 12210-2820

Dear Sir/Madam:

The New York District of the U.S. Army Corps of Engineers (USACE) has received Broadwater Energy LLC's (Broadwater) application for a Department of the Army permit requesting authorization to construct an offshore liquefied natural gas (LNG) terminal, and associated facilities which include a yoke mooring system, and a 30-inch, 22-mile subsea lateral product delivery pipeline with service connection to an existing pipeline (Iroquois Gas Transmission System Pipeline). The proposed project will be located within the New York waters of the Long Island Sound, running from the Town of Riverhead, Suffolk County, New York, to Smithtown, Suffolk County, New York.

The proposed project is regulated by the Department of the Army pursuant to Section 10 of the Rivers and Harbors Act of 1899, and Section 404 of the Clean Water Act, and will be processed by USACE as an Individual Permit. Before USACE can publish a Public Notice for Broadwater's proposal, it will be necessary for you to submit the following additional information pursuant to Title 33 of the Code of Federal Regulations, Part 325.1(d);

- A detailed clear reproducible 8 1/2" by 11" site location map, in black and white, depicting the overall area where the proposed project will be located. A sample map is provided for your reference.

- A detailed clear reproducible 8 1/2" by 11" site location map, in black and white, depicting a more localized view of the actual area the project will be located. A sample map is provided for your reference.

- A location map showing distance from towns or prominent landmarks (Connecticut and New York) along the length of the proposed project area.

- Sequential project plans, with match lines, depicting the mooring yoke system, FSRU, and pipeline. Plans must be on 8 1/2"

by 11" paper, free of any color gradation, and legible so as to be easily reproducible. Please be sure to include page numbers.

• Detailed drawings of the FSRU with overall footprint size (square feet).

• Detailed drawings of the mooring yoke system and scour protection. Please include the footprint size in square feet, and the cubic yards of anticipated fill.

• A plan detail of the pipeline plow.

• Plans depicting trench profile, pipeline, and backfill proposed. Two sample drawings are provided herein.

• When cross-section plans are provided, please provide the approximate locations along the length of the pipeline that are being represented.

• Please be sure to include mean low water (MLW) line on drawings. All depths should be measured from MLW.

• If there are to be any new in-water structures constructed at the landward support locations, please provide plans detailing any proposed work in wetlands or waterways. Plans, if applicable, should include all the information referenced on pages 24 to 25 of the attached applicant information guide.

• Provide the names and addresses of the adjacent property owners at the landward support locations for inclusion on the Public Notice mailing list.

• Provide the names and addresses of any riparian landowners along the length of the proposed activity.

• Please provide latitude and longitude coordinates at various locations along the pipeline.

• Provide an anticipated schedule (time frame) for each stage of the construction, and the anticipated start-up date, and

• A list of all the federal, state, and local authorizations required for your proposed activity, and

• A copy of your Water Quality Certification (WQC) issued by the New York State Department of Environmental Conservation (NYSDEC). If you have not yet received a WQC from the NYSDEC, please provide this office with a copy of the WQC upon receipt.

Lastly, please be advised that USACE has received requests from the Federal Energy Regulatory Commission (the lead agency), and Ecology and Environment, Inc., (the project's environmental

consultant) for a status update meeting. While USACE is in agreement that such a meeting would be beneficial, it is recommended that the applicant provide USACE with the above requested additional information prior to such a meeting to help assure the most productive use of time for all involved.

Please use the above referenced application number when requesting information concerning your application. This number will be used on any further correspondence.

If you should have any questions in regards to your application, please contact Russell Smith of my staff at (917) 790-8519.

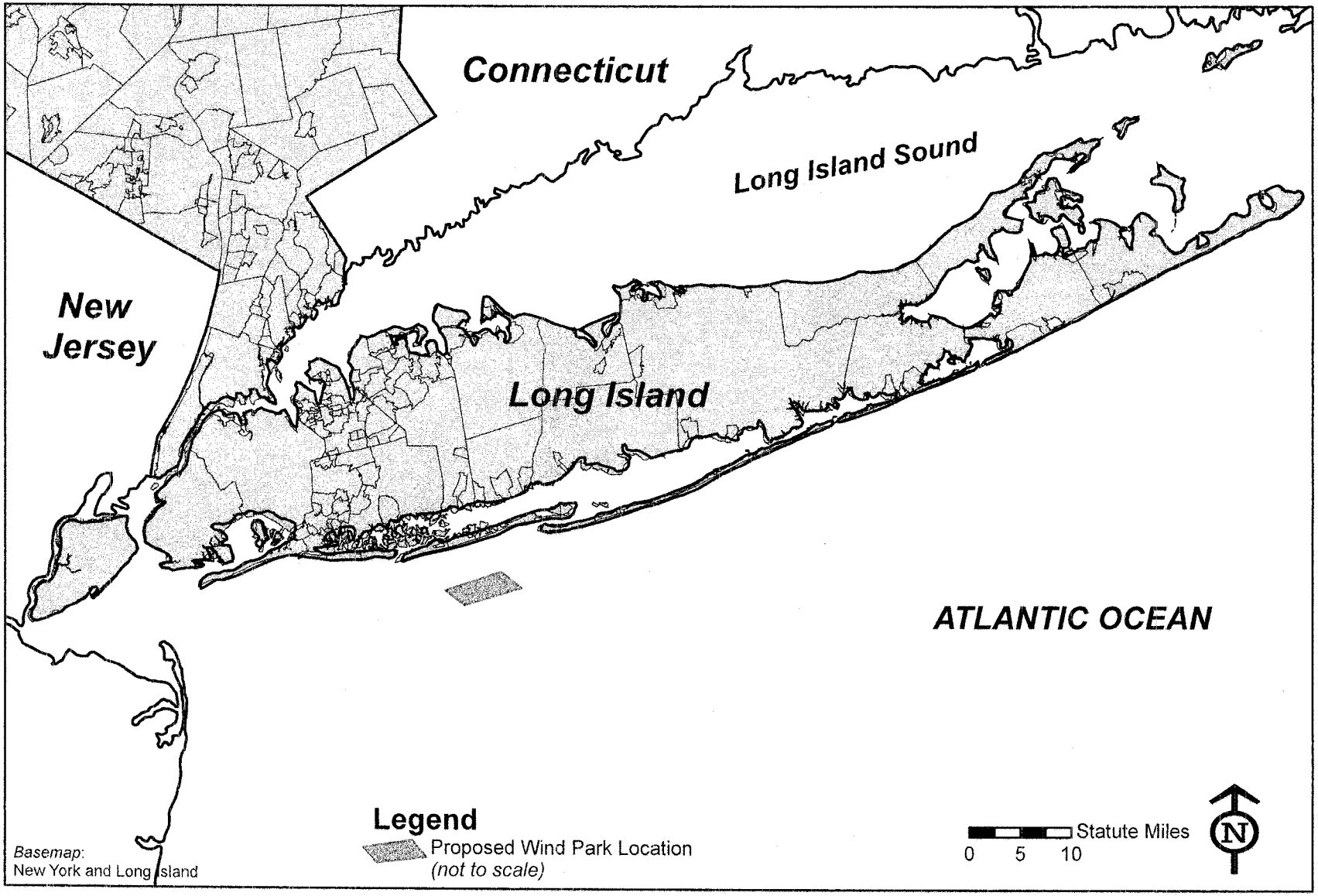
Sincerely,

Michael G. Vissichelli
Chief, Eastern Permits Section

Enclosures

cf: Ecology and Environment, Inc.
ATTN: Michael L. Donnelly
Buffalo Corporate Center
368 Pleasant View Drive
Lancaster, NY 14086

Federal Energy Regulatory Commission
ATTN: Jim Martin
Office of Energy Projects
888 First Street, N.E.
Washington, D.C. 20426



Purpose: Wind Park and Interconnection Cables	**SITE LOCATION MAP**	Location: S. of Jones Beach Island, NY Water Body: Atlantic Ocean
Prepared by: ENSR International Date: 4/13/05	**LONG ISLAND OFFSHORE WIND PARK**	**Sheet 1 of 28**
USACE Application No: 2005-00365	Applicant: Long Island Offshore Wind Park, LLC and Long Island Power Authority	Drawing No. 1

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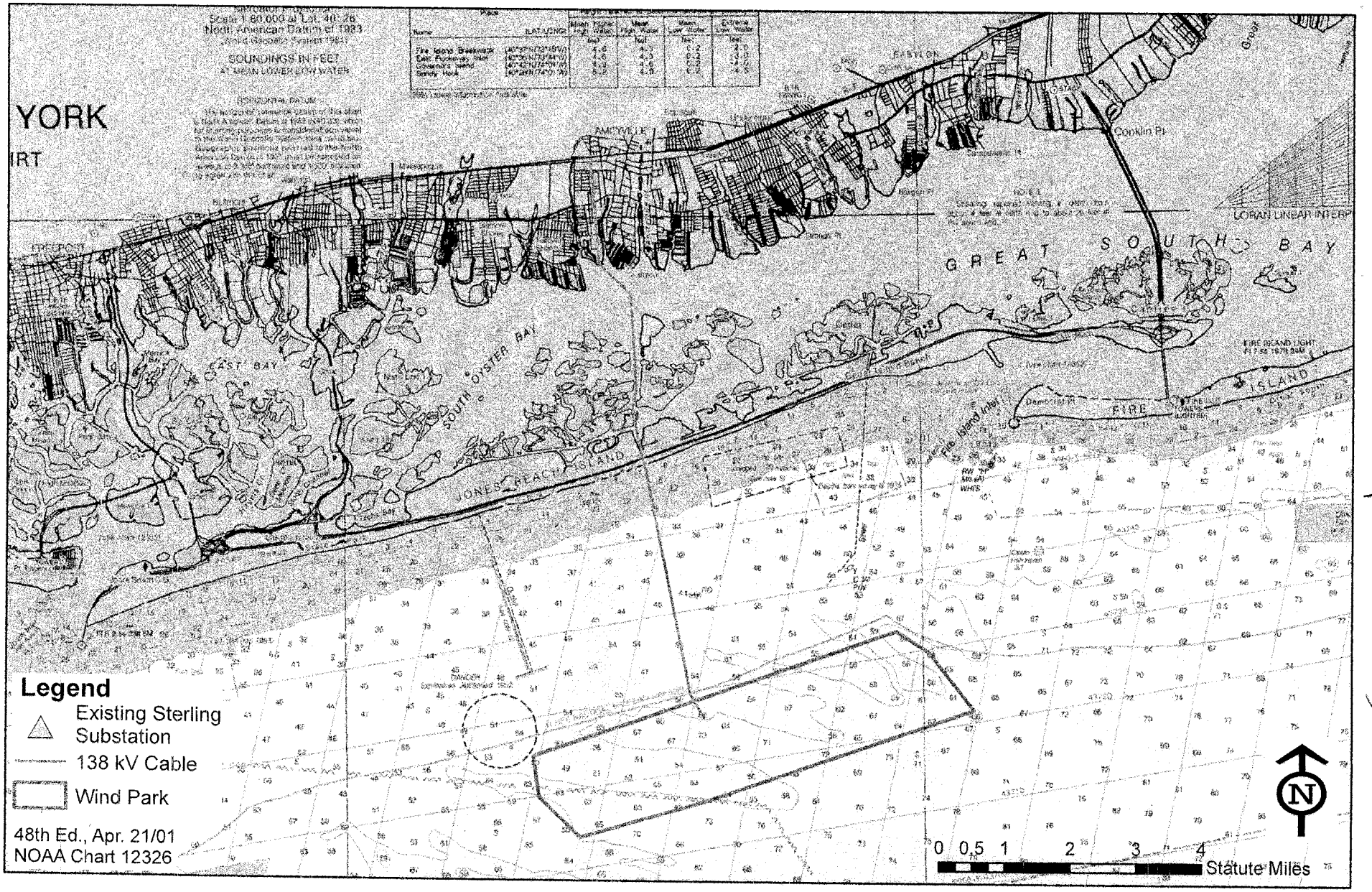
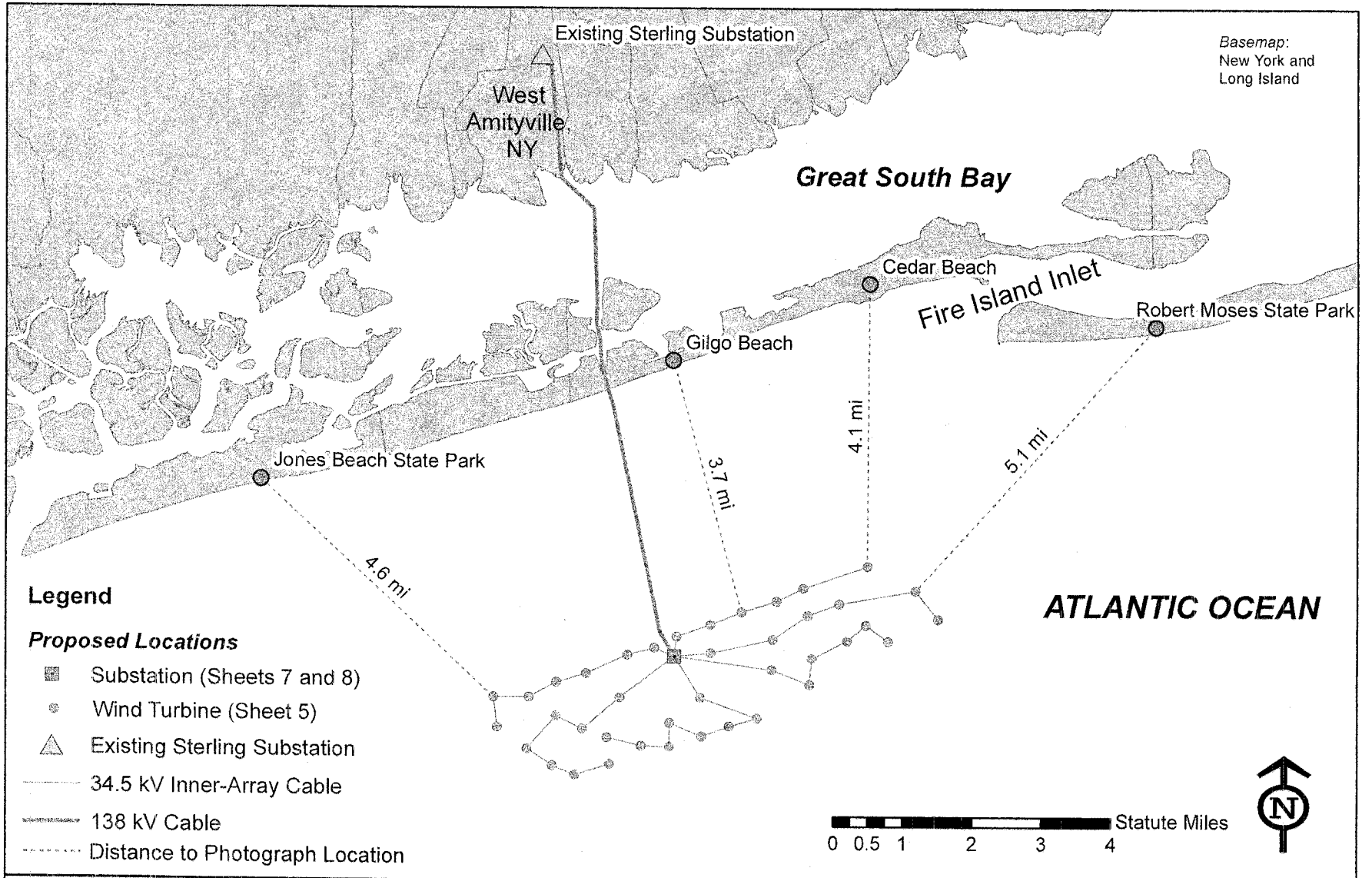
Sample Drawing



Sample Drawing

Purpose: Wind Park and Interconnection Cables	**WIND PARK AREA AND CABLE ROUTE** **Nautical Chart** **LONG ISLAND OFFSHORE WIND PARK**	Location: S. of Jones Beach Island, NY Water Body: Atlantic Ocean
Prepared by: ENSR International Date: 4/13/05		**Sheet 4 of 28**
USACE Application No: 2005-00365	Applicant: Long Island Offshore Wind Park, LLC and Long Island Power Authority	Drawing No. 4

BV005829

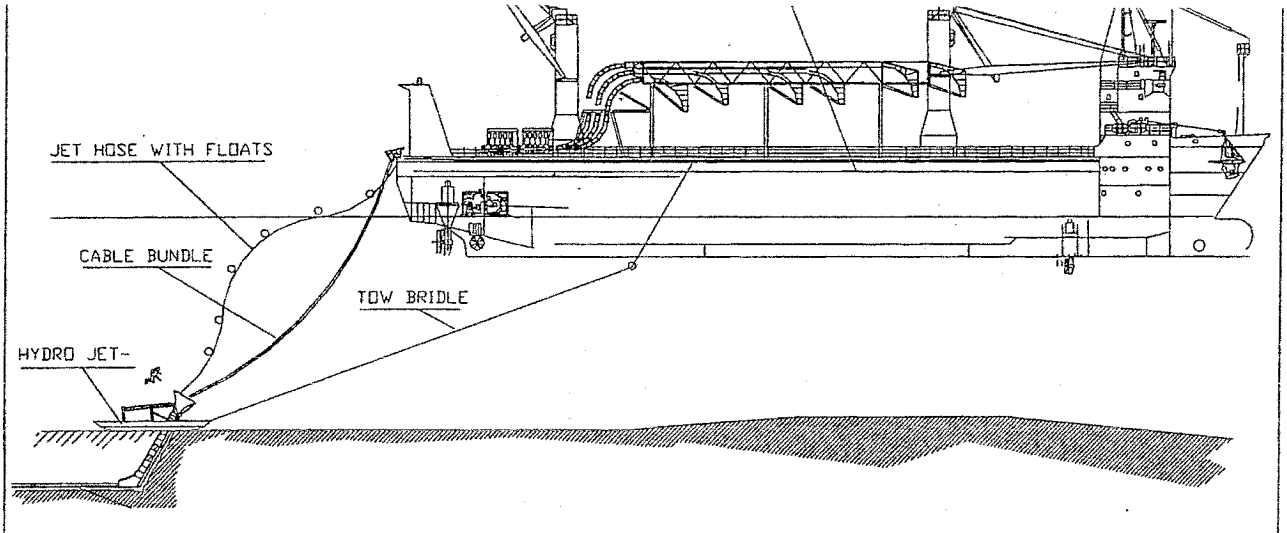


Purpose: Wind Park and Interconnection Cables	**KEY MAP LOCATIONS FOR PHOTOGRAPHS**	Location: S. of Jones Beach Island, NY Water Body: Atlantic Ocean
Prepared by: ENSR International Date: 4/22/05	**LONG ISLAND OFFSHORE WIND PARK**	**Sheet 12 of 28**
USACE Application No: 2005-00365	Applicant: Long Island Offshore Wind Park, LLC and Long Island Power Authority	Drawing No. 12

J:\Water\ProjectFiles\P100\10056_FPL\004_LIWind\WindParkLoc_042205_sheet12.mxd

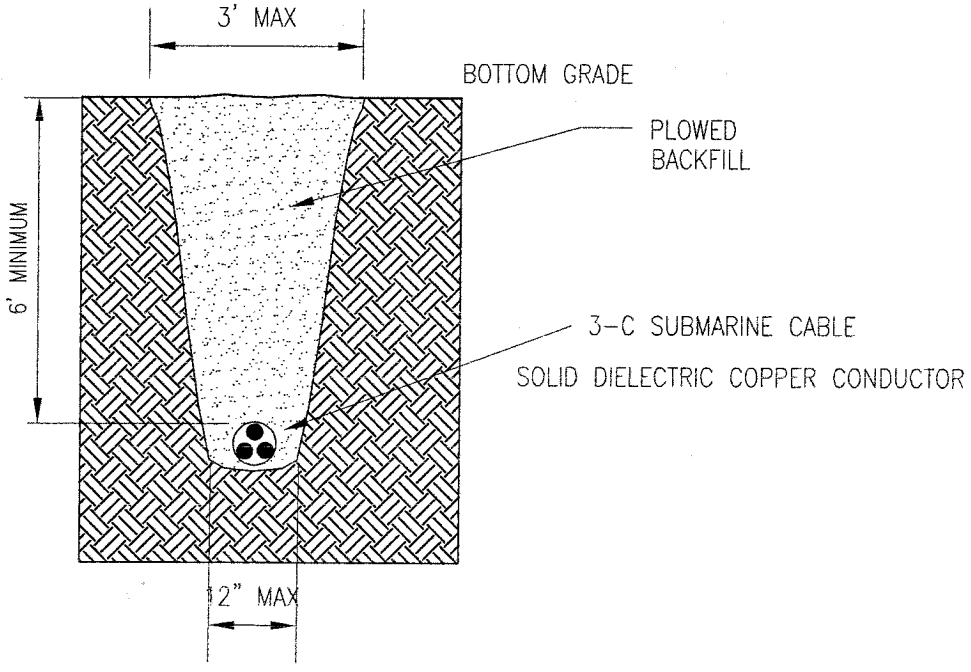
Sample Drawing

Sample Drawing



Purpose: WIND PARK AND INTERCONNECTION CABLES	JET PLOW EMBEDMENT OF SUBMARINE CABLES	**Location:** North & South of Jones Beach Island,NY **Water Body:** Atlantic Ocean & Great South Bay
Prepared by: Long Island Offshore Wind Park, LLC **Date:** 5/13/05	**LONG ISLAND OFFSHORE WIND PARK**	**Sheet 10 of 28**
USACE Application No: 2005-00365	**Applicant:** Long Island Offshore Wind Park, LLC and Long Island Power Authority	**Drawing No.**

Sample Drawing



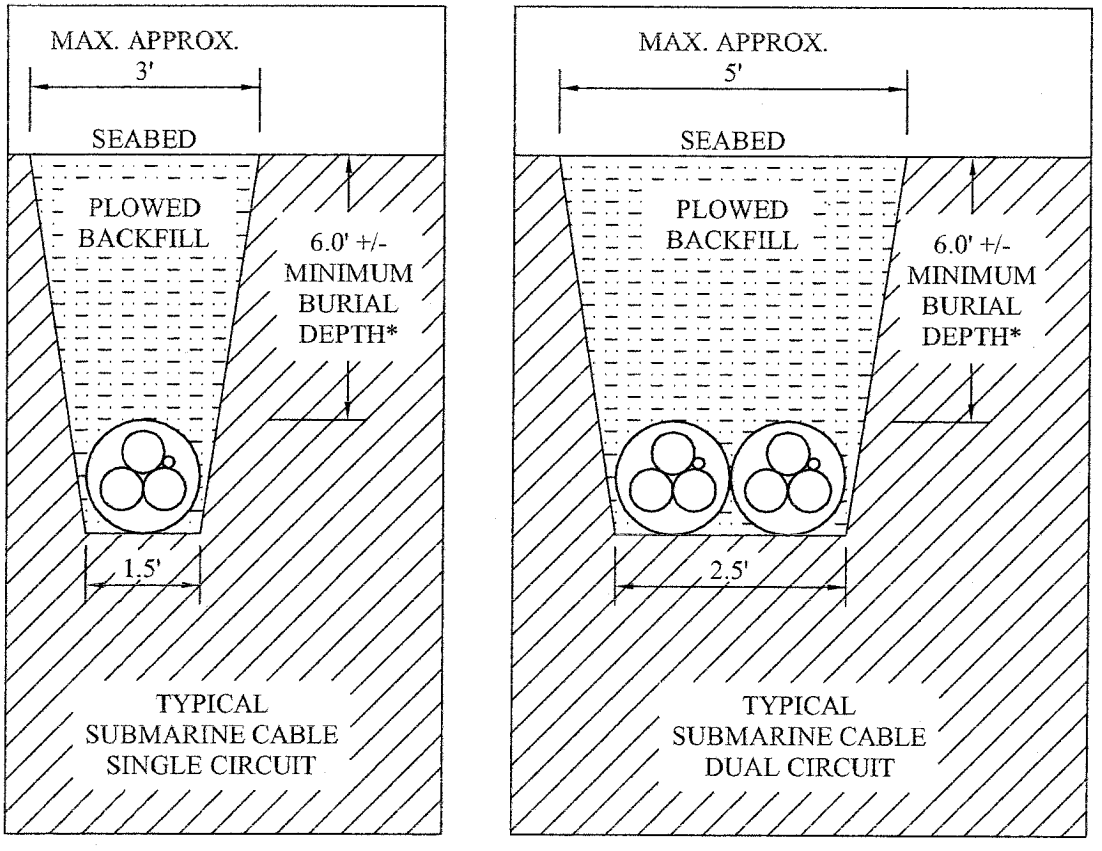
JET PLOW EMBEDMENT

CROSS SECTION DIRECT BURIED SUBMARINE CABLE

138KV TRANSMISSION CABLE FROM OFF SHORE SUBSTATION TO CLOCKS BLVD.

Purpose: WIND PARK AND INTERCONNECTION CABLES	138kV SUBMARINE TRANSMISSION CABLE OFFSHORE SUBSTATION TO CLOCKS BLVD.	**Location:** S. of Jones Beach Island, NY **Water Body:** Atlantic Ocean & Great South Bay
Prepared by: Long Island Offshore Wind Park, LLC **Date:** 4/25/05	**LONG ISLAND OFFSHORE WIND PARK**	**Sheet 22 of 28**
USACE Application No: 2005-00365	**Applicant:** Long Island Offshore Wind Park, LLC and Long Island Power Authority	**Drawing No.**

Sample Drawing



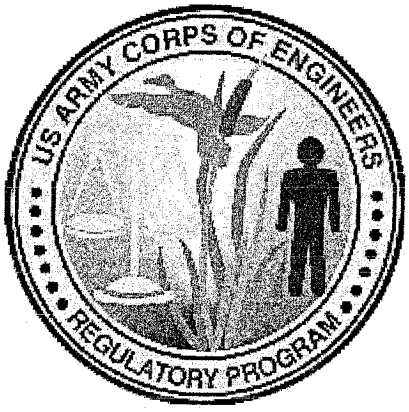
* Depth is reduced as required near terminal points.

NOT TO SCALE

Purpose: Wind Park and Interconnection Cables	COLLECTION SYSTEM 34.5 kV CABLE TYPICAL CROSS SECTIONS FOR JET PLOW EMBEDMENT IN ATLANTIC OCEAN	**Location:** S. of Jones Beach Island, NY **Water Body:** Atlantic Ocean
Prepared by: Long Island Offshore Wind Park, LLC **Date:** 4/11/05	**LONG ISLAND OFFSHORE WIND PARK**	**Sheet 9 of 28**
USACE Application No: 2005-00365	**Applicant:** Long Island Offshore Wind Park, LLC and Long Island Power Authority	**Drawing No. 0591-005**

REGULATORY PROGRAM

APPLICANT INFORMATION GUIDE



US Army Corps of Engineers ®

NEW YORK DISTRICT

July 2005

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

Regulatory Branch

February 2, 2006
Via FAX

Ms. Sandra Barnett, Environmental Affairs Manager
Broadwater Energy
777 Walker Street, 22nd Floor
Houston, TX 77002

Dear Ms. Barnett:

Today we learned from our counterparts in the Federal Energy Regulatory Commission (FERC) that you recently submitted the formal application to them for Broadwater's proposal to establish a Liquefied Natural Gas (LNG) terminal and construct a pipeline in the middle of Long Island Sound in an effort to meet local market demands for natural gas.

During our April 13, 2005 pre-application meeting on the same project, I explained that Broadwater must work with us, in parallel with FERC, the lead federal agency, and file an application with us as early as possible to initiate the processing of a permit application for your proposed project pursuant to 33 CFR 325.1 and 325.2 which details our permit processing procedures.

Enclosed please find another copy of the above-cited regulations and the necessary forms, including example drawings, for filing a complete permit application with us. It is imperative that you file an application with this office immediately so that we may process your application concurrently with FERC application process, including our use of FERC-developed NEPA documents. Delay in submitting your application will not allow for joint coordination of USACE and FERC's regulatory processes that will lead to significant delays in the processing of your application.

If you should have any questions regarding this correspondence, please contact Mike Vissichelli at 917-790-8520.

Sincerely,

Richard L. Tomer

Richard L. Tomer
Chief, Regulatory Branch

Enclosures

Copy furnished
Federal Energy Regulatory Commission (FERC)

New York State Department of Environmental Conservation
Division of Air Resources
Bureau of Stationary Sources, 2rd Floor
625 Broadway, Albany, New York 12233-3254
Phone: (518) 402-8403 • **FAX:** (518) 402-9035
Website: www.dec.state.ny.us

Denise M. Sheehan
Acting Comm

April 11, 2006

Mr. Bruce Wattle, C.C.M.
Ecology and Environment, Inc.
Buffalo Corporate Center
368 Pleasant View Drive
Lancaster, NY 14086

Dear Mr. Wattle,

We continue to review the Revised, January 2006 Air Quality and Visible Plume Analysis Modeling Protocol for the Broadwater LNG Project, but will not finalized our review and approval until the information requested by EPA in their March 9, 2006 letter to Broadwater is satisfied and EPA makes a determination on the sources which are to be included in the PSD applicability and the associated modeling assessments. However, we want to provide additional recommendations on the proposed methodologies and request further information on the proposed meteorological data which are independent of EPA's determination and which will further our review process. The January, 2006 protocol has incorporated most of our November 7, 2005 comments and has proposed some revised procedures and data sets for use in the analysis and our comments mainly reflect these changes:

1) In section 3.1.3, mention is made of startup and shutdown conditions for the turbines and heaters. The pollutant emissions from these conditions which are different from normal operation emissions should be described and modeled to assure compliance with ambient standards.

2) Section 3.4 discusses the revised one year of meteorological data base proposed for use from the central sound buoy site. Although the data recovery appears to be substantially better than the previous data base, the origin and quality of the data is not clear. Your 2/16/06 cover letter to the Protocol indicates

that more recent data have been obtained from a on-site data logger, but we need the following details on the data and the instrumentation:

a) description of the sampling rate and averaging times for each parameter.

b) comparison of the instrument specifications and thresholds to those recommended in EPA's On-Site Meteorological Program monitoring guidance document and quality assurance procedures used in collecting the data.

c) contact person from the University of Connecticut who provided the data.

Furthermore, please provide computer files containing the raw data and the proposed data base for modeling and a description of how the raw data was edited to produce the latter file.

3) With EPA's promulgation of AERMOD on 11/9/05, we agree that the "PRIME" algorithm in that model can be used to simulate structure downwash effects in the near-field zone noted in Section 3.5.2. However, we see no basis to use Islip-MacArthur airport meteorological data for this assessment, as proposed in section 3.4.2, instead of the more representative buoy data. The use of the buoy data will also avoid the classification of the land use in AERMOD as urban which is not representative of the project site.

4) In addition to the 2 years of data to be used for the CSVP visible plume analysis, in Section 3.4.3, we would recommend the use of the eventual data base approved for use in the OCD model.

5) The receptor grid for OCD, discussed in Section 3.5.1, should include the 25m lateral interval proposed for AERMOD at the boundary of the security zone. In addition, the receptor grid around the maximum impacts in the 2km Cartesian grid should be resolved to 70m to match DEC's recommended 100m interval on the diagonal of the grids. Receptors should also be placed along the coastline at a more dense spacing (e.g. 500m) and any prominent heights of land should be simulated along or near the coastline.

6) One approach to address concerns about the representativeness of mixing heights generated from interpolated sounding at Brookhaven would be to use mixing heights generated by AERMET for the AERMOD model. The latter incorporated methods which uses onsite data such as wind speed in stable conditions and more refined calculations from the soundings during unstable layer heights.

If you need any clarifications, please let me know.

Sincerely,

Leon Sedefian
Chief, Impact Assessment and Meteorology
Division of Air Resources

cc: P. Galvin
R. Orr
A. Shah, Region 1
J. Gregg, DEP
W Little
A. Coulter, EPA Region II
James Martin/Eric Tomasi, FERC

EIR-4

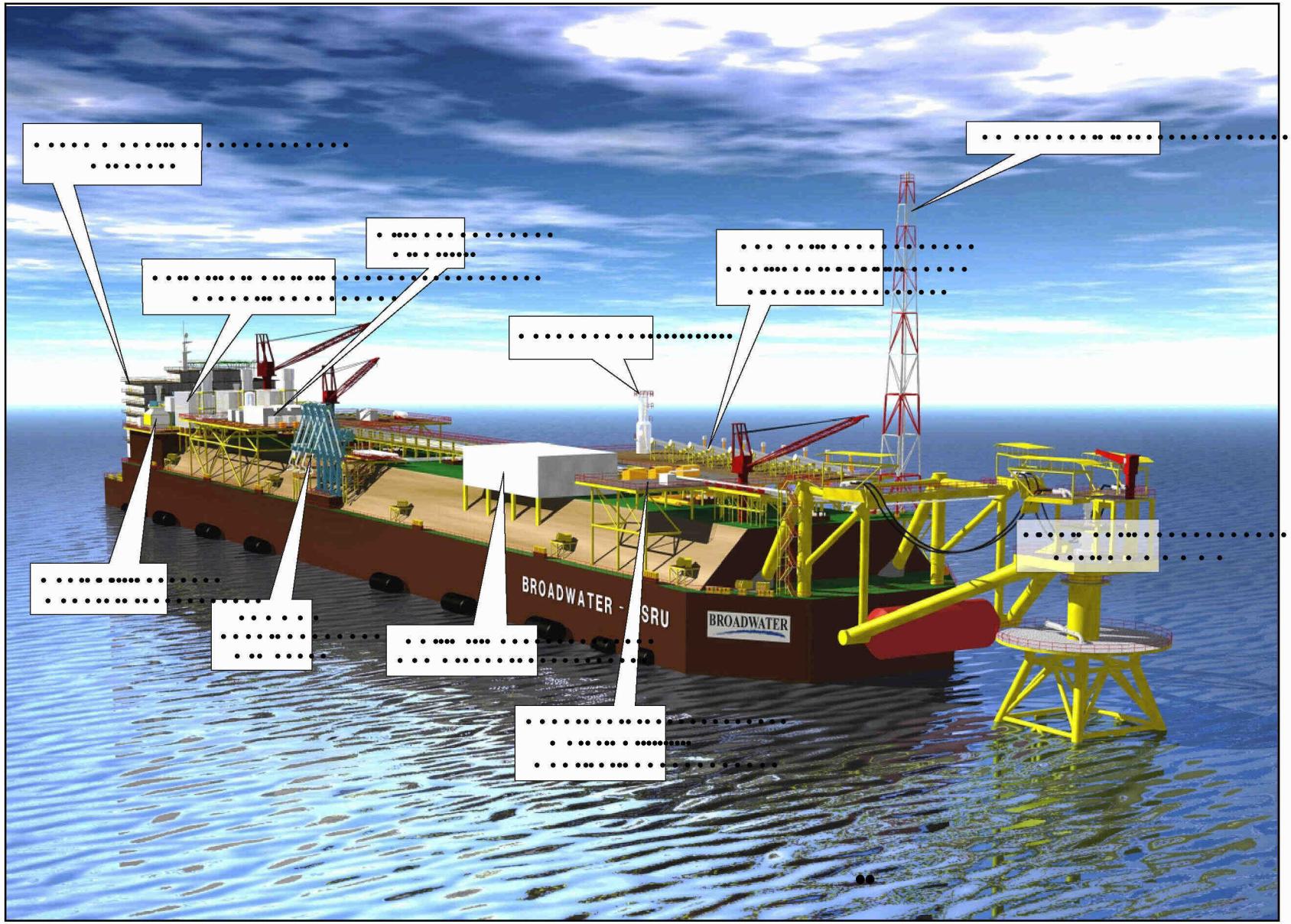
Request:

Revise the following Project-related illustrations from the Resource Reports (or provide the appropriate editable files):

a) RR1, Figure 1-7: Change "Flare to "Emergency Flare;" "HP Pumps" to "Pumps," and "shell and tube" to "Shell-and-Tube"
b) RR1, Figure 1-8a: Spell out "SSSV"
c) RR1, Figure 1-8b: Change "30 In. O.D. Riser" to "30-inch Diameter Riser"
d) RR1, Figure 1-10: Spell out "SSSV" and label the mooring tower
e) RR1, Figure 1-12: Change "IGTS" to "IGTS Pipeline"
f) RR8, Figure 2 (Appendix D): Spell out "WHRU" and clarify the height of the FSRU since the text says 134 feet and the figure indicates 141 feet.
g) RR10, Figure 10-3: Depict the complete Iroquois Gas Transmission System, and correct the illustration of the Columbia Pipeline for the region illustrated. Clarify that MarketLink is part of the Transcontinental (Transco) Pipeline system.
h) RR10, Figures 10-4: Delete the existing pipeline transmission network.
i) RR10, Figures 10-13 through 10-16. Combine illustrations of individual alternative pipeline routes into one graphic.

Response:

Revised Figures are attached. Note: In accordance with the agreements reached between Iroquois Gas Transmission System and Broadwater Energy LLC and Broadwater Pipeline LLC (*see* 04/11/2006 submittal of Supplemental Comments of Iroquois Gas Transmission System, L.P. under CP06-54, et. al.) a second Subsea-Subsurface Safety Valve and associated control umbilical at the base of the mooring tower has been incorporated into the connecting pipeline design. Revised Figures 1-10 and 1-11 reflect this dual SSSV arrangement.



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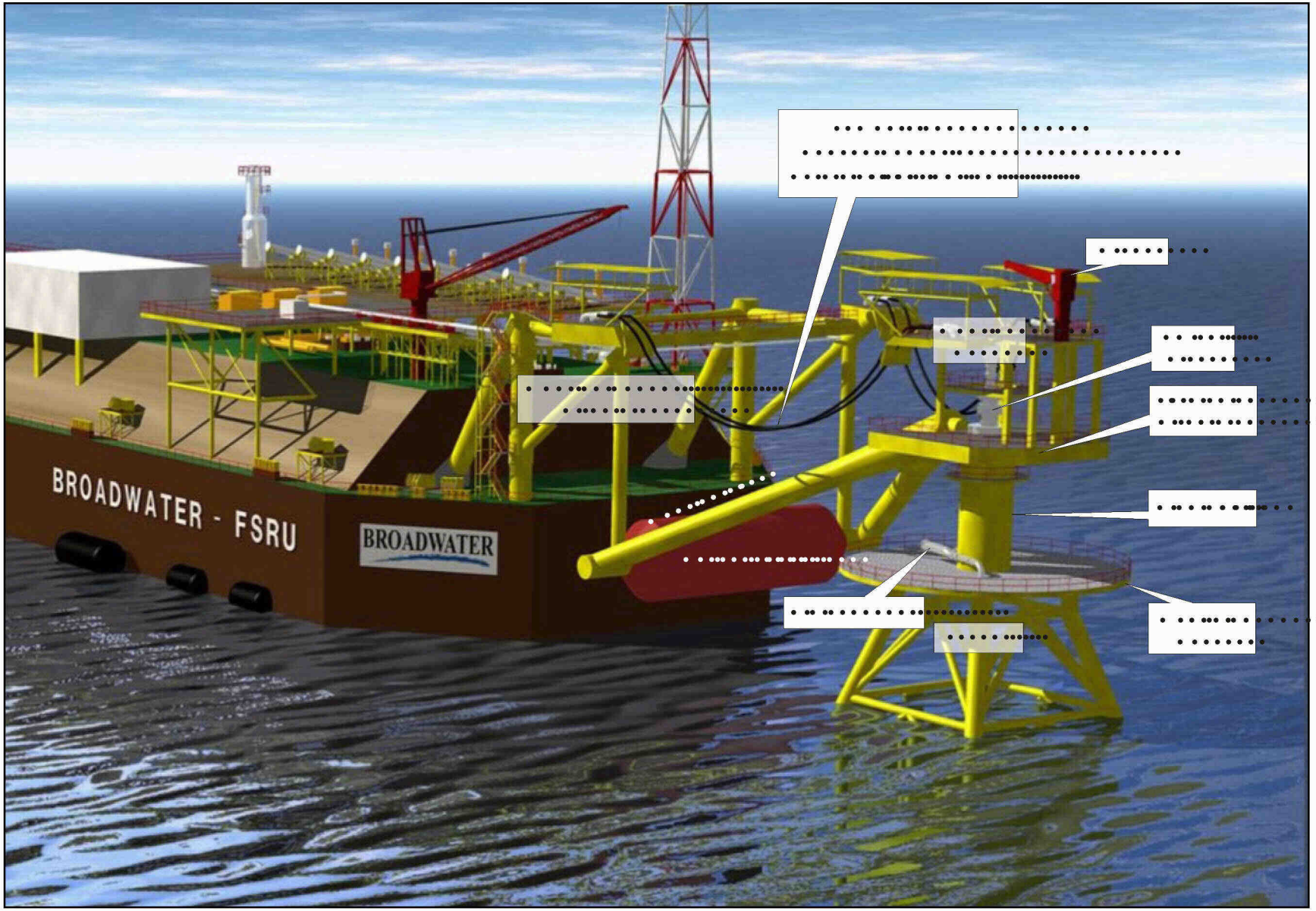

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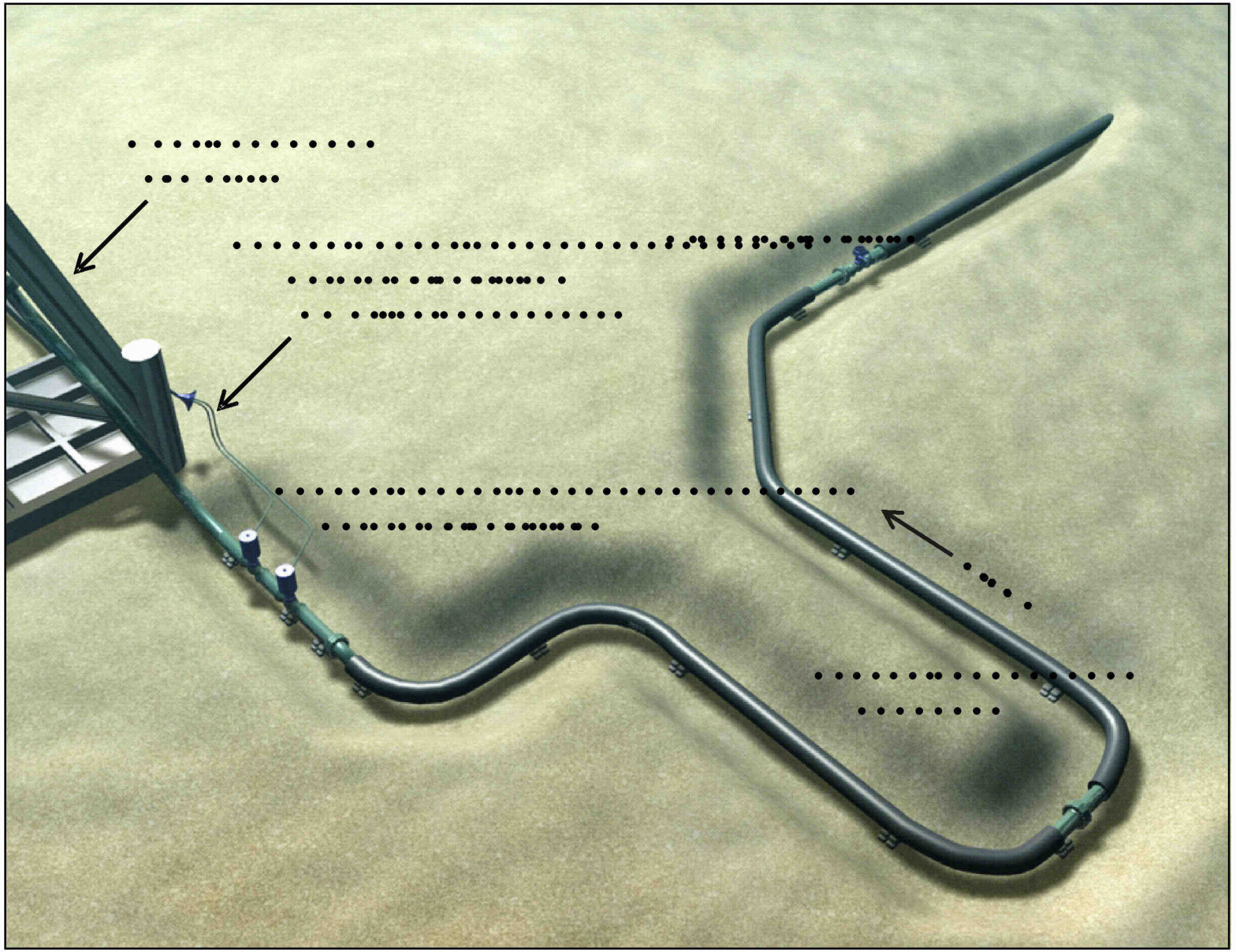

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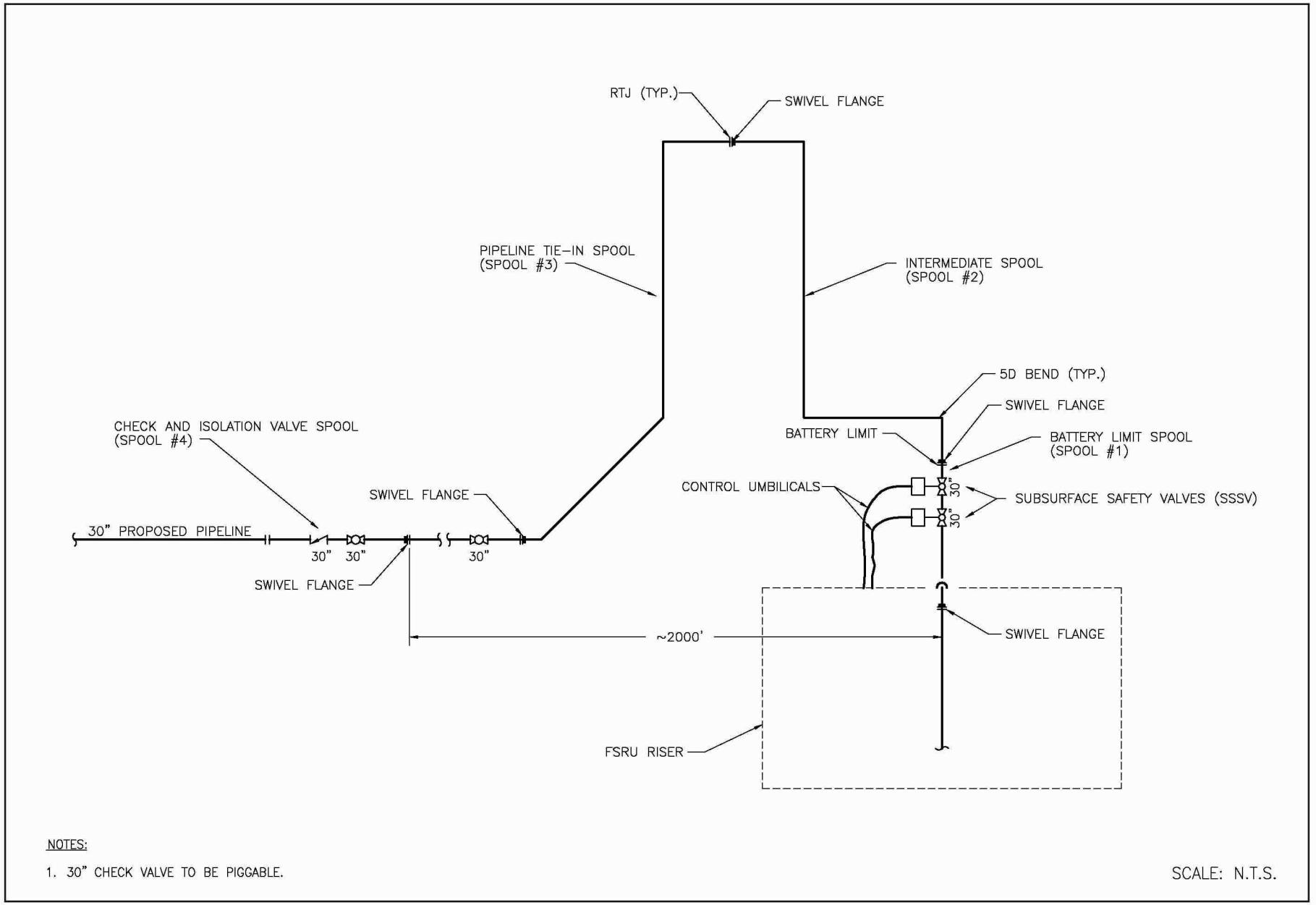
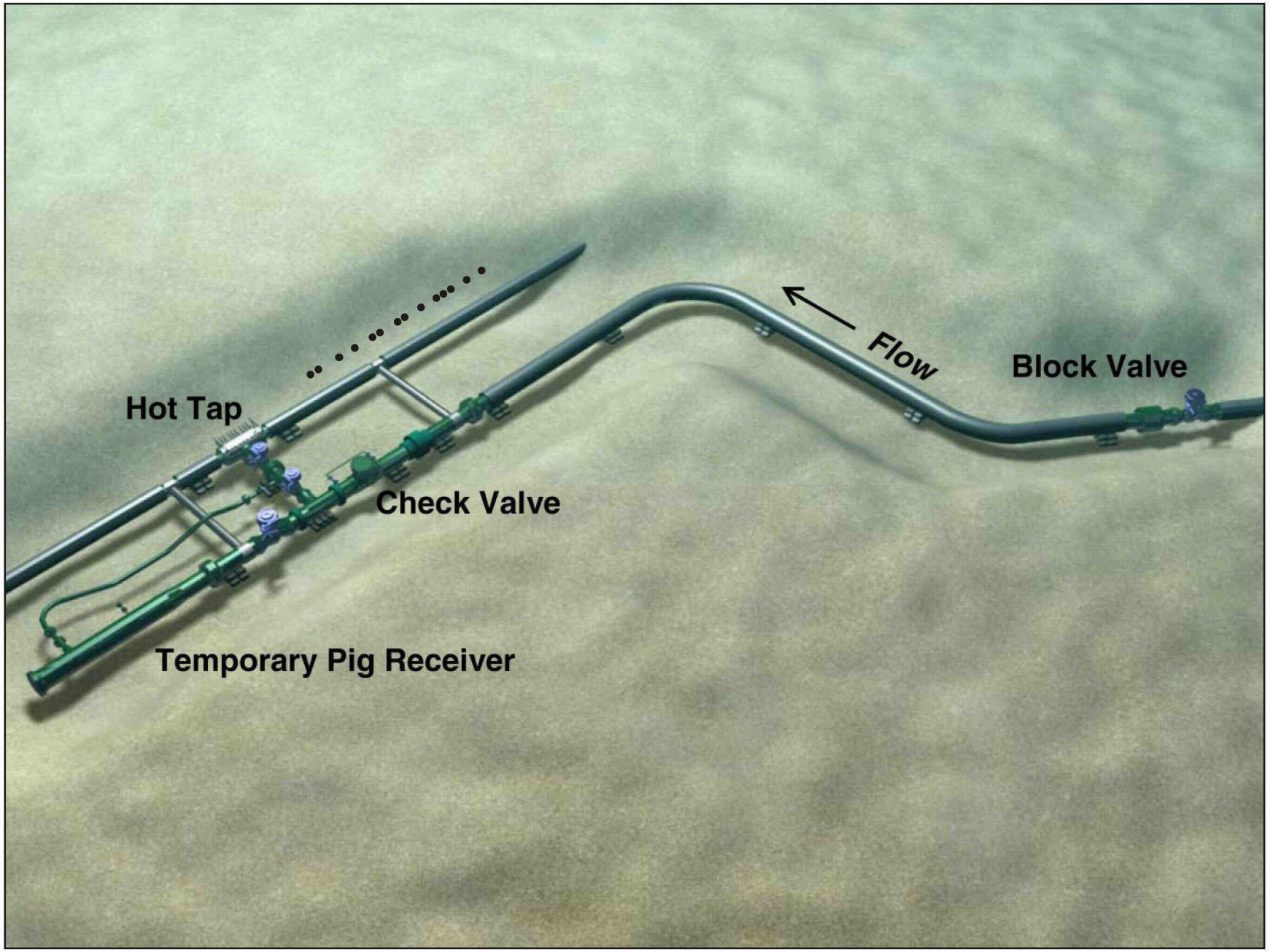
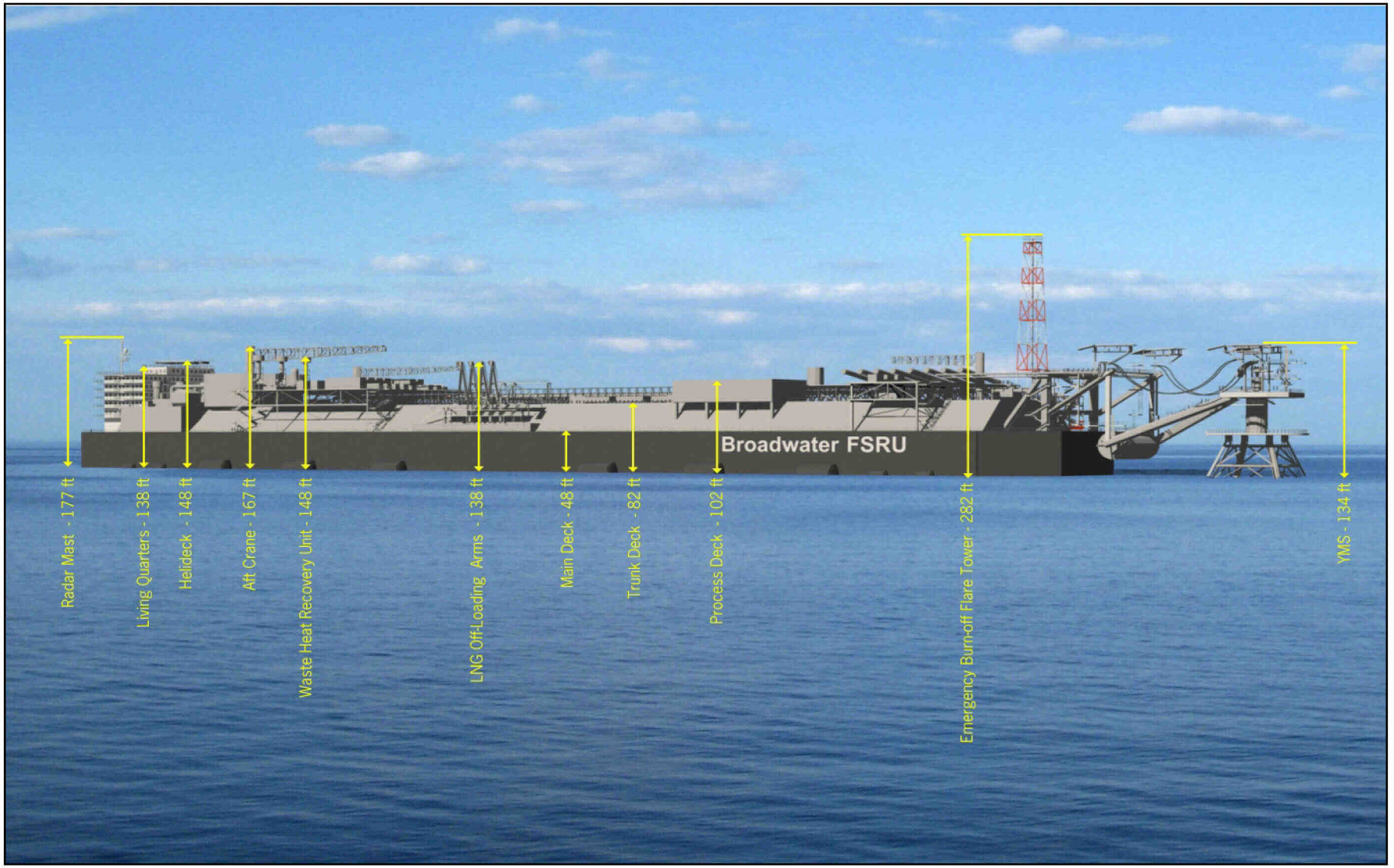


NOTES:

1. 30" CHECK VALVE TO BE PIGGABLE.

SCALE: N.T.S.


Flow
Block Valve
Hot Tap
Check Valve
Temporary Pig Receiver


Broadwater FSRU
Radar Mast - 177 ft
Living Quarters - 138 ft
Helideck - 148 ft
Aft Crane - 167 ft
Waste Heat Recovery Unit - 148 ft
LNG Off-Loading Arms - 138 ft
Main Deck - 48 ft
Trunk Deck - 82 ft
Process Deck - 102 ft
Emergency Burn-off Flare Tower - 282 ft
YMS - 134 ft

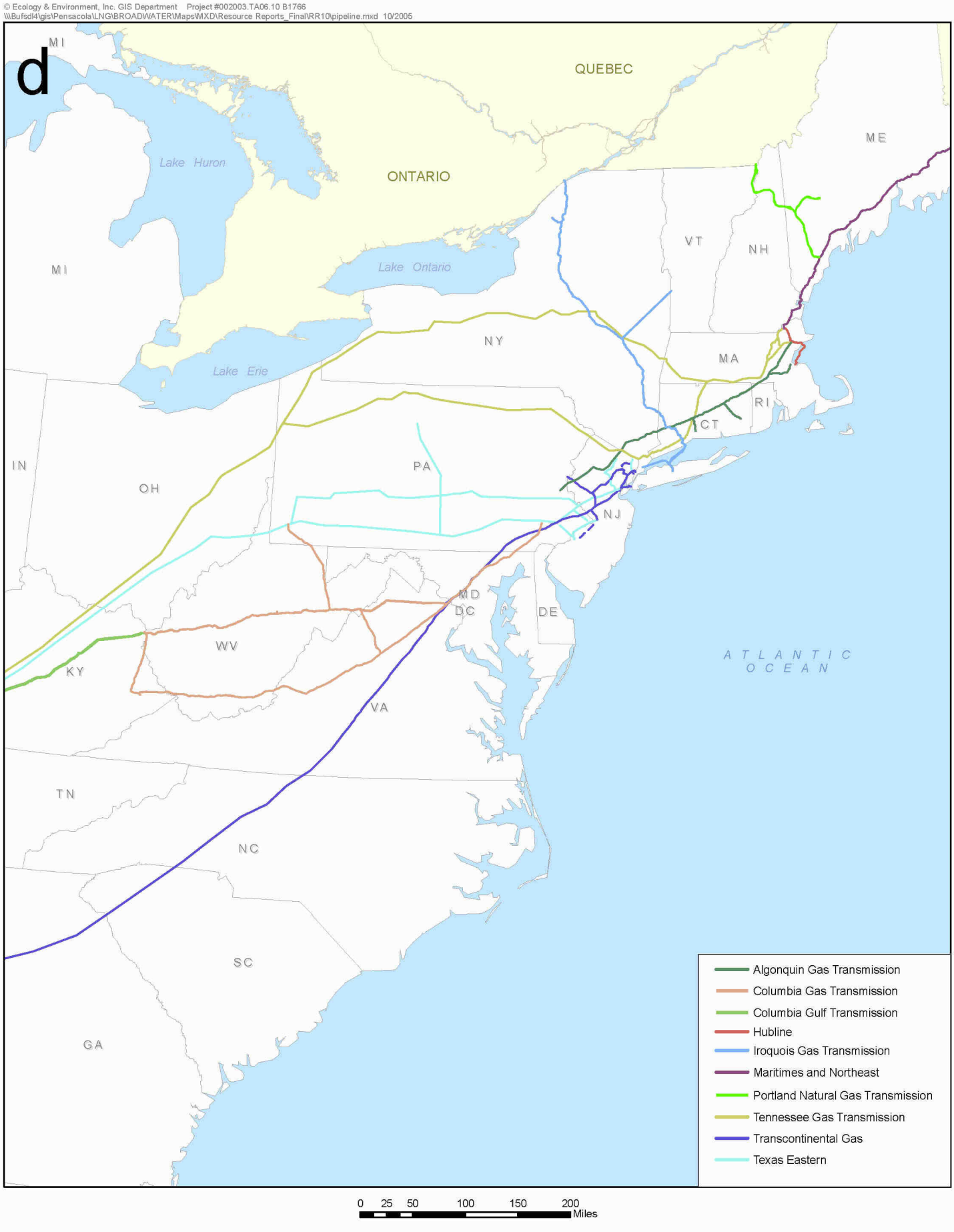


Figure 10-3 Existing Natural Gas Transmission Pipelines Serving the Project Area (Rev 1)

\\Bufsdl4\GIS\Pensacola\LNG\BROADWATER\Maps\MXD\Resource Reports_Final\RR10\millenium_line.mxd 10/31/2005

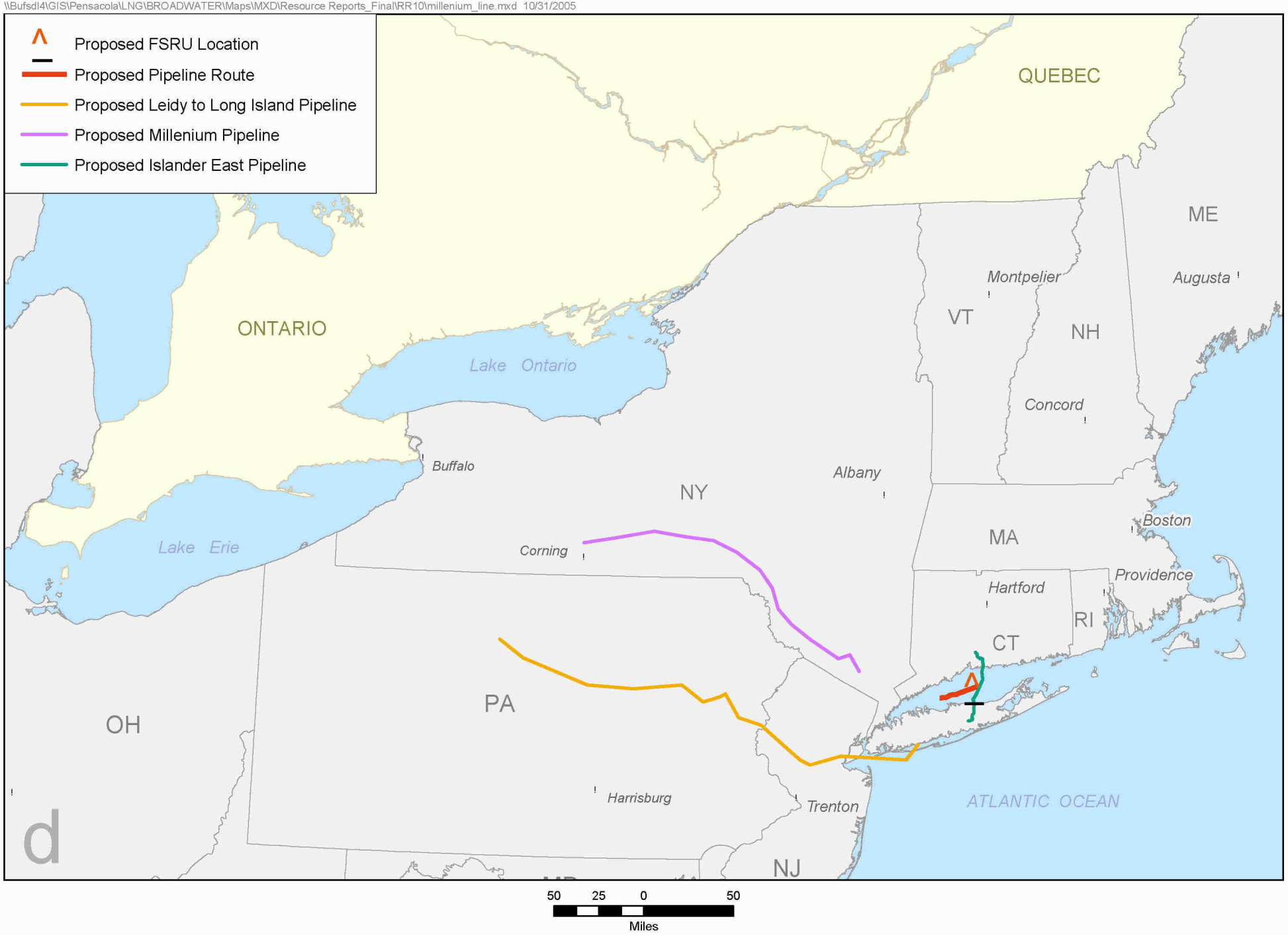
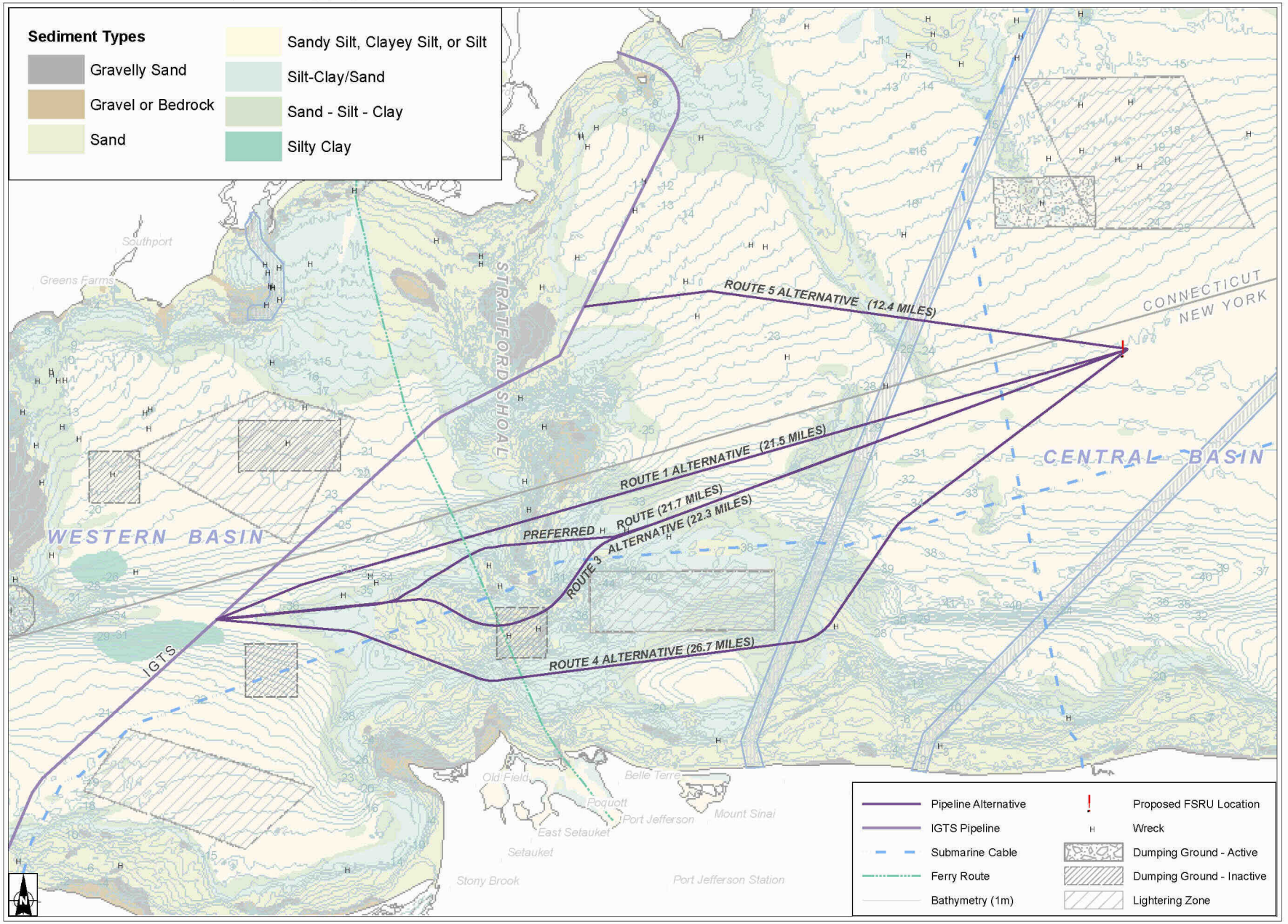


Figure 10-4 Proposed Natural Gas Transmission Pipelines in Relation to the Proposed Broadwater Energy Project Area (Rev 1)



Source: Bathymetry/Sediments, U. S. Geological Survey Open-File Report OFR 00-304, 2000.
Marine Use, NOAA Electronic Nautical Charts 12354 and12363, 2004.

0 2.5 5 10
Miles

Figure 10-13 Alternatives (Rev 1)

EIR-5

Request:

Describe the feasibility of using mid-line buoys on all anchor lines for all construction vessels. Revise Figure 1-14 to accurately represent the proposed use of mid-line buoys on the quarter anchor lines.

Response:

The only pipeline construction vessels that Broadwater anticipates will use anchors for station keeping and/or propulsion are a laybarge, a crane barge, and a Dive Support Vessel (DSV). A conventional anchored lay barge advances by pulling on mooring anchors. A crane barge and DSV typically hold station (but are not propelled) with anchors.

A laybarge will be used for pipe lay and pipeline lowering. For pipe lay operations the laybarge will provide the work platform for the welding and inspection of the pipe joints (40-foot lengths of pipe) to make one continuous pipeline which is laid on the seabed off a "stinger" at the aft end of the lay barge as successive joints of pipe are added. Upon completion of the pipe-laying operation the laybarge will be rigged for pipeline lowering operations. The pipeline will then be lowered below the seabed along its entire length, wherever sediment conditions permit, using one or more passes of a post-lay plow pulled by the laybarge. For most of the pipeline route it is expected that a single pass of the plow will lower the pipeline to the required depth. However, previous experience with the lowering of pipelines of similar (36" O.D. including concrete weight coating) or larger diameter suggests that Broadwater can expect an infrequent reduction in this lowering depth. For this reason Broadwater's pipeline construction plan conservatively contemplates two complete passes of the plow.

In order to reduce the area of impact from laybarge cable sweep during pipe lay and lowering Broadwater, will utilize mid-line buoys on the quarter anchor cables (or lines) of the laybarge. The general arrangement of midline buoys on the quarter anchor lines is depicted in revised Figure 1-14.

In Resource Report 7, Broadwater estimated the impact area from anchor cable sweep for a conventional 8-point mooring laybarge using midline buoys on quarter anchor lines, with 3 anchor sets per mile for 3 passes of the laybarge along the pipeline route (one lay, and two plow).

EIR-5

Basis of revised Figure 1-14

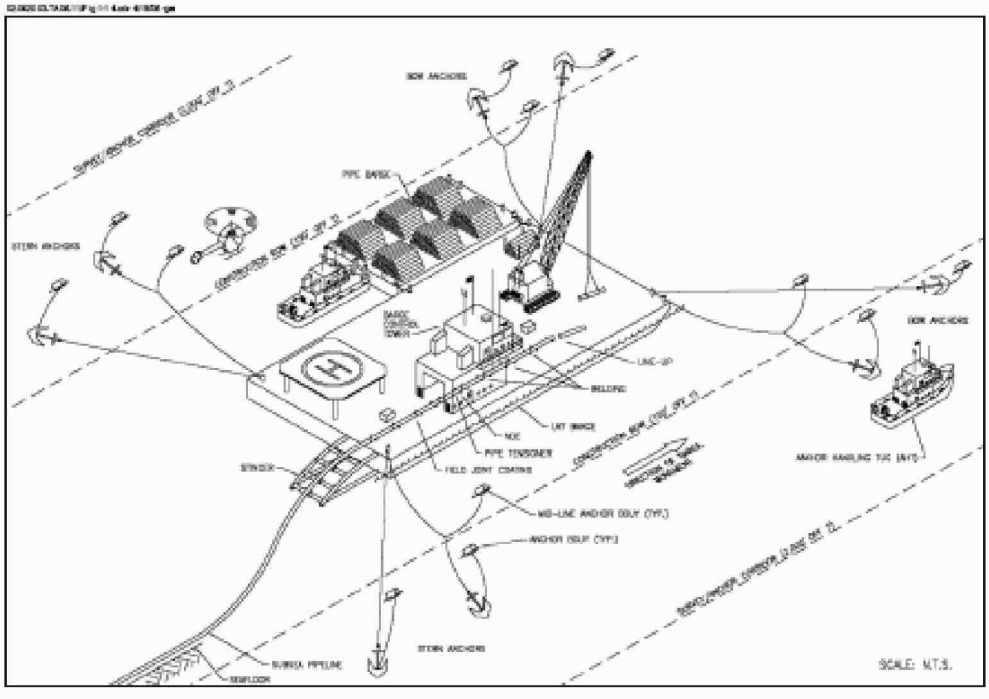


Figure 1-14 Typical Pipeline Lay Barge Spread (Rev 1)

EIR-5

In Resource Report 7, Table 7-2 "Broadwater Pipeline Installation, Summary of Sediment-Related Impacts" the impact area due to anchor cable sweep is estimated at 2,020 acres. As shown in Table EIR5-1, this represents a 70% reduction in the temporary impact on the seabed compared to the conventional scenario of using no mid-line buoys on the quarter anchor lines. However, this reduction comes with a premium as the construction schedule, cost, construction emissions (*see* Table EIR5-2, below), and exposure to safety hazards and downtime risks are increased.

The laybarge bow and stern anchors are oriented more in the direction of travel than the quarter anchors, and their arc of sweep is somewhat less (*see* Figure 1-14A). Utilizing mid-line buoys on these anchor lines would provide for only a further 15% reduction in temporary seabed impact. The premium for this modest reduction in cable sweep acreage is a doubling of the construction schedule, cost, construction emissions, and exposure to safety hazards and downtime risks versus the use of quarter anchor mid-line buoys only. For this reason the use of mid-line buoys on all laybarge anchor lines is not considered feasible for reasons of diminished return and practicality.

Table EIR5-2 Comparison of Pipeline Construction Emissions

Scenario	Emitted Substance (tons)						Increase Compared to No Midline Buoys
	SOx	NOx	PM	CO	VOC	TOTAL	
No Midline Buoys	92	740	32	161	36	1,060	N/A
Midline Buoys on Quarter Anchor Lines	95	761	33	166	36	1,091	3%
Midline Buoys on All Anchor Lines	97	783	34	170	36	1,121	6%

A crane barge will be used to install the mooring tower, and a DSV will be used to install the majority of the various pipeline spools at each end of the pipeline, as well as to support any underwater work or inspection requirements associated with the connecting pipeline and mooring tower. Because these vessels do not use anchors for propulsion, there is only minor disturbance of the seabed due to touchdown of the slack cable during anchor deployment and there is no anchor line sweep impact. Therefore, there is little environmental benefit to be gained by holding the anchor lines of a crane barge or DSV with mid-line buoys. For this reason the use of mid-line buoys on a crane barge or DSV is not proposed.

EIR-5

Table EIR5-1 Comparison of Anchor Cable Sweep Impact Areas

Scenario	Seabed Impact from Pipelay (acres)	Seabed Impact from Lowering (acres)	Total Seabed Impact (acres)	Reduction in Seabed Impact Compared to No Midline Buoys	Comments
No Midline Buoys	3,750	3,060	6,810	N/A	•• Generally accepted standard procedure in Gulf of Mexico and elsewhere
Midline Buoys on Quarter Anchor Lines	950	1,070	2,020	70%	•• Slower pipelay and lowering; schedule extended by 10% (not including mechanical and weather downtime) •• Increased air emissions from construction vessels of approximately 3% •• Increased direct construction cost of $1.7 Million (2005 dollars) •• Increased construction complexity and exposure to safety risks, and mechanical and weather downtime risks
Midline Buoys on All Anchor Lines	359	672	1,031	85%	•• Even slower pipelay and lowering; schedule extended by 20% (not including mechanical and weather downtime) •• Increased air emissions from construction vessels of approximately 6% •• Increased direct construction cost of $3.4 Million (2005 dollars) •• Commensurate increase in construction complexity and exposure to safety risks, and mechanical and weather downtime risks

EIR-5

Basis of New Figure 1-14a

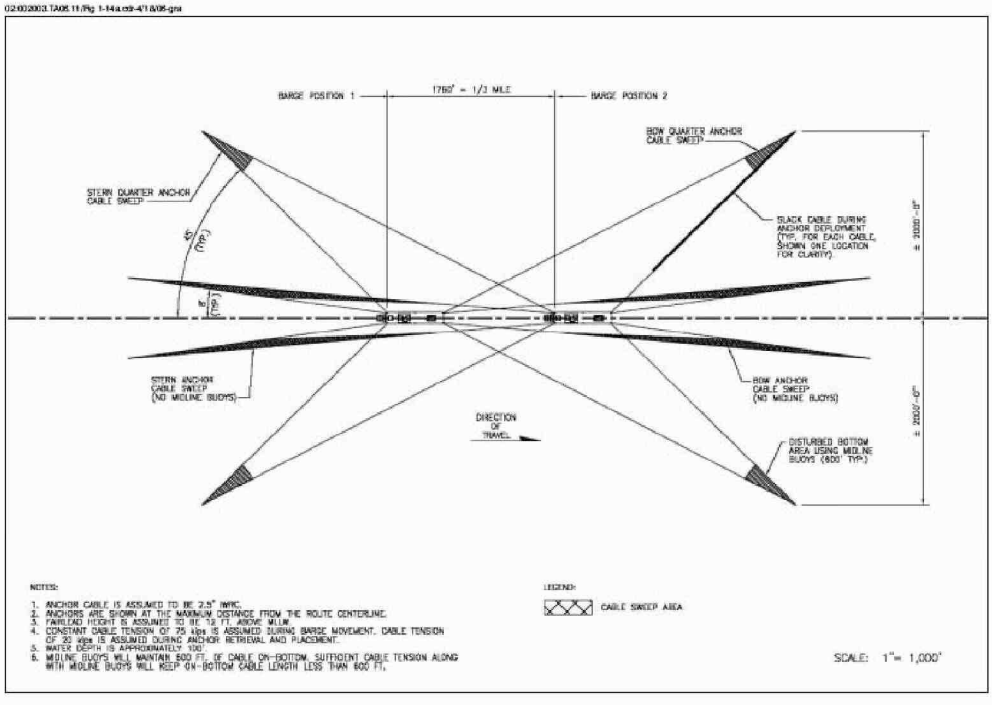


Figure 1-14a **Assumed 8-Point Anchor Cable Sweep with Midline Buoys for Quarter Anchors Only**

EIR-6

Request:

Confirm whether or not fabrication of Project-related vessels and the YMS in the U.S. would entail an expansion of existing shipbuilding facilities, and, if so, identify the potential shipyards to be used, the expected impacts, and appropriate mitigation measures to avoid and minimize impacts.

Response:

Broadwater has identified no US based shipyards that are capable of constructing the FSRU and YMS without significant expansion of existing facilities. As such, Broadwater anticipates constructing the FSRU and YMS at an overseas shipyard with an existing capacity to construct these facilities. This will eliminate the need for significant expansion (and potential environmental impacts) of a US based shipyard.

As indicated in Section 1.6.1 of Resource Report No. 1, Broadwater anticipates that the tugs required to support the Project will likely be constructed at an existing shipbuilding facility in the US with the capacity, ability, and proven track record for this type of construction without modification to its existing facilities. Table 1-4 in Resource Report No. 1 includes a partial list of existing facilities in the US at which the tugs could be constructed.

EIR-7

Request:

Provide a detailed description of the inert gas scrubber process as it relates to potential introduction of chemicals or particulate matter into water, and, as appropriate, identify any potential impacts, treatment, or monitoring associated related to the water quality of related discharges.

Response:

The inert gas generator is used only for LNG storage tank inspection. To inspect a cargo tank, the tank must first be drained of cargo and warmed up to ensure that no liquid is present. Once warm, inert gas is introduced to safely purge the cargo tanks of vapor. Once the cargo tanks are filled with inert gas (i.e. no vapour left), air can then be safely introduced to the cargo tank and the inert gas is then purged from the tanks. The tank is then ready for inspection. Once inspection is complete, the tank is then re-inerted prior to introducing LNG.

Due to the numerous monitoring systems around the cargo system, visual inspection is rarely required. It is therefore expected that inert gas generator use would be required no more than once every 5 years.

Inert gas is produced by combustion. Diesel oil is burned in a dedicated generator, which produces an exhaust of mostly nitrogen, carbon dioxide and a low oxygen concentration (below 5%). The exhaust gas is washed (or scrubbed) in a sea water "shower" to make sure that it is cool and clean. The wash water goes overboard via a weir. No chemicals are introduced into inert gas flow or the water outlet from the inert gas generation plant.

On the basis that low sulfur fuel is used for inert gas generation, the waste water from the inert gas scrubbed is expected to have a pH ranging from 5.5 to 6, a temperature rise of about 11 C degrees with little to no particulate matter present.

EIR-8

Request:

Clarify the proposed methods for, and expected frequency of, any maintenance of the hull of the FSRU during operations including methods proposed to maintain adequate flow through the water intake screens. Identify any potential impacts of these activities and any measures proposed to avoid or minimize impacts to water quality and marine resources.

Response:

The FSRU hull will be designed to remain on station without recourse to dry dock throughout its operational life. In order to maintain facility integrity, survey and inspections of the hull will be regularly conducted and detailed video and photographic records of the surveys and inspections will be kept. To facilitiate maintenance, appropriate hull coatings and cathodic protection systems will be included in the design.

The frequency of hull maintenance will be largely determined by the outcomes of hull survey and inspection. It is anticipated that initial inspection will take place after the first six and 12 months of service. This will help determine the site specific fouling conditions and establish the ongoing frequency of cleaning operations related to hull maintenance. Removal of fouling material in way of intakes and at other locations on the hull will be carried out by a contractor expert in this work using underwater diver-operated power brushing equipment. No chemicals will be used in the cleaning operation. Selection of equipment will be based on minimizing any degradation of the hull coatings.

EIR-9

Request:

Update the estimates of ichthyoplankton loss associated with operational water intake based on results from recent site-specific field surveys.

Response:

Appendix E to Resource Report No. 3 provided ichthyoplankton entrainment estimates based on data collected as part of the 2002 Poletti Ichthyoplankton Program, coupled with site specific data collected by Broadwater in August and October. Since the Poletti data covered the timeframe of March through July, the combination of data allowed for a reasonable assessment of potential entrainment from March through October, which encompasses the vast majority of ichthyoplankton expected within Long Island Sound. As indicated in the Resource Report, the inclusion of March through October period accounts for the seasonal occurrence for the majority of ichthyoplankton stages for the most abundant species in Long Island Sound, with the exception of sand lance, which tend to peak in the later winter months.

In February 2006, Broadwater submitted to FERC a comparison of potential ichthyoplankton Entrainment and Age-1 Equivalent Estimates Based on the Intermediate and Deep Sampling Strata of the 2002 Poletti Ichthyoplankton Program. Broadwater considers the Deep Sampling Strata to be more representative of the FSRU location since the Intermediate Sampling Strata incorporates much shallower (and more productive) inshore waters than would occur in proximity to the FSRU.

Prior Results
Resource Report 3 indicates that, based on data from the 2002 Poletti Ichthyoplankton Program subset to represent the water intake location of the FSRU facility during normal operations (approximately 28.2 MGD, 106,750 m^3/day), approximately 40.6 million eggs and 30.6 million larvae would be entrained from the March 4-August 5 period for which the Poletti Program conducted sampling (*see* Resource Report No. 3, Appendix E, Table B-7).

Entrainment rates would not be uniform across the March-July period due to the seasonal variation in ichthyoplankton density and species composition typical of Mid-Atlantic nearshore and estuarine regions and the majority of the annual entrainment would take place during the June-July peak in ichthyoplankton density. Diel correction factors and entrainment estimates for August-October based on site specific collections in 2005 were included in modified entrainment estimates to address potential biases in the Poletti methodology and provide a more conservative, upper bound to the entrainment counts. Another conservative assumption is that density is directly proportional to entrainment

and no escape behavior is exhibited by larvae. Actual entrainment may be reduced by active avoidance of the seawater intakes.

The inclusion of the site specific August and October 2005 data, applying the diel correction factors to the Poletti data, and including only nighttime samples for bay anchovy and fourspot flounder larvae increased the total entrainment estimate to 47.3 million eggs and 90.9 million larvae from the March-October period (*see* Resource Report No. 3, Appendix E Table B-7). A further conservative estimate included the site specific 2005 data and diel correction factors to the Poletti data and considered only nighttime samples for all larvae collected in the 2005 data. This had little effect on the entrainment estimates. Total number of eggs were 47.3 million and total number of larvae was 91.4 million for the March through October period, which accounts for the seasonal occurrence for the majority of ichthyoplankton stages for most abundant species in Long Island Sound with the exception of sand lance, which was evaluated during the February ichthyoplankton sampling.

February 2006 Sampling Results

Broadwater completed an additional ichthyoplankton sampling effort on February 8, 2006. A summary of the field survey is attached to this response. Data collected as part of this sampling effort confirm Broadwater's conclusions that the peak ichthyoplankton densities within Long Island Sound are captured by the use of the Poletti data supplemental sampling conducted by Broadwater.

Based on the February 2006 sampling data, the average density for eggs and larvae collected from the mid-depth strata during daytime and nighttime sampling was multiplied by the daily water intake of the FSRU and associated LNG carriers (106,750 m^3/day, 28.2 million gallons/day) to estimate daily entrainment rates for species and life stage (*see* Table 1) because water intake will occur from 35-45 feet below surface. Only four species of fish larvae (sand lance, rock gunnel, longhorn sculpin and grubby) were collected from the mid-depth strata, with sand lance the dominant species. Sand lance larvae daily entrainment estimates of 8,444 larvae account for 84% of the total daily larval entrainment estimates of 10,083 larvae. Fourbeard rockling were the only egg collected in the mid-depth strata during the collections of February 8, 2006. Mean density of fourbeard rockling eggs in the mid-depth strata was only 0.10/100m^3 and the daily entrainment estimate is 109 eggs (*see* Table 1).

EIR-9

Table 1. Average density of fish larvae collected during Day and Night tows from the Mid-depth strata in the vicinity of the proposed Broadwater FSRU on February 8, 2006.

Species	Stage	Average Density (#/100m^3)	Daily Entrainment Estimate*
American sand lance	PYSL	7.91	8,444
longhorn sculpin	PYSL	0.10	109
rock gunnel	PYSL	1.38	1,471
fourbeard rockling	Egg	0.10	109
grubby	PYSL	0.06	59

* -Daily entrainment estimates were determined by multiplying the average density by the daily withdrawal by the FSRU and associated LNG carriers (28.2 MGD, 106,750 m^3/day).

Based on published information regarding sand lance seasonal occurrence in Long Island Sound and the long larval duration of this species, the densities (and therefore the daily entrainment estimates based on these densities) encountered on February 8, 2006 are likely representative of the seasonal peak for sand lance larvae during the December 2005-March 2006 period.

Broadwater conducted additional ichthyoplankton sampling on March 28, 2006. The data collected as part of this effort will be combined with the February data to develop the anticipated ichthyoplankton losses for the period of October through March to establish the year round potential impacts to ichthyoplankton from impingement and entrainment.

March 9, 2006
Ref No. 20546.000

Mike Donnelly
Ecology and Environment, Inc.
Buffalo Corporate Center
368 Pleasant View Dr.
Lancaster, NY 14086

RE: Letter Report summarizing the results of ichthyoplankton sampling in the vicinity of the proposed Broadwater FSRU. Sampling event No. 3, February, 2006.

FIELD METHODS

Normandeau Associates, Inc. (Normandeau) conducted ichthyoplankton sampling in the vicinity of the proposed Broadwater Energy floating storage and regasification unit (FSRU) in the Central Basin of Long Island Sound on February 8, 2006. A one by one nautical mile square block centered on the location of the proposed FSRU facility was designated as the sampling area. Three random stations were selected within the sampling area using the Random Point Generator extension in Arcview (Figure 1). At each station the water column was divided into three depth strata based on an assumed depth of about 95 feet: near surface (surface, 0-30 feet), mid-depth (mid-depth, 35-65 feet), near bottom (bottom, 70-95 feet). One ichthyoplankton tow was collected in each depth stratum of each station during daylight (defined as occurring between 1 hour after sunrise and 1 hour before sunset) and the daytime sampling was repeated again at night at the same three stations (defined as occurring between 1 hour after sunset and 1 hour before sunrise). A total of 18 valid samples (3 stations x 3 depths x 2 diel periods, Table 1) were collected on February 8, 2006 between 1:00-4:00 PM (day) and 6:00-9:00 PM (night).

All samples were collected with a 1.0 m^2 Tucker trawl with a 0.335 mm net and an 8:1 length to mouth ratio. The tucker trawl has a closing device that uses a double-trip release mechanism and a weighted lead bar to close the mouth of the net and insure that each sample is collected in each of the three discrete depth strata. Net towing speed was approximately 1.0 m/sec and tow duration was 5 minutes. A flume-calibrated digital flowmeter (GO Model 2030R) was placed in the mouth of the Tucker trawl to measure the distance (volume) of each tow. Tow depth was determined in the field using a cosine function relating wire length and wire angle to sampling depth. Tow volume was approximately 300 m^3 and ranged from 242-330 m^3 (Table 1). The start and end of each towpath was recorded using GPS. Samples were fixed at sea in 4% buffered formaldehyde and changed over to 80% ethanol within 18 hours. A conductivity, salinity, temperature, dissolved oxygen and depth profile was made at 5 foot intervals from one foot below the surface to one foot above the bottom at each of the three stations and two diel periods (6 total profiles) using a YSI Model 85 meter.

LABORATORY METHODS

Samples were sorted under magnification to remove all fish eggs, fish larvae, and lobster larvae which were then enumerated and identified to the lowest possible taxon (generally genus and species). Samples were further identified into the following life stages: egg, yolk-sac larvae and post yolk-sac larvae.

The accuracy of identifications, assignment to life stage, and counting was monitored and controlled by QC checks. A subset of the samples were randomly selected for re-identification by a quality control

inspector according to a "10% AOQL" continuous sampling plan. This insured that at least 90% of the samples met specifications, because if any samples failed QC checks, data from those samples were corrected and the proportion of samples checked was increased. A sample failed identification QC if the original identifier's count differed from the QC inspector's count by 10% or more (or by more than two if the QC total was 20 or less). This acceptance criterion was applied separately by life stage to each taxon. An additional requirement for a sample to pass was that for each taxon, the sum of the percent errors for all life stages was required to be less than 10%.

RESULTS

Physical Profiles of Water Column

Water temperature, dissolved oxygen, and salinity were similar among the three stations (Table 2, Figures 2-4). Water temperature ranged from 4.2-5.3 °C, dissolved oxygen from 10.80-13.50 mg/l, and salinity 23.5-24.2 $^{o}/_{oo}$. At all three stations, the water column was relatively homogeneous and temperature and salinity was slightly higher at the bottom than the surface.

Total Species Composition

Overall ichthyoplankton diversity was low. Fourbeard rockling (*Enchelyopus cimbrius*) was the only fish egg collected during sampling on February 8, 2006 (Table 3). Only two fourbeard rockling eggs were collected, both were collected from the mid-depth strata at station 3 during nighttime. American sand lance (*Ammodytes americanus*), rock gunnel (*Pholis gunnellus*), longhorn sculpin (*Myoxocephalus octodecemspinosus*), grubby sculpin (*Myoxocehpalus aenaeus*), Atlantic menhaden (*Brevoortia tyrannus*), and searobin (*Prionotus* spp.) were the only larvae collected during sampling on February 8, 2006 (Table 3). The majority (> 99%) of the larvae were in the post yolk-sac stage. Larval collections were dominated by sand lance (86.6 % of the total count). Rock gunnel (11.7 %) were the second most abundant larvae collected, all other species comprised < 1.0% of the total larval count (Table 3). One Atlantic silverside (*Menidia menidia*) young of the year was collected, this specimen was collected from the near bottom depth strata of station 3 during nighttime.

Many aspects of the morphology and ecology of *Ammodytes* spp. along the east coast of the United States are potentially confounded by taxonomic problems differentiating between the American or inshore sand lance (*A. americanus*) and the offshore sand lance *A. dubius* (Nizinski et al. 1990). Because most estuarine collections of *Ammodytes* are *A. americanus* (Able and Fahay 1998) and *A. americanus* predominates in Long Island Sound (Monteleone et al. 1987), *Ammodytes* larvae were assumed to be *A. americanus.*

Ichthyoplankton Density Across Diel Period and Depth Strata

A two-way ANOVA on log (x+1) transformed larvae (yolk sac+post yolk sac stages) density for all species combined and sand lance only did not detect a significant difference between the two diel periods or between the three depth strata, however the diel period* depth strata interaction term was significant ($p < 0.001$). This significant interaction term suggests that larval distribution with depth was not the same during day and night. Fish larvae (primarily sand lance) were more concentrated in the surface collections during the day, while at night they were more concentrated in the bottom collections (Table 4, Figure 5). A one-way ANOVA on log (x+1) transformed larvae density for all species combined and for sand lance only was used to determine if larvae density differed between the three depth strata during daytime and nighttime samples separately in order to explain the significant interaction. One way

ANOVA revealed that during daytime sampling larval fish density was significantly different between the three depth strata ($p < 0.01$), there was no difference between the surface and mid-depth strata where larval density was significantly higher than in the bottom collections (Tukey's Studentized Range Test, $p < 0.05$). Results were similar for sand lance larvae density during daytime except there was a significant difference between all three depth strata with sand lance larvae concentration greatest in the surface collections and lowest in the bottom collections (Tukey's Studentized Range Test, $p < 0.05$). One way ANOVA on nighttime collections detected a significant difference in larval density between the three depth strata ($p < 0.01$) and multiple comparison procedures (Tukey's Studentized Range Test) determined that density was significantly higher in the bottom samples than in the surface samples ($p < 0.05$). Results were similar for one way ANOVA on sand lance larval density during the nighttime collections.

Ichthyoplankon Community Similarity Across Diel Period and Depth Strata

Community similarity between the two diel periods and three depth strata was evaluated through ordination using non-metric multidimensional scaling (NMDS). Analysis was based on the Bray-Curtis similarity index generated from all pairwise sample comparisons on untransformed transformed egg and larval (yolk-sac + post yolk-sac stages) densities. Like all multivariate techniques, NMDS is based on a similarity coefficient matrix calculated between every pair of samples. The Bray-Curtis similarity values were then transformed to ranks (the highest similarity between a pair of sites has the lowest rank, 1, and the lowest similarity has the highest rank, (n(n-1)/2). NMDS then constructs a "map" or configuration of the samples. The NMDS map is constructed to preserve the similarity ranking as Euclidean distances on the two dimensional plot and attempts to satisfy all conditions imposed by the rank similarity matrix, e.g. if sample 1 has higher similarity to sample 2 than it does to sample 3 then sample 1 will be placed closer on the map to sample 2 than it is to 3. The principle of the NMDS algorithm is to choose a configuration of points which minimize the degree of *stress* or distortion between the similarity rankings and the corresponding distance rankings in the ordination plot. The stress value provides a "goodness of fit" measure, in general, stress < 0.05 gives an excellent representation with no prospect of misinterpretation, stress < 0.1 corresponds to a good ordination with no real prospect of a misleading interpretation, and stress < 0.2 still gives a potentially useful 2-dimensional picture, though for values at the upper end of this range too much reliance should not be placed on the detail of the plot (Clarke and Warwick 1994). NMDS is based on rank order about which samples are most or least similar, axes are non-metric and the ordination plot can say nothing about which direction is "up" or "down", or the absolute "distance apart" of two samples, what can be interpreted is relative distances apart (Clarke and Warwick 1994). NMDS can be recommended as one of the best (arguably the best) ordination technique available (Everitt 1978, Clarke and Warwick 1994). The few comprehensive studies that have compared ordination methods for community data give NMDS a high rating (Kenkel and Orloci 1986).

A two-way crossed ANOSIM (analysis of similarities, Clarke and Warwick 1994) test was used to evaluate differences in the larval fish community between the two diel periods and three depth strata based on the corresponding rank similarities between samples in the similarity matrix. ANOSIM is a non-parametric permutation applied to the rank similarity matrix underlying the NMDS ordination. If r_w is defined as the average of all rank similarities among replicates within a diel or depth group, and r_b is the average of rank similarities arising from all pairs of replicates between a diel or depth group then the test statistic is:

$R = (r_b - r_w)/ (M/2)$ where $M = n(n-1)/2$ and n is the total number of samples under consideration (Clarke and Warrick 1994).

The R statistic usually falls between 0 and 1, R is approximately zero if similarities between and within groups are the same, and R = 1 if all replicates within a group are more similar to each other than any replicates from different groups. The R statistic itself is a useful comparative measure of the degree of separation of sites, though the main interest usually centers on whether it is significantly different from zero (Clarke and Warwick 1994). Further discussion of ANOSIM is provided by Clarke and Green (1988) and Clarke and Warwick (1994).

Because there was only one species of egg collected (fourbeard rockling), NMDS analysis was not run for fish eggs. The larval fish community had low diversity (6 taxa) and was dominated by sand lance, therefore the results of the NMDS on untransformed data are largely driven by differences in abundance of sand lance larvae. Figure 6 shows a general separation of nighttime surface collections and daytime bottom collections from the rest of the samples as expected based on the low density of fish larvae in those collections (Figure 5). ANOSIM revealed higher separation (less similarity) between depth strata ($R = 0.576$, $p = < 0.001$) than between diel period ($R = 0.481$, $p < 0.05$). NMDS was also performed on 4^{th} root transformed larval density in order to down-weigh the numerical dominance of sand lance larvae. Results were similar to the untransformed data (Figure 7) with general separation of the nighttime surface collections and daytime bottom collections from the rest of the samples. A similar response to the untransformed data likely occurs because rock gunnel larvae demonstrate a similar diel and depth distribution to sand lance; they were more concentrated in surface waters during the daytime and more concentrated in mid-depth and bottom waters at night (Table 4,5,6). Sand lance and rock gunnel larvae accounted for 98% of the total number of fish larvae collected on February 8, 2006.

Impact Analysis Based on Ichthyoplankton Densities

The average density (#/m^3) for eggs and larvae collected from the mid-depth strata during daytime sampling (n=3) and during nighttime sampling (n=3) was multiplied by the daily water intake of the FSRU and associated LNG carriers (106,750 m^3/day, 28.2 million gallons/day) to estimate daily entrainment rates for species and life stage (Table 8) because water intake will occur from 35-45 feet below surface. Four species of fish larvae (sand lance, rock gunnel, longhorn sculpin and grubby) were collected from the mid-depth strata. Sand lance larvae were dominant and daily entrainment estimates (8,444) account for 84% of the total daily larval entrainment estimates (10,083). Fourbeard rockling were the only egg collected in the mid-depth strata during the collections of February 8, 2006. Mean density of fourbeard rockling eggs in the mid-depth strata was only 0.10/100m^3 and the daily entrainment estimate is 109 eggs (Table 8).

Entrainment estimates from Table 8 were expressed in terms of Age 1 fish using the Equivalent Adult Model. The Equivalent Adult Model (EAM) is a method for expressing entrainment losses as an equivalent number of individuals at some other common life stage, referred to as the age of equivalency (Goodyear 1978). The method provides a convenient means of converting losses of fish eggs and larvae into units of individual fish and provides a standard metric for comparing losses among species, years, and facilities (EPA 2004). The age of equivalency can be any life stage of interest. For the 316 (b) cooling water intake case studies, EPA (2004) expressed impingement and entrainment losses as an equivalent number of Age 1 individuals (the Age 1 fish considered in this analysis are typically under 6 inches in length).

The EAM calculation requires life-stage specific entrainment counts and life-stage specific mortality rates from the life stage of entrainment to the life stage of equivalence. The losses at any given stage are

multiplied by the fraction of fish at that stage or age that would be expected to survive to the age of equivalence:

$$EA = S_A N$$

Where: EA = equivalent age 1 loss, N= number of fish lost due to entrainment, S_A= fraction of fish expected to survive from the age at which they are entrained to the age of equivalence.

Survival rates of early life stages of fish are often expressed on a life-stage specific basis so that the fraction surviving from any particular life stage to the age of equivalency is expressed as the cumulative product of survival fractions for all of the life stages through which a fish must pass before reaching the age of equivalency. One of the benefits of this model is that it can be used to express losses imposed on different lifestages in common equivalent units.

$$EA = \bullet \bullet S_{i,a} N_i$$

Where:

N_i= number of fish lost at age i

$S_{i,a}$= fraction of fish expected to survive from age i to the age of equivalence

Instantaneous total mortality (Z) is the sum of mortality from natural causes (M) and mortality from recreational and commercial fishing (F), (Z = M+F). Fishing mortality is zero for Age 1 fish species collected during sampling on February 8, 2006, therefore Z=M. Survival rate (S) is the estimated proportion of a lifestage that survives from the beginning to the end of that stage ($S = e^{-Z}$). It was conservatively assumed that no eggs or larvae survived entrainment and no larvae were able to actively avoid the intake.

The probability that a fish entrained at any given life stage would have survived to the age of equivalence is greater if the fish is near the end of that stage than if it at the beginning of the stage, because it would have already survived most of the natural mortality that occurs during that stage. Therefore, to find the expected survival rate from the day that a fish is entrained until the time that it would have passed into the subsequent age, an adjustment to S_i is required. The adjusted rate S^*_i describes the effective survival rate for the group of fish entrained at stage i considering the fact that the individual fish were entrained at various ages within stage i. This adjustment is applied only to the stage at which entrainment occurs, the unadjusted survival rate would be applied to subsequent lifestages until the age of equivalency (Age 1).

$$S^*_i = 2S_i e^{-\ln(1+S_i)}$$ (EPRI 2003, EPA 2004)

Lifestage specific mortality rates were obtained from EPA (2004) values used to evaluate impingement and entrainment in the North-Atlantic Region (http://www.epa.gov/waterscience/316b/casestudy/final/appc1.pdf). The entrainment estimates for fish eggs and larvae in Table 8 were expressed in terms of Age 1 equivalents using the survival rates in Table 9. For example, the daily entrainment estimate of 8,444 sand lance larvae is multiplied by the adjusted survival rate for the larval stage (0.10) resulting in an estimated 844 fish expected to survive until the end of the larval stage from the original 8,444 entrained. Of these 844 fish entering the juvenile stage, only 47 would be expected to survive natural mortality during that stage (S= 0.06). Therefore, 47 of the original 8,444 sand lance larvae entrained would be expected to survive to the beginning of Age 1 based on these natural mortality rates. Of the estimated 1,471 rock gunnel entrained per day based on the February 8,

2006 samples, only 188 would be expected to survive natural mortality to the beginning of Age 1 (Table 9).

Discussion

In summary, the ichthyoplankton community in the vicinity of the proposed Broadwater FSRU in the central basin of Long Island Sound during day and night sampling on February 8, 2006 was comprised of relatively few species and was dominated by American sand lance post yolk-sac larvae (primarily 7-12 mm total length). American sand lance occurred in every sample and accounted for 87% of the larvae collected. Rock gunnel were the second most abundant larvae collected and accounted for about 12% of the larvae collected. Other fish larvae collected include longhorn sculpin, Atlantic menhaden, grubby, and searobin. Fish eggs were rare and only 2 fourbeard rockling eggs were collected. Fish known to spawn in the region during winter are generally species with boreal affinities that produce demersal, adhesive eggs that are not likely to occur in the water column (i.e. American sand lance, rock gunnel, sculpins, winter flounder). Ichthyoplankton diversity and abundance was considerably lower for the February 8, 2006 samples than during the August 23, 2005 sampling event, reflecting the seasonality of the ichthyoplankton community in Long Island Sound typical of estuarine systems in the Mid-Atlantic Bight (Able and Fahay 1998). Ichthyoplankton abundance and diversity are low in the winter when few species spawn. Ichthyoplankton abundance and diversity begin to increase in the spring, reaching a peak during mid-late summer when many species reproduce. Ichthyoplankton abundance and diversity decline in the fall when spawning is curtailed (Able and Fahay 1998).

American sand lance spawn demersal, adhesive eggs over the inner half of the continental shelf from Canada to Virginia (Wheatland 1956, Norcross et al. 1961). Sand lance have a long spawning season, typically from November through March in Long Island Sound (Wheatland 1956, Monteleone et al. 1987). Incubation, hatch and larval duration and are particularly long for this species. Smigielski et al. (1984) incubated eggs in the laboratory at a range of temperatures (2, 4, 7, and 10 ^{o}C). Start of hatching ranged from 61 days (2 ^{o}C) to 25 days (10 ^{o}C) after fertilization. Larval collections in Long Island Sound indicate that sand lance hatching commences sometime in late November-early December, peaks from December through February when they are the dominant larval fish collected, and continues into March and April (Wheatland 1956). Monteleone et al. (1987) presented 17 years of data of American sand lance larvae in Long Island Sound collected over a 32 year interval and found approximately 94% of the annual catch of sand lance larvae occurred from December to March when water temperatures ranged from -1 to 12 ^{o}C. Sandlance density from daytime collections in the surface depth strata collected on February 8, 2006 (approximately 0.31/m^3, ± 0.08 standard deviation) are well within the range of February densities given by Monteleone et al. (1987). Monteleone et al. (1987) found large interannual fluctuations in density of sand lance larvae in Long Island Sound and hypothesized that this could be partially explained by water temperatures in December, with warm Decembers associated with low larval densities. Based on published information regarding sand lance seasonal occurrence in Long Island Sound and the long larval duration of this species, the densities (and therefore the daily entrainment estimates based on these densities) encountered on February 8, 2006 are likely representative of the seasonal peak for sand lance larvae during the December 2005-March 2006 period.

Published information regarding diel distribution of American sand lance larvae is relatively sparse and contradictory. Sette (unpubl. cited by Wheatland 1956) found the total ratio of American sand lance larvae in surface waters to deeper layers over the continental shelf was 18:1 and that many more were at the surface at night than during the day. Wheatland (1956) noted the occurrence of sand lance larvae throughout the water column during day and night, although there was a preference for the surface during six tows taken with closing nets capable of discrete depth sampling in Long Island Sound in March, 1954. Norcross et al. (1961)

found sand lance larvae to be concentrated in a zone several feet below the surface during daylight hours and at night they were concentrated within the superficial layers (approximately 18 inches of the surface) with few collected near the bottom during collections in January on inner continental shelf waters off lower Chesapeake Bay. However, this vertical distribution was not consistent on every station as several collections showed sand lance larvae to be distributed near the bottom during daytime. Sampling by Norcross et al. (1961) in February found sand lance larvae to be distributed throughout the water column, while collections in March found larvae of the same size class to be predominant near the bottom during both day and nighttime. Sampling in the vicinity of the proposed FSRU facility on February 8, 2006 suggests diel vertical migration of American sand lance larvae with higher densities occurring in the surface collections during the daytime, while at night they descended towards the bottom and were more concentrated in near bottom samples. However, it is possible that sand lance larvae were concentrated in the upper few feet of the surface at night as observed by Norcross et al. (1961) in their January samples, surface samples conducted during this survey all occurred from 20 feet below surface. Larval fish density in the area of water withdrawal of the proposed FSRU facility (mid-depth strata) was similar during day and night samples (about 10/100m^3, Figure 5). The mid-depth strata does not appear to be heavily utilized by the winter larval fish community in the vicinity of the proposed facility as observed during sampling on February 8, 2006. Data suggests that sand lance larvae vertically migrate from surface waters to the bottom at night and thus might be exposed to the FSRU's mid-depth seawater intake (35-45 feet below surface) for only a portion of each day.

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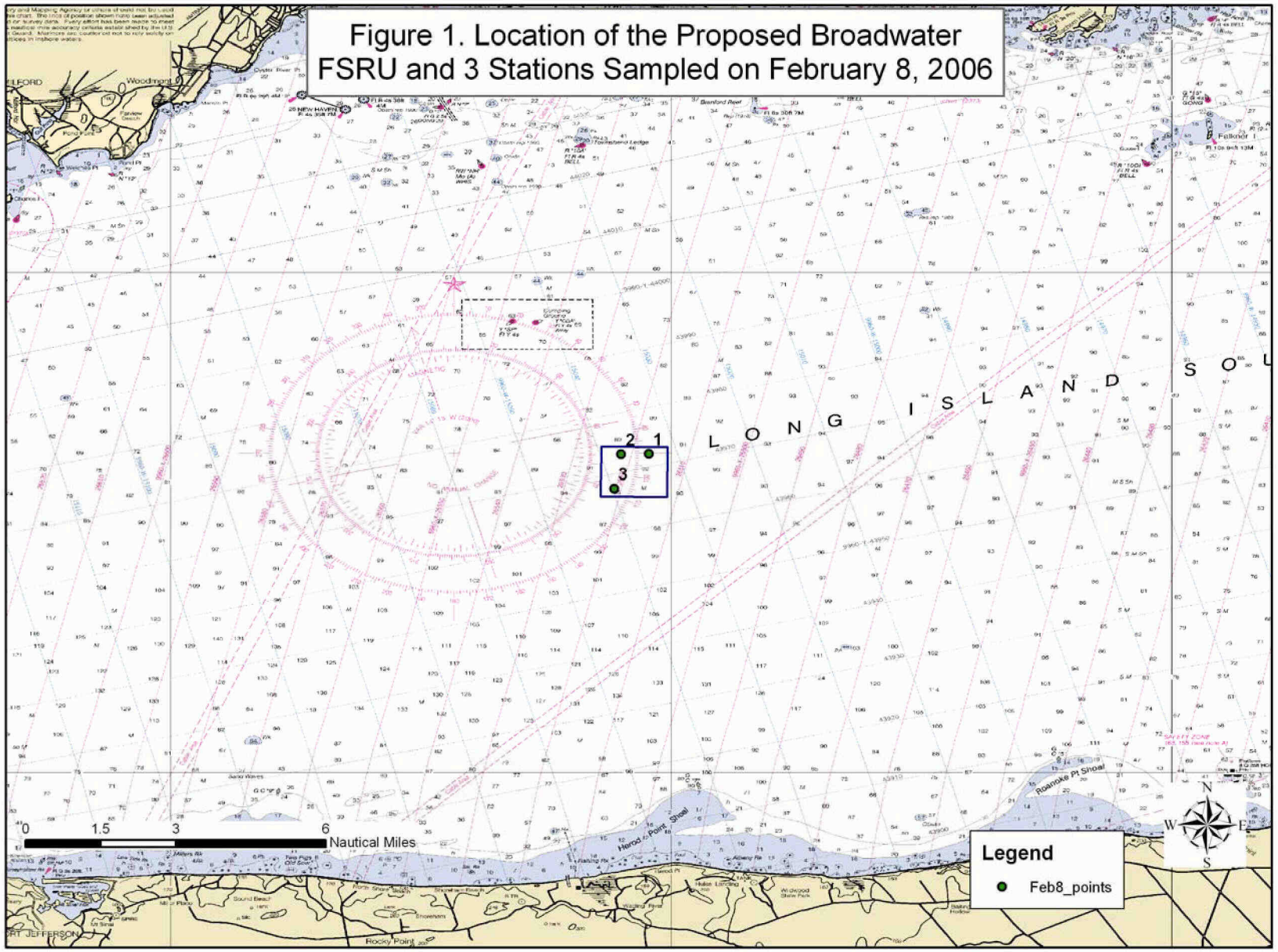
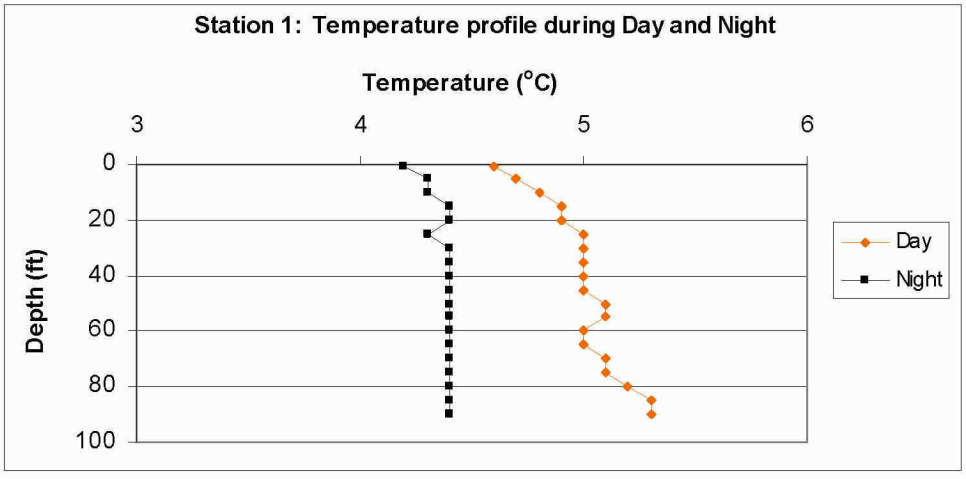
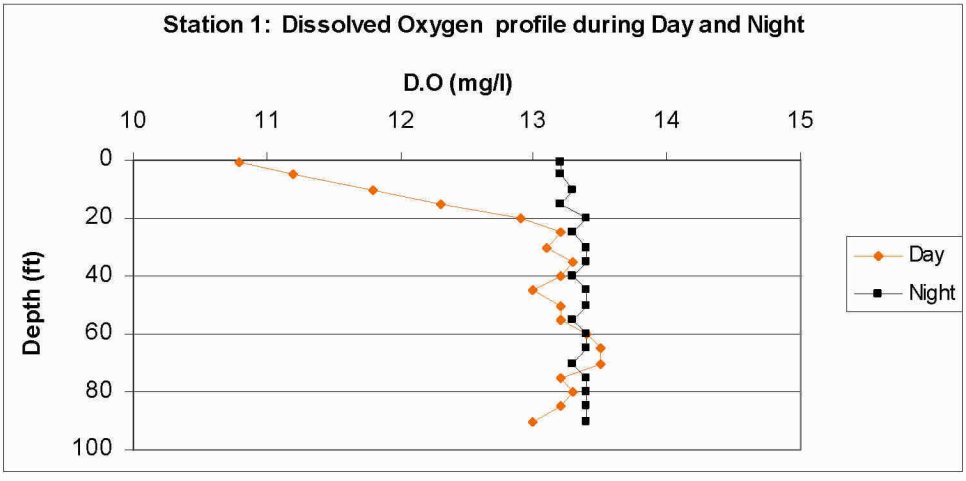


Figure 1. Location of proposed Broadwater FSRU and three stations sampled on February 8, 2006.





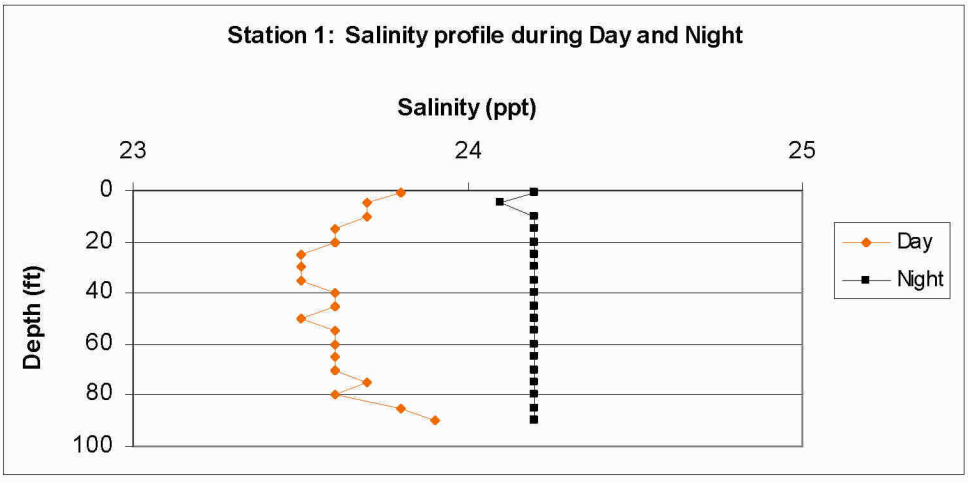


Figure 2. Physical profile (temperature, dissolved oxygen, and salinity) of the water column during Day and Night sampling at Station 1 on February 8, 2006.

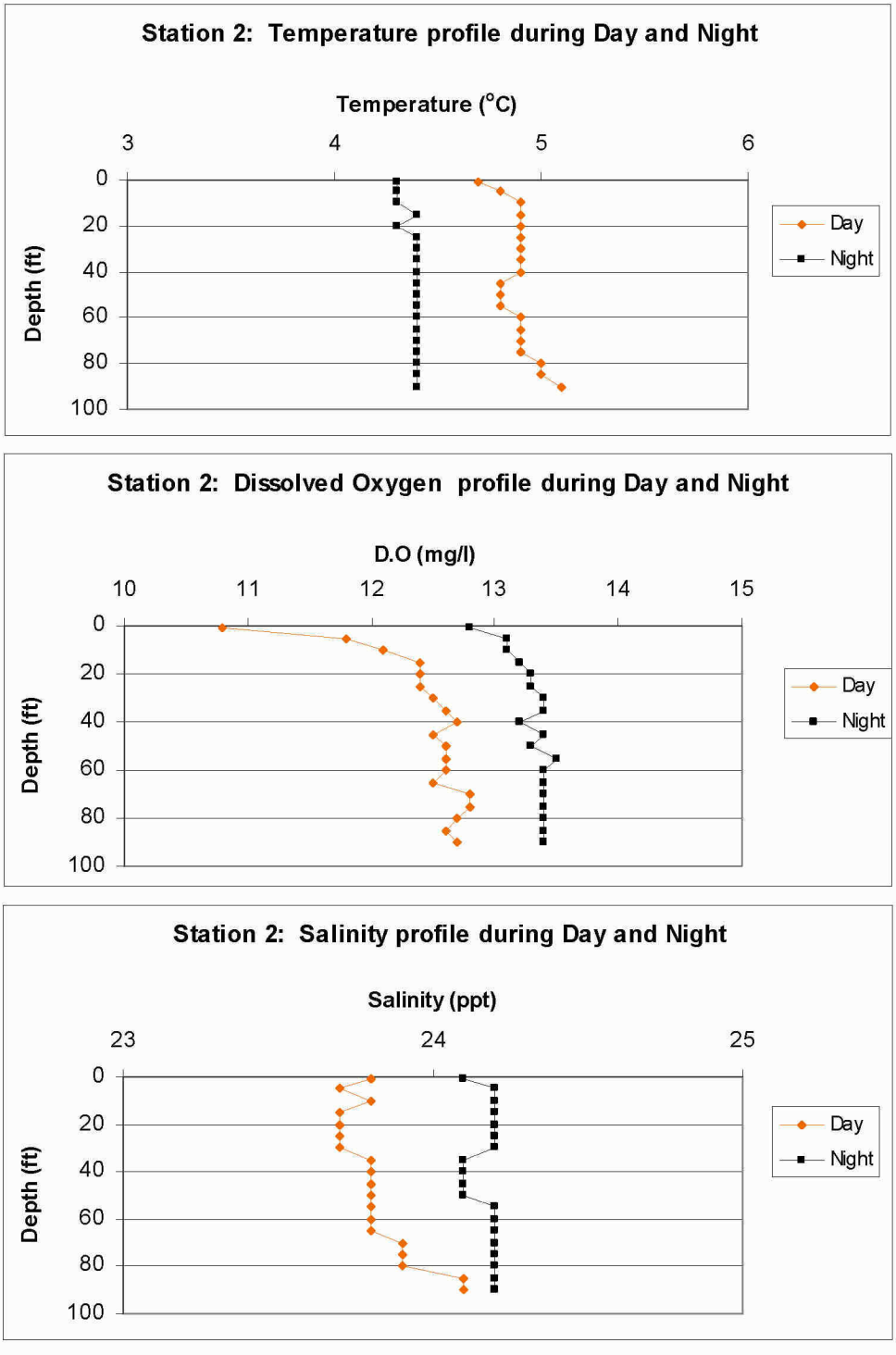


Figure 3. Physical profile (temperature, dissolved oxygen, and salinity) of the water column during Day and Night sampling at Station 2 on February 8, 2006.

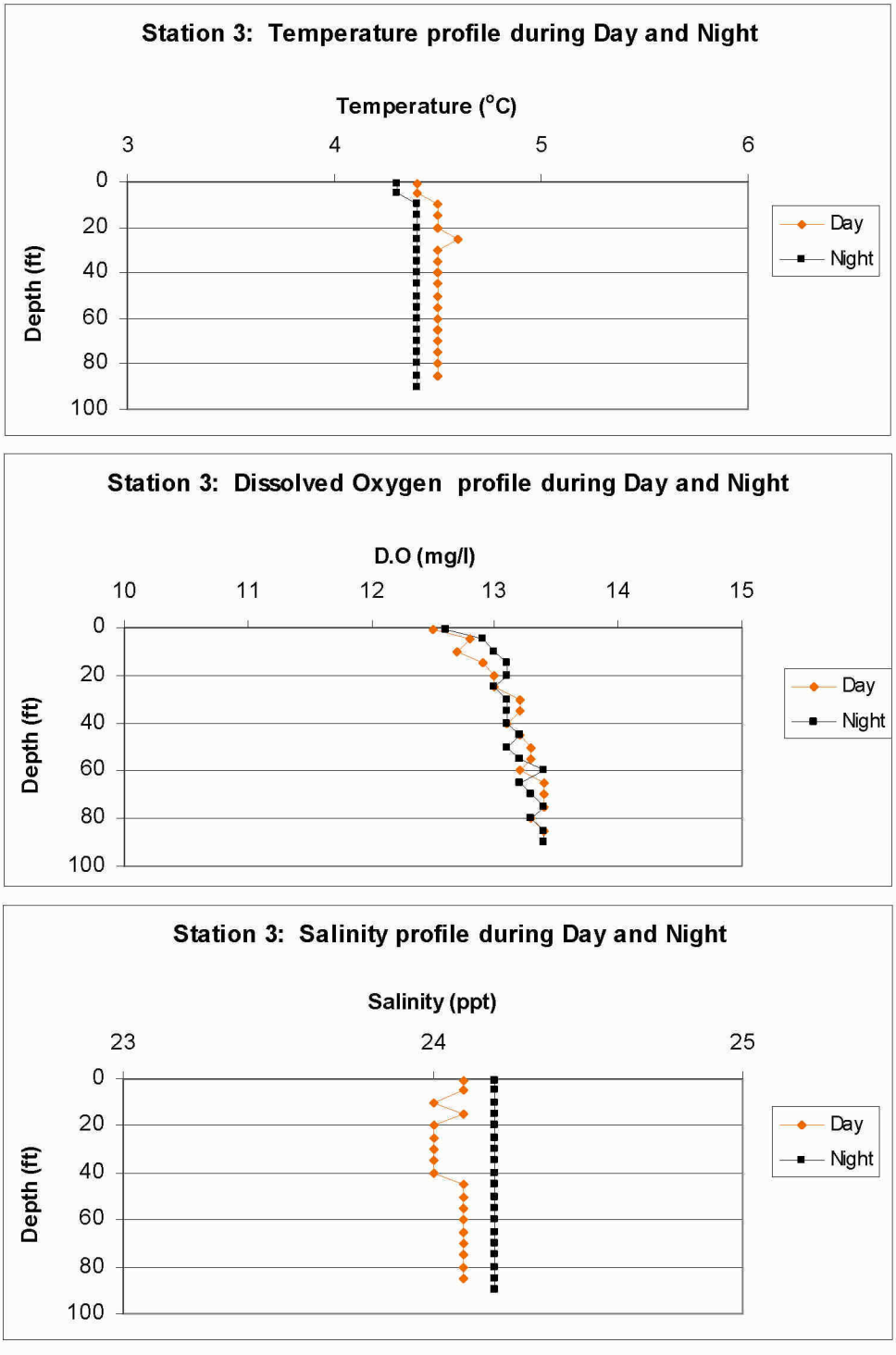


Figure 4. Physical profile (temperature, dissolved oxygen, and salinity) of the water column during Day and Night sampling at Station 3 on February 8, 2006.

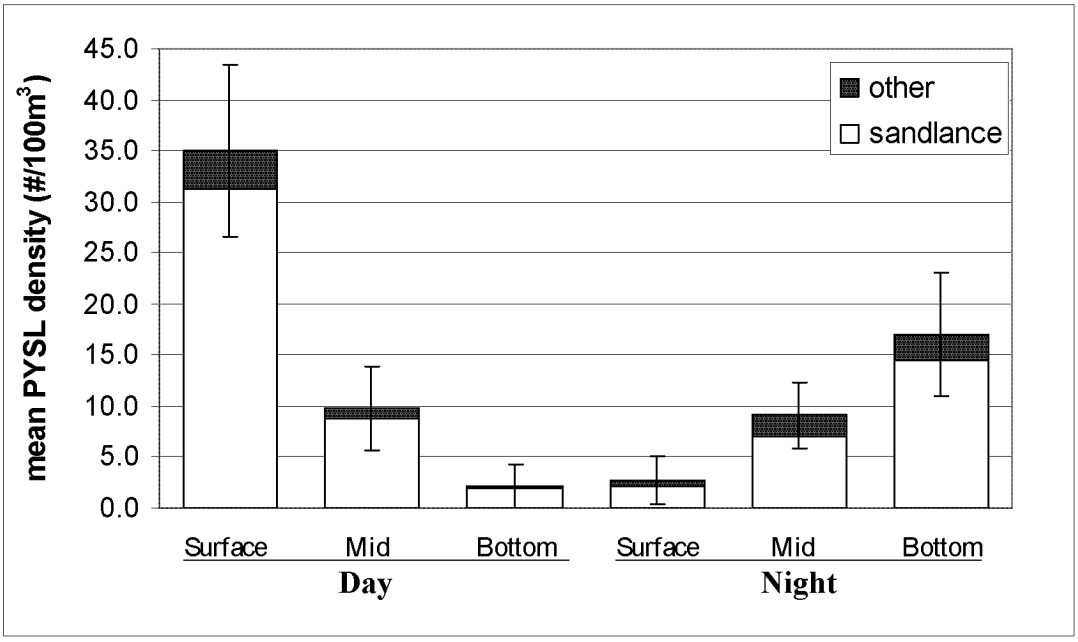


Figure 5. Mean post yolk-sac larvae (PYSL) density (#/100m^3) and standard deviation from the three replicate tows conducted at the surface (0-30 ft), mid-depth (35-65 ft) and bottom (70-95 ft) strata during daytime and nighttime sampling in the vicinity of the proposed FSRU facility on February 8, 2006.

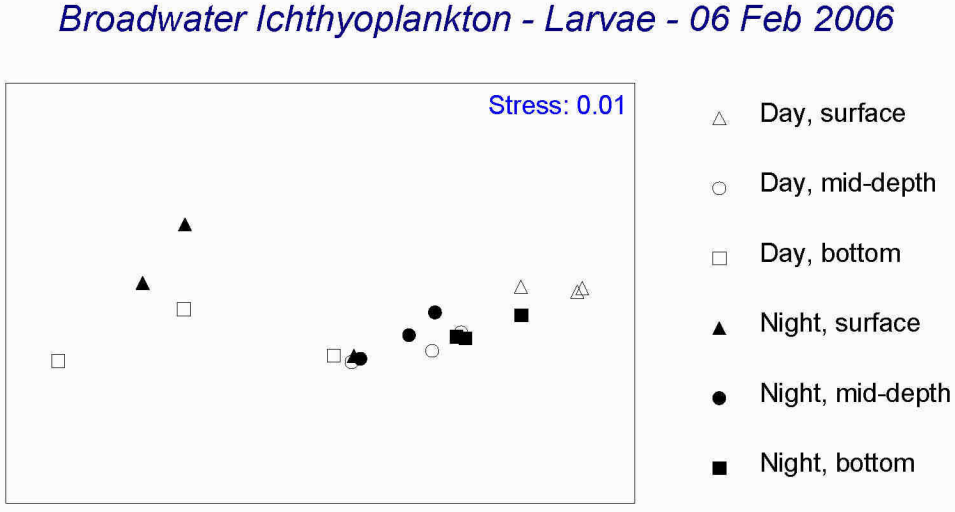


Figure 6. Non-metric multidimensional scaling ordination of 18 (3 replicate stations, 2 diel periods, 3 depth strata) samples collected on February 8, 2006 for untransformed fish larvae density (#/100m^3) based on Bray-Curtis similarities.

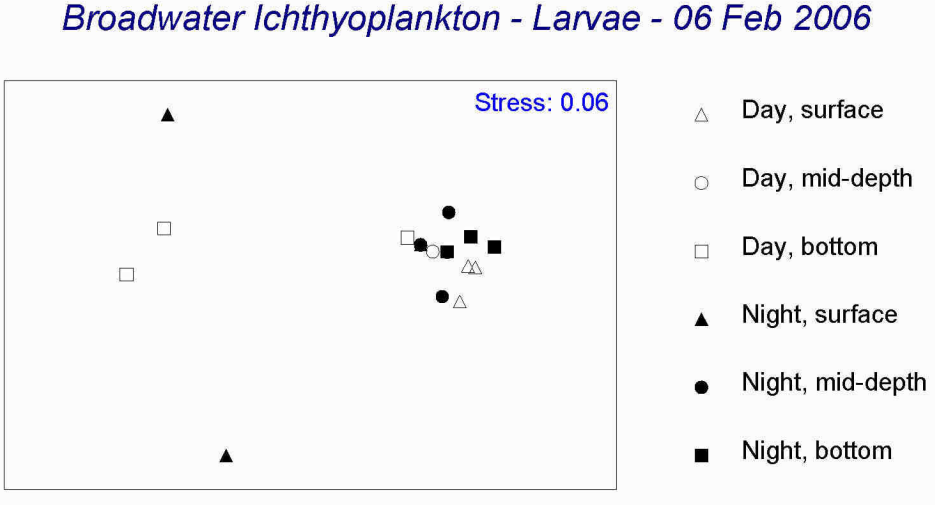


Figure 7. Non-metric multidimensional scaling ordination of 18 (3 replicate stations, 2 diel periods, 3 depth strata) samples collected on February 8, 2006 for 4th root transformed fish larvae density (#/100m^3) based on Bray-Curtis similarities.

Table 1. **Sample allocation, sample depths and volume of water sampled (m^3) among the three stations, three depth strata, and two diel periods sampled in the vicinity of the proposed Broadwater FSRU facility on February 8, 2006.**

Station	Depth Strata	Sample Depth (ft.)	Diel Period	Volume Sampled
1	Surface	20	Day	273.9
	Mid-depth	45		279.1
	Bottom	82		253.1
	Surface	20	Night	253.5
	Mid-depth	47		299.7
	Bottom	84		275.0
3	Surface	20	Day	257.0
	Mid-depth	45		241.5
	Bottom	81		242.2
	Surface	20	Night	330.5
	Mid-depth	48		294.5
	Bottom	86		318.2
4	Surface	20	Day	282.6
	Mid-depth	46		250.4
	Bottom	86		238.4
	Surface	20	Night	299.3
	Mid-depth	49		327.6
	Bottom	91		300.9

Table 2. **Temperature, dissolved oxygen, and salinity at the three stations during day and night sampling in the vicinity of the proposed Broadwater FSRU on February 8, 2006.**

	Temperature (°C)				Dissolved Oxygen (mg/l)				Salinity ($^0/_{00}$)			
	min	max	mean	stdev.	min	max	mean	stdev.	min	max	mean	stdev.
Station 1												
Day	4.6	5.3	5.0	0.2	10.80	13.50	12.86	0.77	23.5	23.9	23.6	0.1
Night	4.2	4.4	4.4	0.1	13.20	13.40	13.34	0.08	24.1	24.2	24.2	0.02
Station 2												
Day	4.7	5.1	4.9	0.1	10.80	12.80	12.43	0.46	23.7	24.1	23.8	0.1
Night	4.3	4.4	4.4	0.0	12.80	13.50	13.31	0.16	24.1	24.2	24.2	0.1
Station 3												
Day	4.4	4.6	4.5	0.0	12.50	13.40	13.13	0.26	24.0	24.1	24.1	0.1
Night	4.3	4.4	4.4	0.0	12.60	13.40	13.15	0.20	24.2	24.2	24.2	0.0

Table 3. **Number of fish eggs, larvae (yolk-sac + post yolk-sac stages) and young of the year (YOY) and the percent contribution to the total catch by species in the 18 ichthyoplankton tows conducted in the vicinity of the proposed Broadwater FSRU on February 8, 2006.**

Common Name	Scientific Name	# Eggs	% Total Eggs	# YSL	# PYSL	# Larvae	% Total Larvae	# YOY	% Total YOY
American sand lance	*Ammodytes americanus*			2	548	550	86.6		
Rock gunnel	*Pholis gunnellus*				74	74	11.7		
Longhorn sculpin	*Myoxocephalus octodecemspinosus*				6	6	0.9		
Atlantic menhaden	*Brevoortia tyrannus*				3	3	0.5		
Grubby	*Myoxocephalus aenaeus*				1	1	0.2		
Searobin	*Prionotus* spp.				1	1	0.2		
Atlantic silverside	*Menidia menidia*							1	100
Fourbeard rockling	*Enchelyopus cimbrius*	2	100						
TOTAL		2		2	633	635		1	

Table 4. Mean larvae (yolk sac + post yolk sac stage) density (#/100m^3) and percent of the total catch comprised for each species collected in the three replicate samples in each diel period and depth strata in the vicinity of the proposed Broadwater FSRU on February 8, 2006.

	Day						Night					
	Depth Strata						Depth Strata					
	Surface		Mid-depth		Bottom		Surface		Mid-depth		Bottom	
Species	# per 100 m^3	% Total	# per 100 m^3	% Total	# per 100 m^3	% Total	# per 100 m^3	% Total	# per 100 m^3	% Total	# per 100 m^3	% Total
American sandlance	31.6	89.5	8.7	89.5	1.9	93.3	2.2	78.3	7.1	77.6	14.5	85.3
Atlantic menhaden	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.0
Atlantic silverside	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Four bearded rockling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grubby	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.2	0.0	0.0
Longhorn sculpin	0.2	0.7	0.0	0.0	0.0	0.0	0.2	8.7	0.2	2.4	0.0	0.0
Rock gunnel	3.4	9.8	1.0	10.5	0.1	6.7	0.3	8.7	1.7	18.8	2.1	12.7
Searobin	0.0	0.0	0.0	0.0	0.0	0.0	0.1	4.3	0.0	0.0	0.0	0.0
Total	35.2	100.0	9.8	100.0	2.1	100.0	2.8	100.0	9.1	100.0	17.0	100.0

Table 5. Egg, yolk-sac larvae (YSL) and post yolk-sac larvae (PYSL) densities (#/100m^3) at the three randomly selected sampling stations and three depth strata during daytime sampling in the vicinity of the proposed Broadwater FSRU on February 8, 2006.

Daytime Survey		Station 1			Station 2			Station 3		
		Surface	Mid-depth	Bottom	Surface	Mid-depth	Bottom	Surface	Mid-depth	Bottom
American sandlance	YSL				0.8					
	PYSL	22.6	9.7	0.4	37.4	4.6	1.2	34.0	12.0	4.2
Longhorn sculpin	PYSL	0.7								
Rock gunnel	PYSL	2.2	0.7		3.1	0.8		5.0	1.6	0.4

Table 6. Egg, yolk-sac larvae (YSL), post yolk-sac larvae (PYSL) and young of the year (YOY) densities (#/100m^3) at the three randomly selected sampling stations and three depth strata during nighttime sampling in the vicinity of the proposed Broadwater FSRU on February 8, 2006.

Nighttime Survey		Station 1			Station 2			Station 3		
		Surface	Mid-depth	Bottom	Surface	Mid-depth	Bottom	Surface	Mid-depth	Bottom
American sandlance	PYSL	4.7	7.0	20.4	0.9	5.1	11.6	1.0	9.2	11.6
Atlantic menhaden	PYSL			0.7			0.3			
Atlantic silverside	YOY									0.3
Four bearded rockling	EGG								0.6	
Grubby	PYSL		0.3							
Longhorn sculpin	PYSL							0.7	0.6	
Prionotus sp.	PYSL				0.3					
Rock gunnel	PYSL	0.8	2.0	2.9		0.7	2.2		2.4	1.3

Table 7. **Species richness (# species identified to at least genus level in a sample), Shannon-Wiener diversity index (H'), and density (#/100m^3) of eggs and larvae (yolk-sac + post yolk-sac stage) at the three sampling stations, three depth strata, and two diel periods sampled in the vicinity of the proposed Broadwater FSRU on February 8, 2006.**

Station	Depth Strata	Diel Period	Species Richness		Diversity (H')		Density (#/100m^3)	
			Eggs	Larvae	Eggs	Larvae	Eggs	Larvae
1	Surface	Day	0	3	0.00	0.42	0.00	25.56
	Mid-depth		0	2	0.00	0.25	0.00	10.39
	Bottom		0	1	0.00	0.00	0.00	0.40
	Surface	Night	0	2	0.00	0.41	0.00	5.52
	Mid-depth		0	3	0.00	0.66	0.00	9.34
	Bottom		0	3	0.00	0.50	0.00	24.00
2	Surface	Day	0	2	0.00	0.27	0.00	41.25
	Mid-depth		0	2	0.00	0.43	0.00	5.38
	Bottom		0	1	0.00	0.00	0.00	1.24
	Surface	Night	0	2	0.00	0.56	0.00	1.21
	Mid-depth		0	2	0.00	0.36	0.00	5.77
	Bottom		0	3	0.00	0.53	0.00	14.14
3	Surface	Day	0	2	0.00	0.38	0.00	38.92
	Mid-depth		0	2	0.00	0.36	0.00	13.58
	Bottom		0	2	0.00	0.30	0.00	4.61
	Surface	Night	0	2	0.00	0.67	0.00	1.67
	Mid-depth		1	3	0.00	0.69	0.61	12.21
	Bottom		0	2	0.00	0.33	0.00	12.96

Table 8. **Average density (#/100m^3) of fish larvae collected during Day (n=3) and Night (n=3) tows from the Mid-depth strata in the vicinity of the proposed Broadwater FSRU on February 8, 2006. Daily entrainment estimates were determined by multiplying the average density by the daily withdrawal by the FSRU and associated LNG carriers (28.2 MGD, 106,750 m^3/day).**

Species	Stage	Average Density (#/100m^3)	Daily Entrainment Estimate
American sand lance	PYSL	7.91	8,444
longhorn sculpin	PYSL	0.10	109
rock gunnel	PYSL	1.38	1,471
fourbeard rockling	Egg	0.10	109
grubby	PYSL	0.06	59

Table 9. **Lifestage specific mortality rates used by EPA (2004) to calculate daily Age-1 equivalent estimates lost to entrainment in the FSRU facility. Instantaneous Total Mortality (Z) is the sum of Natural Mortality (M) and Fishing Mortality (F), (Z=M+F). Survival rate (S) is the estimated proportion of a lifestage that survives from the beginning to the end of that stage ($S= e^{-z}$). An adjusted survival rate (S*) was applied to the stage at which entrainment occurs as explained in the text.**

Species	Stage Name	M[a]	F[a]	Z	S	S*	# Entrained/Day	Estimated number entrained/day that would survive			
								Egg to Later Stages	Larvae to Later Stages	Juvenile to Later Stages	Estimated total # Age 1 Entrained
American sandlance	Larvae	2.97	0	2.97	0.05	0.10	8,444		844.4		
	Juvenile	2.90	0	2.90	0.06		0		46.5		46.5
[a] From Table C1-3 in EPA (2004)											
Rock gunnel	Larvae	1.66	0	1.66	0.19	0.32	1,471		470.7		
	Juvenile	0.92	0	0.92	0.40		0		188.3		188.3
[a] From Table C1-26 in EPA (2004)											
Grubby	Larvae	3.79	0	3.79	0.02	0.04	59		2.4		
	Juvenile	0.92	0	0.92	0.40		0		0.9		0.9
[a] From Table C1-18 in EPA (2004)											
Longhorn sculpin	Larvae	3.79	0	3.79	0.02	0.04	109		4.4		
	Juvenile	0.92	0	0.92	0.40		0		1.7		1.7
[a] From Table C1-27 in EPA (2004)											
Fourbeard rockling	Eggs	2.30	0	2.30	0.10	0.18	109	19.5			
	Larvae	4.25	0	4.25	0.01		0	0.3			
	Juvenile	0.92	0	0.92	0.40		0	0.1			0.1
[a] From Table C1-17 in EPA (2004)											

EIR-10

Request:

While Resource Report 3 discusses potential impacts to marine mammals in general, specifically discuss potential impacts and mitigation related to pinnipeds under the Marine Mammal Protection Act. Include distances from the proposed project area to known feeding and loafing areas, and methods to minimize the potential for harassment.

Response:

The Marine Mammal Protection Act of 1972 established a federal responsibility to conserve marine mammals, with the Department of Commerce (NOAA Fisheries) being responsible for pinniped (seal) species known to occur in the Project area. As discussed in Resource Report No. 3, potential impacts to pinnipeds could occur during either construction or operation of the project.

Figure 3-7A in Resource Report No. 3 identified known seal haul-out areas in Long Island Sound. This figure has been reproduced for this response with all other information removed for ease of reference. While there are some seal haul-out areas within the Long Island Sound, as demonstrated by the figure, they tend to be more prevalent outside the Sound in the more open water environment. The closest identified seal haul-out area to the FSRU is located on the Long Island shoreline, approximately 9 miles (14.5 km) south of the FSRU. No seal haul-out areas have been identified in proximity to the Port Jefferson onshore facility; seal haul-out areas have been identified approximately 4 miles (6.4 km) east of Greenport. The area stretching from Fisher Sound to Gardiners Bay between the North and South Forks of Long Island is mapped as a special use area for seals.

The haul-out areas at the eastern tip of Long Island are well removed from Greenport, being located on the eastern shores of Shelter Island and the adjacent Ram Island. As shown in the attached figure, haul-out areas are more common in the open waters of Block Island Sound and in Fisher Sound. While these haul-out areas are in closer proximity to the proposed LNG routes and the carriers will transit the special use area, the LNG carriers will be utilizing well-established shipping routes that currently are utilized by other commercial vessels entering Long Island Sound. Seal populations have been able to utilize these haul-out sites with no adverse impacts from existing vessel traffic and the minimal increase in traffic associated with the Project will not result in any additional significant pressures that will impact seals.

Seals are typically found in Long Island Sound from November through May. As such, their presence will likely overlap with the construction activities associated with pipeline installation and the installation of the FSRU. Potential impacts during construction could

occur from direct vessel collision, entanglement, noise associated with the installation of the mooring tower pilings, and potential spills. Section 3.3.4.6 in Resource Report No. 3 specifically addresses noise and spill impacts. This supplemental response focuses on potential collisions and entanglement impacts.

Pinnipeds and other marine mammals are typically quite mobile and, as such, collisions with larger, slower moving vessels are not expected. Most collisions involving small cetaceans, pinnipeds, and sea turtles involve small, fast vessels. In small craft, the noise source and dangerous parts of the vessel are essentially in the same place. The shaft, strut, and rudder—or outdrive—and the propeller are at or near the stern, but the bow is not far away.

Mooring lines, anchor mid-line buoy lines, diver's air hoses, and other construction related lines all pose a risk of entanglement to marine mammals. However, due to the size of the mooring cables and other lines, impacts from entanglement are not expected.

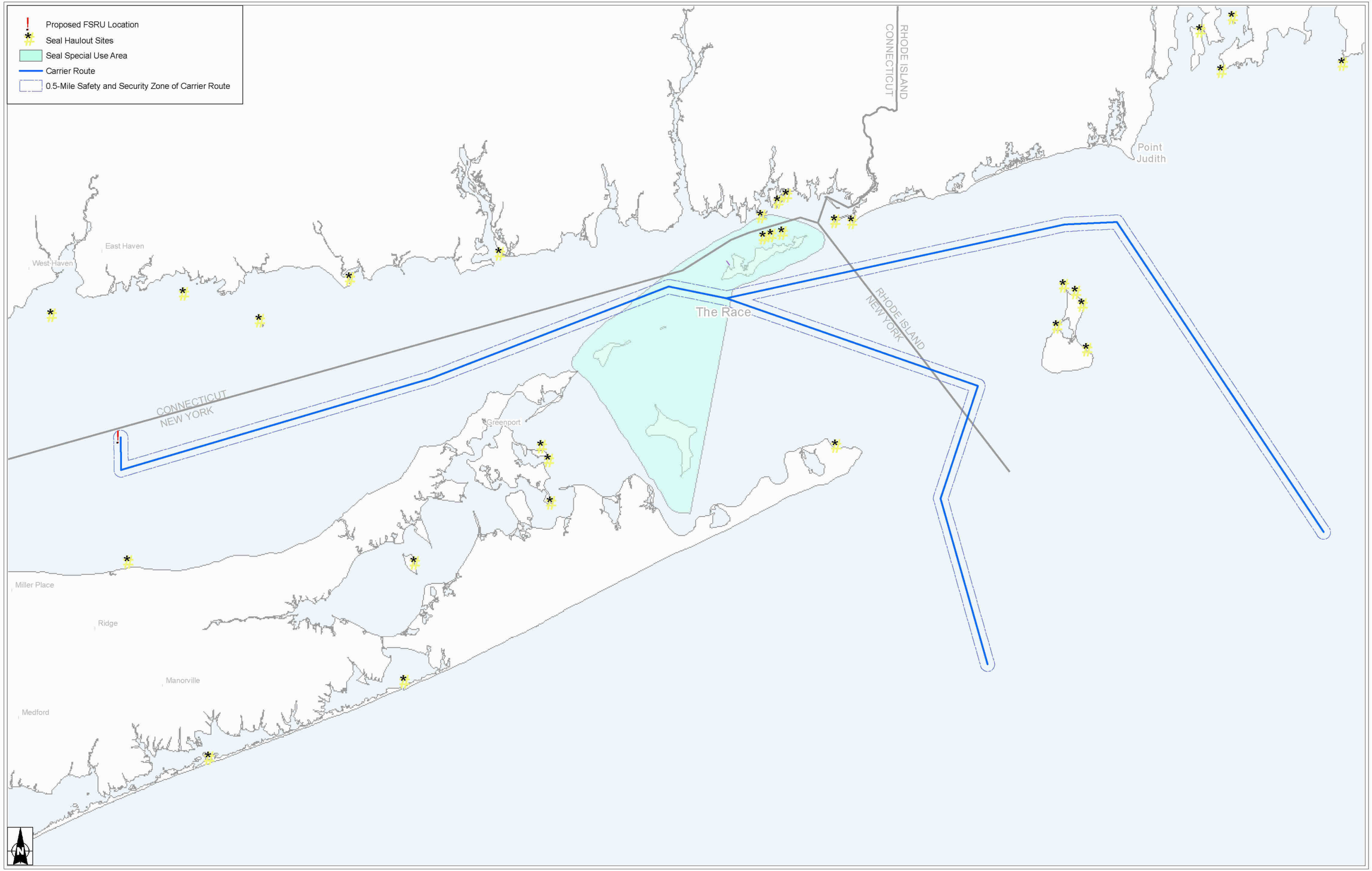
Mitigation

During the course of construction, qualified monitors will be used to avoid impacts to marine mammals, including pinnipeds. NOAA Fisheries and the USFWS, in consultation with the NYSDEC, will be given the opportunity to review resumes of individuals employed as monitors. If marine mammals are identified within the project area, the monitors will assess potential impacts from construction related activities. Monitors will have the authority to stop work if they determine that the Project operations have the potential to threaten the health or safety of marine wildlife or "take" a protected species as defined by regulations implementing the ESA and MMPA. Throughout construction, the monitors will:

- Establish and maintain communications with the vessel operator at all times.
- Be positioned so that a 360-degree view of construction is maintained.
- Be on watch during all construction operations, day or night.
- Use night vision or low-light binoculars in reduced light.
- If a collision appears likely, coordinate with ship pilots to reduce the speed of the vessel as quickly and as much as possible and engage propulsion machinery only when necessary to maintain position.
- If a collision is likely, take up observation position and require available crew aboard the ship to take up observation positions to help report sightings to the monitor so that appropriate actions can be taken to avoid collision.

During construction Broadwater will ensure that the vessel operator deploys any material that has the potential for entangling marine mammals only for as long as necessary, and then immediately removes such material from the Project site. Slack will be taken out of any material that could cause entanglement unless such slack is necessary to allow for currents, tides, and other factors. In the unlikely event that an entanglement appears likely, the marine mammal monitor shall request the operator to remove all lines that

could cause entanglement, if possible, and to take up as much slack as possible in lines that cannot be immediately removed. Temporary mooring buoys will be positioned with heavy steel cables or chains to minimize potential entanglements. Mooring lines will be used only when vessels are moored and will not be left on mooring buoys when not in use.



Seal Haulout Areas in and Around Long Island Sound

EIR-11

Request:

File with the Secretary Broadwater's response to all remaining issues listed in the NY SHPO's December 22, 2005 letter to Ecology and Environment.

Response:

Following receipt of the December 22, 2005 letter, Broadwater contacted SHPO to discuss the outstanding items. SHPO was notified that full scale foldout maps of all charts indicating the route and identified targets would be submitted to SHPO, and SHPO was informed of the text proposed for incorporation into the report addressing 86 potential targets.

Based on the submittal of this additional information, SHPO indicated that all OPRHP requirements for the offshore portion of the Project would be met.

CONTACT REPORT

Meeting [] Telephone [x] Other [ ]

AGENCY:
New York State Office of Parks, Recreation,
And Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island Resource Center
Delaware Ave.
Cohoes, NY 12047

PERSON
CONTACTED:
Mark Peckham,
Historic Preservation Program Coordinator

PHONE NO.:518-237-8643

TO: M. Donnelly

FROM: L. Shmookler

DATE: January 4, 2006

RE: Broadwater, LNG FSRU, response to NYOPRHP comments on Resource Report 4 (RR4).

Mark Peckham of the OPRHP sent a letter to E & E dated December 22, 2005 with comments on the second draft of the RR 4. The letter stated that previous OPRHP concerns regarding theoretical and methodological questions have been resolved.

The letter brought up two outstanding issues: some of the charts were illegible, and the explanation of the treatment of the potential targets outside of the APE was required.

I called Mark and told him that we will send him full scale foldout maps of the all the charts indicating the route and the targets. Also, the final report will be submitted as a part of the FERC filling, and he will get a copy.

I read him a text that I propose to include in the text of the report regarding 86 potential targets, and Mark agreed that this text is appropriate.
Following these corrections the Broadwater RR4 for the LNG FSRU would meet all OPRHP requirements.

ecology and environment, inc.
International Specialists in the Environment
BUFFALO CORPORATE CENTER
368 Pleasant View Drive, Lancaster, New York 14086
Tel: 716/684-8060, Fax: 716/684-0844

January 24, 2006

Mark Peckham
New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island Resource Center
Delaware Avenue
Cohoes, N.Y. 12047

Re: Proposed Broadwater Floating Storage and Regasification Unit (FSRU) and interconnecting marine pipeline, Long Island Sound, New York.
Phase I Investigation. OPRHP No. 05PR00342. FERC Docket No. PF05-4-000. Final Submission.

Dear Mr. Peckham:

On January 4, 2005 we had a conversation pertaining to the OPRHP comments on Resource Report 4 for this FERC filing. We agreed that all issues originating from the comments have been resolved, with the exception of high resolution, large- scale maps. I indicated that these maps would be sent to you.

We are pleased to submit nine maps (24x36 inches) as requested.

It is our understanding that this submission completes the Section 106 consultation with the OPRHP.

We would like to thank the staff at the Historic Preservation Field Services Bureau for their helpful comments and assistance in compliance with Section 106.

If you have any questions or require additional information, please feel free to contact me at (716) 684-8060.

Sincerely,

LShmookler

Leonid Shmookler, RPA
E & E Chief Archaeologist

Encl

CC: Mike Donnelly
David Robinson

EIR-12

Request:

File with the Secretary any correspondence or documentation of consultation with the SHPO or Native American groups not previously filed with the Commission, in particular, and response to Ecology and Environment's January 9, 2006 letter to NY SHPO.

Response:

SHPO issued a letter to Broadwater on February 9, 2006 providing comment on the onshore facilities sites. A copy of the letter is attached. SHPO identified no concerns regarding archaeological resources, and no concerns regarding historic resources at the Port Jefferson site. SHPO identified two National Register listed sites in proximity to the Greenport site. SHPO recommended that if the Greenport site is chosen, Broadwater submit design documents for review. Due to the preliminary nature of Broadwater's selection of Greenport as suitable location, sufficient information is not available at this time to submit to SHPO. As recommended by SHPO, if Broadwater selects Greenport for the onshore facilities, design documents will be submitted to SHPO for review.

OFFICE OF PARKS · RECREATION · HISTORIC PRESERVATION
NEW YORK STATE
Bernadette Castro
Commissioner

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island, PO Box 189, Waterford, New York 12188-0189
518-237-8643

February 9, 2006

Leonid Shmookler, RPA
Chief Archaeologist
Ecology and Environment, Inc.
Buffalo Corporate Center
368 Pleasant View Drive
Lancaster, NY 14086

Re: Broadwater LNG Terminal
Suffolk Co.
FERC, CORPS
05PR00342

Dear Mr. Shmookler:

Thank you for providing the New York State Historic Preservation Office with additional information regarding the Broadwater LNG Terminal in Suffolk County, NY. We received the bound report on January 10, 2006 and are reviewing the project under the provisions of Section 106 of the National Preservation Act of 1966.

Our office has no archeology concerns with this project according to Douglas Mackey of our archeology unit.

If the Greenport site is chosen, we recommend that design documents are submitted to our office for review because of the two National Register listed historic districts adjacent to that site (Greenport Village Historic District 90NR01922 and Greenport Railroad Complex 90NR01923). The site also contains potentially National Register eligible buildings. I have enclosed a copy of our guidelines for new construction for your review and use.

Please send us the following additional information if the Greenport site is chosen:

1. A map showing the location of the historic districts relevant to the project area.
2. Photographs of any buildings 50 years old or older within the view shed of the project area and the historic districts keyed to the map.
3. An existing conditions site plan.
4. Photographs of the site keyed to the existing conditions site plan.
5. A proposed site plan.
6. Elevation drawings of construction proposed.

Thank you for continuing to work with us on this project. Please refer to the PR number at the top of this letter in the future and feel free to contact me at 518-237-8643 ext. 3252 if you have any questions.

Sincerely,

Sloane Bullough
Historic Sites Restoration Coordinator

Enclosure

OFFICE OF PARKS · RECREATION · HISTORIC PRESERVATION
NEW YORK STATE
Bernadette Castro
Commissioner

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island, PO Box 189, Waterford, New York 12188-0189 518-237-8643

New York State Office of Parks, Recreation & Historic Preservation
New York State Historic Preservation Office

Guide to New Construction

1. New additions to an historic property can include new construction physically attached to an historic resource—such as appendage to a building—or may be a separate new piece of construction having nearby historic counterparts, such as a new building, bridge, road or path adjacent to a similar historic resource. They may also include new installations that are completely contemporary in nature, such as utility towers and service, parking facilities, play equipment, street lighting or signage systems.

2. Any new addition should be located in a manner that allows historic features to remain the primary visual and physical components of the historic property. Considerations include characteristics such as density, orientation, scale and form of features both within the historic property and its setting.

3. Attached additions, such as a building appendage, should be somewhat smaller in scale although similar in overall form to the historic feature. Separate new construction, such as a new building along an historic street or a new path within an historic park, should be of the same general scale or size as adjacent historic counterparts. Considerations include overall dimensions, as well as size of significant features—such as roof slopes and overall height, or road width and general alignment. A general rule of thumb is that the new construction falls within 10% of the scale of historic equivalents.

4. Additions to historic properties should reflect the shape or form of similar adjacent historic counterparts. When shape is determined by strict geometric arrangements—for example, the combination of rectilinear components to form buildings or the 90-degree grid of streets and blocks that delineate a village or neighborhood, these same forms should be reflected in contemporary additions. If historic forms are more organic or free flowing, as might be the case in the arrangement of structures on a farmstead or in the overall layout of a trail system, such forms should guide the design of new construction.

5. New construction should be comprised of individual features comparable, but not identical, to those of similar historic properties. For example in an historic district characterized by dwellings having front porches, paired windows and dormers, new buildings should include these same features. The addition of contemporary new construction having no historic precedent—such as surface parking lots, accessibility ramps or security fencing—should be detailed in a manner that avoids false historicism, and instead consists of features typical of present-day stylistic trends.

6. Materials used in new construction should be compatible with those of corresponding historic properties and their features. Additions having historic counterparts should reflect the overall pattern, texture and color of materials found at the historic property; for example, a new outbuilding should complement an historic main building in application of roof, cladding and foundation materials. Contemporary new additions, such as retaining walls or cross-walks, should use materials that complement those of an historic property without conveying a false historic image.

EIR-13

Request:

Clarify the types of fuel used in construction activities and in onshore-related activities. Currently, Appendix A of Resource Report 9 does not specify fuel types for vessels and equipment named in associated spreadsheets. Consider the EPA Final Rule 40 CFR Parts 9, 69, et al., Control of Emissions of Air Pollution From Nonroad Diesel Engines and Fuel.

Response:

Marine vessels will be used in offshore construction activities. No construction will occur onshore; therefore no nonroad construction equipment will be used onshore.

Onshore related activities will consist of an office, the receipt of supplies from a commercial delivery service, storing supplies for shipment to the FSRU in a warehouse, loading and unloading supply vessels and minor maintenance. Commercial delivery services to the onshore facility will likely use on-road diesel powered trucks that will use on-road commercially available diesel fuel. In 2008, ultra low sulfur (15 ppm) on-road diesel fuel will be in use. As a result, the emissions related to onshore activities will be minor (*see* Response to EIR 26).

Marine vessels used in offshore construction will be powered by marine diesel engines that will likely use No. 2 distillate marine diesel fuel. Offshore construction will occur in 2009 and 2010. Construction emission calculation procedures, fuel type and specification used in the analysis are shown in Appendix A of Resource Report 9 (in Appendix A of Resource Report 9, *see* Appendix B "MMS Spreadsheet for Air Emission Calculation"). Air emission computation factors in Appendix B show the diesel fuel specification used (0.4% weight sulfur, etc.). As discussed in more detail below, Broadwater expects that upcoming restrictions on the sulfur content of diesel fuel will significantly reduce sulfur dioxide emissions related to offshore construction activities associated with the Project.

The EPA Final Rule "Control of Emissions of Air Pollution from Nonroad Diesel Engines and Fuel" published June 29, 2004 in the Federal Register, Volume 69, No. 124 was reviewed to assess its impacts on construction and operation emissions associated with the Project. The rule sets forth requirements for diesel engine manufacturers and refiners and importers of diesel fuel for nonroad, locomotive and marine use. The Rule provides that nonroad diesel fuel sulfur requirements for refiners and/or importers will be phased-in beginning in 2007. By June 1, 2010, nonroad diesel fuel produced or imported for use in nonroad equipment excluding locomotives and marine diesels must meet a 15 ppm sulfur content requirement. By June 1, 2012, nonroad diesel fuel produced or imported for use in locomotives and marine diesels must meet a 15 ppm

sulfur content requirement. These limits must be met at the "refinery gate", meaning that the limits apply to fuel that leaves the refinery or import facility.

The final rule distinguishes between sulfur requirements for refiners and importers and sulfur content of diesel fuel downstream of the refiner or importer to be used in locomotive and marine diesel equipment. Although refiners and importers are limited to marine diesel fuel with maximum 15 ppm sulfur content after June 1, 2012, nonroad marine diesel fuel downstream of the refiner or importer is allowed a maximum sulfur content of 500 ppm.[1]

The construction marine vessel emission estimates shown in Resource Report 9 were based on 4,000 ppm (0.4%) sulfur nonroad diesel fuel. Based on the dates in the EPA's rule, beginning June 1, 2007, nonroad diesel fuel produced at a refinery or imported will need to meet a maximum sulfur content limit of 500 ppm (0.05%). The reduction to a maximum 15 ppm sulfur content nonroad diesel fuel for refiners or importers is not mandated until June 1, 2012 for nonroad marine (and locomotive) diesel fuel. Thus, marine vessels operated during construction 2009 and 2010 will use nonroad marine diesel fuel with a sulfur content of 500 ppm (0.05%). Sulfur dioxide emissions for construction activities shown in the revised Resource Report 9, Table 9-12 are 26 tons in construction Year 1 and 67 tons in construction Year 2. The effect of using 500 ppm sulfur nonroad marine diesel fuel in place of 4,000 ppm sulfur nonroad diesel fuel in this calculation would result in an 87.5% reduction in SO_2 emissions to 3.2 tons of SO_2 in Year 1 and 8.4 tons of SO_2 in Year 2. Emission factors for other pollutants for existing engines using the lower sulfur marine diesel fuel are not available and, as a result, it is conservatively assumed for purposes of this analysis that the lower sulfur marine diesel fuel will have no effect on other pollutants when used in existing marine diesel engines.

[1] This provision in the final rule addresses the concerns of the refining industry regarding the need for an outlet for off-specification nonroad diesel fuel and the likelihood that after fuel with a sulfur content of 15 ppm leaves the refinery or importer, it may become contaminated with higher sulfur fuel residue in transport and storage tanks (defined in the rule as the generation of off-specification product in the distribution system). EPA determined that the locomotive and marine diesel fuel pool should remain an outlet for the off-specification product; thus, the 500 ppm sulfur limit for nonroad LM diesel fuel provides the needed flexibility.

EIR-14

Request:

Explain why calculations for the general construction emissions in Appendix A of Resource Report 9 do not match values presented in the text of Resource Report 9 (Table 9-12), or correct them as appropriate. In addition, report $PM_{2.5}$ and PM_{10} separately, and reflect the zero values for ammonia in the calculations in Appendix A.

Response:

Construction emissions shown in Table 9-12 of Resource Report 9 dated January 2006 were not updated to reflect the revised values shown in Appendix A of Resource Report 9. A revised Table 9-12 is shown below. Although ammonia was shown in the previous version of Table 9-12, none of the construction vessels or other construction equipment will emit ammonia. Therefore, the ammonia column has been removed from revised Table 9-12 below. Since Resource Report 9 was filed with the FERC, EPA has established general conformity *de minimis* levels for $PM_{2.5}$ and specified $PM_{2.5}$ precursors. Broadwater is in the process of evaluating EPA's final general conformity rule and will update Table 9-12 to reflect this rule.

Table 9-12 Estimated Emissions from Construction Activities

Year	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	NO_X[(1)] (tpy)	VOCs[(1)] (tpy)	CO (tpy)
1	10	10	26	213	11	46
2	22	22	67	538	24	117
Annual General Conformity *de minimis*	100[(2)]	100[(2)]	100[(3)]	100	50	Not applicable

(1) Assumes that *de minimis* thresholds proposed by EPA for a moderate ozone nonattainment area are applicable. The *de minimis* threshold for VOCs under the proposed $PM_{2.5}$ implementation rule is less stringent than the ozone nonattainment *de minimis* VOC threshold; the *de minimis* threshold for NO_x under the proposed $PM_{2.5}$ implementation rule is equal to 100 tpy, which is the same as the *de minimis* threshold proposed by EPA for moderate ozone nonattainment. If the 1-hour ozone nonattainment *de minimis* thresholds are applied for NO_x and VOC (25 tpy each), the outcome would be the same for each construction year; i.e., construction emissions of NO_x would be above *de minimis*, while construction emissions of VOC would be below *de minimis*.

(2) EPA issued guidance in April 2005 describing an interim surrogate $PM_{2.5}$ program for nonattainment areas to be used while states develop $PM_{2.5}$ control programs. The threshold for $PM_{2.5}$ in this guidance is recommended to equal the 100-tpy threshold for PM_{10} nonattainment areas.

(3) EPA's proposed $PM_{2.5}$ implementation rule (issued 11/01/05) does not set *de minimis* levels for $PM_{2.5}$ precursor compounds. However, the proposed rule suggests that the *de minimis* levels will be set equal to nonattainment area major source levels for the NSR program. Thus, using this approach, 100 tpy would be the *de minimis* level for all $PM_{2.5}$ precursor pollutants.

EIR-15

Request:

Provide a copy of the air mitigation plan being prepared for submittal to the NYSDEC documenting compliance with the General Conformity regulations (40 CFR Part §51.860) for the portion of Project emissions generated in the State of New York taking into consideration all enforceable and quantifiable mitigation measures. If Project emissions exceed listed General Conformity applicability thresholds, provide detailed information documenting how the Project would demonstrate conformance with the applicable State Implementation Plan and/or Air Quality Management Plan in accordance with Title 40 CFR Part 51.858. Address each regulatory criteria listed in Part 51.858 and provide:

a) A detailed explanation as to whether or not the Project, in whole or in-part, would meet each requirement to demonstrate conformity; and
b) For each criteria being satisfied, provide all supporting information on how the Project would comply.

Response:

The recent publication of the "Proposed Rule to Implement the Fine Particle National Ambient Air Quality Standards" (Federal Register, Tuesday November 1, 2005) and publication of the direct final rule "PM2.5 *De Minimis* Emission Levels for General Conformity Applicability" (Federal Register, Vol. 71, No. 65, April 5, 2006) are being evaluated with respect to the Project. Broadwater is also evaluating EPA's "Proposed Rule to Implement the 8-Hour National Ambient Air Quality Standard" (Fed. Reg. Vol. 68, No. 105, June 2, 2003) with respect to the Project. Suffolk County is designated nonattainment with respect to the 8-hour ozone standard and candidate mitigation measures are being evaluated to address NO_x and VOC emissions subject to General Conformity for ozone. Suffolk County is also designated nonattainment for $PM_{2.5}$. Projected direct emissions of $PM_{2.5}$ subject to General Conformity are expected to be below the *de minimis* level; however, General Conformity also applies to project emissions of $PM_{2.5}$ precursor compounds. The final rule indicates that certain compounds (i.e. VOCs and ammonia) that may be $PM_{2.5}$ precursor compounds may be identified as $PM_{2.5}$ precursors by EPA at the Regional level or by the State air agency for General Conformity purposes. Thus, the air mitigation plan remains under development since neither EPA Region 2 nor NYSDEC has indicated their intention regarding establishing additional *de minimis* levels.

EIR-16

Request:

Provide technical justification to support Broadwater's conclusion that a pipeline longer than 40 miles would require intermediate compression.

Response:

The Broadwater Project is designed to increase the availability of natural gas to the New York and Connecticut markets through an interconnection with the 24-inch-diameter Iroquois Gas Transmission pipeline located subsea at MP 18.2 of Iroquois' Long Island Sound crossing. Broadwater's 30-inch-diameter connecting pipeline will deliver the vaporized natural gas approximately 22 miles from the FSRU site to the subsea interconnect. The Maximum Allowable Operating Pressure (MAOP) of the Broadwater connecting pipeline matches that of the Iroquois pipeline at 1,440 psig. The Broadwater pipeline does not need to utilize its full MAOP under most operating scenarios. As shown in Exhibit G of Broadwater's application, a sendout pressure of 1,393 psig for the average throughput of 1 bcf/d will provide for the daily design capacity of the system. The daily design capacity reflects the maximum deliverability to New York City and necessitates a delivery pressure at the Iroquois interconnect of 1,270 psig after transmission pressure losses along the connecting pipeline. If at the average throughput of 1 bcf/d the sendout pressure were to equal the pipeline MAOP of 1,440 psig then the connecting pipeline could theoretically be lengthened to approximately 28 miles. Distances longer than 28 miles would necessitate intermediate pressure boosting in order to match the daily design capacity afforded by the preferred Iroquois interconnect location. Therefore, 28 miles is the actual length constraint for the connecting pipeline given the preferred Iroquois location.

EIR-17

Request:

Describe potential impacts to water quality and marine resources (e.g., sea turtles, marine mammals, and fish) from spills of chemicals used during construction and operation of the proposed Project.

Response:

An accidental release of diesel fuel, oil, or other substances during construction or operation could disturb foraging activities, migration patterns, and spawning events or cause direct harm to marine species and habitats. A release of fuel oils may effectively narcotize invertebrate species, making them more susceptible to predation. An accidental release of chemicals could also cause injury or mortality of marine mammals through direct contact or ingestion of the material. LNG or hydrocarbon releases, such as diesel fuel and various lubricants, could result in negative direct impacts to juvenile and adult fish that are irreversible, including death or chronic effects. Information about the effects of methane and its homologues on marine organisms is limited. However, in the marine environment, gases in general can rapidly penetrate into fish (especially through the gills) and disturb the main functional systems. External evidence of these disturbances includes a number of common symptoms mainly of behavioral nature (e.g., fish excitement, increased activity, scattering in the water). Further exposure can lead to chronic poisoning and cumulative effects can occur. These effects depend on the nature of the toxicant, exposure time, and environmental conditions.

The construction barges and support vessels, as well as the FSRU, LNG carriers and other support vessels will have stored fuels and possibly other hazardous materials on board that are required for normal operations (e.g., lubricating oils, etc.). Therefore, there would be a potential for accidental spillage of these materials into marine waters. All vessels must comply with MARPOL and other applicable regulations to minimize the risk of accidental discharges to the extent possible. All vessels will have an approved Spill Prevention Control and Countermeasures (SPCC) plan, which will identify specific measures to avoid or minimize potential impacts of a release into marine waters during construction and operation.

Due to their size and mobility, fish species are less likely to be affected by such a release. Any such release would float to the water's surface and disperse from the immediate spill area and would affect only a small number of individual organisms.

It is expected that with immediate response actions, as prescribed in required construction and operation spill response plans, the consequences of a release would be temporary and limited in scope. Since fish do not come up to the surface for air, any potential spills of

oil or lubricants, which generally float on the surface of the water, would be unlikely to have a direct effect on marine fish populations. Large releases of LNG can result in seawater cooling and freezing of surface layers with potential effects on fish near the surface, through either behavioral avoidance of colder waters or physiological effects. In addition, there may be negative indirect effects to fish from releases and potential spills that may affect their eggs and food sources at the surface, but overall impacts to marine fish from any releases would be negligible.

Seabirds, especially diving birds, are extremely vulnerable to oil and fuel spills. Oil clogs the fine strands of the feathers, which shed water and trap air for insulation (Holmes and Chronshaw 1977). Once this occurs, the metabolic rate increases, the fat reserves are expended and progressively more energy is consumed, resulting in death. Also, once the feathers are fouled, buoyancy is reduced, resulting in even greater expenditures of energy (Briggs et al. 1997). Oiled seabirds generally preen, ingesting oil in the process. Aliphatic compounds may concentrate in the liver, resulting in adverse behavioral effects (Kuletz 1997). Numerous inflammatory and toxic impacts on internal organs can be manifested (Leighton 1991). Oil in the gastrointestinal system can result in limited absorption of nutrients (Briggs et al. 1997).

The effects of hydrocarbon exposure to marine mammals have been somewhat better documented. In general, these effects vary from species to species and with various hydrocarbon compounds. Ingestion of hydrocarbon compounds can occur when marine mammals breathe in volatile elements or swallow oil. The liver and blubber tend to accumulate the highest concentrations of hydrocarbons. These substances may be released from blubber during lactation, which may affect the young at crucial life stages. Little though is known on the clinical or pathological effects of oil on pinnipeds. Most do not die after exposure to such substances (Moeller 2003). The literature is replete with cautions against assuming a casue and effect relationship between exposure of marine mammals to hydrocarbons and other potentially toxic susbstances. Contaminant levels in tissues do not necessarily equate to contaminant toxicity (Reddy and Ridgeway 2003). The greatest difficulty lies in obtaining sufficiently large sample sizes from both healthy and moribund specimens, as well as restrictions on controlled experiments on living marine mammals (Stein et. al 2003).

References:

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Stein, J.E., K.L. Tilbury, J.P. Meador, J. Gorzelany, G.A.J. Worthy, and M.M. Krahn. 2003. Ecotoxicological investigations of bottlenose dolphin (Tursiops truncatus) strandings: accumulation of persistent organic chemicals and metals. In Toxicology of marine mammals, edited by J.G. Vos, G.D. Bossart, M. Fournier, and T.J. O'Shea. New York: Taylor and Francis. pp. 458-485.

EIR-18

Request:

Identify any mitigation measures that Broadwater proposes to minimize impacts to ichthyoplankton.

Response:

As presented in Resource Report 3 Section 3.3.2.2, Broadwater proposes the following measures to minimize impacts to ichthyoplankton:

- Water intake flow velocities will be maintained at a maximum of 0.5 feet/second (0.15 m/s) or less, which will allow any motile organisms to swim away from the intake, thereby largely limiting entrainment/impingement impacts.
- The intake structure will include a pair of screens/grates to further reduce impacts. The intake will contain a grate, flush with the FSRU hull that will restrict the passage of larger fish.
- A second internal screen with a mesh size of approximately 5 mm will restrict the intake of all but the smallest planktonic organisms.
- Intakes for the FSRU will be located approximately 40 feet (12 m) below the water line.
- LNG carriers calling on the FSRU will have similar screen sizing and intake velocities. However, due to less draft, intakes associated with the carriers may be as shallow as 30 feet (8 m).
- By situating the intake structure at approximately 30-40 feet (8-12 m) below the surface, in the middle of the water column, impacts are avoided for all buoyant or demersal biological life stages.

EIR-19

Request:

Describe the economic effects of project construction on commercial fishing and what mitigation measures Broadwater would incorporate into the project to eliminate or minimize those impacts. Identify any compensation options being considered for impacts to commercial fishermen during construction and operation.

Response:

Attached is a copy of a study entitled "Marine/Land Use Compatibility Assessment" dated April 2006. The study was filed as Appendix E to Broadwater's New York State Coastal Zone Consistency Determination that was filed with the New York Department of State on April 4, 2006 and with the FERC on April 12, 2006. The study describes the effects on commercial fishing from project construction and operation. Impacts from construction were analyzed based on a conservative estimate of a 1,000 yard safety and security zone referenced to the center of the mooring tower. Analysis of impacts will be further refined when the size of the anticipated safety and security zone is determined by the United States Coast Guard. Current analysis, as reflected in the study, indicates that there will be only minor impacts to commercial fishing. As part of its continuing outreach program, Broadwater will be discussing its impacts analysis with affected fishermen and will provide compensation to fishermen for a demonstrated loss of income due to the Project.

APPENDIX E

MARINE/LAND USE COMPATIBILITY ASSESSMENT

April 2006

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1.0 MARINE USE

1.1 General Description of Long Island Sound Coastal Region and Marine Resources

Long Island is the largest island adjoining the continental United States, extending approximately 118 miles (190 km) east-northeast from the mouth of the Hudson River. Totaling 1,377 square miles (3,580 km^2) of land area, Long Island is divided into four counties: Kings (Brooklyn), Queens, Nassau, and Suffolk. The proposed floating storage regasification unit (FSRU) site and subsea pipeline route are located in Suffolk County, New York.

Land uses along the coastal areas of Long Island vary primarily according to the location on the island. The population and overall development is generally less dense on the eastern coastal areas of Long Island, including the area directly south of the proposed Project as well as areas to the east (i.e., eastern Suffolk County). Suffolk County's five eastern towns (Riverhead, Southampton, Southold, East Hampton, and Shelter Island) had a combined estimated population of 136,850 in 2004, or only 9% of the County's population, but occupy 42% of the county's land area. The estimated population of Suffolk County was 1,475,488 in 2004, and the Town of Brookhaven (estimated population 471,291) is Suffolk County's most populous town. The estimated population of Nassau County, which is immediately west of Suffolk County, was 1,339,641 in 2004.

The coastal area of eastern Suffolk County is much less urbanized than the western portion of the County. Eastern Long Island comprises a mix of agriculture, open space, and rural/low-density residential development. Some densely developed commercial/industrial uses occur along eastern Long Island, outside of organized maritime centers; however, most urban development occurs in the defined maritime centers such as Port Jefferson and Greenport (*see* Figures 1-1 and 1-2).

Regional land use patterns in the upland areas comprising the four larger towns traversed by the Suffolk County north shore watershed boundary are mixed. Residential development comprises 53% of the watershed acreage, with the majority of that category being low-density residential (*see* Table E-1).

Table E-1 Regional Land Use in Towns Traversed by the Suffolk County North Shore Watershed Boundary

	Huntington	Smithtown	Brookhaven	Islip	Total	Percent
Low-density residential	7,316	4,630	2,817	24	14,787	28.50%
Medium-density residential	3,415	4,198	3,854	134	11,601	22.30%
High-density residential	571	218	234	0	1,023	2.00%
Commercial	324	295	274	10	903	1.70%
Industrial	34	185	36	0	255	0.50%
Institutional	776	1,028	1,390	141	3,335	6.40%
Recreation and Open Space	4,279	4,670	1,283	55	10,287	19.80%
Agriculture	86	197	96	0	379	0.70%
Vacant	1,290	1,053	953	1	3,297	6.30%
Transportation	1,833	1,910	1,621	39	5,403	10.40%
Utilities	416	53	171	6	646	1.20%
Waste Handling and Management	0	19	6	0	25	0.10%
Freshwater surface	22	5	9	0	36	0.10%
Total	**20,362**	**18,461**	**12,744**	**410**	**51,977**	**100.00%**

Source: Suffolk County 2004

1.2 Marine Resources and Potential Marine Use Conflicts in Long Island Sound

The proposed Project will be located in an open-water environment in Long Island Sound. The land use within which the offshore Project will be constructed and operated is designated entirely as open water. Onshore components of the Project will be located in waterfront locations with various land use designations (*see* Section 2). The offshore Project area falls under certain jurisdictions of the State of New York as the Project is entirely located within the New York portion of Long Island Sound. A summary of the entire Project area, including marine resources identified in the Sound and in the Race, as well as the proposed FSRU location and liquefied natural gas (LNG) carrier transit route, is presented on Figures 1-1, 1-2, and 1-2.1. The Race is the eastern entrance to Long Island Sound, between Fisher's Island and Gull Island, including Valiant Rock. (*see* Resource Report No. 8, Land Use, Recreation and Aesthetics, incorporated herein by reference). Because the U.S. Coast Guard has not defined the required safety and security zone for the Project, the summary map and overall assessment assumes conservatively that the safety and security zone will be approximately 1,000 yards as

referenced to the center of the mooring tower. The U.S Coast Guard will also establish a traveling safety and security zone for the LNG carrier as it transits to the FSRU. Broadwater assumes conservatively that the U.S. Coast Guard-imposed safety and security zone will be approximately 2 miles ahead, 1 mile behind and 880 yards on either side of the LNG carrier. An assessment of resources located in the vicinity of the proposed FSRU location, the preliminary LNG carrier transit routes, and the onshore portions of the Project are presented in this document. The assessment also identifies any potential conflicts or compatibility issues with marine and land uses in Long Island Sound and the resulting impact.

1.2.1 Shipping Routes and Designated Navigable Waters

As the primary thoroughfare for accessing the industrial ports along the coast of Long Island, Long Island Sound continues to support a significant amount of commercial vessel traffic. In fact, approximately 46 million tons of petroleum and coal are currently moved annually by ship in the Sound. Navigation-dependent activities are very important to the economies of New York and Connecticut and comprise a significant portion of the use of the main body and port areas of Long Island Sound. Broadwater purposely sited the FSRU and interconnecting pipeline to avoid impacts on other water-dependent businesses and activities.

There are no official vessel traffic routes in Long Island Sound. In the absence of a routing scheme in the Sound, reliance on federal navigational aides and the use of standard marine practice have led to the development of de facto traffic patterns and generalized shipping routes in the Sound. The generalized shipping routes illustrated on Figure 1-3 were identified by the U.S. Coast Guard as part of its Ports and Waterways Assessment (PAWSA) (U.S. Coast Guard 2005) conducted for Long Island Sound in May of 2005. The figure presents vessel routes identified using global positioning systems (GPS) onboard vessels that travel the Sound. While the figure may not depict all routes utilized by vessels, it does identify the primary routes utilized by commercial vessels in the Sound as determined by the U.S. Coast Guard. Maintained navigation channels are restricted to nearshore areas and within the rivers and harbors along the Sound. The locations of ports within the Sound and the presence of Stratford Shoal, which is centrally located in the Sound, largely dictate the specific paths that shipping follows in the Sound (*see* Figure 1-1). Following the installation of the FSRU and pipeline, all navigation maps for the Sound would be updated to include both the FSRU location and the specific safety and

security zone surrounding the facility, as designated by the U.S. Coast Guard.

The FSRU will be a permanent navigation constraint during its operational lifetime. Construction of the pipeline that interconnects the FSRU with the existing Iroquois Gas Transmission System (IGTS) pipeline could result in a short-term impact on navigation due to the presence of construction vessels on the Sound. Navigational warnings and precautions will be implemented so as to not impede vessel traffic during the period required for pipeline construction and installation of the mooring structure. In addition, Broadwater will coordinate with the U.S. Coast Guard, and a Notice to Mariners will be issued with installation details. Construction vessels associated with the Project will maintain an open line of communication with all vessels during construction and installation activities.

Potential Marine Use Compatibility Issues

As shown on Figure 1-4, there is a potential conflict between the historic shipping route that traverses the central portion of the Sound and establishment of the U.S. Coast Guard-required safety and security zone around the FSRU. The 1,000-yard safety and security zone would overlap with a portion of this vessel transit route based on the transit data provided by the U.S. Coast Guard.

However, given the width of the shipping route, as demonstrated by the U.S. Coast Guard data, this minor conflict is manageable. Large commercial vessels transiting the Sound are controlled by local pilots who are aware of all navigational constraints in the Sound. Therefore, these vessel pilots would be well aware of constraints associated with the FSRU and the U.S. Coast Guard-designated safety and security zone and could modify their course of transit accordingly. By having the Broadwater facility located in the widest portion of the Sound, there is ample space to allow for navigation outside any established safety and security zone.

1.2.2 Subsea Utilities

Several cables, pipelines, and other utilities traverse the bottom of Long Island Sound. These utilities are largely buried beneath the seafloor except in specific locations where rock or other obstructions prevent complete burial. The Project's pipeline will cross subsea rights-of-way and other designated uses between the FSRU and IGTS tie-in location. These crossings are described below. Impacts on these existing subsea utilities will be temporary and

limited to the construction phase of the Project.

- **Cross Sound Cable.** This submarine power cable traverses the Sound from New Haven, Connecticut, to Shoreham, New York. The proposed Broadwater pipeline route will require a single crossing of this cable.

- **AT&T Cable Corridor.** This submarine fiber-optic telecommunications cable corridor traverses the Sound from Shoreham, New York, to East Haven, Connecticut. The proposed Broadwater pipeline route crosses the corridor and associated cables.

- **IGTS Pipeline.** This pipeline runs from Northport, New York, to Milford, Connecticut. A subsea connection to this pipeline will be the terminus of the proposed Broadwater subsea pipeline.

- **MCI Cable Corridor.** This fiber-optic telecommunications cable corridor runs from Rocky Point, New York, to Madison, Connecticut. It is located east of the proposed FSRU location.

- **Cross Island Cables.** These seven power cables are contained within a corridor that crosses Long Island Sound from Northport, New York, to Norwalk, Connecticut. The corridor is located west of the proposed Broadwater pipeline's western terminus at the IGTS pipeline.

- **Flag Atlantic-1 North Cable.** This trans-Atlantic fiber-optic telecommunications cable extends from Northport, New York, to England. The portion of the cable in Long Island Sound runs south of the New York/Connecticut border and provides a direct communication link between New York City, London, and Paris. This cable is located south of the proposed Broadwater pipeline route and will not be impacted by the Broadwater Project.

- **IGTS Eastchester Extension.** This pipeline runs east-west in the Sound from Northport to Eastchester, New York, west of the Broadwater Project area.

- **Islander East Pipeline.** This proposed pipeline is routed to the east of the Broadwater Project area.

Potential Marine Use Compatibility Issues

There are no anticipated conflicts or compatibility issues with existing utilities in Long Island Sound from either the FSRU or LNG carriers, and the associated security zones, as these utilities are located beneath the seafloor. Regardless of the size of the safety and security zone designated by the U.S. Coast Guard for the FSRU, existing facilities will be located well outside of the safety and security zone, allowing normal maintenance operations to occur as

required, with no impact on either the Broadwater Project or the individual utilities. Installation of the Broadwater pipeline will create an additional utility right-of-way within the Sound that will need to be depicted on navigation charts to avoid future impacts. While the pipeline will require a new right-of-way, the extensive field investigations conducted by Broadwater demonstrate that, with the exception of Stratford Shoal, the bottom substrate is largely homogenous across the 21.7-mile length of the proposed pipeline. In addition, the substrate offers no unique habitat value, and installation of the pipeline will not impact the health of the Sound's ecosystems. Where the pipeline route traverses Stratford Shoal, which is largely characterized by a cobble substrate, the pipeline will be protected with rock or other imported fill material, which will not result in adverse impacts on any other existing marine uses.

1.2.3 Commercial Fishing/Designated Fishing Grounds

Commercial Fishing

Long Island Sound has numerous areas that traditionally have been high-use fishing grounds and fishery areas. Shellfishing tends to predominate in the shallower nearshore Connecticut waters, while lobster fishing and finfishing predominate in the deeper central portions of the Sound. Whereas the nearshore shellfishing grounds are established through defined leases with the states, the finfish, and lobster industries tend to operate under informal agreements with regard to specific areas fished. Much of the nearshore area along the Connecticut coastline in proximity to the FSRU is designated for oyster and clam leases (*see* Figure 1-1). In New York, the New York State Department of Environmental Conservation (NYSDEC) has designated offshore areas in Long Island Sound as Marine Use Assignment Areas, which are located close to the New York shoreline, away from both the proposed FSRU location and subsea pipeline route. Marine Use Assignments are 5-acre parcels within which NYSDEC permits use by shellfishermen for off-bottom culture of shellfish. Hard clams and Eastern oyster are the most actively fished commercial species in the region, accounting for more than 74% of the total revenues in 2001. Given Broadwater's location in the deeper waters of the central Sound, impacts to the hard clam and oyster industries are avoided, thus preserving the most economically important component of the commercial fishery.

Historical use maps of the Sound prepared by the Connecticut Department of

Environmental Protection (CTDEP) indicate that nearly all of the western two-thirds of the Sound, including the area being considered for the FSRU and pipeline, are classified as a high-use lobster fishery area. Although lobstermen are required to renew permits on a yearly basis, the state agencies do not provide leases for particular portions of the Sound. Rather, territories have been determined largely through historic usage and informal agreements between the fishermen.

Historically, the lobster fishery was a significant part of the shellfish industry in the Sound; however, lobster catches have decreased significantly in recent years because of a die-off that began in 1998. Despite the lobster die-off that has occurred in recent years, the Project area continues to be heavily fished for lobsters. Finfishing also takes place throughout the Sound, although trawl fishing is limited because of the density of lobster pots throughout the Sound.

For the years leading up to the die-off, lobstermen throughout Long Island Sound landed an average of 10 million pounds (4.5 million kilograms) of lobster per year, with a total value of $32 million annually. Since the die-off, the landings have fallen to 1.44 million pounds (650,000 kg), and the value has declined to approximately $5.1 million. As a result, several lobstermen have chosen to pursue finfish and shellfish after modifying their vessels and gear, while others have dropped out of the industry. Tables E-2 and E-3 summarize the top five commercial fish landings, in terms of dollars, for New York and Connecticut for the years 2002 and 2003.

Table E-2 Top Five Commercial Fishing Landings, in Terms of Dollars, for New York and Connecticut (2002)

Location of Species	Pounds	Value	Price per Pound
New York			
Quahog clam	1,501,752	$12,244,654	$8.15
Longfin squid	9,613,411	$6,246,554	$0.65
Atlantic surf clam	8,543,690	$5,519,822	$0.65
American lobster	1,440,483	$5,131,295	$3.56
Eastern oyster	536,958	$4,994,990	$9.30
Connecticut			
Quahog clam	3,434,844	$9,202,241	$2.70
Sea scallop	1,578,640	$6,399,897	$4.05
American lobster	1,067,121	$4,225,522	$3.96
Eastern oyster	246,669	$2,012,161	$8.16
Longfin squid	1,778,266	$1,178,428	$0.66

Source: National Oceanic and Atmospheric Administration (NOAA) Fisheries Department (NOAA Fisheries) 2005.

Table E-3 Top Five Commercial Fishing Landings, in Terms of Dollars, for New York and Connecticut (2003)

Location of Species	Pounds	Value	Price per Pound
New York			
Quahog clam	1,552,946	$12,399,024	$7.98
Atlantic surf clam	13,263,570	$7,934,420	$0.60
American lobster	946,449	$4,426,316	$4.68
Longfin squid	4,602,936	$4,353,264	$0.95
Eastern oyster	466,117	$4,262,701	$9.15
Connecticut			
Quahog clam	4,038,021	$10,469,996	$2.59
Sea scallop	1,907,675	$8,124,639	$4.26
American lobster	671,119	$3,170,088	$4.72
Eastern oyster	279,414	$2,273,760	$8.14
Silver hake	2,453,756	$1,460,245	$0.60

Source: NOAA Fisheries 2005

Lobster Fishing

Throughout Long Island Sound, fishing occurs according to territories established through cooperative agreements between and among the fishermen. Lobster fishing and other fishing utilizing fixed gear is ubiquitous throughout the Sound, with very high lobster pot densities in some areas. Lobster pots are usually set in a series, with 5 to 15 traps being most common. The pots are strung on a ground line about 60 to 100 feet apart. Buoys marking these lines of lobster pots can be set at intervals of 500 feet or less. Based on an average of 10 pots per line and 500-foot intervals between buoys, lobster pot densities could be as high as 1,000 per square mile. However, given the overall reduction in lobster pots that has occurred in the last 7 years, the actual number of traps set in any given area is likely to be considerably less. NYSDEC estimates that approximately 110,910 lobster traps were set in all of Long Island Sound (including the East End) in 2004 (*see* Table E-4). Based on this data, 32,336 lobster traps were set in eastern Long Island Sound (where the FSRU would be located) in 2004. This represents a

decrease of approximately 76,000 traps from 1998 (i.e , prior to the significant lobster die-off in the Sound) when 108,413 traps were set

Table E-4 Lobster Trap Use Reported on Annual Recall Survey

Year	Western Long Island	Eastern Long Island	East End	Total Long Island Sound
1998	162,457	108,413	28,926	299,795
1999	161,910	102,024	40,447	304,381
2000	81,835	80,065	30,406	192,306
2001	80,708	71,205	24,095	176,007
2002	57,207	65,862	21,556	144,624
2003	40,307	36,011	12,654	88,971
2004	52,971	32,336	25,604	110,910

Source: NYSDEC 2005

Trawling Lanes/Finfishing

In order to avoid conflict between fishermen using fixed gear and fishermen who trawl, specific areas have been agreed upon as trawling lanes. In general, trawling is limited in the Sound due to the predominance of fixed-gear lobster fishing. Trawling lanes were identified during the initial consultation with local fisherman and through information presented in the *Environmental Impact Statement for the Designation of Dredge Material Disposal Sites in Central and Western Long Island Sound, Connecticut and New York* (EPA 2004). Designated trawling lanes in Long Island Sound are shown on Figure 1-5.

Lobster fishermen report fishing 12 months of the year, with two peak periods, one in the spring/summer (beginning sometime between February and April and continuing through August) and one in the fall/early winter (late October through December). Fishermen who trawl reported fishing from April to June, August to October, and December to January. Table E-5 provides a summary of the species fished, gear type, and fishing periods reported by fishermen interviewed during the survey.

Table E-5 Species Fished, Gear Used, and Fishing Periods

Species Fished	Gear	Fishing Periods
Lobster	Lobster traps/pots	12 months (beginning sometime between February and April and continuing through August, and in late October through December; peak in the spring/summer)
Primary lobster by-catch: tautog (blackfish), black sea bass	Lobster traps/pots	
Other lobster by-catch: scup (porgies), conch, squid, summer flounder	Lobster traps/pots	
Tautog (blackfish)	Fish pots	
Conch	Conch pots	
Scup (porgies), summer flounder, tautog (blackfish), bluefish, striped bass, squid, flounder, and butterfish	Fish traps, nets, hook and line	12 months (target species change with seasons)
Scup (porgies), summer flounder, tautog (blackfish), bluefish, striped bass, squid, flounder, and butterfish	Trawl	Focused efforts from April to June, August to October, and December to January (target species change with seasons)

Broadwater undertook a fishermen's outreach program for the proposed Project in order to identify interested parties that utilize the Sound for commercial and recreational fishing and to identify those that may be impacted by the Project (*see* Appendix F). Information obtained from commercial and recreational fishermen through a telephone survey included: areas fished in Long Island Sound, targeted species, gear type, seasons fished, and concerns related to the proposed Project. The outreach program also included review of information provided by NOAA Fisheries related to catch in the Project area.

The majority of interviewed commercial fishermen (> 90%) target lobster with fixed gear (lobster pots/traps). This corresponds with reports of lobster fishing dominating the commercial fishing industry in Long Island Sound. Approximately half of the lobster fishermen target only lobster and half also harvest finfish.

A discussion of the potential marine conflicts and economic impacts associated with removal of areas fished is discussed below. A comprehensive economic impact analysis discussing impacts on commercial fisheries is presented in Appendix F, and the Fisherman Outreach Study is provided in Appendix H.

Potential Marine Use Compatibility Issues

Lobster Fishery

By estimating the safety and security zone surrounding the stationary tower structure/FSRU at 1,000 yards, an order-of-magnitude estimate of the number of potentially displaced lobster pots and lobstermen and an estimate of the overall direct and indirect economic impact on the lobster industry can be made. As discussed below, the projected economic losses associated with the Project are not significant in terms of the overall industry production, and any adverse economic impacts can be easily offset by Broadwater.

The trawling lane that parallels the New York and Connecticut border (*see* Figure 1-5) may be impacted by the FSRU and the associated safety and security zone. However, as shown on Figure 1-5, the established trawling lane is wide enough to accommodate trawling to the north.

Economic Impacts of Lobster Fishing

Future annual landings for the safety and security zone were estimated. Detailed procedures and methodologies employed for this study which address value of average landings and density of lobster pots in Long Island Sound are provided in Appendix F. Based on recent average lobster pounds caught per pot in the Project ocean area (*see* Figure 1-6) and a potential range of potential lobster pots per trawl in Long Island Sound, the analysis indicates a restricted access area of 1,000 yards from the FSRU radius would, for example, correspond to annual lobster landings valued at between $5,000 and $20,000 per year depending on the number of pots attached to a trawl. In other words, at 15 pots per trawl, the annual value of landings contained within a 1,000 yard safety and security zone would average $15,000 (*see* Table E-6).

Table E-6 Direct Economic Impacts-Summary Analysis Based on Range of Lobster Pots per Trawl

Pots per Trawl	Economic Impact
Value of Average Annual Landings (2010-2040)	
5	$5,029
10	$10,059
15	$15,088
20	$20,118
Cumulative Present Value of Future Annual Landings (2010-2040)	
5	$81,442
10	$162,883
15	$244,325
20	$325,766

Also, as illustrated by Table E-6, the estimated cumulative present value of future landings is estimated to be $326,000 over the life of the Project. This represents a potential worse case economic loss scenario over the lifetime of the Project.

In addition to direct impacts, indirect and induced impacts were estimated. Direct economic loss has an indirect economic impact or stimulus on the suppliers and firms that are the recipients of subsequent rounds of spending related to the impacted activity. In addition, employees and households that earn wages from these industries are also impacted and they in turn spend a portion of their incomes in NYS. These latter impacts are called induced effects. The direct, indirect and induced impacts are summed and are called total economic impacts. The indirect and induced impacts represent the multiplier or ripple effects that are generated from the initial direct impacts on the lobster landings revenues.

The total economic impacts associated with the potential loss of lobster revenues due to a 1,000 yard safety and security zone were estimated for an average year, and also over the long-term 30 year operational life of the Project (*see* Table E-7). The long-term impacts were estimated for each year over the life of the Project and also expressed as a cumulative present value sum. The cumulative present value sum is a measure of the total long-term impact in

present worth terms. Table E-7 also presents the impacts to employee compensation, total value added and employment. With a projected 1,000 yard safety and security zone for the Project, the total cumulative economic impact to the lobster fishing industry is estimated at approximately $381,000 in present values terms over a 30-year period. This represents the potential worst case scenario

Table E-7 Summary of Economic Impacts to NYS Associated with Ocean Area Size Equivalent to the FSRU Safety and Security Zone-Average Year and Long-Term Cumulative Impacts

	Average Annual Impacts	Cumulative Impacts (2010 – 2040)
Total Industry Output		
Direct	$15,088	$190,817
Indirect	$5,837	$73,819
Induced	$9,197	$116,315
Total	$30,122	$380,951
Employee Compensation		
Direct	$3,493	$44,175
Indirect	$2,018	$25,519
Induced	$2,920	$36,930
Total	$8,431	$106,624
Total Value Added		
Direct	$9,389	$118,742
Indirect	$3,368	$42,599
Induced	$5,923	$74,907
Total	$18,680	$236,248
Employment		
Direct	0.8	25
Indirect	0.0	1
Induced	0.1	2
Total	1.0	29

Commercial Finfishing

The following section provides an evaluation and estimate of the value of commercial fishery landings that would potentially be forgone because of fishing grounds not being accessible over the proposed Project's 30-year lifetime due to establishment of a safety and security zone around the FSRU. Methods, assumptions, and procedures are also summarized. The comprehensive economic impact analysis evaluating overall impacts on commercial fisheries, recreation and tourism, and vessel traffic is attached as Appendix F.

The future annual value of commercial fish landings (2010 to 2040) are defined as the direct economic impact. The impact estimates are presented for an average year and for a period spanning the life of the Project.

The method used to estimate the value of commercial fisheries landings was based on using an extract of the commercial species landings data within the East End and West End of Long Island Sound provided in the Fisherman's Outreach report (*see* Figure 1-6). The annual value of landings corresponding to the species within the circular areas was projected forward over the 30-year life of the Project to arrive at an estimate of long-term impacts. No assumptions were made concerning species population growth or catch effort over this time period. The direct economic impacts and value of commercial fish landings represent order-of-magnitude estimates using available information.

The data for commercial landings within the wide ocean area was scaled to estimate landings attributable to the potential 1,000 yard safety and security zone ocean area (*see* Table E-8). Data was assembled on the total acreage corresponding to the ocean area between the East End and West End lines as displayed in Figure 1-6. The Project safety and security zone (in acres) was compared to the total acreage of the trawl areas. Table E-8 presents the results of these comparisons, while Figure 1-5 identifies the trawling areas.

The data in Table E-8 was used to scale the total landings data for the larger ocean area based on the acreage of the safety and security zone. The direct economic impact estimates assume that similar types of species would be landed at depths corresponding to the ocean areas

of the proposed FSRU safety and security zone location.

Table E-8 Comparison of Long Island Sound Trawl Areas and Project Fishing Areas

Trawl Areas	Acres	Square Miles
A	16,734.26	26.15
B	2,582.32	4.04
C	2,209.21	3.45
Total	**21,525.79**	33.64

Safety and Security Zone	Acres	Percent of Total Trawl Area
1,000 yards	248.34	1.2%

Table E-8 shows the results of applying the scaling factors. Then Table E-9 shows the results of scaling the East End to West End Ocean Area by the acres corresponding to the Project's projected safety and security zone.

Table E-9 Species, Total Live Pounds, and Estimated Value of Fish Harvested in Long Island Sound Commercial Fisheries During the 2002 and 2003 Fishing Seasons as Provided by NOAA and Estimated Values

		Long Island Sound East to West End Ocean Area[a]		Anticipated Safety and Security Zone Ocean Area Surrounding Project FSRU	
				Landings in Pounds	Estimated Value of Landings
No.	Species	Pounds	Value		
1	Angler	43,680	$34,462	503.9	$354.50
2	Scup	40,733	$29,200	469.9	$377.80
3	Bluefish	14,827	$5,130	171.1	$51.20
4	Flounder, Summer	12,513	$24,744	144.4	$291.80
5	Tautog	3,642	$6,117	42.0	$85.20
6	Butterfish	3,527	$2,138	40.7	$25.50
7	Squid (Loligo)	1,810	$1,358	20.9	$16.90
8	Skates	1,767	$251	20.4	$2.80
9	Sea Robbins	1,222	$202	14.1	$1.80
10	Sea Bass, Black	1,093	$2,609	12.6	$30.00
11	Flounder, Yellowtail	770	$846	8.9	$11.80
12	Flounder, Winter	572	$648	6.6	$8.20
13	Bass, Striped	272	$681	3.1	$7.40
14	Dogfish, Smooth	189	$58	2.2	$0.60
15	Hake, Red	92	$37	1.1	$0.50
16	Croaker, Atlantic	26	$13	0.3	$0.20
17	Eel, Conger	25	$14	0.3	$0.10
18	Bonito	12	$18	0.1	$0.10
19	Flounder, Sand-Dab	4	NA	0.0	NA
	Total:	**126,776**	**$108,527**	**1,463**	**$1,267**

Table E-9 shows the results of the scaling calculations using the relative number of trawl area acres to estimate the value of fish landings. The table shows that, by applying this method, the FSRU safety and security zone area would correspond to several thousand dollars worth of fish landings within an average year.

The annual value of dockside landings was used to project the total economic impacts corresponding to this ocean area as shown below. Table E-10 shows the estimated direct economic impact Since the impacts are expected to occur in future years, the annual and cumulative value of landings are expressed in present value terms using a 5% discount rate to acknowledge the time value of money.

Table E-10 Summary of Economic Impacts to NYS Commercial Fisheries Average Year and Long-Term Cumulative Impacts with 1,000 Yard Projected U.S. Coast Guard Safety and Security Zone

	Average Annual Impacts	Cumulative Impacts (2010 – 2040)
Total Industry Output		
Direct	$1,328	$21,510
Indirect	$514	$8,321
Induced	$810	$13,112
Total	$2,652	$42,943
Employee Compensation		
Direct	$308	$4,980
Indirect	$178	$2,877
Induced	$257	$4,163
Total	$742	$12,019
Total Value Added		
Direct	$827	$13,385
Indirect	$297	$4,802
Induced	$521	$8,444
Total	$1,645	$26,632

The estimated commercial landings in pounds were held constant over the projection period but the annual unit value ($/lb) used to calculate the annual value of landings was increased over time based on the historic trend growth rate for all combined species. The long-term, or cumulative, total impact over the 30-year life of the Project would be approximately $42,000 in present value terms with the 1,000 yard safety and security zone.

Potential Habitat Sanctuary Impacts

It is possible that the loss of fishing access to the safety and security zone area may enhance select populations of commercially valuable species by functioning as a de facto haven where fishermen are precluded from entering and placing stress on these populations. The restricted access may potentially lead to a rebound in overstressed species by allowing select populations at formative lifecycle stages to recover unimpeded by the threat of fishing gear and boats. This potential impact has not been quantified or estimated, but it should be considered as a form of de facto mitigation over the life of the Project.

1.2.4 Dumping Grounds

Several active and inactive dumping grounds are located in Long Island Sound. The active dumping grounds include the Central Long Island Sound Disposal Site, the Cornfield Shoals Disposal Site, and the Western Long Island Sound Disposal Site. All of these sites are located in Connecticut waters. No portion of the proposed Project is located within, or in the vicinity of, these disposal sites (*see* Figure 1-1).

Inactive or historic disposal sites include the Southport Historic Disposal Site, the Bridgeport Historic Disposal Site, the Smithtown Historic Disposal Site, and the Port Jefferson Historic Disposal Site. The Port Jefferson Disposal Site, which is located approximately 1 mile (1 6 km) south of the proposed pipeline route, is the disposal site closest to the Project area. The site may have been used for disposal of sediments from Port Jefferson Harbor or other local projects, and any use would have occurred prior to 1977 (Fredette 2005; Gregus 2005). The site is located in an area with an erosional/non-depositional sedimentary environment. Historic disposal sites were located in these areas to allow any dumped sediment to be dispersed by natural hydrology. Based on Broadwater's spring 2005 sampling effort, no evidence of elevated contamination was identified within the identified Port Jefferson Disposal Site. No other known historic disposal sites are located within the area affected by the proposed Project.

Potential Marine Use Compatibility Issues

Based on the current Project alignment, no marine use impacts or conflicts on or from dump sites are anticipated.

1.2.5 Shipwrecks

Based on information obtained from the NOAA Automated Wreck and Obstruction Information System, there appear to be several identified wrecks in the general Project area, the majority of which are in the vicinity of the Stratford Shoal Middle Ground Area. In March and April 2005, Broadwater conducted a preliminary survey that included bathymetry, side-scan sonar, and magnetometer studies to develop a route for the proposed pipeline.

Potential Marine Use Compatibility Issues

No shipwrecks are located within the central construction corridor. Within the proposed anchor spread, a total of nine anomalies were identified that could potentially be significant cultural resources. During construction, safety and security zones will be established around each of these targets, and midline buoys will be used to avoid impacts on these targets. As such, no impacts on shipwrecks, or any potentially significant cultural features, are expected. Resource Report No. 4, Cultural Resources, incorporated by reference herein, provides complete details of the archaeological investigations completed for the Project (*see* Environmental Reports, Confidential and Privileged Volume, Volume VII).

1.2.6 Lightering Zones

Lightering zones are designated locations for anchoring and ship-to-ship transfer operations. Several lightering zones are located in Long Island Sound (*see* Figure 1-1). These lightering zones were identified by reviewing current NOAA navigation charts for the Sound.

The lightering zones closest to the proposed FSRU location include one located south of East Haven, Connecticut, in Connecticut waters, and one located north of Riverhead, New York, in New York waters. The lightering zone south of East Haven, which is closest to the FSRU, is more than 2.5 miles (4 km) from the proposed facility location.

The lightering zones closest to the proposed pipeline include one located north of Port Jefferson, New York, in New York waters, a zone north of Fort Salonga, New York, in New York waters, and a zone located south of Bridgeport, Connecticut, in Connecticut waters (*see* Figure 1-1). The zone north of Port Jefferson, which is closest to the proposed pipeline route, is approximately 0.5 mile (0.8 km) from the proposed facility location.

Potential Marine Use Compatibility Issues

No direct impacts or conflicts with any of these areas are expected. Indirect impacts may include temporary rerouting of vessel traffic into these areas during construction activities. All appropriate notifications will be made and standard marine practices and precautions will be followed so as to not interfere with anchoring or lightering activities.

1.2.7 Vessel Traffic

Vessel traffic in Long Island Sound includes commercial shipping, recreational boating, ferry services, and sightseeing tours. Each aspect of vessel traffic in the Sound is discussed below. A discussion of the anticipated increase in vessel traffic from the proposed Project, anticipated change in type of vessel traffic that will transit the Sound, and potential vessel traffic conflicts is provided below.

Commercial Shipping

Information on commercial vessel traffic from the United States Army Corps of Engineers (USACE) was gathered and analyzed in consultation with the U.S. Coast Guard Vessel Traffic Service New York, the New York Pilots Association, and USACE. Domestic and foreign traffic were addressed, but fishing vessels and escort tugs were not included. Each of the deepwater ports receives transit tankers that are similar in size to LNG carriers.

Commercial shipping in the Project area mainly involves vessels arriving and departing the ports of Northport, Northville, and Asharoken, New York, and Bridgeport and New Haven, Connecticut. Based on USACE data, the Connecticut ports receive significantly more traffic than the New York ports. Bridgeport is the most active commercial port in the Sound, with over 10,000 vessels per year. New London registers over 5,000 vessels per year, and New Haven approaches 2,000 vessels per year. Typical cargo for these ports includes oil, other petroleum products, bulk chemicals, and containerized goods. While the vast majority of the vessels calling on these ports will be significantly smaller than the LNG carriers, it is estimated that up to 300 vessels per year within the Sound would be similar in appearance and size to the LNG carriers that will service the FSRU. It is also estimated that up to three to four vessels per month accessing the New York ports would be similar in appearance and size to the LNG carriers that will service the FSRU.

Additional vessel traffic in the Sound is associated with vessels calling on ports of New York and New Jersey. While the vast majority of ships servicing ports in New York and New Jersey leave New York Harbor via southern channels, it is estimated that one to two ships per month utilize Long Island Sound.

As mentioned previously, in the absence of a traffic routing scheme in Long Island Sound, federal navigational aids and standard marine practices have led to the development of established traffic patterns and generalized shipping routes in the Sound. The main shipping route runs generally down the center of the Sound on a straight course from deepwater areas in the eastern Sound to the deepwater pass through Stratford Shoal, with a secondary shipping route trending from northeast to southwest toward Northport, New York. Traffic branches off to enter deepwater ports (*see* Figure 1-3). Broadwater located the proposed FSRU outside of this traffic pattern specifically to avoid and minimize impacts on commercial shipping.

Table E-11 presents 2003 commercial vessel traffic counts for deepwater ports in Long Island Sound as provided by USACE. Ports and traffic routes are depicted on Figure 1-3.

Table E-11 Commercial Vessel Traffic in Long Island Sound (2003)

Deepwater Ports[1]	Vessel Trips per Year	Transit Tankers
Bridgeport, CT	21,588	27
New London, CT	10,564	10
New Haven, CT	3,603	469
Port Jefferson, NY[2]	21,943	—
Northville, NY	1,207	31
Asharoken, NY	282	11
New York, NY[3]	50	50
Northport, NY	24	Unknown

Source: USACE 2005

1 Foreign and domestic traffic were totaled for deepwater ports; fishing vessels and escort tugs were not included

2 Vessel traffic received at Port Jefferson is significant; however, vessels range in size from less than 500 gross registered tons (GRT) to 25,000 GRT Two transit tankers were noted in the overall traffic numbers that are likely similar in appearance to an LNG carrier However, they are much smaller in size

3 While 21,789 vessels were reported for New York Harbor, the majority of these vessels do not approach through Long Island Sound due to strong currents

In May 2005, a PAWSA was conducted for Long Island Sound in which the U.S. Coast Guard provided vessel arrival data for the significant harbors in Long Island Sound. The PAWSA was conducted to understand and address issues associated with waterway risks and potential intervention actions to avoid waterway risks, including the Broadwater Project. The process involved gathering together a select group of waterway users and stakeholders to evaluate waterway risk factors in Long Island Sound and the effectiveness of various intervention factors.

The PAWSA-generated data differed from the USACE-derived data in that only vessels required to provide a Notice of Arrival under the Vessel Traffic Service were included, making this a subset of the total vessel traffic.

Ferry Routes

Several ferry services operate year-round in Long Island Sound and Block Island Sound, and coordination between the Project and potentially affected ferry operators began

during the U S Coast Guard's PAWSA Workshop. Broadwater has been actively engaged with ferry operators throughout this Project.

Installation of the subsea pipeline may have some minor, temporary impact on the Port Jefferson-to-Bridgeport ferry service. Due to the linear nature of the Project, the installation activity and associated construction barges, boats, and tenders will move along the route and not stay in one area for long. During construction operations, Broadwater will closely coordinate schedules with the ferry operator to provide for minimal disruption to the ferry schedule. Once the pipeline has been installed, no impact would occur as a result of operation of the pipeline.

Other Vessel Traffic

The Naval Submarine Base New London is located in Groton, Connecticut (*see* Figure 1-2), and most of the naval vessels operating from New London are submarines. For security purposes, the exact routes of naval submarines are not published and are, therefore, not shown on the figure. Although impacts on naval vessels are not expected, coordination and communication between the Navy and LNG carriers will be required to ensure that scheduling requirements are enforced and there are no safety concerns with these vessels as they transit this area. In addition, the U S Coast Guard is charged with providing security zones around submarines as they travel through the Sound. The U.S. Coast Guard would have the same responsibility for safeguarding LNG tankers. As a result, coordination of the tanker and submarine traffic should not be a problem, according to the captain of the port for Long Island Sound, Captain Peter Boynton. *See* "CG Captain Sees Subs, Tankers Co-existing; Security zones for LNG vessels in L I Sound viewed as routine," Paul Choiniere, The Day, 3/16/06.

Potential Marine Use Compatibility Issues

Potential Conflicts with Commercial/Recreational Vessels in the Race

The greatest potential for marine conflict would arise from the operation of the FSRU and the ingress and egress of LNG carriers, particularly in the area of the Race, which constricts traffic flow between the Atlantic Ocean and Long Island Sound (*see* Figure 1-7). Passing vessels merge into a corridor that is about 3 nm long and 3 nm wide. Vessels using the Race include a broad mix of naval vessels with traveling security zones, commercial deep-draft

vessels, commercial fishing vessels, and recreational fishing and pleasure crafts. Even with the real restrictions imposed, the Race does currently not have a Traffic Separation Schedule (TSS). During high traffic periods, mainly summer and holidays, the Race can be relatively congested.

Navy vessel data is not tracked in U.S. Coast Guard's PAWSA database, but these vessels likely consist primarily of submarines. Broadwater will continue to coordinate with the Navy regarding the coordination of vessel passage, but based on the infrequency of LNG carriers, this issue can be readily managed.

As mentioned, commercial vessels will have pilots on board, which allows for close coordination of incoming and outgoing commercial vessels. Given that the Race currently constricts passage of larger commercial vessels, continued coordination between the pilots will ensure that conflicts are appropriately managed. An LNG carrier and a commercial vessel would not be able to simultaneously pass through the Race due to the narrow passage and likely safety and security zone requirements. If an LNG carrier and a commercial vessel arrive at the Race at the same time, one vessel will need to wait while the other passes through. Broadwater has estimated that it would take approximately 15 minutes to pass through the Race, resulting in no significant delay for other commercial vessels. Based on Broadwater's current proposal, only two to three carriers per week would call on the FSRU, minimizing conflict at the Race.

There is a significant amount of push or pull barge traffic in the Race area and this consists of the largest traffic density as identified in the PAWSA database. Since two commercial vessels cannot pass through the Race simultaneously, either the LNG carrier or the barge/tug would need to wait until the other has cleared the Race. This is consistent with the current procedures observed in the Race.

Most of these vessels transit through the Race during periods of little or no tidal currents. Due to strong tidal currents in the Race, most commercial and recreational fishing vessels likely cross the Race during slack tide. Therefore, Broadwater may be able to schedule LNG carrier traffic through the Race outside of slack water periods and may also be able transit the Race during nighttime hours when there is less traffic present in the Race area. Once through the Race, the vast majority of commercial traffic heading toward Connecticut ports would not be impacted by LNG carrier transits, with the commercial traffic utilizing the northern of the two

primary shipping routes and the LNG carriers using the southern route. Based on the PAWSA data, approximately 20% of the commercial traffic services either the New York ports or the offshore Northport Terminal/Riverhead Terminal. There is ample room within the eastern portion of the Sound for these vessels to pass at a safe distance.

Due to the overall size of Long Island Sound, there will be ample room for both LNG carriers and fishing or recreational vessels to avoid conflict. NYSDOS has raised concerns regarding potential impacts on existing lobster fishing (i.e., set trap lines) resulting from the transit of the LNG carriers. However, the LNG carriers will be routed along an existing, recognized shipping route that experiences regular usage. Therefore, any conflict resulting from increased vessel traffic due to the presence of the carriers will be a conflict that the lobstermen already experience.

LNG Carrier Routing

An analysis of the proposed LNG carrier routes was conducted to evaluate potential marine conflicts in the area of the Race and along the LNG carrier routes entering into Block Island Sound and Long Island Sound from the Atlantic Ocean. The analysis covers shorelines and relevant offshore features from Point Judith, Rhode Island, and Montauk, New York, to the entrance into Long Island Sound at the Race and onwards to the proposed FSRU location. This includes an analysis of the shoreline features of Rhode Island, the far eastern shorelines of New York and Connecticut, and Block Island. The LNG carrier route and associated safety and security zone are indicated on Figure 1-2.

An LNG carrier will transit to the proposed FSRU on average once every two to three days. Based on preliminary routing, there are two routes that LNG carriers may take when entering Block Island Sound prior to entering Long Island Sound via the Race:

- The Northern Route, which runs between Block Island and Point Judith, Rhode Island; and
- The Southern Route, which enters Block Island Sound via the Montauk Channel.

For both routes, the LNG carriers would be nearest the shoreline as they enter Long Island Sound via the Race.

The Northern Route. The Northern Route is assumed to start at the U.S. territorial border south and east of Block Island and follow a north-northwesterly course to the pilot station located north of Block Island. At this location, the LNG carrier would be approximately 4.3 nm (5 statute miles) from Point Judith, Rhode Island. Along the remainder of the inbound transit from north of Block Island to the proposed FSRU location, the carrier would follow a route that is not less than 3.3 nm (3.8 statute miles) from the shoreline of Rhode Island, Connecticut, or New York.

The Northern Route is approximately 87 nm (100 statute miles) in length, and water depths exceed 100 feet (30.5 m) for the majority of the route.

Southern Route. Arriving LNG carriers would approach the Southern Route from a northerly course beginning at the U.S. territorial border (*see* Figure 1-2), on a heading toward the Montauk pilot station near waypoint S2. With the exception of the initial waypoints, the route is similar as described for the Northern Route. The length of this leg is approximately 78 nm (90 statute miles).

Potential Conflicts with Vessels during Pipeline Installation. No significant, permanent impacts on, or conflicts with, commercial shipping are expected to result from installation or operation of the subsea pipeline. Installation of the pipeline will be completed in an approximately 6-month time frame between October and April. Although the pipeline construction route will infringe temporarily on the shipping route approaching Bridgeport, Connecticut, due to the linear nature of the Project, the installation activity and associated construction barges, boats, and tenders will move along the route and not stay in one place for long. The offshore areas allow for movement of commercial vessels from one place to another; therefore, commercial shipping can continue in other areas as the Project installation moves across the Sound. Constant communication between construction vessels and other commercial traffic will ensure that adequate safety margins are maintained.

There is an established performance history associated with constructing subsea utilities (i.e., natural gas pipelines, submarine electric transmission cables, and submarine fiber-optic cables) within Long Island Sound. All of these projects required effective communication between construction vessels and other commercial and recreational vessels within the Sound. In

the past five years the following projects were successfully constructed: Eastchester Expansion Pipeline Project, the Cross Sound Cable, and the Flag Atlantic-1 North fiber-optic cable.

Economic Impact on Vessel Traffic. The Broadwater FSRU location and surrounding safety and security zone will be identified on marine navigational charts and illuminated at night, and the FSRU safety and security zone will be marked by buoys. The footprint of the FSRU and safety and security zone is not large enough to result in an economic impact based on the potential interruption or delay of transiting vessels. While some transiting vessels may need to navigate around this location, there is sufficient room within the established shipping lanes to easily accommodate these changes without imposing additional operational costs on commercial vessel operators. Historically, commercial vessels and navigators have become familiar with noteworthy parts of Long Island Sound (e.g., Stratford Shoal and the Race) and have adjusted their operations accordingly without incurring any disruptions to economic activity.

Furthermore, as the Long Island Sound Waterborne Transportation Plan indicates, most waterborne freight consists of heavy bulk commodities that are not time sensitive or tied to just-in-time inventory schedules, as the freight mostly serves service sectors of the regional economy, and not manufacturing. This fact suggests that the possibility of any minor delays to shipping traffic resulting from FSRU operations would not have a negative economic impact on these sectors.

It is reasonable to expect that, once Broadwater operations commence, navigators would become familiar with the Project footprint and adjust their behavior to work with and around this site location. The east-to-west and west-to-east commercial freight traffic has adapted to north-to-south and south-to-north ferry transits without any interruptions to economic activity. Similarly, the LNG vessel transits to and from the FSRU would be incorporated into existing commercial vessel flow patterns without incurring any impacts on economic activity.

Furthermore, the scheduling of LNG carrier arrivals will take into account the use of the area by other marine traffic and will require close cooperation between Broadwater, the U.S. Coast Guard, and other operators to ensure impacts on other users of the Sound are avoided or minimized.

1.2.8 Recreation and Tourism

Recreation and tourism are important segments of the economies of both Suffolk County and the Long Island, especially in the more rural eastern portion of the County and Long Island. In Suffolk County alone there are 986 miles of shoreline and over 70,000 acres of parkland, which makes it a valuable recreational resource. In addition, Suffolk County has 38,000 seasonal homes, which ranks it amongst the highest in that category in the country.

The major recreational uses of Long Island Sound include activities such as swimming, beach going, recreational/sportfishing, and recreational boating. Information and data were gathered on these recreational activities to determine annual economic impacts on the Long Island Sound community and to develop a determination of potential impacts resulting from the Project.

Individuals utilizing Long Island Sound for recreational purposes are either residents of the surrounding communities in New York and Connecticut or are tourists from outside of the area. Trends in tourist visitation to Long Island Sound were estimated based on data received on hotel stays from the Long Island Convention and Visitors Bureau and Sports Commission (LICVB). From 1999 to 2005, it was estimated that the number of hotel stays has remained essentially constant for Long Island (Nassau and Suffolk Counties). There was a slight drop in occupancy rates between these years; however, there was also an increase in over 2,000 rooms to the hotel/motel room inventory. Based solely on hotel stays, it was assumed that that tourist visitation to Long Island has remained essentially constant over the past five to six years, even though tourism as a whole over that period experienced a slowdown related to national security events.

Recreational Spending. The quantification of recreational spending in the Long Island Sound area will be divided into beach swimming, recreational/sportfishing, and recreational boating due to data availability and distinction between activities.

In 1992, a study of the economic impact of these three above-defined recreational activities was conducted by Dr. Altobello of the University of Connecticut – *The Economic Importance of Long Island Sound's Water Quality Dependent Activities*. The results of the study are presented in Table E-12. The data contained in the table includes total user values, which

represent the value of the resource to the actual users. Direct effects include actual spending on goods and services in the community related to recreational activities. The indirect effects represent impacts from direct recreational spending on industries throughout the region. Induced effects represent the spending impacts from affected households along the supply chain.

Since the study was conducted using 1990 dollars, the results have been inflated to 2005 dollars using the Consumer Price Index (CPI). This is the most commonly referenced study when addressing the economic impact of recreational activities in Long Island Sound and is the source of the commonly used figure of $5.2 billion of economic impact. Using the CPI to update the 1990 impact estimate to current price levels, it was estimated that the economic impact from these recreational activities on Long Island Sound is now valued at $7.1 billion. This procedure is used by the Bureau of Labor Statistics (BLS) for rough estimating purposes and is based on assuming similar participation levels among residents and tourists (BLS 2006).

The three major recreational activities are further defined and discussed in the sections below, and additional studies are used to outline the economic impacts and the potential effects of the Broadwater Project on this resource.

Beach Swimming. Beach visitation and beach swimming result in a variety of economic impacts on the local community through retail purchases, food and beverage purchases, accommodations, and miscellaneous trip expenses (e.g., gas, tolls, etc.). As presented in Table E-12, the total economic impact of beach swimming in Connecticut and New York was $622.2 million and $514.61 million respectively. This equates to a total impact of $1,136.81 million for the Long Island Sound area in 2005 dollars. The only adjustment made to the final results of the study was an inflation adjustment to 2005 dollars based upon the CPI.

Table E-12 Total Recreational Values for Long Island Sound, 1990 and 2005 dollars

	Total User Values (million $)		Direct Effects (million $)		Multiplier Effects (Indirect + Induced) (million $)		Total (million $)	
	1990	2005	1990	2005	1990	2005	1990	2005
Connecticut								
Beach Swimming	$99.83	$134.66	$159.10	$214.60	$202.35	$272.94	$461.28	$622.20
Sportfishing	$11.08	$14.95	$258.46	$348.62	$366.17	$493.91	$635.71	$857.48
Boating	$56.23	$75.85	$836.00	$1,127.64	$1,003.20	$1,353.16	$1,895.43	$2,556.65
Connecticut Totals	**$167.14**	**$225.45**	**$1,253.56**	**$1,690.86**	**$1,571.72**	**$2,120.01**	**$2,992.42**	**$4,036.32**
New York								
Beach Swimming	$82.57	$111.37	$131.59	$177.49	$167.36	$225.74	$381.52	$514.61
Sportfishing	$11.13	$15.01	$173.09	$233.47	$245.22	$330.76	$429.44	$579.25
Boating	$42.33	$57.10	$629.31	$848.84	$755.17	$1,018.61	$1,426.81	$1,924.55
New York Totals	**$136.03**	**$183.48**	**$933.99**	**$1,259.81**	**$1,167.75**	**$1,575.12**	**$2,237.77**	**$3,018.41**
CT and NY Totals	**$303.17**	**$408.93**	**$2,187.55**	**$2,950.67**	**$2,739.47**	**$3,695.13**	**$5,230.19**	**$7,054.73**

Source: Altobello 1992 and BLS 2006.

Recreational Boating

Long Island Sound is a popular recreational boating area. During construction of the proposed pipeline facilities, there will be a temporary and minor loss of recreational boating area in the immediate vicinity of the active work area. Because installation will occur primarily during the winter months, when use of the Sound by recreational boaters is reduced, impacts on recreational boating are minimized. Therefore, installation of the facilities is expected to have only minor, if any, impacts on recreational boating. During operation, the proposed pipeline will have no effect on recreational boating due to its installation beneath the seafloor.

By siting the facility centrally in the Sound, impacts are minimized, and the Project will not result in significant limitations on public access to the Sound. An assessment of the potential economic impacts on recreational boating is provided below.

Economic Impact of Recreational Boating. The Altobello study mentioned above looked at the economic impact of recreational spending on various activities, including boating, and estimated the economic impact of recreational boating on Long Island Sound (sum of direct, indirect, and induced effects plus the user value) in 1990 as $3.322 billion, of which the New York State portion was $1.427 billion. Inflated to current prices, that would translate to an overall impact of $4.481 billion in total, and $1.925 billion for New York State (Altobello 1992).

A more recent study on recreational boating was completed for New York State in 2003 under the New York Sea Grant – *Recreational Boating Expenditures in 2003 in New York State and Their Economic Impacts*. A benefit of this study is the breakdown by geographic region; however, since it is only a state-wide study, no economic impacts are noted for Connecticut. In addition, the 2003 New York Sea Grant study indicated a much lower overall economic impact from recreational boating than the 1992 Altobello study. It estimated that the total economic impact for the New York City Long Island Metropolitan Area was $843 million in 2003 dollars (adjusted to 2005 dollars, this would equate to $907 million). This is only half of the $1.925 billion impact that was estimated in the 1992 study.

Table E-13 is a breakdown of trip expenditures by geographic area in downstate New York, which may be more representative of actual spending in Long Island Sound. The mean expenditure per boater, per trip in Long Island Sound was $3,112 in 2003. Adjusted for

inflation, this equates to $3,346 in 2005 dollars.

Table E-13 Trip-Related (and Non-Trip Marina) Expenditures by Category and Per Boater for Downstate New York Regions in 2003

Expenditure Category	New York City Area	Long Island	Suffolk County	Long Island Sound
At-site expenditures				
Marinas and yacht clubs	$16,714,906	$41,213,188	$33,417,610	$19,961,521
Gas stations	$6,047,504	$21,520,880	$15,064,446	$7,733,943
Restaurants and bars	$3,271,601	$16,527,473	$13,314,000	$5,685,824
Grocery and convenience type stores	$1,526,747	$7,595,605	$5,887,865	$2,537,222
Bait and tackle shops	$1,725,026	$8,017,583	$5,251,339	$2,904,050
Boat launching and mooring fees	$1,447,435	$8,439,561	$6,524,390	$4,126,807
Lodging	$575,099	$1,898,901	$1,909,578	$1,467,309
Entertainment and all other expenses	$2,756,076	$2,602,198	$2,386,972	$1,161,620
All other retail purchases	$396,558	$4,430,769	$3,766,112	$1,772,999
Tournament fees	$237,935	$1,406,593	$1,220,008	$213,983
At-site non-trip expenditures				
Marinas and yacht clubs*	NA	NA	NA	$43,928,160
Total At-Site Expenditures	**$34,698,796**	**$113,652,750**	**$88,742,319**	**$91,493,437**
En Route Expenditures	**$5,650,947**	**$7,806,594**	**$5,622,645**	**$3,637,704**
Total Expenditures	**$40,349,743**	**$121,459,343**	**$94,364,964**	**$95,131,141**
Number of Boaters	**19,828**	**70,330**	**53,044**	**30,569**
Mean Expenditure per Boater	**$2,035**	**$1,727**	**$1,779**	**$3,112**

Source: Connelly et al. 2004.

* At-site, non-trip expenditures were only tracked for specific bodies of water and would include such expenditures as annual slip or mooring rental fee, haul-out, winterization, etc.

IMPLAN software was utilized in the 2003 New York State Sea Grant study to estimate the indirect and induced impacts of recreational boating. In Table E-14, the total output and total value added impacts are presented for Long Island Sound in both 2003 and adjusted 2005 dollars. Total output represents the value of industrial output or total sales in the regional economy. Value added represents the sum of employee compensation, proprietor income, other property income and indirect business taxes.

Table E-14 Long Island Sound - Output and Total Value Added Impacts of Regional Boating Expenditures (trip plus marina non-trip-related) on Regions Surrounding Specific Water Bodies (2003 dollars)

Impact/ Water Body	Direct	Indirect	Induced	Total
Output				
Long Island Sound (2003 dollars)	$76,875,779	$22,716,685	$22,816,209	$122,405,674
Long Island Sound (2005 dollars)	$82,666,725	$24,427,901	$24,534,922	$131,626,324
Total Value Added				
Long Island Sound (2003 dollars)	$46,263,142	$15,114,438	$14,377,713	$74,755,295
Long Island Sound (2005 dollars)	$49,748,080	$16,252,988	$15,460,766	$80,386,508

Source: Connelly et al 2004

Despite the difference in the overall total economic impact of recreational boating estimated by the two studies presented, it is apparent that this recreational activity results in major spending locally on boating trips, for supplies, equipment, food, services, and maintenance.

Recreational/Sportfishing

Charter boat companies and private individuals use Long Island Sound as a recreational fishing area. Important recreational fisheries include flounder, bluefish, scup (porgies), striped bass, tautog (blackfish), and weakfish. Broadwater undertook a fishermen's outreach program for the proposed Project in order to identify interested parties that utilize the Sound for commercial and recreational fishing and to identify those that may be impacted by the Project. Information obtained from commercial and recreational fishermen through a telephone survey included: areas fished in Long Island Sound, targeted species, gear type, seasons fished, and concerns related to the proposed Project. The outreach program also included a review of available information related to catch.

The Marine Recreational Fishery Statistics Survey (MRFSS) indicated that an estimated 464,997 marine anglers made 1,537,899 trips in 2003 (CIDEP 2004). The three principal modes of recreational marine fishing included: fishing from shore (40%), fishing from

privately owned or rental boats (56%), and fishing from party and charter boats (4%). Scup was the most frequently creeled fish, followed by bluefish, summer flounder, tautog, and striped bass. These five species comprised approximately 94% of the total creeled catch.

The MRFSS was developed to provide government agencies, scientists, and the public with reliable estimates of the recreational fishery harvest as far back as 1979. The NOAA Fisheries database was queried for 2003 recreational landings in inland waters of Connecticut and New York, which are defined as "inshore saltwater and brackish water bodies such as bays, estuaries, sounds, etc."

According to the MRFSS, recreational landings from New York and Connecticut exceeded 15 million pounds (6.8 million kg) during 2003. Bluefish, scup (porgies), striped bass, and summer flounder account for the vast majority of the landings in both states. While the top species harvested in Connecticut according to NOAA Fisheries are consistent with those reported by CTDEP (2004), the total landings are more than twice those reported by CTDEP (2004). One possible reason for this discrepancy is that while CTDEP (2004) relies on only an intercept survey to estimate total landings, NOAA Fisheries relies on that same intercept survey as well as a telephone survey.

Economic Impact of Sportfishing. The two sources used to determine the economic impact of sportfishing in Long Island Sound were the 1992 study from the University of Connecticut and a 2001 New York State Sea Grant report – *The Economic Contribution of the Sport Fishing, Commercial Fishing, and Seafood Industries to New York State*. Together these form the framework for assessing the economic impact of sportfishing.

According to the Altobello study (*see* Table E-12), the specific annual economic impact of sportfishing, inflated to 2005 dollars, in Long Island Sound on New York and Connecticut was $579.25 and $857.48 million, respectively, for a total of $1,436.73 million. The benefit of this study is the examination of impacts on both Connecticut and New York State; however, it fails to look at trends and specific spending characteristics of marine anglers (Altobello 1992).

The following tables from the 2001 New York State Sea Grant study present more detailed information on marine (saltwater) fishing characteristics and trends in New York State.

Table E-15 presents two years of data on marine angler participation. After a peak in 1994, the total number of anglers has declined annually (Techlaw 2001).

Table E-15 New York State Marine Anglers, 1996 and 1998

Number of Anglers	Activity in New York State					
	Total		New York Residents		Non-Residents	
	Number	Percent	Number	Percent	Number	Percent
1996	539,540	100	501,130	92.9	38,410	7.1
1998	475,720	100	433,226	91.1	42,494	8.9

Source: Techlaw 2001

An important indicator of sportfishing expenditures is the mode by which the angler is able to fish. Many individuals fish from shore, while others own boats, rent boats, fish from party boats, or charter boats from fishing guides. Table E-16 presents the total number of trips and mode by fishing area. It should be noted that Long Island Sound is considered an inland water body with respect to this study (*see* note in Table E-16). The most popular type of fishing area is inland waterway (which includes Long Island Sound), and the most popular mode of fishing for each fishing area is from a privately owned or rented boat.

Table E-16 New York State - Numbers of Trips by Mode and Fishing Area, 1998

Mode	Inland[1]	Percent	Ocean <=3 miles	Percent	Ocean >3 miles	Percent	Total
Shore	1,043,064	36.0	131,686	30.5	NA	0	1,174,750
Party/Charter[2]	163,394	5.7	106,071	24.6	25,431	16.3	294,896
Private/Rental	1,687,595	58.3	194,141	44.9	130,342	83.7	2,012,078
Total	2,894,053	100	431,898	100	155,773	100	3,481,724

Source: Techlaw 2001

Notes: NA = not applicable

1 Other bodies of saltwater besides the ocean; sounds, inlets, tidal portions of rivers, bays, and estuaries

2 Party boats conduct daily, scheduled trips and provide anglers with the ability to go fishing without advanced planning. There is a fee that covers their fishing needs. Party boat vessels carry 30 or more passengers. Charter boats carry passengers who have pre-arranged fishing trips for certain species. Fees are based on species to be fished and distance. Charter boats carry six to eight passengers, although some carry more.

Specific data that summarizes employment in the fishing industry has not been

collected. However, sportfishing employment can be estimated by using U.S. Census sales per employee data for the services and retail businesses that make up the sportfishing industry. Using this method, it is estimated that the employment impact in the sportfishing industry is over 17,000 jobs. These jobs are a mix of full- and part-time positions (Techlaw 2001).

Boating Surveys

To supplement and expand on literature research and interviews with local resources, Broadwater performed a boat traffic survey in the summer of 2005 to observe commercial and recreational boat traffic patterns in the vicinity of the proposed Project (*see* Appendix B). Based on the results of the survey, Broadwater assessed the potential impacts resulting from construction and operation of the FSRU and pipeline on commercial and recreational boating activities in Long Island Sound.

The objective of the boat survey was to quantify boat use in the area of the proposed Project during holiday weekends and other high-use days during the summer to observe the maximum boat traffic near the proposed FSRU location and along the proposed pipeline route. High-use days included days where sailing regattas and excellent weather coincided, which often overlapped with holiday weekends. For major findings of the boat traffic survey, refer to the separate report entitled Boat Traffic Survey (*see* Appendix I).

Potential Marine Use Compatibility Issues

Potential Economic Impact from the Broadwater Project. When examined based upon the three major recreational activities outlined in this section, the potential economic impact from the Broadwater Project has varying results due to the nature of activity. Swimming and beach visitation are not expected to be impacted as a result of the Broadwater Project due to the inherent distance of these activities from the proposed FSRU location. However, boating and fishing activities could take place closer to the FSRU and the surrounding safety and security zone during Project operations and, thus, could be negatively impacted. These recreational activities and estimated impacts are discussed individually below.

Beach Swimming. Beach visitation and swimming are activities confined, by definition, to coastal areas with beaches. The closest coastline to the proposed location of the

Broadwater Project is 9 miles away and does not inhibit or alter the ability of residents or tourists from participating in beach-going activities or swimming. As a result, it is estimated that the Broadwater Project will have no impact on this recreational activity or its associated economic impact on the Long Island Sound area. Observations from other coastal communities around the U.S. show that beach attendance has not been affected in any material way by compatible industrial and commercial marine activities. For instance, beach users in South Florida are accustomed to seeing large cargo and freight vessels transit the coastline within their activity viewsheds. These economic activities have not detracted from the recreational experience or beach attendance, as revealed in hotel occupancy data figures.

There may be some perceived adverse impact associated with the view, depending on weather, of the FSRU in the Sound when either swimming or at a beach. However, this potential impact is discussed in Resource Report No. 8, Land Use, Recreation, and Aesthetics, which is incorporated by reference herein, and is not assumed to have a negative economic impact with respect to this recreational activity.

Recreational Boating. As discussed previously, recreational boating on Long Island Sound is a significant economic driver and results in several billion dollars in total economic impact annually. The Boat Traffic Survey conducted as part of Resource Report No. 8, Land Use, Recreation, and Aesthetics, outlines the approximate boating activity in the vicinity of the Project site during several of the busiest boating days of the year. Beyond short-term impacts associated with construction-related activities, there are expected to be no impacts associated with the proposed pipeline since it is on the seafloor.

Data from the Boat Traffic Survey was used to analyze the economic impact on recreational boating. The survey found that 2.1 boats per survey hour came within 0.6 mile of the proposed FSRU location. According to the 2001 New York State Sea Grant study, the mean expenditure per boater was $3,346 in 2005 dollars. Since the Boat Traffic Survey was performed during the busiest boating days of the year, it is assumed that one boat per hour is an appropriate figure, using 10-hour days and a 6-month (May to October) recreational boating season. This equates to 1,840 total boats (1 boat per hour x 10 hours of boating time per day x 6 months of boating season) that would approach the proposed FSRU annually. When the average

expenditure per boater is applied to this boating estimate, a total direct economic impact of $6,156,640 is obtained. When measured against a total expenditure for Long Island Sound of $102,297,238 (according to Table 4-4, inflated to 2005 dollars), the potential loss in expenditures equals 6%. However, this assumes that all boaters on a course that would take them in the vicinity of the proposed FSRU would not boat and would expend absolutely no money on boating activities, whereas the far more likely scenario is that they would choose to avoid the area of the proposed FRSU through prior trip planning or small course adjustments, and the overall economic impact would be minimal.

Impact of Proposed Safety and Security Zone. The projected safety and security zone sensitivity analysis assesses a buffer of 1,000 yards. After taking into account the size of the FSRU, this equates to approximately 660 acres

As reported by the Long Island Sound Study (LISS) in 2006, there are approximately 844,800 total acres in Long Island Sound (LISS 2006). Assuming 20% of this total area is removed because it is not suitable for recreational boating due to the proximity to shore, depth of water, or other obstructions, 675,840 acres of adequate boating water still remains. Table E-17 compares the percent total of the potential safety and security zone with the total adequate boating area of Long Island Sound.

Table E-17 Percentage of Navigable Water in Long Island Sound

Security Zone	Acres in Zone	% of Total Long Island Sound
1,000-yard buffer	594	0.07

The safety and security zone ocean area that would potentially be off limits to recreational boating represents a minute portion of the total usable navigable water in Long Island Sound; and the region gains a valuable resource – natural gas.

Other than sailing in regattas, recreational boaters typically do not follow a specific course and would be able to alter their heading to avoid the FSRU and any established safety and security zone without significantly or adversely impacting their trip.

Some recreational boaters may choose to avoid the area surrounding the FSRU

completely. Due to the location of the proposed FSRU site in the middle of Long Island Sound and the closest coast being approximately 9 miles away, it is assumed that recreational boaters who would prefer to avoid the FSRU have the ability to do so, i.e., the FSRU is not located directly offshore from a port where recreational boaters would have no choice but to pass close to the FSRU and the safety and security zone.

The number of recreational boaters that would choose to not boat on Long Island Sound due to the presence of the Broadwater Project, who would either move to another body of water or not boat at all, is assumed to be minimal and would not have a significant impact on the overall established current economic impact.

Recreational Sportfishing. As discussed above, the proposed FSRU and the associated safety and security zone would occupy only a small portion of Long Island Sound. Table E-17 presents a breakdown, in acres, of Long Island Sound waters that would no longer be accessible to anglers for sportfishing

Sportfishing participation rates have been decreasing since 1994 according to the 2001 New York State Sea Grant study. With this decrease in the overall number of anglers, the conclusion could be drawn that there has been an overall decrease in competition for fishing areas in Long Island Sound. Thus, sportfishermen would likely be able to find adequate fishing locations in Long Island Sound outside of the safety and security zone that would be associated with the FSRU.

The Stratford Shoal area, which is a popular fishing location and has high fisherman boat traffic, as noted in the Boat Traffic Survey, is approximately 12 miles away from the proposed FSRU location. There would be no conflict between the proposed Project and sportfishing in the Stratford Shoal area.

Long Island Tourism

Information on Long Island Sound based recreational activity was covered in previous sections. This section provides additional background information and economic data related to the tourism industries that support both offshore and land based recreational activities and attractions for out of town visitors.

The tourism "industry" can be comprised of firms that fall mostly within the retail trade sectors. Environmental and natural resource based amenities on Long Island serve to attract visitors from outside the region who then spend money on goods and services within Suffolk and Nassau Counties. The tourism spending is amplified by overnight stays and attractions and visits that require overnight lengths of stays.

The region possesses a tourist infrastructure comprised of hotels/motels/bed & breakfasts and Inn and restaurants and other support services that cater to tourists. An area's historic character or market "branding" can define the resources that attract tourists. Out of town visitors bring in new or imported dollars to a region and their spending contributes to economic growth in a region and supports other dependent industries and households. Eastern Long Island has always attracted visitors from the NYC metro area who view the less developed parts of the Island as a weekend or even day retreat or getaway destination.

Industrial and commercial activities that are considered low impact or benign serve to leave the region's particular "brand" untarnished. This is because these activities are not located in high profile areas that serve to attract out of town visitors.

Background Activity

It is estimated that the 20 New York State-managed parks and historic sites (along with other locally run municipal parks) on Long Island attract nearly 20 million visitors annually. Many of these sites are located in Nassau County, close to New York City, or on the far eastern end of Long Island (New York State Office of Parks 2006). The attractions on Long Island are the coastal areas and bays for swimming, fishing, boating and other beach recreational activities, in addition to golf destinations, wine tours, inland hiking, biking and camping, and general sightseeing tours.

Specific popular attractions in Suffolk County, NY include the Vanderbilt Museum, Walt Whitman Historic Site and the Stony Brook Grist Mill in the "North Shore" area. Central Suffolk attractions include a top-rated water park, Splish Splash, and the Atlantis Marine World aquarium in Riverhead, NY. In eastern Long Island, the two "forks" each offer unique attractions. North Fork is more rural, with vineyards, farm stands and smaller villages. South Fork is the location of the more exclusive Hamptons, which includes upscale dining and

shopping (LICVB 2006).

The Long Island wine industry is a growing tourist destination which has received significant attention and funds over the past decade. There are 38 licensed wine producers on Long Island, 33 of which are located on the North Fork (30 on LI and 26 on North Fork are open to the public). It is estimated that there are approximately 500,000 visitors to the East End wineries annually (Long Island Wine Country 2006).

Access to Long Island can also be gained through use of buses, trains, ferries or personal vehicles or plane. Airports generally serving tourists coming to Long Island include the following:

JFK International Airport	LaGuardia Airport
Brookhaven Airport	Republic Airport Farmingdale
Lufker Airport East Moriches	East Hampton Airport
Islip Airport	Mattituck Airport
Francis S. Gabreski Airport Westhampton	Montauk Airport
Long Island MacArthur Airport	

Source: Long Island Browser 2006

Tourism-related employment figures for New York State and Long Island (Nassau and Suffolk Counties) are presented in Table E-18. As indicated in the table notes, the tourism-related employment data is estimated from a "Travel & Tourism Cluster" of industries, which are then prorated based on assumptions of purchases and spending directly related to tourists (not residents). Thus, the figure of 38,130 pro-rated 2004 Long Island employment is representative of jobs that cater directly to non-resident, out-of-town tourists visiting local attractions.

Table E-18 Tourism Related Employment and Wages for New York State and Long Island (2004)

	Pro-Rated Employment	Pro-Rated Total Wages	Average Wages
New York State	**333,530**	**$10,818,540**	**$32,400**
Long Island	**38,130**	**$1,105,120**	**$29,000**
Nassau	19,380	$581,191	$30,000
Suffolk	18,750	$523,930	$27,900

Source: N Y State Dept. of Labor 2006.

Notes:

1. ESD counts 70 6-digit NAICS-based industries as part of the Travel & Tourism Cluster; this industry list is further broken down into 5 sub-clusters including: 1) Travel Retail; 2) Passenger Transportation; 3) Culture, Recreation and Amusements; 4) Accommodations; and 5) Food Services
2. As it has for the past few years, ESD pro-rates industry employment and wages data by only counting that share of employment and wages in an industry attributable to purchases made by tourists. Share estimates were developed by the BEA (For example, according to the BEA, approximately 20 percent of all food and beverage purchases are made by visitors, while the remaining 80 percent are made by local residents.)
3. Pro-rated County and regional travel & tourism employment and wages data for 2004 are attached. Also included is a list of tourism industries and their respective pro-ration shares

Although tourism is a major industry in Long Island, generating an estimated $65 million in annual sales, it is not a major source of employment in Nassau and Suffolk Counties.

Potential Economic Impact from the Broadwater Project

Negative impact to historic tourism levels and associated spending from the proposed Project is not expected. The Project will not affect the Long Island area's natural resources and amenities that serve to attract tourists. The Project will be sited at a significant distance from any coastal areas that would attract tourism. In addition, land based activities to support Broadwater will be small and low impact in scope. Because no adverse impact is expected, the Project is not expected to have any effect on the regional "branding" that defines the tourist experience on Long Island. The level of spending that is derived from tourism is expected to be unimpeded by the Project.

It would take a significant, protracted change in commercial and industrial activity and development to affect the particular "brand" that defines Eastern Long Island. Open spaces and access to water are amenities that "brand" this part of Long Island.

The marketing appeal and branding for a sub-area such as a wine country area will not be impacted by offshore commerce. In addition, ecologically fragile areas that function as regional eco-tourist attractions such as the North Fork and the Pine Barrens (*see* Figure 1-8 for geographic reference) would not be impacted by the Project. As long as the resources that attract tourism remain intact, the tourist based economic sectors that depend on this visitation will not be impacted.

2.0 ONSHORE LAND USE

Broadwater has identified two onshore locations on Long Island that can provide the facilities needed to support the operation of the Project: a waterfront site in the Village of Greenport, and a waterfront site in the Village of Port Jefferson (*see* Figures 2-1 and 2-2). The Village of Greenport is located in the Town of Southold, on the North Fork of Long Island, and Port Jefferson is located in the Town of Brookhaven, on the north shore of Long Island. The permanent onshore facilities will include land required for office space, warehousing, and a waterfront facility. Broadwater expects to lease all onshore facility space; no fee simple land acquisition is proposed.

2.1 Port Jefferson

The existing waterfront and docking facilities located at the proposed Port Jefferson site are adequate to address the needs for temporary facilities related to construction of the Project. As such, no new additional facilities will be constructed and, therefore, no related environmental impacts or conflicts are anticipated.

2.1.1 Land Use

Port Jefferson's waterfront area is also known as its downtown. This area is comprised of a mix of land uses, including waterfront, industry, commercial, residential, and government (*see* Figure 2-3). The Village has developed over recent years and has begun to take on a tourist center character, revolving around the Port Jefferson ferry terminal, restaurants, and shopping centers. According to the Port Jefferson Harbor Complex Harbor Management Plan (HMP) (Village of Port Jefferson 1999), there has been a slow transition of Port Jefferson Harbor from a mostly industrial waterfront to one characterized by a mix of land uses, including recreational, commercial, industrial, and residential, which has resulted in conflicts and congestion within the harbor. Despite this, however, the proposed usage of properties by Broadwater for Project-related activities is allowable and encouraged under the Village's and Town's planning documents (Village of Port Jefferson 1999) and will be consistent and compatible with existing land use patterns in the area.

2.1.2 Zoning

The Port Jefferson site is currently zoned primarily as M-W (Marina Waterfront) (*see* Figure 2-4). The M-W zoning designation allows for land uses that support water-dependent uses such as marinas and docks. Other surrounding zoning includes C-G (General Commercial) to the south and R-2 (One- and Two-Family Residential) to the west and east (Suffolk County Planning Department 1997). Therefore, the facilities proposed in support of the Project will be consistent with existing zoning.

2.1.3 Coastal Zone Management

The proposed site for permanent Project facilities in Port Jefferson is located within the Long Island Sound Coastal Zone Management Area. According to the NYSDOS, Port Jefferson does not have an approved Local Waterfront Revitalization Program (LWRP) (Saske 2005). Port Jefferson does have a current HMP, which is maintained by local municipalities bordering the harbor complex. The Port Jefferson HMP provides a comprehensive environmental, ecological and natural resources evaluation of the harbor and identifies existing sources of impacts on sensitive harbor resources. The HMP is also used as a planning tool for the bordering municipalities to guide future development within the HMP area. Port Jefferson's HMP also provides information on land use and ecological resources in the planning area. Although the majority of the proposed site consists of marine commercial/industrial shoreline type parcels, sensitive ecological resources include large bluffs occurring in various locations adjacent to Port Jefferson Harbor shoreline and adjacent to portions of the Project area.

The Port Jefferson HMP also states that because the amount of commercial waterfront is limited and concentrated in specific areas, priority for development should be given to water-dependent and water enhanced uses in these areas in order to provide the greatest economic benefits. In the Harbor Issues and Recommendations section of the HMP, Harbor Objective No. 1 states that the existing uses in lower Port Jefferson Harbor (in the area of the proposed Broadwater onshore facility), such as "boatyard dockage facilities, transshipment and oil transfer facilities, and marinas," are of "vital importance to the economic vitality and historic character of the Village of Port Jefferson and should be enhanced," in a manner consistent with the protection of natural resources in the area spanning Port Jefferson Harbor. The proposed use

of onshore facilities in this location by Broadwater will be consistent and compatible with this key recommendation as stipulated in the Port Jefferson HMP.

2.2 Greenport

Permanent onshore facilities such as office space, warehousing, and a waterfront facility are required at the Greenport site. Leasing of all needed onshore facility space is anticipated; no land acquisition is proposed at Greenport. The intended use of the facilities for these purposes is expected to be the same as their current use, as discussed below. Therefore, no related environmental impacts or conflicts are anticipated at the Greenport site.

2.2.1 Land Use

The specific parcels proposed for permanent facilities in Greenport fall within areas designated as Waterfront Area 1 and Waterfront Area 2, which include the following mix of land uses: marine commercial (9.2 acres [56.9%]), vacant disturbed abandoned (2.8 acres [17.2 %]), institutional (0.39 acres [2.4%]), and commercial (3.8 acres [23.5%]) (*see* Figure 2-5). The surrounding uses include commercial and marine commercial to the north, village residential to the west and south, and open water (Greenport Harbor) to the east (U.S. Office of Ocean and Coastal Resource Management 1996). In addition, the proposed onshore facilities are located in an area designated as marine commercial under the Village of Greenport's future land use map. According to the Village of Greenport's LWRP, marine commercial uses in Waterfront Areas 1 and 2 currently include a variety of water-dependent businesses and activities, including but not limited to: retail and wholesale seafood product manufacturers; facilities for offloading fish from commercial vessels; dockage for transient vessels; and marine supply facilities (U.S. Office of Ocean and Coastal Resource Management 1996). Based on the existing usage within Greenport's Waterfront Areas 1 and 2, the proposed Project-related activities are expected to be consistent and compatible with existing land use patterns in the area.

2.2.2 Zoning

Currently, the Greenport site is primarily zoned W-C (Waterfront Commercial), with a small portion being zoned C-R (Retail Commercial) (*see* Figure 2-6). Other zoning designations adjacent to the proposed site include R-A and R-B2 (Residential) to the east and west, and C-1 (Central Commercial) to the south. The W-C zoning designation allows for uses

supporting water-dependent uses such as marinas and docks. Therefore, the facilities proposed in support of the Project will be consistent with existing zoning (U.S. Office of Ocean and Coastal Resource Management 1996).

2.2.3 Coastal Zone Management

The proposed site for Project facilities in the Village of Greenport is located within the Long Island Sound Coastal Zone Management Area, as well as within the boundaries of the Village of Greenport's state and federally approved LWRP. The goals of the Greenport LWRP are to protect and maintain water-dependent uses, revitalize underutilized waterfront areas, strengthen Greenport as a commercial fishing seaport, provide for public access to the waterfront, and enhance the village as a commercial and business center (U.S. Office of Ocean and Coastal Resource Management 1996). Because the proposed Project waterfront facilities will be used for the marine transfer of people, equipment, and FSRU support vessels, the use is a water-dependent use consistent with the Greenport LWRP.

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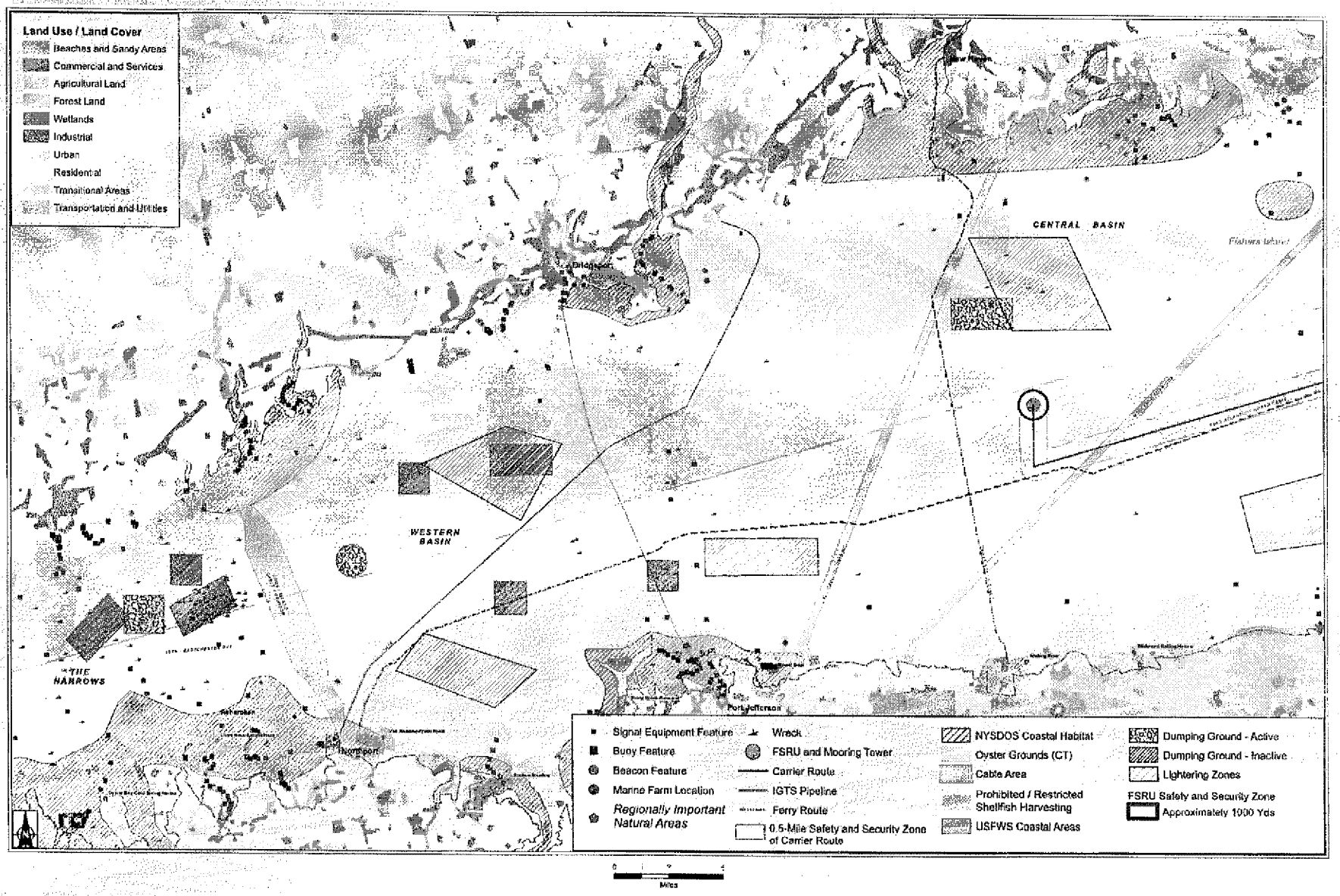


Figure 1-1 Land Use / Coastal Areas and Navigation Features
Central Long Island Sound

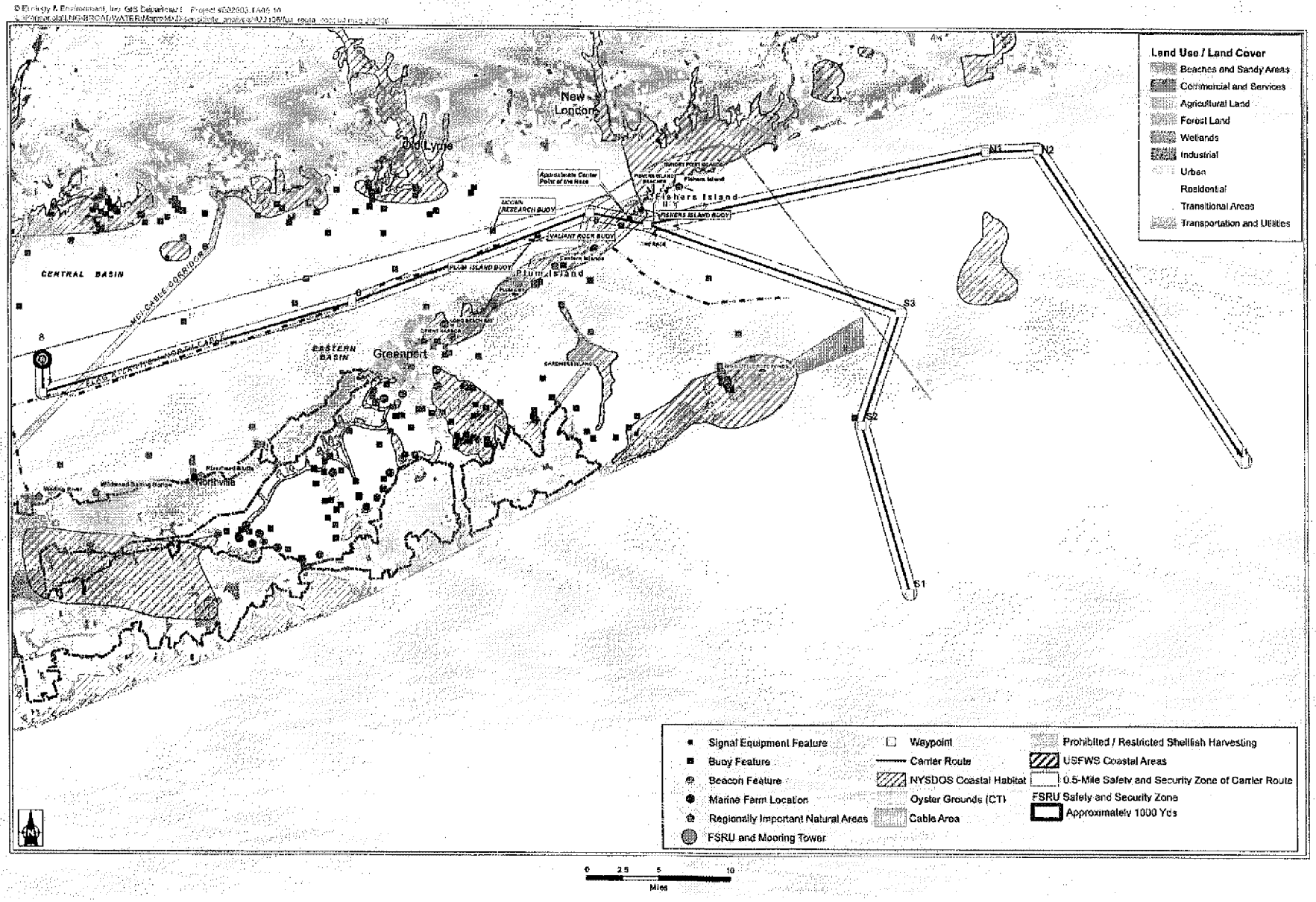
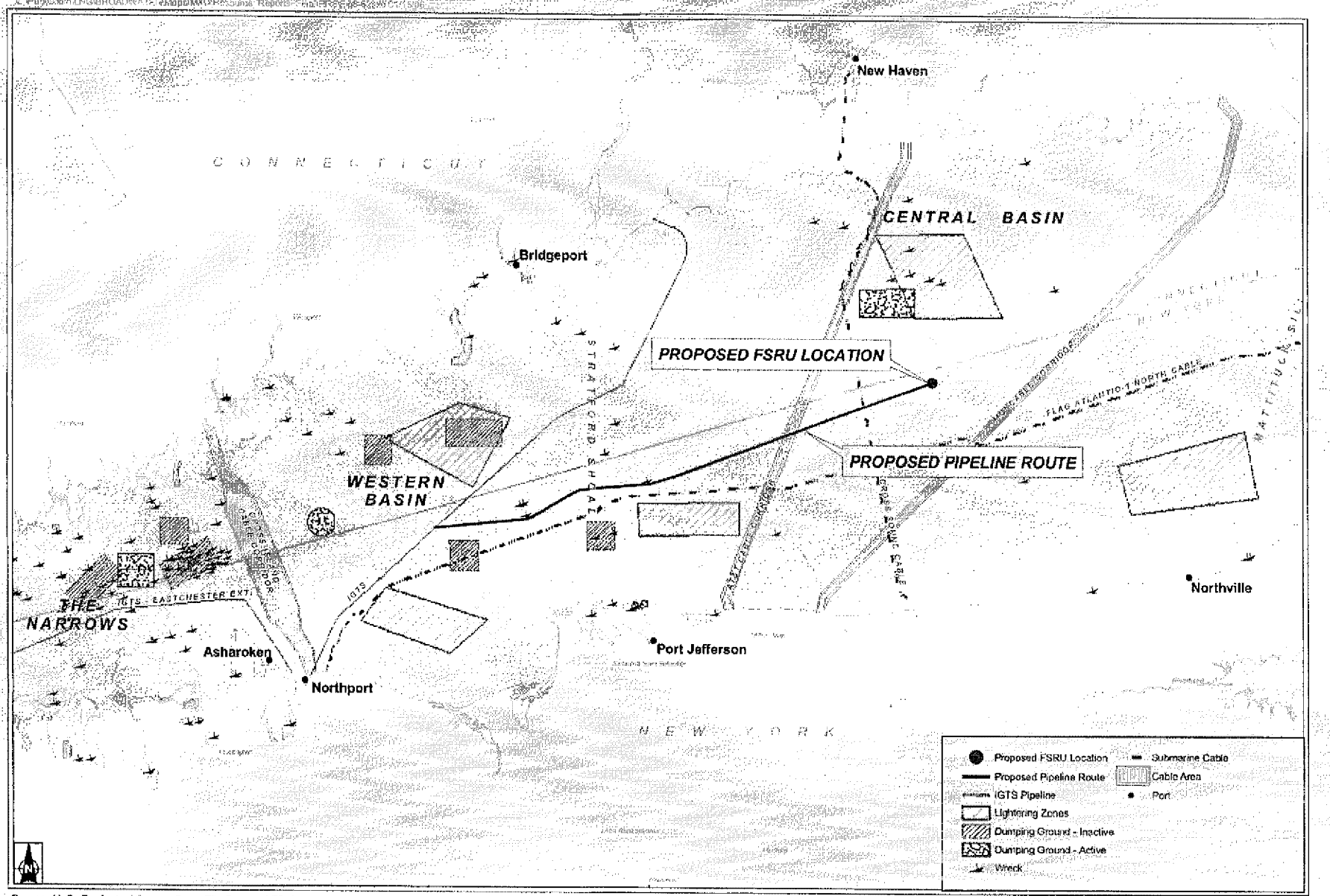


Figure 1-2 Land Use / Coastal Areas and Navigation Features
Eastern Long Island Sound



Source: U. S. Geological Survey Open-File Report OFR 00-304, 2000,
U. S. NOAA Electronic Nautical Charts.

Figure 1-2.1 Marine Uses in Long Island Sound

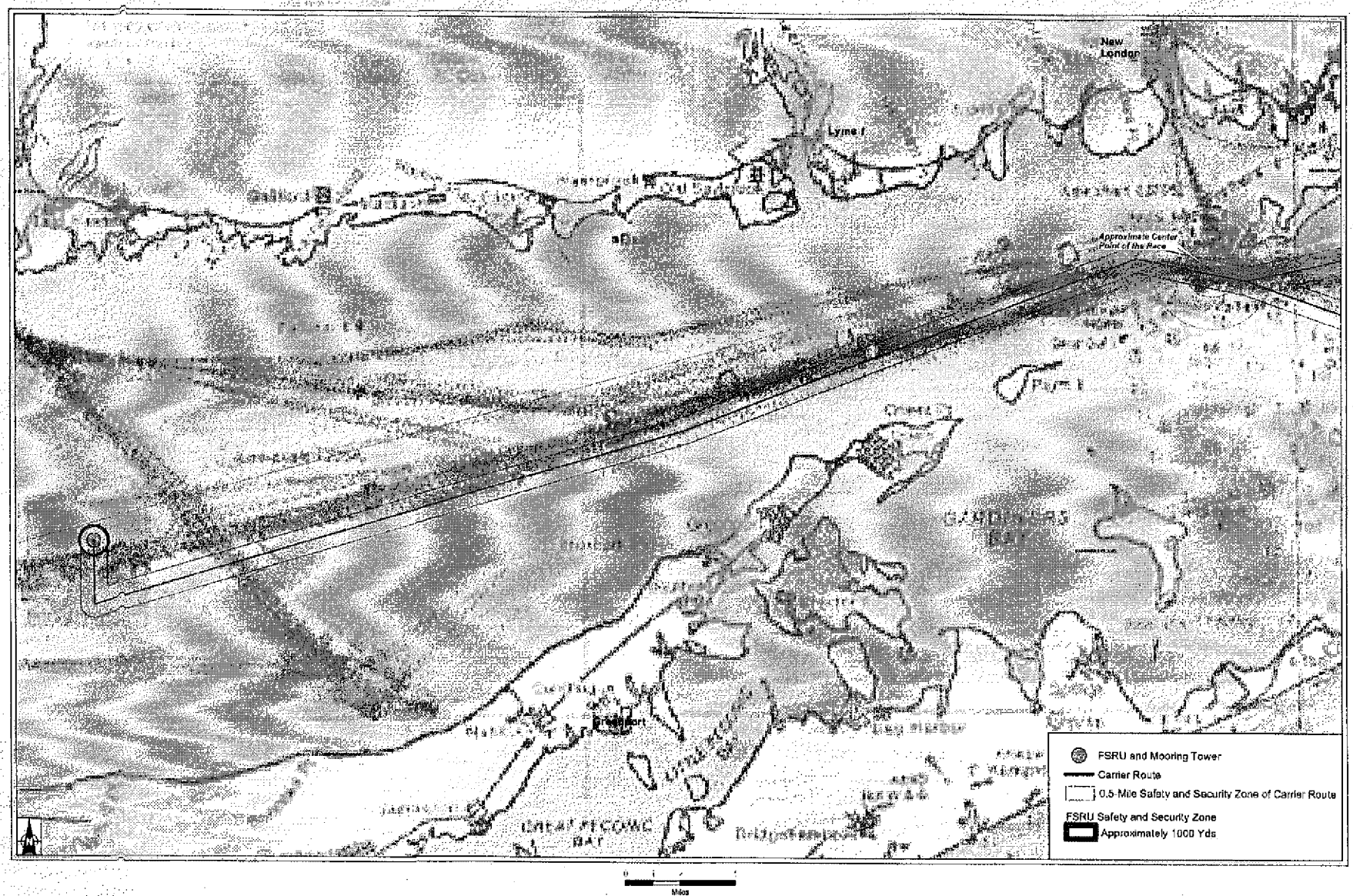
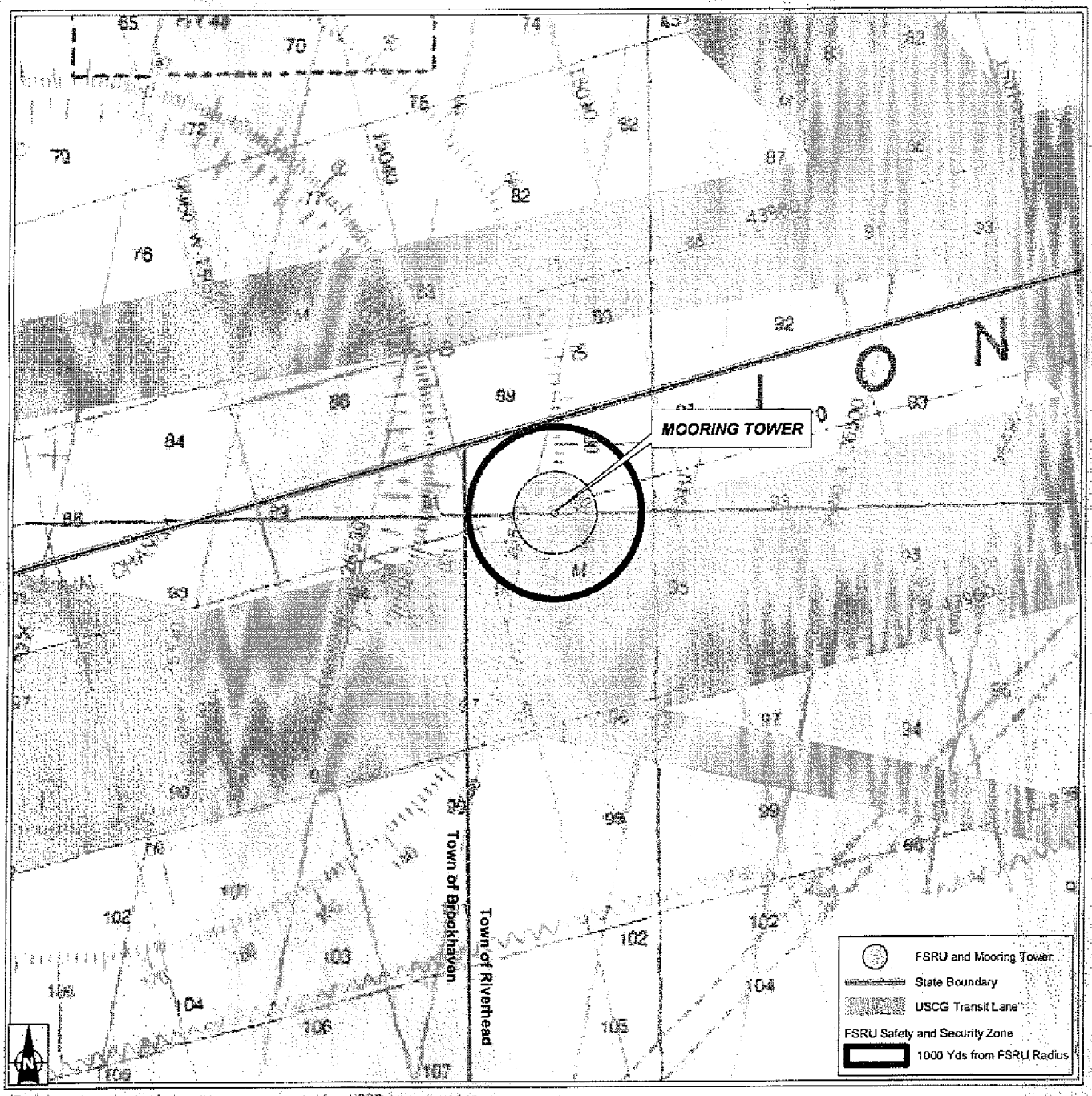


Figure 1-3 USCG Transit Lanes:
Race to Mooring Tower



*The information presented for transit lanes was generated from USCG data gathered as part of the PANSA report for the Broadwater Project and do not represent defined transit boundaries

Figure 1-4 USCG Transit Lanes Surrounding Proposed FSRU

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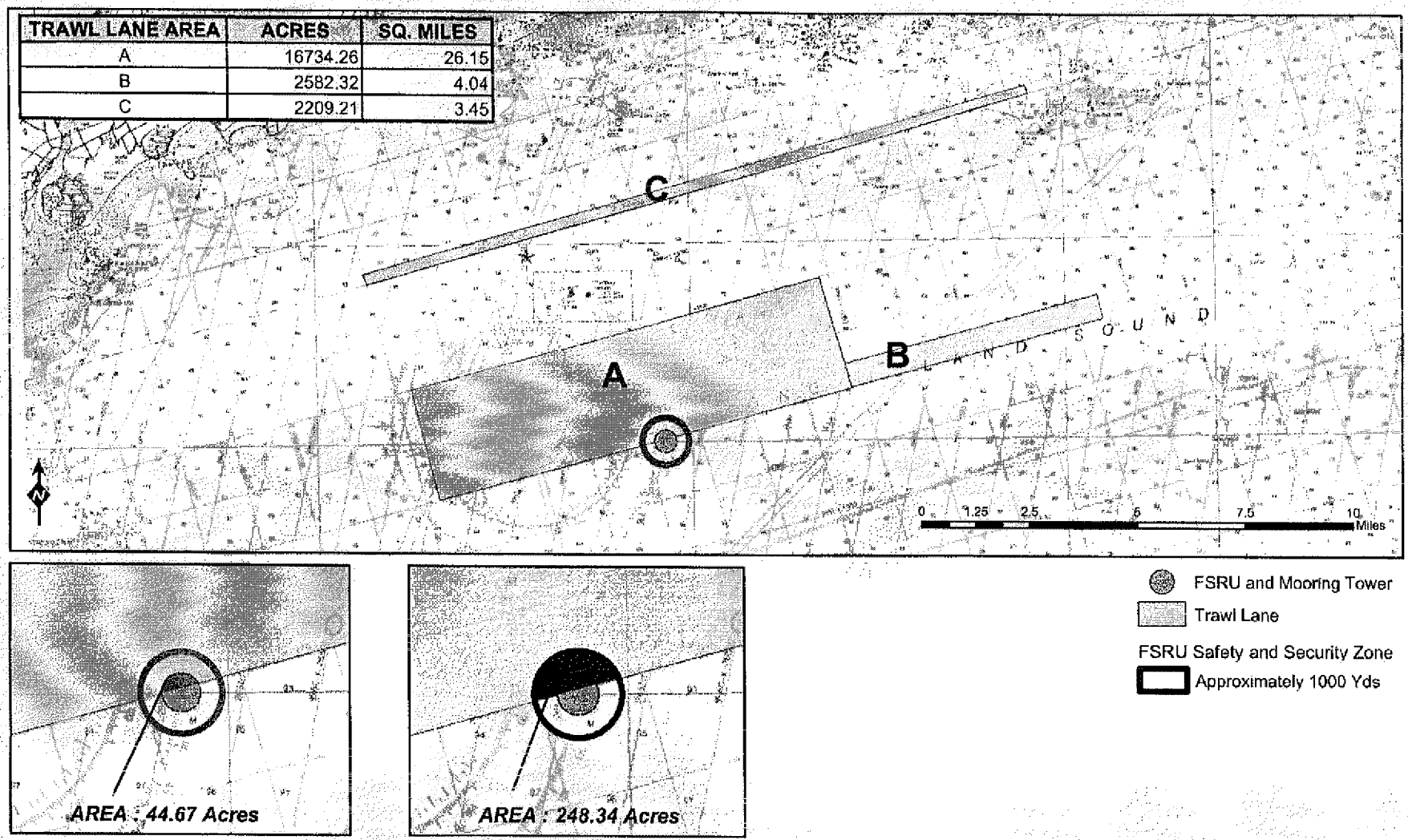
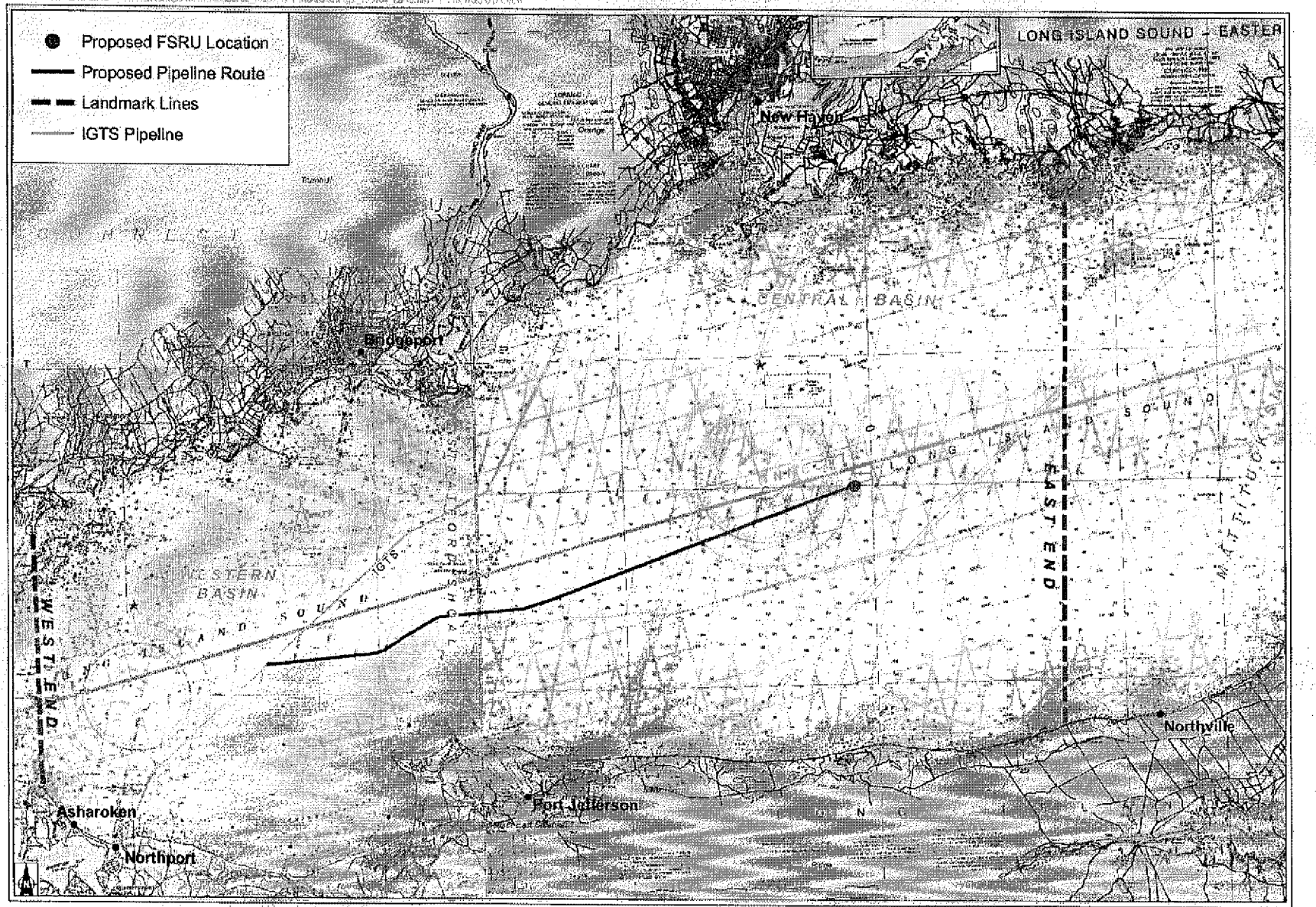


Figure 1-5 Area of Trawl Lanes Surrounding Mooring Towers



Source: U. S. Geological Survey Open-File Report OFR 00-304, 2000,
U. S. NOAA Electronic Nautical Charts.

Figure 1-6 Locations of LIS Boundaries Corresponding to NOAA Fisheries Landings Data

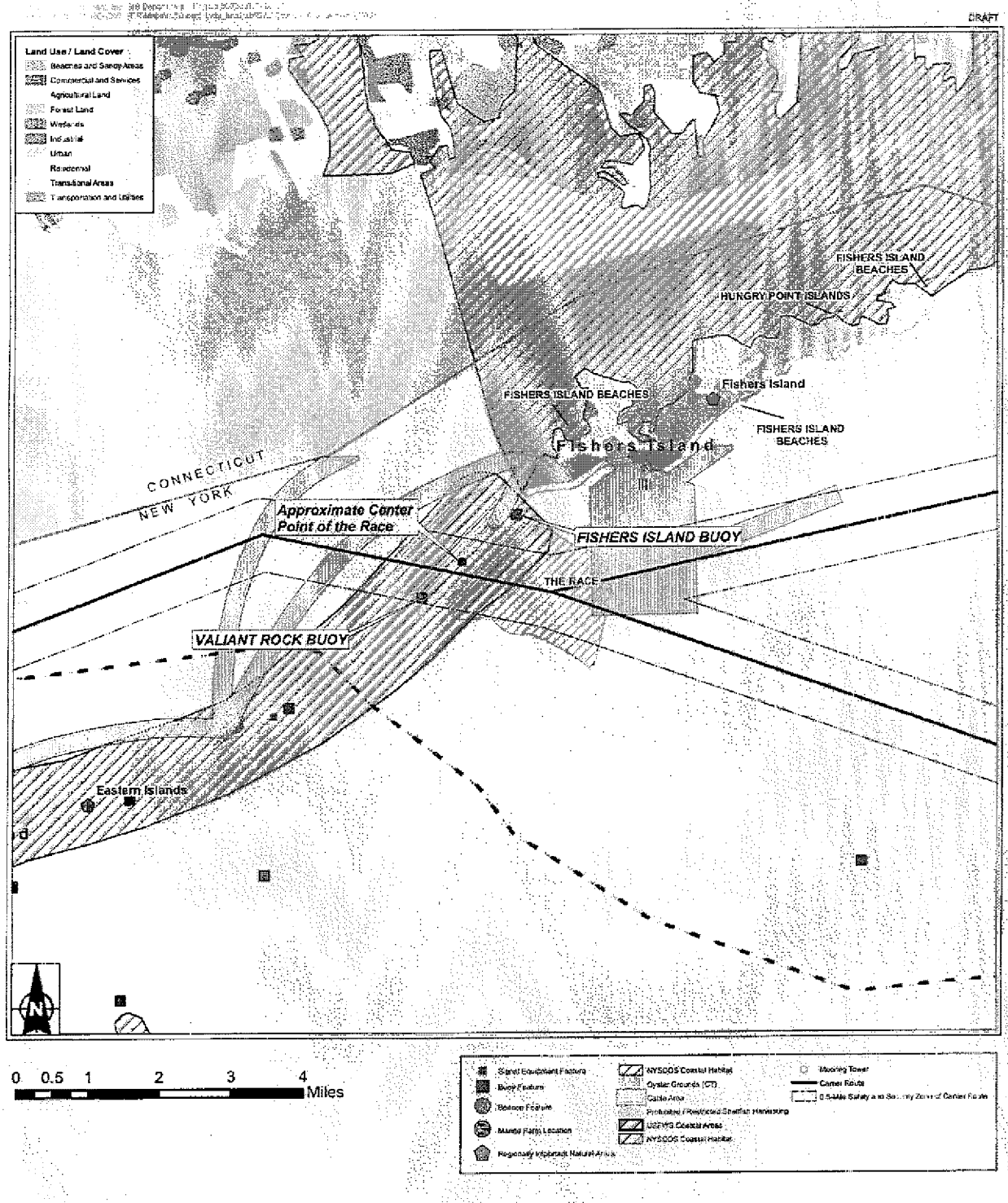
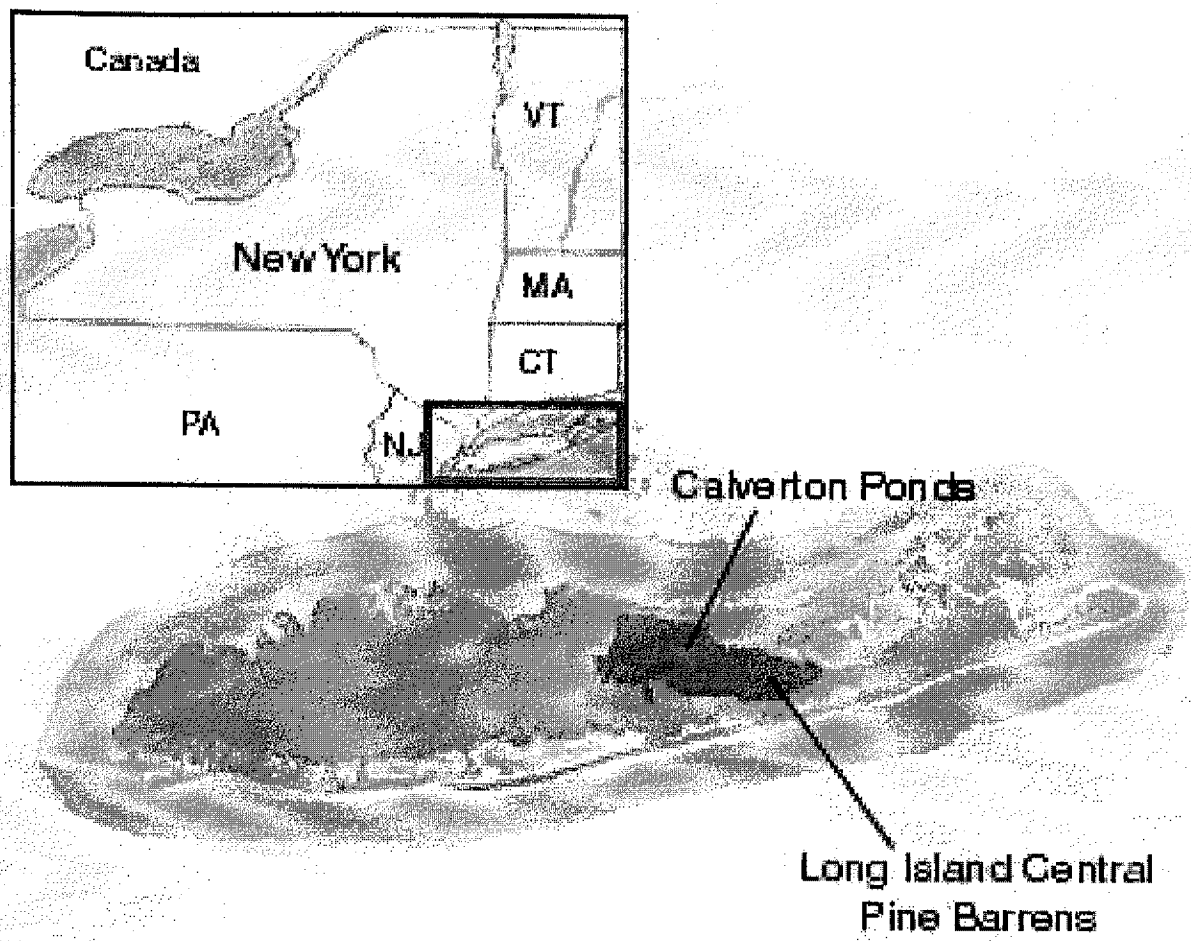


Figure 1-7 Coastal Areas and Navigation Features "The Race", Long Island Sound



Source: The Nature Conservancy 2006.

Figure 1-8 Pine Barrens Area of Long Island

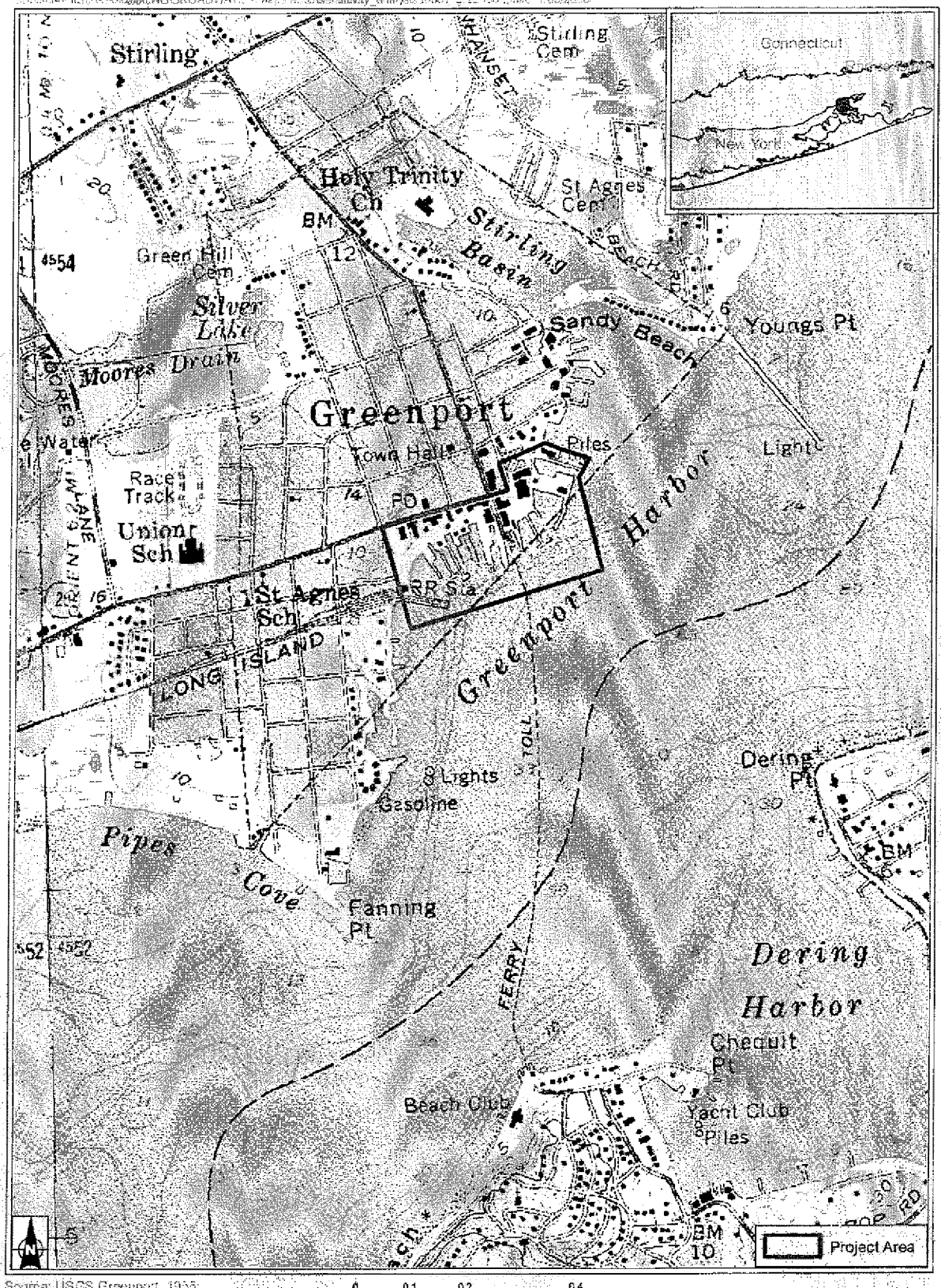
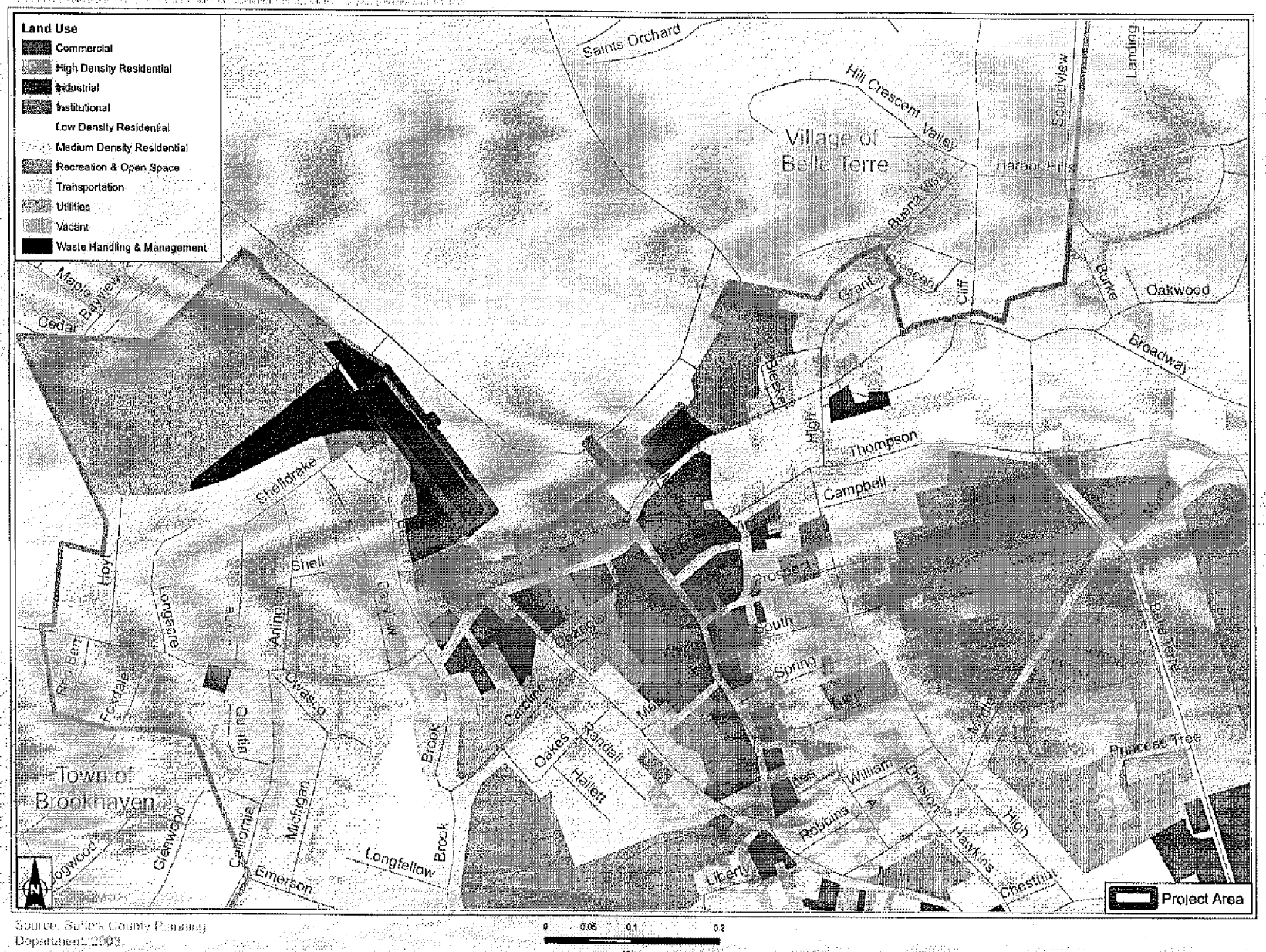


Figure 2-1 Proposed Onshore Facility Location
Greenport, New York

Figure 2-2 Proposed Onshore Facility Location
Port Jefferson, New York



Source: Suffolk County Planning Department, 2003.

Figure 2-3 Proposed Port Jefferson Site Land Use

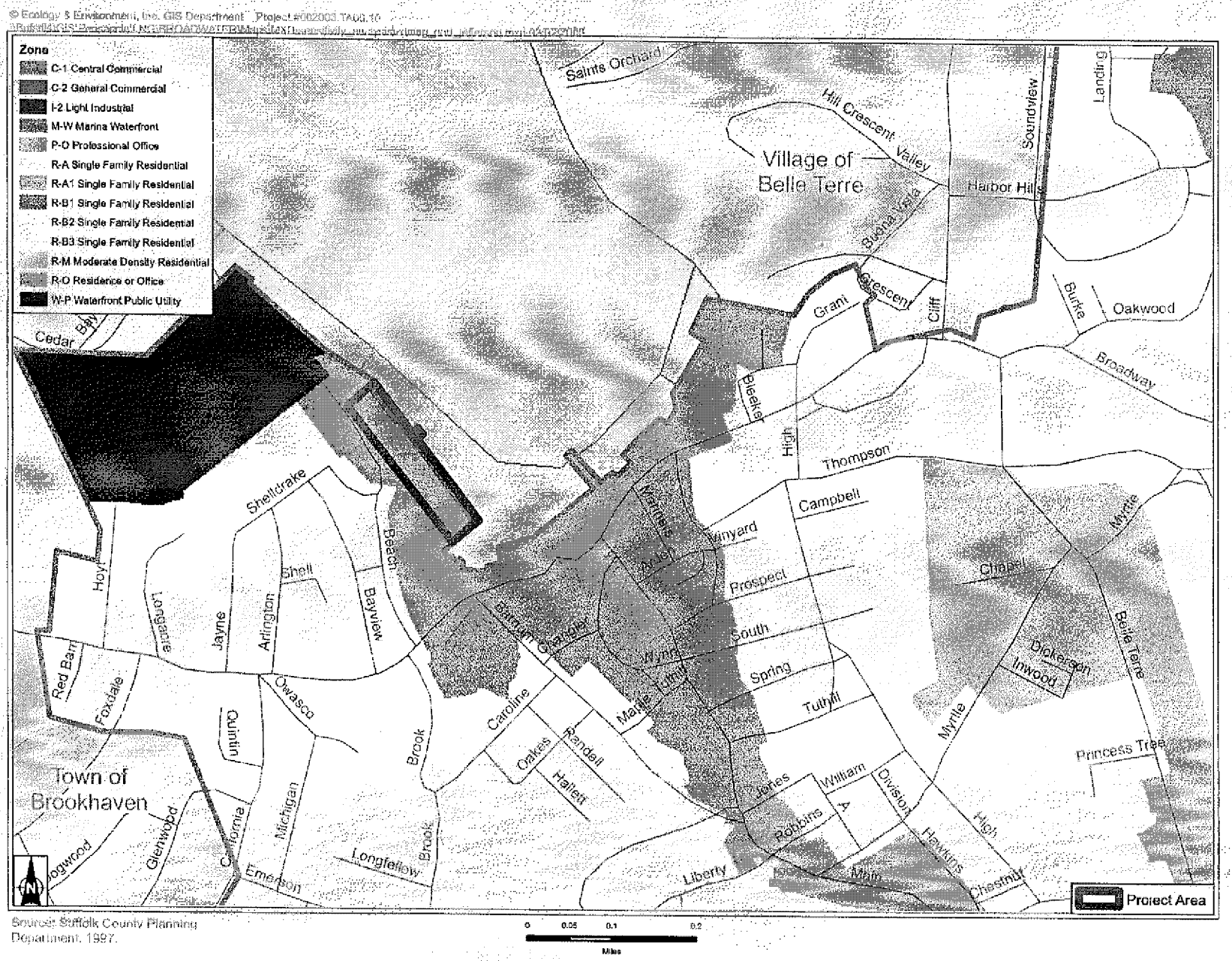


Figure 2-4 Proposed Port Jefferson Site Zoning

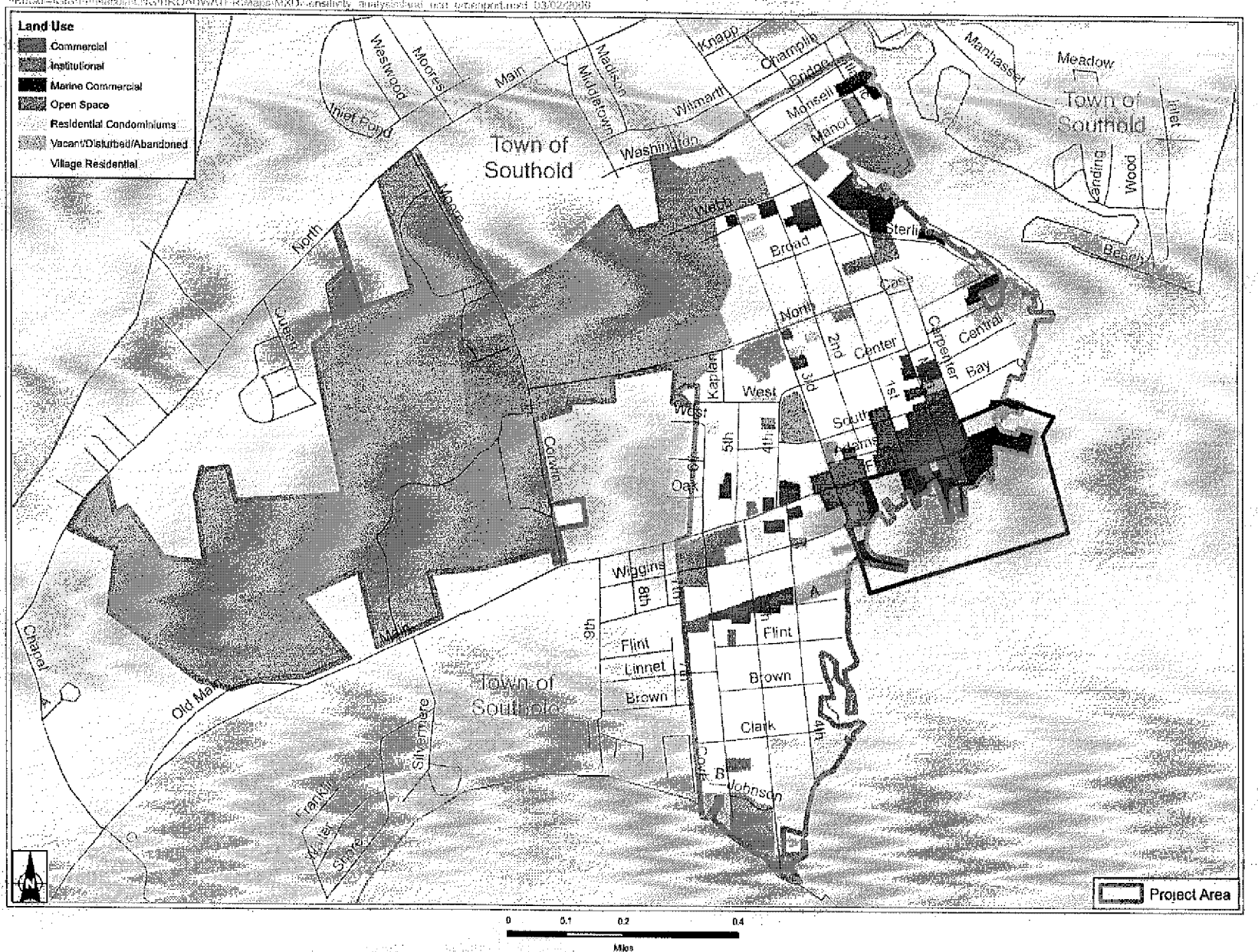


Figure 2-5 Proposed Greenport Site Land Use

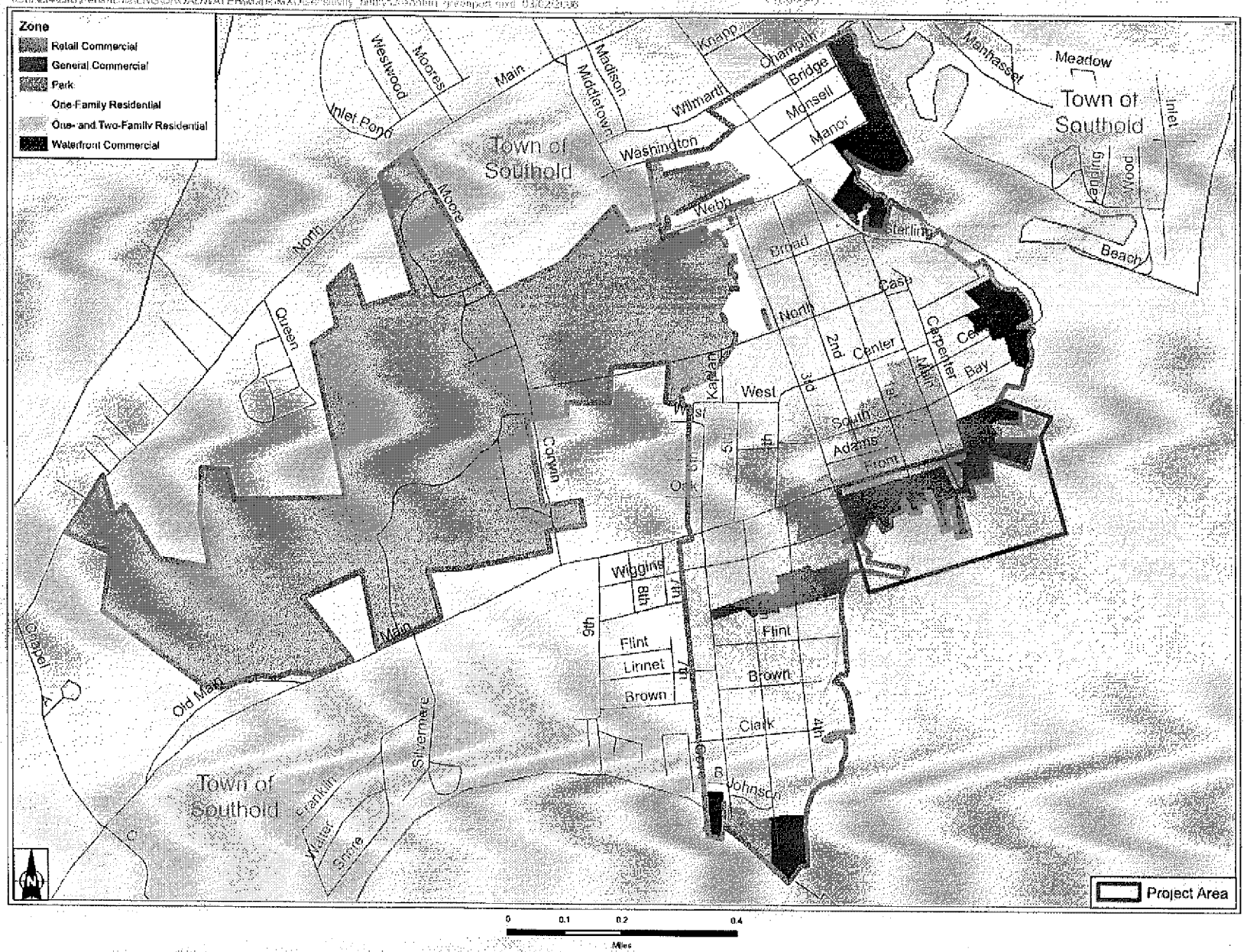


Figure 2-6 Proposed Greenport Site Zoning

EIR-20

Request:

Describe the likelihood and type of potential seismic impacts to the proposed Project associated with the magnitude and frequency of seismic activity (including the potential for soil liquefaction based on site-specific substrate conditions at the proposed YMS location).

Response:

The proposed pipeline route traverses the ACP physiographic province, characterized as a flat, low-lying seaward-thickening wedge of Cretaceous-age and younger sediments in a region of generally low seismicity marked by several distinct areas of higher activity. These higher activity areas can be correlated to unique specific structures or zones that are not found in the Project area and are not typical of the entire ACP.

According to the USGS (1996) ground-shaking map showing hazards from earthquakes, Long Island Sound has a very low ground-shaking hazard (ground shaking is expressed as a percent probability vs. percentage force of gravity [%g]). The proposed yoke mooring system (YMS) would be located near the 4%g border, while the pipeline would traverse the 4%g to 5%g zones. This means that there is a 90% probability that a ground shaking hazard would not occur in the project area in a given 50-year period, and if it does, it would be with a force of 4%g to 5%g (which is only capable of rattling objects). For the 2% probability, the FSRU would be located in the 12 to 14%g range, while the pipeline would traverse the 12 to 18%g range. This means that there is a 98% chance that a ground shaking hazard would not occur in the project area in a given 50-year period, and if it does, it would be with a force of 12 to 18%g (which equates to an earthquake intensity of about VII on the Mercali scale, capable of breaking furniture and causing bricks to fall from buildings).

Soil liquefaction is a phenomenon in which saturated soils temporarily lose their strength and liquefy (i.e. behave similar to a viscous liquid) when subjected to earthquake shaking or other rapid loading. When partial or total liquefaction occurs within a sand or silt, the shearing strength of the soil is reduced or lost. This can lead to floatation of buried pipelines or failure of pile supported structures.

According to the Federal Energy Regulatory Commission (FERC), areas with the potential for seismic soil liquefaction are "underlain by Holocene deposits which are likely to be non-cohesive, such as alluvial, lucustrine, littoral deposits, *and* where the water table occurs at 10 feet or less below the surface, *and* where the U.S.G.S. Open File Report 82-1033 indicates a 90 percent probability that horizontal ground accelerations of 10% of gravity (g) or greater, would not be exceeded in 50 years" (FERC 1998 *Order*

Establishing Guidelines for the Submission of Required Data for Pipeline Projects.). According to the USGS hazard maps, since the Project area is located in a 90% probability area with a ground-shaking force of only 4%g to 5%g, the proposed Project site has a low risk of soil liquefaction based on the low potential for significant seismic activity.

It is reasonable to assume that an intensity VII event could occur anywhere within the Project area, although the likelihood of such an event at any given point is extremely low (2%). In general, pipeline systems have been demonstrated to be capable of withstanding earthquakes of up to intensity VII with little damage (FERC 2000). Therefore, based on this information, the likelihood of a damaging earthquake occurring in the Project area over the life of the Project is very low.

Backfilling of the pipeline trench will be accomplished by the settling of the trench walls and natural sedimentation save for those areas where mechanical backfilling will take place. Resource Report 7, Table 7-1 Sediment Characteristics Summary describes the findings from the site investigations completed during 2005. It shows mineral soils comprised of silts, sands, clays, gravels, cobbles and combinations thereof, occurring within pipeline trench depth over the 21.7 mile length of the connecting pipeline. The capacity exists, albeit of a very low probability, for some of these sediments to liquefy during a strong seismic event.

When the soil around a buried pipeline liquefies, buoyancy forces become mobilized and the pipeline can float fully or partially out of its trench and loose depth of cover. The common means to counteract buoyancy forces is to weight down the pipeline. Weight coating for the connecting pipeline will be steel reinforced concrete (140 to 205 pounds per cubic foot densities, as required) applied over the pipeline's corrosion coating. During the detail design phase, the concrete coating thicknesses will be confirmed through an on bottom stability analysis that will take into account seismic induced liquefaction – although it is expected that normal buoyancy in sea water and hydrodynamic forces (tidal currents) will govern the design. Preliminarily, the thickness of the concrete weight coating is expected to be approximately 3 inches.

It is expected that the four legged tubular steel jacket of the mooring tower will be fixed to the seabed via steel piles driven through the corner tubulars, in about 27 meters of water. Deep exploratory borings will be conducted in the later part of 2008 to assess the existing conditions underlying the Sound and to determine the actual depth to which the piles will be installed. However, the geological information available from the USGS shows bedrock is likely to be sufficiently deep (at ~130 m) for a driven pile solution to be adopted. The piles are likely to be 50 to 70 m long, terminating in the lower glacial lake deposits, with friction piles nominally 1.0 to 1.2 m in diameter. The upper 20 m of soil at the FSRU site is expected to be soft/loose Holocene deposits (postglacial marine deposits to upper lacustrine and fluvial deposits), providing little pile capacity. Therefore the

foundation design will not rely on sustained integrity of the upper soil horizons where liquefaction in a strong seismic event would be most pronounced.

EIR-21

Request:

Identify potential impacts of scouring of surface sediments along the pipeline and mooring structure. Identify any sediment stabilization methods associated with pipeline installation or the mooring structure. In addition, specify the measures used to protect the subsea pipeline directly beneath the FSRU and berthed LNG carriers to avoid potential impacts to the pipeline.

Response:

The mechanism of soil or sediment erosion (i.e. scour) is complex and is related to soil properties (grain size, specific gravity, etc.) and the velocity of the water current which initiates and drives scouring forces. In general, the initiation of the motion of sand requires less current velocity than that needed for the initiation of motion of clay particles. This is due to the cohesion between the clay particles.

Resource Report 7, Table 7-1 Sediment Characteristics Summary describes the findings from the site investigations completed during 2005. It shows mineral soils comprised of silts, sands, clays, gravels, cobbles and combinations thereof, occurring within pipeline trench depth over the 21.7 mile length of the connecting pipeline. The sediment at the FSRU site is a silty clay.

Backfilling of the pipeline trench will be accomplished by the settling of the trench walls and natural sedimentation save for those areas where mechanical backfilling will take place. It is expected that the four legged tubular steel jacket of the mooring tower will be fixed to the seabed via steel piles driven through the corner tubulars. The upper 20 m of soil at the FSRU site is expected to be soft/loose Holocene deposits (postglacial marine deposits to upper lacustrine and fluvial deposits), providing little pile capacity. Therefore the foundation design will not rely on sustained integrity of the upper soil horizons.

Based on the spring 2005 field surveys completed for Broadwater, water depths range from approximately 55 to 130 feet (17 to 40 m) along the proposed pipeline route. The shallowest depths occur over the Stratford Shoal, and the deepest depths (>100 feet [30 m]) occur to the west and east of the Shoal. Water depths in the eastern 7.5 miles of the proposed pipeline route and at the proposed FSRU location are consistently about 95 feet (29 m) deep, with the depth at the FSRU centerpoint at 93 feet (28 m) below sea level. Tidal fluctuations in the Sound can reach 8 feet (2.4 m) with strong currents following each tidal change between slack tides. Current speed and direction is influenced by daily wind patterns and speeds, but is notably stronger over the Stratford Shoal.

EIR-21

To verify existing tidal currents within the Project area, three Acoustic Doppler Current Profilers (ADCPs) were deployed during the course of the field sampling effort during 2005. One (ADCP) was deployed near the proposed tie-in with the IGTS system, one was deployed near the proposed FSRU location, and a third was deployed at the proposed crossing of the Stratford Shoal. The ADCPs were deployed for one entire tidal cycle in May 2005, with the following results:

Site	M.P.	Sediment Type	Average Tidal Current Velocity
FSRU	0.0	Silty clay	0.84 ft/s (0.3 m/s; 0.5 knots)
Stratford Shoal	14.5	Sand, gravel, cobbles	1.34 ft/s (0.4 m/s; 0.8 knots)
IGTS tie-in	21.7	Silty clay	0.64 ft/s (0.2 m/s; 0.4 knots)

Potential impacts of scouring of surface sediments along the pipeline and mooring structure.

If a scour pit were to occur during the life of the project around a section of the pipeline or a mooring tower leg then its criticality would need to be assessed. The issue with respect to the pipeline is the potential for a critical span length to develop which can lead to problems of fatigue due to vortex induced oscillations (vortex shedding) caused by current flow around the pipeline, overstressing the pipeline due to excessive bending moments, or hooking of the pipeline by anchors or fishing gear. For the mooring tower it is the potential for loss of soil material around the piles. Depending on the findings, corrective action could be needed to repair and stabilize the area of the scour.

Sediment stabilization methods associated with pipeline installation or the mooring structure.

The susceptibility of the post construction seabed to scour will be assessed during final detailed design of the pipeline and the YMS. The objective will be to design for the avoidance of scouring.

Problems with scour are generally avoided by sufficient burial of the pipeline below the zone of scour potential. In addition, the concrete weight coating that the pipeline will receive for negative buoyancy and on-bottom stability will significantly mitigate any issues with respect to spans. Finally, certain areas of the pipeline will receive mechanical backfill that can be designed to resist scouring (e.g. amour rock backfill or concrete mats). Armour rock scour protection can be utilized around the base of the mooring tower legs if detailed design shows this is recommended.

Measures used to protect the subsea pipeline directly beneath the FSRU and berthed LNG carriers to avoid potential impacts to the pipeline.

Broadwater recognizes that the area within the 1,370 ft. weathervaning radius of the FSRU requires particular attention from the point of view of risk of damage from dropped objects. Broadwater has incorporated many features in the design of the pipeline

EIR-21

to mitigate these risks most of which are described in Resource Reports 1 and 11. These measures include:

- Aligning the initial section of the connecting pipeline normal to the prevailing FSRU orientation due to winds and currents,
- Use of protective cages over subsea valves,
- Use of the thicker Class 3 wall thickness design,
- Use of high density steel reinforced concrete weight coating,
- Extra depth of burial and mechanical amour rock backfill,
- Possible use of concrete mats in the areas of material handling (i.e. under the reach of the FSRU's cranes),
- Non use of anchors by LNG Carriers,
- Possible controlled operational procedures for material transfer while not over pipeline, and
- Installation of a check and isolation valve immediately outside the range of FSRU weathervaning radius. The check valve will automatically contain gas downstream should there be a failure in the pipeline system inside the weathervaning radius of the FSRU.

EIR-22

Request:

Identify each coastal zone policy element applicable to the proposed project, and provide a discussion of whether or not the proposed project would be consistent with each policy element including the rationale.

Response:

The Federal Coastal Zone Management Act (CZMA) governs the coastal consistency review of the Broadwater Project. While participation in the CZMA program is voluntary for states, a state that elects to participate must "develop and implement a CMP pursuant to federal requirements." (*see* CZMA Federal Consistency Regulations, 71 Fed. Reg. 788, 789 (Jan. 5, 2006) (to be codified at 15 CFR Part 930). New York's CMP received federal approval in 1982; thereby, New York State has been authorized to implement the federal CZMA through its CMP. The state CMP contains 44 policy statements that are applied to projects to determine "consistency" with the State's coastal management program. (*see* N.Y.C.R.R. tit. 19 § 600.5). In addition to the 44 general policies of the State CMP, New York has also developed and approved a separate and distinct coastal management program for the Long Island Sound. The Long Island Sound Coastal Management Program (LIS CMP) "refines" the State CMP and incorporates programs and laws governing coastal activities within Long Island Sound. Specifically, the LIS CMP replaces the State CMP for the Sound Shorelines of Westchester County, New York City to the Throgs Neck Bridge, Nassau County, and Suffolk County.

On April 4, 2006, Broadwater submitted its Coastal Zone Consistency Determination (April 2006 CZCD) to the New York State Department of State. The April 2006 CZCD provides a detailed analysis of the Broadwater Project's consistency with the 13 specific policies of the LIS CMP, the State CMP, Local Waterfront Revitalization Programs (LWRPs) for the Town of Southold, the Village of Greenport, and the Town of Smithtown, and the Port Jefferson Harbor Complex Harbor Management Plan (Port Jefferson HMP). The April 2006 CZCD identifies the elements of coastal zone policies and related plans/programs that potentially apply to the proposed Broadwater Project and provides a discussion of the Project's consistency with their elements and objectives, and Broadwater respectfully refers to Chapter 4 of its April 2006 CZCD for a comprehensive discussion of these issues.

EIR-23

Request:

Provide an estimate of the number of recreational vessels likely to be temporarily displaced during each LNG carrier transit of the Race. In addition, describe the types and estimated density of recreational vessels (by season) that use the offshore areas that LNG carriers would transit in Rhode Island/Block Island Sound between Point Judith to approximately Fishers Island. Identify any high-density locations of recreational use in this area including fishing, diving, or boating.

Response:

With respect to potential conflicts with commercial and recreational fishing vessels, due to strong tidal currents in the Race, most commercial and recreational fishing vessels likely cross the Race during slack tide. Broadwater proposes, if possible and in agreement with the USCG, to schedule the passage of LNG carriers outside of slack water periods to avoid any potential conflict. Broadwater would also consider transiting the Race during nighttime hours when significantly less traffic is present in the area.

It should also be noted that because most commercial and recreational fishing vessels can traverse the Race outside of the deep channel because of their shallow draft, the potential for even temporary displacement is minimized.

It is not possible to estimate the density of or quantify the types of recreational vessels in either the Race or Block Island Sound as there is no data available from any reliable source.

EIR-24

Request:

Provide all correspondence between Broadwater and the EPA, Region 2 and the NYSDEC documenting the applicability of federal Prevention of Significant Deterioration review to the proposed Project. In particular, provide specific responses to questions posed in the EPA, Region 2 letter dated March 9, 2006 to Broadwater regarding Standard Industrial Classification (SIC) codes, detailed breakdown and discussion of emissions (unit by unit) associated with off-loading and on-board processing of the LNG, feasibility of vessels using gas turbines to generate electricity while berthed at the FSRU, and the feasibility of using low sulfur-diesel when possible.

Response:

The March 9, 2006 letter from EPA Region 2 to the Broadwater Project is attached to this response. Prior to receipt of the March 9, 2006 letter, EPA Region 2 contacted the Project by telephone to ask various questions; a summation of these contacts is the subject matter of the March 9, 2006 letter. Responses to the March 9 letter are under development and will be submitted to the EPA and the Commission on or about April 28, 2006.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

MAR - 9 2006

rcvd 3/13/06 E+E HQ

Ms. Sandra Barnett,
Environmental Affairs Manager
Broadwater Energy
777 Walker Street, 22nd Floor
Houston, Texas 77002

Re: Prevention of Significant Deterioration of Air Quality (PSD) Applicability Review
Broadwater Energy

Dear Ms. Barnett:

EPA has reviewed the report entitled: "Broadwater Resource Report No. 9, Air and Noise Quality for a Project to Construct and Operate a Liquified Natural Gas Receiving Terminal in Long Island Sound," dated October 2005 and a subsequent update dated January 2006 for possible PSD applicability. We have the following comments. It should be noted that some of the information requested below have already been transmitted to us orally through various telephone calls. However, we will need responses to these comments in writing as part of the administrative record of the project.

1. The various Standard Industrial Classification (SIC) Codes that will be applicable for the proposed facility (floating storage and regasification unit [FSRU] and vessels) and for each group of polluting emitting equipment that has a specific function should be listed in the report.

2. Consistent with the guidance provided in the October 28, 2003 EPA letter from Charles J. Sheehan, Regional Counsel, EPA Region 6 to Mr. Michael Cathey and Ms. Diana Dutton, from El Paso Energy Bridge Gulf of Mexico, L.L.C. and Akin, Gump, Strauss, Hauer & Feld, L.L.P., respectively, EPA Region 2, in coordination with our OAQPS office, has determined that certain emissions from the vessels should be counted toward the PTE (potential to emit) of the FSRU. More specifically, for PSD applicability purposes, the vessel emissions related to off-loading and on-board processing of the LNG count towards the PTE of the FSRU and that emissions related to hotelling and propulsion of the vessel do not count towards the PTE of the FSRU.

   Consequently, the report should contain a detailed breakdown of emissions (with a detailed discussion) quantifying vessel emissions that correspond to the off-loading and on-board processing of the LNG and quantifying vessel emissions that correspond to hotelling and other ship functions while at berth. If there are more than one unit

(boiler/diesel engine) producing these emissions, specify these units. The report should also break down the emissions on a unit by unit basis so it is clear which units on the ships are generating the emissions for these various functions. PTE emissions from the FSRU should be recalculated by incorporating the corresponding emissions from the vessels not associated with hotelling.

3. There is a discussion in Page 9-14 of the October 2005 Report (or Page 9-13 of the January 2006 Report) regarding the applicable PSD applicability threshold for this proposed facility. The Report states that this proposed facility has two PSD category sources within the FSRU: 1) fossil fuel-fired steam electric plants of more than 250 MMBTU/hr heat input and 2) fossil fuel boilers (or combinations thereof) totaling more than 250 MMBTU/hour heat input. Broadwater states that individual and combined emissions from these two category sources would not exceed the PSD threshold of 100 tons/year. Furthermore, Broadwater states that the primary purpose of the FSRU is the storage and regasification of natural gas and since it does not fall within the 28 recognized PSD source categories, the 250 tons/year PSD applicability threshold applies to the FSRU process.

   This approach seems to be consistent with the July 6, 1992 letter from Edwin Erickson, Regional Administrator, EPA Region 3, to Mr. George Freeman, Counsel for Reserve Coal Properties Company. This EPA letter states in Page 4 that "EPA's policy is to use the primary activity test to determine which SIC code governs and thus, which activities may be grouped into a single 'source.' However, once the source is identified, EPA will determine the proper applicability threshold on the basis of the categories set out in Section 169(l). If a source includes an industrial operation listed under Section 169(l), the 100-ton threshold will apply to the listed operation no matter what the primary activity of the entire source." However, because EPA Region 2 has not yet received any final Report/application containing the SIC codes and the proper reapportioning of the emission estimates from the FSRU and vessels (see Comments Nos.1 and 2 above), a final PSD applicability determination cannot be made at this time.

4. Will all the vessels carrying the LNG to the FSRU have a boiler on board (or a combination of boilers) totaling more than 250 MMBTU/hour heat input? If not all vessels will have such boiler(s), give an estimate of the percent of vessels that will be at berth at the FSRU that will have boiler(s) totaling more than 250 MMBTU/hr heat input. Please specify how many boilers are on each ship and how many MMBTU/hr heat input each boiler is.

5. The Report must also include a discussion as to the feasibility of the gas turbines at the FSRU providing electricity to the vessels at berth so that the vessels can run the LNG pumps. This approach can potentially reduce SO_2 emissions from the vessels while at berth because the vessels will use higher sulfur fuel than the FSRU. If this is technically infeasible, detailed reasons should be provided.

6. The Report must include a discussion on the feasibility of the FSRU providing fuel oil containing 1.0% sulfur content or less to the vessels carrying the LNG while at berth for the purposes of off-loading and on-board processing of the LNG. Also, it should address the feasibility of the ships burning lower sulfur fuel on their own while at berth.

Please provide the above information so that we can continue with our review. If you have any questions, please contact Mr. Frank Jon, of my staff, at (212) 637-4085.

Sincerely,

Steven C. Riva, Chief
Permitting Section
Air Programs Branch

cc: Robert Sliwinski, NYSDEC - Albany
Syed Rahman, NYSDEC - Region 1
Bruce Wattle, Ecology and Environment, Inc.

EIR-25

Request:

Provide quantified construction emission estimates by type of emission source, their duration, and the emissions associated with each activity. Provide data on NO_x, CO, SO_2, VOC, PM_{10}, $PM_{2.5}$, ammonia, and HAPS. Note that in the January 2006 Resource Report 9, PM_{10} and $PM_{2.5}$ emission estimates were lumped together and ammonia and HAPS emissions were not identified in either the construction emission study or the emissions calculations workbook, and little, if any, explanatory text was provided. Refer to EPA AP-42.

Response:

The construction emission analysis tables in the Appendices to Resource Report 9 provide the following detail:

- The type of emission source is identified in the table entitled "Broadwater Energy Pipeline Construction Vessel Operation Chart". A copy of the table is attached for ease of reference. The column headings show the type of vessels to be used: diving support vessel, lay barge, anchor handling tug, support vessel, pipe hauler tug, material hauler tug, survey vessel, and security vessel. The type of emission source on each vessel is internal combustion engines. The Chart describes the duration of vessel use in days for each vessel and activity type.

- In Appendix B (MMS Spreadsheet for Calculation of Air Emissions) to the Construction Emission Study contains a table entitled "Air Emission Computation Factors". A copy of the table is attached. This table lists the emission factors used in the calculation, along with the reference to the source of the emission factor. The reference list includes the EPA AP-42 emission factor document.

- In the same Appendix, the tables entitled "Air Emission Calculations – First and Second Year" detail the emissions associated with each construction activity. These tables are also attached to this Response. The construction activity is defined in the left column in the table (the column is labeled "Operations") and the emissions are shown in pounds per hour and tons per year in the table. Pollutants evaluated in this manner are PM, SOx (assumed to be all SO2), NOx, CO and VOC. The PM value is assumed to equal both PM10 and PM2.5 fractions (that is, the PM value is used as the value for PM10 and as the value for PM2.5). As stated in the Response to EIR 14, ammonia was inadvertently shown in Table 9-12 of Resource Report 9. Construction emissions will not include any emission of ammonia since there are no processes used in construction that will generate ammonia.

EIR-25

Port emission inventory documents (including the EPA Sector Strategy document "Current Methodologies and Best Practices in Preparing Port Emission Inventories" and the "Northern New York, New Jersey, Long Island Nonattainment Area Commercial Marine Vessel Emission Inventory" prepared by Starcrest Consulting) do not provide HAP emission factors for marine vessel emissions. Reliable emission factors for HAPs from marine vessels that can be referenced to a noted publication are not currently available in the literature (EPA AP-42 does not contain HAP emission factors for marine vessels). The EPA AP-42 emission factors for stationary large diesel engines (section 3.4) contains HAP emission factors, however these factors are based on testing of only one stationary on-shore engine in California and are likely not representative of marine vessel engine HAP emission factors.

Broadwater Energy Pipeline Construction Vessel Operation Chart
rev E
(modified for Optional Activities- 092905)

Activity	DURATION FOR VESSEL	Diving Support Vessel		Lay Barge		Anchor Handling Tug		Support Vessel		Pipe Hauler Tug		Material Hauler Tug		Survey		Security Vessel	
Security	446		0		0		0	1	446		0		0		0	1	446
IGTS Hot-Tap Installation (Excavation, Installation, and Protection)	14	1	14		0		0	1	14		0	1	14		0		
Survey Vessel	172		0		0		0	1	172		0		0	1	172		0
Prelay Diving Operations	22	1	22		0		0	2	44		0	1	22		0		0
Pipelay Operations	42		0	1	42	2	84	2	84	6	252		0		0		0
Pipeline Lowering	41		0	1	41	2	82	2	82		0		0		0		0
Hot-Tap Connecting Spool (Spool #1) with Lay Barge	5		0	1	5	2	10	2	10		0	1	5		0		0
FSRU Pipeline Tie-in Spool (Spool #3) with Lay Barge	4		0	1	4	2	8	2	8		0	1	4		0		0
Crossing Completion and Cover Placement	15	1	15		0		0		0		0		0		0		0
Additional Construction Requirements	22	1	22		0		0		0		0		0		0		0
Filling, Treating, and Cleaning	8	2	16		0		0		0		0		0		0		0
Check and Isolation Valve Spool (Spool #4)	12	1	12		0		0	1	12		0	1	12		0		0
Hydrostatically Test Pipeline with Treated Water	3	2	6		0		0	2	6		0		0		0		0
Acceptance of Hydrostatic Test	1	2	2		0		0	2	2		0		0		0		0
IGTS Pipeline Tie-in Spool (Spool #2)	10	1	10		0		0	1	10		0	1	10		0		0
FSRU Tie-in (Spool #1 and Spool #2)	15	1	15		0		0	1	15		0	1	15		0		0
Dewatering & Drying (Pre-Commissioning and Commissioning)	21	2	42		0		0	2	42		0				0		0
	DAYS:		**176**		**92**		**184**		**947**		**252**		**82**		**172**		**446**
Optional Activities																	
Backfilling	34			1	34	1	34	1	34								
Dredging	20	1	20							**Dredging Vessel**		**Hopper Barge /Tug**					
Backfilling (from Dredging)	20							1	20	1	20	2	40	1	20		

Vessel Type	Vessel Name
Diving Support Vessel	Defender
Lay Barge	DLB 801
Ocean Transport Tug	M/V Provider 1800
Anchor Handling Tug	M/V Crosby Pride 1200
Support Vessel	Multiple
Security Vessel	Multiple
Pipe Hauler Tug	M/V Aaron Joseph 1000
Material Hauler Tug	M/V Aaron Joseph 1000
Survey Vessel	R/V Connecticut

* Listing company and vessel name is solely to describe in detail the type of vessel used in that operation. It by no means insinuates they will be choosen or given favor for the work.

AIR EMISSION COMPUTATION FACTORS

Fuel Usage Conversion Factors	Natural Gas Turbines		Natural Gas Engines		Diesel Recip. Engine		REF	DATE
	SCF/hp-hr	9.524	SCF/hp-hr	7.143	GAL/hp-hr	0.0483	AP42 3.2-1	4/76 & 8/84

Equipment/Emission Factors	units	PM	SOx	NOx	VOC	CO	REF	DATE
NG Turbines	gms/hp-hr		0.00247	1.3	0.01	0.83	AP42 3.2-1& 3.1-1	10/96
NG 2-cycle lean	gms/hp-hr		0.00185	10.9	0.43	1.5	AP42 3.2-1	10/96
NG 4-cycle lean	gms/hp-hr		0.00185	11.8	0.72	1.6	AP42 3.2-1	10/96
NG 4-cycle rich	gms/hp-hr		0.00185	10	0.14	8.6	AP42 3.2-1	10/96
Diesel Recip. < 600 hp.	gms/hp-hr	1	1.468	14	1.12	3.03	AP42 3.3-1	10/96
Diesel Recip. > 600 hp.	gms/hp-hr	0.32	1.468	11	0.33	2.4	AP42 3.4-1	10/96
Diesel Boiler	lbs/bbl	0.084	2.42	0.84	0.008	0.21	AP42 1.3-12,14	9/98
NG Heaters/Boilers/Burners	lbs/mmscf	7.6	0.593	100	5.5	84	P42 1.4-1, 14-2, & 14	7/98
NG Flares	lbs/mmscf		0.593	71.4	60.3	388.5	AP42 11.5-1	9/91
Liquid Flaring	lbs/bbl	0.42	6.83	2	0.01	0.21	AP42 1.3-1 & 1.3-3	9/98
Tank Vapors	lbs/bbl				0.03		E&P Forum	1/93
Fugitives	lbs/hr/comp.				0.0005		API Study	12/93
Glycol Dehydrator Vent	lbs/mmscf				6.6		La. DEQ	1991
Gas Venting	lbs/scf				0.0034			

Sulfur Content Source	Value	Units
Fuel Gas	3.33	ppm
Diesel Fuel	0.4	% weight
Produced Gas(Flares)	3.33	ppm
Produced Oil (Liquid Flaring)	1	% weight

AIR EMISSION CALCULATIONS - FIRST YEAR

COMPANY	AREA	BLOCK	LEASE	PLATFORM				WELL	CONTACT		PHONE	REMARKS				
Broadwater Energy	Long Island Sound, New York	N/A	N/A	Floating Storage Regasification Unit				N/A	Stephen Marr			#REF!				
OPERATIONS	EQUIPMENT	RATING	MAX. FUEL	ACT. FUEL	RUN TIME			MAXIMUM POUNDS PER HOUR					ESTIMATED TONS			
	Diesel Engines	HP	GAL/HR	GAL/D												
	Nat. Gas Engines	HP	SCF/HR	SCF/D												
	Burners	MMBTU/HR	SCF/HR	SCF/D	HR/D	DAYS		PM	SOx	NOx	VOC	CO	PM	SOx	NOx	VOC	CO
DRILLING	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	BURNER diesel	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	AUXILIARY EQUIP<600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(tugs)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PIPELINE INSTALLATION																
Security	**Security Vessel**															
	Main Engine	500	24.15	579.60	24	81	1.10	1.62	15.42	1.23	3.34	1.07	1.57	14.99	1.20	3.24
	Support Vessel															
	Main Engine	500	24.15	579.60	6	81	1.10	1.62	15.42	1.23	3.34	0.27	0.39	3.76	0.30	0.81
Survey Support	**Survey Vessel**															
	Main Engine	825	39.8475	956.34	24	56	0.58	2.67	19.99	0.60	4.36	0.39	1.79	13.43	0.40	2.93
	Bow Thruster	205	9.9015	237.64	24	56	0.45	0.66	6.32	0.51	1.37	0.30	0.45	4.25	0.34	0.92
	Generators (2)	125	6.0375	144.90	24	56	0.28	0.40	3.85	0.31	0.83	0.19	0.27	2.59	0.21	0.56
	Support Vessel															
	Main Engine	500	24.15	579.60	6	56	1.10	1.62	15.42	1.23	3.34	0.19	0.27	2.59	0.21	0.56
IGTS Hot Tap Installation	**Diving Support Vessel**															
	Main Engines (2)	4200	202.86	4868.64	24	14	2.96	13.58	101.76	3.05	22.20	0.50	2.28	17.10	0.51	3.73
	Bow Thrusters (2)	1600	77.28	1854.72	24	14	1.13	5.17	38.77	1.16	8.46	0.19	0.87	6.51	0.20	1.42
	Stern Thrusters (2)	1200	57.96	1391.04	24	14	0.85	3.88	29.07	0.87	6.34	0.14	0.65	4.88	0.15	1.07
	Material Hauler Tug															
	Main Engines (2)	1000	48.3	1159.20	8	14	2.20	3.23	30.84	2.47	6.67	0.12	0.18	1.73	0.14	0.37
	Anchor Towing Winch	157	7.5831	181.99	8	14	0.35	0.51	4.84	0.39	1.05	0.02	0.03	0.27	0.02	0.06
	Support Vessel															
	Main Engine	500	24.15	579.60	6	14	1.10	1.62	15.42	1.23	3.34	0.05	0.07	0.65	0.05	0.14
Proley Diving Operations	**Diving Support Vessel**															
	Main Engines (2)	4200	202.86	4868.64	24	22	2.96	13.58	101.76	3.05	22.20	0.78	3.59	26.87	0.81	5.86
	Bow Thrusters (2)	1600	77.28	1854.72	24	22	1.13	5.17	38.77	1.16	8.46	0.30	1.37	10.23	0.31	2.23
	Stern Thrusters (2)	1200	57.96	1391.04	24	22	0.85	3.88	29.07	0.87	6.34	0.22	1.02	7.68	0.23	1.67
	Material Hauler Tug															
	Main Engines (2)	1000	48.3	1159.20	8	22	2.20	3.23	30.84	2.47	6.67	0.19	0.28	2.71	0.22	0.59
	Anchor Towing Winch	157	7.5831	181.99	8	22	0.35	0.51	4.84	0.39	1.05	0.03	0.04	0.43	0.03	0.09
	Support Vessel 1															
	Main Engine	500	24.15	579.60	6	22	1.10	1.62	15.42	1.23	3.34	0.07	0.11	1.02	0.08	0.22
	Support Vessel 2															
	Main Engine	500	24.15	579.60	6	22	1.10	1.62	15.42	1.23	3.34	0.07	0.11	1.02	0.08	0.22
Pipeline Construction Operations	**Pipeline Lay Barge**															
	Main Power Generators (2)	2000	98.6	2318.40	24	34	1.41	6.47	48.46	1.45	10.57	0.59	2.64	19.77	0.59	4.31
	Winch Engines (4)	2000	98.6	2318.40	6	34	4.41	6.47	61.67	4.93	13.35	0.45	0.66	6.29	0.50	1.36
	Boom Engine	405	19.5615	469.48	8	34	0.89	1.31	12.49	1.00	2.70	0.12	0.18	1.70	0.14	0.37
	Hoist Engine	600	28.98	695.52	8	34	0.42	1.94	14.54	0.44	3.17	0.06	0.26	1.98	0.06	0.43
	Generator Engines (3)	1140	55.062	1321.49	8	34	2.51	3.69	35.15	2.81	7.61	0.34	0.50	4.78	0.38	1.03
	Deck Crane	540	26.082	625.97	20	34	1.19	1.75	16.65	1.33	3.60	0.40	0.59	5.66	0.45	1.23
	Anchor Handling Tug 1															
	Main Engines (2)	1200	57.96	1391.04	18	34	0.85	3.88	29.07	0.87	6.34	0.26	1.19	8.90	0.27	1.94
	Anchor Handling Tug 2															
	Main Engines (2)	1200	57.96	1391.04	18	34	0.85	3.88	29.07	0.87	6.34	0.26	1.19	8.90	0.27	1.94
	Pipe Hauler Tug 1															
	Main Engines (2)	1000	48.3	1159.20	8	34	2.20	3.23	30.84	2.47	6.67	0.30	0.44	4.19	0.34	0.91
	Anchor Towing Winch	157	7.5831	181.99	8	34	0.35	0.51	4.84	0.39	1.05	0.05	0.07	0.66	0.05	0.14
	Pipe Hauler Tug 2															
	Main Engines (2)	1000	48.3	1159.20	8	34	2.20	3.23	30.84	2.47	6.67	0.30	0.44	4.19	0.34	0.91
	Anchor Towing Winch	157	7.5831	181.99	8	34	0.35	0.51	4.84	0.39	1.05	0.05	0.07	0.66	0.05	0.14
	Pipe Hauler Tug 3															
	Main Engines (2)	1000	48.3	1159.20	8	34	2.20	3.23	30.84	2.47	6.67	0.30	0.44	4.19	0.34	0.91
	Anchor Towing Winch	157	7.5831	181.99	8	34	0.35	0.51	4.84	0.39	1.05	0.05	0.07	0.66	0.05	0.14
	Pipe Hauler Tug 4															
	Main Engines (2)	1000	48.3	1159.20	8	34	2.20	3.23	30.84	2.47	6.67	0.30	0.44	4.19	0.34	0.91
	Anchor Towing Winch	157	7.5831	181.99	8	34	0.35	0.51	4.84	0.39	1.05	0.05	0.07	0.66	0.05	0.14
	Pipe Hauler Tug 5															
	Main Engines (2)	1000	48.3	1159.20	8	34	2.20	3.23	30.84	2.47	6.67	0.30	0.44	4.19	0.34	0.91
	Anchor Towing Winch	157	7.5831	181.99	8	34	0.35	0.51	4.84	0.39	1.05	0.05	0.07	0.66	0.05	0.14

AIR EMISSION CALCULATIONS - FIRST YEAR

	Pipe Hauler Tug 6															
	Main Engines (2)	1000	48.3	1159.20	6	34	2.20	3.23	30.84	2.47	6.67	0.30	0.44	4.19	0.34	0.91
	Anchor Towing Winch	157	7.5831	181.99	6	34	0.35	0.51	4.84	0.39	1.05	0.05	0.07	0.66	0.05	0.14
	Support Vessel 1															
	Main Engine	500	24.15	579.60	6	34	1.10	1.62	15.42	1.23	3.34	0.11	0.16	1.57	0.13	0.34
	Support Vessel 2															
	Main Engine	500	24.15	579.60	6	34	1.10	1.62	15.42	1.23	3.34	0.11	0.16	1.57	0.13	0.34
FACILITY INSTALLATION	DERRICK BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PRODUCTION	RECIP.<600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	RECIP.>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUPPORT VESSEL diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	TURBINE nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.2 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle rich nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	BURNER nat gas	0	0.00	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	MISC.	BPD	SCF/HR	COUNT			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	TANK-	0			0	0										
	FLARE-		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	PROCESS VENT-		0		0	0				0.00					0.00	
	FUGITIVES-			0.0		0				0.00					0.00	
	GLYCOL STILL VENT-		0		0	0				0.00					0.00	
DRILLING WELL TEST	OIL BURN	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GAS FLARE		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	YEAR 1 TOTAL						52.90	121.24	1025.26	55.00	222.74	9.86	25.94	212.92	10.72	46.30
EXEMPTION CALCULATION	**DISTANCE FROM LAND IN MILES**															
	0.0											0.00	0.00	0.00	0.00	0.00

AIR EMISSIONS CALCULATIONS - SECOND YEAR

COMPANY	AREA	BLOCK	LEASE	PLATFORM			WELL		CONTACT		PHONE	REMARKS				
Broadwater Energy	Long Island Sound, New York	N/A	N/A	Floating Storage Regasification Unit			N/A		Stephen Marr			#REF!				
OPERATIONS	EQUIPMENT	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR					ESTIMATED TONS				
	Diesel Engines	HP	GAL/HR	GAL/D												
	Nat. Gas Engines	HP	SCF/HR	SCF/D												
	Burners	MMBTU/HR	SCF/HR	SCF/D	HR/D	DAYS	PM	SOx	NOx	VOC	CO	PM	SOx	NOx	VOC	CO
DRILLING	PRIME MOVER>600hp diesel	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	BURNER diesel	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	AUXILIARY EQUIP<600hp diesel	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(tugs)	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PIPELINE INSTALLATION Security	Security Vessel															
	Main Engine	500	24.15	579.60	24	365	1.10	1.62	15.42	1.23	3.34	4.82	7.08	67.53	5.40	14.62
	Support Vessel															
	Main Engine	500	24.15	579.60	6	365	1.10	1.62	15.42	1.23	3.34	1.21	1.77	16.88	1.35	3.86
Survey Support	Survey Vessel															
	Main Engine	825	39.8475	956.34	24	116	0.58	2.67	19.99	0.80	4.36	0.81	3.71	27.82	0.83	6.07
	Bow Thruster	205	9.9015	237.64	24	116	0.45	0.66	6.32	0.51	1.37	0.63	0.92	8.80	0.70	1.90
	Generators (2)	125	6.0375	144.90	24	116	0.28	0.40	3.85	0.31	0.93	0.38	0.56	5.37	0.43	1.16
	Support Vessel															
	Main Engine	500	24.15	579.60	6	116	1.10	1.62	15.42	1.23	3.34	0.38	0.56	5.37	0.43	1.16
Pipeline Construction Operations	Pipeline Lay Barge															
	Main Power Generators (2)	2000	96.6	2318.40	24	8	1.41	6.47	48.46	1.45	10.57	0.14	0.62	4.65	0.14	1.01
	Winch Engines (4)	2000	96.6	2318.40	6	8	4.41	6.47	61.67	4.93	13.35	0.11	0.16	1.48	0.12	0.32
	Boom Engine	405	19.5615	469.48	8	8	0.89	1.31	12.49	1.00	2.70	0.03	0.04	0.40	0.03	0.09
	Hoist Engine	600	28.98	695.52	8	8	0.42	1.94	14.54	0.44	3.17	0.01	0.06	0.47	0.01	0.10
	Generator Engines (3)	1140	55.062	1321.49	8	8	2.51	3.69	35.15	2.81	7.61	0.08	0.12	1.12	0.09	0.24
	Deck Crane	540	26.082	625.97	20	8	1.19	1.75	16.65	1.33	3.60	0.10	0.14	1.33	0.11	0.29
	Anchor Handling Tug 1															
	Main Engines (2)	1200	57.96	1391.04	18	8	0.85	3.88	29.07	0.87	6.34	0.06	0.28	2.09	0.06	0.46
	Anchor Handling Tug 2															
	Main Engines (2)	1200	57.96	1391.04	18	8	0.85	3.88	29.07	0.87	6.34	0.06	0.28	2.09	0.06	0.46
	Pipe Hauler Tug 1															
	Main Engines (2)	1000	48.3	1159.20	8	8	2.20	3.23	30.84	2.47	6.67	0.07	0.10	0.99	0.08	0.21
	Anchor Towing Winch	157	7.5831	181.99	8	8	0.35	0.51	4.84	0.39	1.05	0.01	0.02	0.15	0.01	0.03
	Pipe Hauler Tug 2															
	Main Engines (2)	1000	48.3	1159.20	8	8	2.20	3.23	30.84	2.47	6.67	0.07	0.10	0.99	0.08	0.21
	Anchor Towing Winch	157	7.5831	181.99	8	8	0.35	0.51	4.84	0.39	1.05	0.01	0.02	0.15	0.01	0.03
	Pipe Hauler Tug 3															
	Main Engines (2)	1000	48.3	1159.20	8	8	2.20	3.23	30.84	2.47	6.67	0.07	0.10	0.99	0.08	0.21
	Anchor Towing Winch	157	7.5831	181.99	8	8	0.35	0.51	4.84	0.39	1.05	0.01	0.02	0.15	0.01	0.03
	Pipe Hauler Tug 4															
	Main Engines (2)	1000	48.3	1159.20	8	8	2.20	3.23	30.84	2.47	6.67	0.07	0.10	0.99	0.08	0.21
	Anchor Towing Winch	157	7.5831	181.99	8	8	0.35	0.51	4.84	0.39	1.05	0.01	0.02	0.15	0.01	0.03
	Pipe Hauler Tug 5															
	Main Engines (2)	1000	48.3	1159.20	8	8	2.20	3.23	30.84	2.47	6.67	0.07	0.10	0.99	0.08	0.21
	Anchor Towing Winch	157	7.5831	181.99	8	8	0.35	0.51	4.84	0.39	1.05	0.01	0.02	0.15	0.01	0.03
	Pipe Hauler Tug 6															
	Main Engines (2)	1000	48.3	1159.20	8	8	2.20	3.23	30.84	2.47	6.67	0.07	0.10	0.99	0.08	0.21
	Anchor Towing Winch	157	7.5831	181.99	8	8	0.35	0.51	4.84	0.39	1.05	0.01	0.02	0.15	0.01	0.03
	Support Vessel 1															
	Main Engine	500	24.15	579.60	6	8	1.10	1.62	15.42	1.23	3.34	0.03	0.04	0.37	0.03	0.08
	Support Vessel 2															
	Main Engine	500	24.15	579.60	6	8	1.10	1.62	15.42	1.23	3.34	0.03	0.04	0.37	0.03	0.08
Pipeline Lowering	Pipeline Lay Barge															
	Main Power Generators (2)	2000	96.6	2318.40	24	41	1.41	6.47	48.46	1.45	10.57	0.69	3.18	23.84	0.72	5.20
	Winch Engines (4)	2000	96.6	2318.40	6	41	4.41	6.47	61.67	4.93	13.35	0.54	0.80	7.59	0.61	1.64
	Boom Engine	405	19.5615	469.48	8	41	0.89	1.31	12.49	1.00	2.70	0.15	0.21	2.05	0.16	0.44
	Hoist Engine	600	28.98	695.52	8	41	0.42	1.94	14.54	0.44	3.17	0.07	0.32	2.38	0.07	0.52
	Generator Engines (3)	1140	55.062	1321.49	8	41	2.51	3.69	35.16	2.81	7.61	0.41	0.60	5.77	0.46	1.25
	Deck Crane	540	26.082	625.97	20	41	1.19	1.75	16.65	1.33	3.60	0.49	0.72	6.83	0.55	1.48
	Anchor Handling Tug 1															
	Main Engines (2)	1200	57.96	1391.04	18	41	0.85	3.88	29.07	0.87	6.34	0.31	1.43	10.73	0.32	2.34
	Anchor Handling Tug 2															
	Main Engines (2)	1200	57.96	1391.04	18	41	0.85	3.88	29.07	0.87	6.34	0.31	1.43	10.73	0.32	2.34
	Support Vessel 1															
	Main Engine	500	24.15	579.60	6	41	1.10	1.62	15.42	1.23	3.34	0.14	0.20	1.90	0.15	0.41

PUBLIC

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AIR EMISSIONS CALCULATIONS - SECOND YEAR

	Support Vessel 2																
	Main Engine	500	24.15	579.60	6	41	1.10	1.62	15.42	1.23	3.34	0.14	0.20	1.90	0.15	0.41	
IGTS Hot-Tap	**Pipeline Lay Barge**																
Spool Piece #1	Main Power Generators (2)	2000	96.6	2318.40	24	5	1.41	6.47	48.46	1.45	10.57	0.08	0.39	2.91	0.09	0.83	
	Winch Engines (4)	2000	96.6	2318.40	6	5	4.41	6.47	61.67	4.93	13.35	0.07	0.10	0.93	0.07	0.20	
	Boom Engine	405	19.5615	469.48	8	5	0.89	1.31	12.49	1.00	2.70	0.02	0.03	0.25	0.02	0.05	
	Hoist Engine	600	28.98	695.52	8	5	0.42	1.94	14.54	0.44	3.17	0.01	0.04	0.29	0.01	0.06	
	Generator Engines (3)	1140	55.062	1321.49	8	5	2.51	3.69	35.15	2.81	7.61	0.05	0.07	0.70	0.06	0.15	
	Deck Crane	540	26.082	625.97	20	5	1.19	1.75	16.65	1.33	3.60	0.06	0.09	0.83	0.07	0.18	
	Anchor Handling Tug 1																
	Main Engines (2)	1200	57.96	1391.04	18	5	0.85	3.88	29.07	0.87	6.34	0.04	0.17	1.31	0.04	0.29	
	Anchor Handling Tug 2																
	Main Engines (2)	1200	57.96	1391.04	18	5	0.85	3.88	29.07	0.87	6.34	0.04	0.17	1.31	0.04	0.29	
	Material Hauler Tug																
	Main Engines (2)	1000	48.3	1159.20	8	5	2.20	3.23	30.84	2.47	6.67	0.04	0.06	0.62	0.05	0.13	
	Anchor Towing Winch	157	7.5831	181.99	8	5	0.35	0.51	4.84	0.39	1.05	0.01	0.01	0.10	0.01	0.02	
	Support Vessel 1																
	Main Engine	500	24.15	579.60	6	5	1.10	1.62	15.42	1.23	3.34	0.02	0.02	0.23	0.02	0.05	
	Support Vessel 2																
	Main Engine	500	24.15	579.60	6	5	1.10	1.62	15.42	1.23	3.34	0.02	0.02	0.23	0.02	0.05	
FSRU Pipeline	**Pipeline Lay Barge**																
Spool Piece #3	Main Power Generators (2)	2000	96.6	2318.40	24	4	1.41	6.47	48.46	1.45	10.57	0.07	0.31	2.33	0.07	0.51	
	Winch Engines (4)	2000	96.6	2318.40	6	4	4.41	6.47	61.67	4.93	13.35	0.05	0.08	0.74	0.06	0.16	
	Boom Engine	405	19.5615	469.48	8	4	0.89	1.31	12.49	1.00	2.70	0.01	0.02	0.20	0.02	0.04	
	Hoist Engine	600	28.98	695.52	8	4	0.42	1.94	14.54	0.44	3.17	0.01	0.03	0.23	0.01	0.05	
	Generator Engines (3)	1140	55.062	1321.49	8	4	2.51	3.69	35.15	2.81	7.61	0.04	0.06	0.56	0.04	0.12	
	Deck Crane	540	26.082	625.97	20	4	1.19	1.75	16.65	1.33	3.60	0.05	0.07	0.67	0.05	0.14	
	Anchor Handling Tug 1																
	Main Engines (2)	1200	57.96	1391.04	18	4	0.85	3.88	29.07	0.87	6.34	0.03	0.14	1.05	0.03	0.23	
	Anchor Handling Tug 2																
	Main Engines (2)	1200	57.96	1391.04	18	4	0.85	3.88	29.07	0.87	6.34	0.03	0.14	1.05	0.03	0.23	
	Material Hauler Tug																
	Main Engines (2)	1000	48.3	1159.20	8	4	2.20	3.23	30.84	2.47	6.67	0.04	0.05	0.49	0.04	0.11	
	Anchor Towing Winch	157	7.5831	181.99	8	4	0.35	0.51	4.84	0.39	1.05	0.01	0.01	0.08	0.01	0.02	
	Support Vessel 1																
	Main Engine	500	24.15	579.60	6	4	1.10	1.62	15.42	1.23	3.34	0.01	0.02	0.19	0.01	0.04	
	Support Vessel 2																
	Main Engine	500	24.15	579.60	6	4	1.10	1.62	15.42	1.23	3.34	0.01	0.02	0.19	0.01	0.04	
Crossing	**Diving Support Vessel**																
Completion	Main Engines (2)	4200	202.86	4868.64	24	15	2.96	13.58	101.76	3.05	22.20	0.53	2.44	18.32	0.55	4.00	
	Bow Thrusters (2)	1600	77.28	1854.72	24	15	1.13	5.17	38.77	1.16	8.46	0.20	0.93	6.98	0.21	1.52	
	Stern Thrusters (2)	1200	57.96	1391.04	24	15	0.85	3.88	29.07	0.87	6.34	0.15	0.70	5.23	0.16	1.14	
Additional	**Diving Support Vessel**																
Construction	Main Engines (2)	4200	202.86	4868.64	24	22	2.96	13.58	101.76	3.05	22.20	0.78	3.59	26.87	0.81	5.86	
Requirements	Bow Thrusters (2)	1600	77.28	1854.72	24	22	1.13	5.17	38.77	1.16	8.46	0.30	1.37	10.23	0.31	2.23	
	Stern Thrusters (2)	1200	57.96	1391.04	24	22	0.85	3.88	29.07	0.87	6.34	0.22	1.02	7.68	0.23	1.67	
Filling, Treating,	**Diving Support Vessel 1**																
and Cleaning	Main Engines (2)	4200	202.86	4868.64	24	8	2.96	13.58	101.76	3.05	22.20	0.28	1.30	9.77	0.29	2.13	
	Bow Thrusters (2)	1600	77.28	1854.72	24	8	1.13	5.17	38.77	1.16	8.46	0.11	0.50	3.72	0.11	0.81	
	Stern Thrusters (2)	1200	57.96	1391.04	24	8	0.85	3.88	29.07	0.87	6.34	0.08	0.37	2.79	0.08	0.61	
	Diving Support Vessel 2																
	Main Engines (2)	4200	202.86	4868.64	24	8	2.96	13.58	101.76	3.05	22.20	0.28	1.30	9.77	0.29	2.13	
	Bow Thrusters (2)	1600	77.28	1854.72	24	8	1.13	5.17	38.77	1.16	8.46	0.11	0.50	3.72	0.11	0.81	
	Stern Thrusters (2)	1200	57.96	1391.04	24	8	0.85	3.88	29.07	0.87	6.34	0.08	0.37	2.79	0.08	0.61	
FSRU Check and	**Diving Support Vessel**																
Isolation Valve	Main Engines (2)	4200	202.86	4868.64	24	12	2.96	13.58	101.76	3.05	22.20	0.43	1.96	14.65	0.44	3.20	
Spool (Spool #4)	Bow Thrusters (2)	1600	77.28	1854.72	24	12	1.13	5.17	38.77	1.16	8.46	0.16	0.74	5.58	0.17	1.22	
	Stern Thrusters (2)	1200	57.96	1391.04	24	12	0.85	3.88	29.07	0.87	6.34	0.12	0.56	4.19	0.13	0.91	
	Material Hauler Tug																
	Main Engines (2)	1000	48.3	1159.20	8	12	2.20	3.23	30.84	2.47	6.67	0.11	0.16	1.48	0.12	0.32	
	Anchor Towing Winch	157	7.5831	181.99	8	12	0.35	0.51	4.84	0.39	1.05	0.02	0.02	0.23	0.02	0.05	
	Support Vessel																
	Main Engine	500	24.15	579.60	6	12	1.10	1.62	15.42	1.23	3.34	0.04	0.06	0.56	0.04	0.12	
Hydrostatic	**Diving Support Vessel 1**																
Testing	Main Engines (2)	4200	202.86	4868.64	24	3	2.96	13.58	101.76	3.05	22.20	0.11	0.49	3.66	0.11	0.80	
	Bow Thrusters (2)	1600	77.28	1854.72	24	3	1.13	5.17	38.77	1.16	8.46	0.04	0.19	1.40	0.04	0.30	
	Stern Thrusters (2)	1200	57.96	1391.04	24	3	0.85	3.88	29.07	0.87	6.34	0.03	0.14	1.05	0.03	0.23	
	Diving Support Vessel 2																
	Main Engines (2)	4200	202.86	4868.64	24	3	2.96	13.58	101.76	3.05	22.20	0.11	0.49	3.66	0.11	0.80	
	Bow Thrusters (2)	1600	77.28	1854.72	24	3	1.13	5.17	38.77	1.16	8.46	0.04	0.19	1.40	0.04	0.30	
	Stern Thrusters (2)	1200	57.96	1391.04	24	3	0.85	3.88	29.07	0.87	6.34	0.03	0.14	1.05	0.03	0.23	
	Support Vessel 1																
	Main Engine	500	24.15	579.60	6	3	1.10	1.62	15.42	1.23	3.34	0.01	0.01	0.14	0.01	0.03	
	Support Vessel 2																
	Main Engine	500	24.15	579.60	6	3	1.10	1.62	15.42	1.23	3.34	0.01	0.01	0.14	0.01	0.03	
Acceptance of	**Diving Support Vessel 1**																

AIR EMISSIONS CALCULATIONS - SECOND YEAR

Hydrostatic Test	Main Engines (2)	4200	202.86	4868.64	24	1	2.96	13.58	101.76	3.05	22.20	0.04	0.16	1.22	0.04	0.27
	Bow Thrusters (2)	1600	77.28	1854.72	24	1	1.13	5.17	38.77	1.16	8.46	0.01	0.03	0.47	0.01	0.10
	Stern Thrusters (2)	1200	57.96	1391.04	24	1	0.85	3.88	29.07	0.87	6.34	0.01	0.05	0.35	0.01	0.08
	Diving Support Vessel 2															
	Main Engines (2)	4200	202.86	4868.64	24	1	2.96	13.58	101.76	3.05	22.20	0.04	0.16	1.22	0.04	0.27
	Bow Thrusters (2)	1600	77.28	1854.72	24	1	1.13	5.17	38.77	1.16	8.46	0.01	0.06	0.47	0.01	0.10
	Stern Thrusters (2)	1200	57.96	1391.04	24	1	0.85	3.88	29.07	0.87	6.34	0.01	0.05	0.35	0.01	0.08
	Support Vessel 1															
	Main Engine	500	24.15	579.60	6	1	1.10	1.62	15.42	1.23	3.34	0.00	0.00	0.05	0.00	0.01
	Support Vessel 2															
	Main Engine	500	24.15	579.60	6	1	1.10	1.62	15.42	1.23	3.34	0.00	0.00	0.05	0.00	0.01
JGTS Pipeline	Diving Support Vessel															
Spool Piece #2	Main Engines (2)	4200	202.86	4868.64	24	10	2.96	13.58	101.76	3.05	22.20	0.36	1.69	12.21	0.37	2.66
	Bow Thrusters (2)	1600	77.28	1854.72	24	10	1.13	5.17	38.77	1.16	8.46	0.14	0.62	4.65	0.14	1.01
	Stern Thrusters (2)	1200	57.96	1391.04	24	10	0.85	3.88	29.07	0.87	6.34	0.10	0.47	3.48	0.10	0.76
	Material Hauler Tug															
	Main Engines (2)	1000	48.3	1159.20	8	10	2.20	3.23	30.84	2.47	6.67	0.09	0.13	1.23	0.10	0.27
	Anchor Towing Winch	157	7.5831	181.99	8	10	0.35	0.51	4.84	0.39	1.05	0.01	0.02	0.19	0.02	0.04
	Support Vessel															
	Main Engine	500	24.15	579.60	6	10	1.10	1.62	15.42	1.23	3.34	0.03	0.06	0.46	0.04	0.10
FSRU Tie-In	Diving Support Vessel															
Spool Pieces #1,2	Main Engines (2)	4200	202.86	4868.64	24	15	2.96	13.58	101.76	3.05	22.20	0.53	2.44	18.32	0.55	4.00
	Bow Thrusters (2)	1600	77.28	1854.72	24	15	1.13	5.17	38.77	1.16	8.46	0.20	0.93	6.98	0.21	1.52
	Stern Thrusters (2)	1200	57.96	1391.04	24	15	0.85	3.88	29.07	0.87	6.34	0.15	0.70	5.23	0.16	1.14
	Material Hauler Tug															
	Main Engines (2)	1000	48.3	1159.20	8	15	2.20	3.23	30.84	2.47	6.67	0.13	0.19	1.85	0.15	0.40
	Anchor Towing Winch	157	7.5831	181.99	8	15	0.35	0.51	4.84	0.39	1.05	0.02	0.03	0.29	0.02	0.06
	Support Vessel															
	Main Engine	500	24.15	579.60	6	15	1.10	1.62	15.42	1.23	3.34	0.05	0.07	0.69	0.06	0.15
Dewatering	Diving Support Vessel 1															
& Drying	Main Engines (2)	4200	202.86	4868.64	24	21	2.96	13.58	101.76	3.05	22.20	0.75	3.42	25.64	0.77	5.60
(Pre-commissioning	Bow Thrusters (2)	1600	77.28	1854.72	24	21	1.13	5.17	38.77	1.16	8.46	0.28	1.30	9.77	0.29	2.13
and Commissioning)	Stern Thrusters (2)	1200	57.96	1391.04	24	21	0.85	3.88	29.07	0.87	6.34	0.21	0.98	7.33	0.22	1.60
	Diving Support Vessel 2															
	Main Engines (2)	4200	202.86	4868.64	24	21	2.96	13.58	101.76	3.05	22.20	0.75	3.42	25.64	0.77	5.60
	Bow Thrusters (2)	1600	77.28	1854.72	24	21	1.13	5.17	38.77	1.16	8.46	0.28	1.30	9.77	0.29	2.13
	Stern Thrusters (2)	1200	57.96	1391.04	24	21	0.85	3.88	29.07	0.87	6.34	0.21	0.98	7.33	0.22	1.60
	Support Vessel 1															
	Main Engine	500	24.15	579.60	6	21	1.10	1.62	15.42	1.23	3.34	0.07	0.10	0.97	0.08	0.21
	Support Vessel 2															
	Main Engine	500	24.15	579.60	6	21	1.10	1.62	15.42	1.23	3.34	0.07	0.10	0.97	0.08	0.21
FACILITY	DERRICK BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INSTALLATION	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PRODUCTION	RECIP.<600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	RECIP.>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUPPORT VESSEL diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	TURBINE nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.2 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle rich nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	BURNER nat gas	0	0.00	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	MISC.	BPD	SCF/HR	COUNT			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	TANK-	0			0	0										
	FLARE-		0		0	0				0.00					0.00	
	PROCESS VENT-		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	FUGITIVES-			0.0		0				0.00					0.00	
	GLYCOL STILL VENT-		0		0	0				0.00					0.00	
										0.00					0.00	
DRILLING	OIL BURN	0			0	0										
WELL TEST	GAS FLARE		0		0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
								0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	YEAR 2 TOTAL						165.60	468.97	3924.30	178.47	854.08	22.36	67.33	538.41	24.06	117.19
EXEMPTION CALCULATION	DISTANCE FROM LAND IN MILES															
	0.0											0.00	0.00	0.00	0.00	0.00

AIR EMISSIONS CALCULATIONS - YEAR 2 Dredging Option

COMPANY	AREA	BLOCK	LEASE	PLATFORM			WELL	CONTACT		PHONE	REMARKS					
Broadwater Energy	Long Island Sound, New York	N/A	N/A	Floating Storage Regasification Unit			N/A	Stephen Marr			#REF!					
OPERATIONS	EQUIPMENT	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR					ESTIMATED TONS				
	Diesel Engines	HP	GAL/HR	GAL/D												
	Nat. Gas Engines	HP	SCF/HR	SCF/D												
	Burners	MMBTU/HR	SCF/HR	SCF/D	HR/D	DAYS	PM	SOx	NOx	VOC	CO	PM	SOx	NOx	VOC	CO
DRILLING	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	BURNER diesel	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	AUXILIARY EQUIP<600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(tugs)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PIPELINE INSTALLATION **Dredging (Optional)**	**Dredging Vessel**															
	Main Engine	3500	169.05	4057.20	24	20	2.47	11.32	84.80	2.54	18.50	0.59	2.72	20.35	0.61	4.44
	Survey Vessel															
	Main Engine	825	39.8475	956.34	24	20	0.58	2.67	19.99	0.60	4.36	0.14	0.64	4.80	0.14	1.05
	Bow Thruster	205	9.9015	237.64	24	20	0.46	0.66	6.32	0.51	1.37	0.11	0.16	1.52	0.12	0.33
	Generators (2)	125	6.0375	144.90	24	20	0.28	0.40	3.85	0.31	0.83	0.07	0.10	0.93	0.07	0.20
	Diving Support Vessel															
	Main Engines (2)	4200	202.86	4868.64	24	20	2.96	13.58	101.76	3.05	22.20	0.71	3.26	24.42	0.73	5.33
	Bow Thrusters (2)	1600	77.28	1854.72	24	20	1.13	5.17	38.77	1.16	8.46	0.27	1.24	9.30	0.28	2.03
	Stern Thrusters (2)	1200	57.96	1391.04	24	20	0.85	3.88	29.07	0.87	6.34	0.20	0.93	6.98	0.21	1.52
	Support Vessel															
	Main Engine	500	24.15	579.60	6	20	1.10	1.62	15.42	1.23	3.34	0.07	0.10	0.93	0.07	0.20
Backfilling (Optional)	**Hopper Barge/Tug 1**															
	Main Engines (2)	1000	48.3	1159.20	24	20	2.20	3.23	30.84	2.47	6.67	0.53	0.78	7.40	0.59	1.60
	Anchor Towing Winch	157	7.5831	181.99	24	20	0.35	0.51	4.84	0.39	1.05	0.08	0.12	1.16	0.09	0.25
	Hopper Barge/Tug 2															
	Main Engines (2)	1000	48.3	1159.20	24	20	2.20	3.23	30.84	2.47	6.67	0.53	0.78	7.40	0.59	1.60
	Anchor Towing Winch	157	7.5831	181.99	24	20	0.35	0.51	4.84	0.39	1.05	0.08	0.12	1.16	0.09	0.25
	Survey Vessel															
	Main Engine	825	39.8475	956.34	24	20	0.58	2.67	19.99	0.60	4.36	0.14	0.64	4.80	0.14	1.05
	Bow Thruster	205	9.9015	237.64	24	20	0.45	0.66	6.32	0.51	1.37	0.11	0.16	1.52	0.12	0.33
	Generators (2)	125	6.0375	144.90	24	20	0.28	0.40	3.85	0.31	0.83	0.07	0.10	0.93	0.07	0.20
FACILITY INSTALLATION	DERRICK BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PRODUCTION	RECIP.<600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	RECIP.>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUPPORT VESSEL diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	TURBINE nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.2 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle rich nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	BURNER nat gas	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MISC.	BPD	SCF/HR	COUNT												
	TANK-	0			0	0				0.00					0.00	
	FLARE-		0		0	0				0.00					0.00	
	PROCESS VENT-		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	FUGITIVES-			0.0		0				0.00					0.00	
	GLYCOL STILL VENT-		0		0	0				0.00					0.00	
DRILLING WELL TEST	OIL BURN	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GAS FLARE		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	YEAR 2 Dredging Option TOTAL						16.22	50.52	401.51	17.40	87.41	3.69	11.83	93.59	3.95	20.38
EXEMPTION CALCULATION	DISTANCE FROM LAND IN MILES															
	0.0											0.00	0.00	0.00	0.00	0.00

PUBLIC

BW005993

AIR EMISSIONS CALCULATIONS - YEAR 2 Route Backfilling Option

COMPANY	AREA	BLOCK	LEASE	PLATFORM			WELL	CONTACT		PHONE	REMARKS					
Broadwater Energy	Long Island Sound, New York	N/A	N/A	Floating Storage Regasification Unit			N/A	Stephen Marr			#REF!					
OPERATIONS	EQUIPMENT	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR					ESTIMATED TONS				
	Diesel Engines	HP	GAL/HR	GAL/D												
	Nat. Gas Engines	HP	SCF/HR	SCF/D												
	Burners	MMBTU/HR	SCF/HR	SCF/D	HR/D	DAYS	PM	SOx	NOx	VOC	CO	PM	SOx	NOx	VOC	CO
DRILLING	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	BURNER diesel	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	AUXILIARY EQUIP<600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(tugs)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PIPELINE INSTALLATION **Backfilling (Optional)**	**Pipeline Lay Barge**															
	Main Power Generators (2)	2000	96.6	2318.40	24	34	1.41	6.47	48.46	1.45	10.57	0.58	2.84	19.77	0.59	4.31
	Winch Engines (4)	2000	96.6	2318.40	6	34	4.41	6.47	61.67	4.93	13.35	0.45	0.66	6.29	0.50	1.36
	Boom Engine	405	19.5615	469.49	8	34	0.89	1.31	12.49	1.00	2.70	0.12	0.18	1.70	0.14	0.37
	Hoist Engine	600	28.98	695.52	8	34	0.42	1.94	14.54	0.44	3.17	0.06	0.26	1.98	0.06	0.43
	Generator Engines (3)	1140	55.062	1321.49	8	34	2.51	3.69	35.15	2.81	7.61	0.34	0.50	4.78	0.38	1.03
	Deck Crane	540	26.082	625.97	20	34	1.19	1.75	16.65	1.33	3.60	0.40	0.59	5.66	0.45	1.23
	Anchor Handling Tug 1															
	Main Engines (2)	1200	57.96	1391.04	18	34	0.85	3.88	29.07	0.87	6.34	0.26	1.19	8.90	0.27	1.94
	Anchor Handling Tug 2															
	Main Engines (2)	1200	57.96	1391.04	18	34	0.85	3.88	29.07	0.87	6.34	0.26	1.19	8.90	0.27	1.94
	Support Vessel 1															
	Main Engine	500	24.15	579.60	6	34	1.10	1.62	15.42	1.23	3.34	0.11	0.16	1.57	0.13	0.34
	Support Vessel 2															
	Main Engine	500	24.15	579.60	6	34	1.10	1.62	15.42	1.23	3.34	0.11	0.16	1.57	0.13	0.34
FACILITY INSTALLATION	DERRICK BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PRODUCTION	RECIP.<600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	RECIP.>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUPPORT VESSEL diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	TURBINE nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.2 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle rich nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	BURNER nat gas	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MISC.	BPD	SCF/HR	COUNT												
	TANK-	0			0	0				0.00					0.00	
	FLARE-		0		0	0				0.00					0.00	
	PROCESS VENT-		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	FUGITIVES-			0.0		0				0.00					0.00	
	GLYCOL STILL VENT-		0		0	0				0.00					0.00	
DRILLING WELL TEST	OIL BURN	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GAS FLARE		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	YEAR 2 Route Backfilling Option TOTAL						14.72	32.61	277.95	16.18	60.37	2.69	7.54	61.12	2.91	13.30
EXEMPTION CALCULATION	DISTANCE FROM LAND IN MILES															
	0.0											0.00	0.00	0.00	0.00	0.00

PUBLIC

BW005994

EIR-26

Request:

Explain why potential nuisance emissions for either onshore or marine receptors are not anticipated. In addition, provide emissions estimates for idling and operating vessels and trucks associated with the onshore facility, as well as potential impacts and mitigation measures.

Response:

The term "nuisance emission" refers, in general, to air pollutant emissions of any sort that interfere with or otherwise annoy the public. Examples of nuisance emissions are visible emissions (such as water vapor, dust or smoke) and odorous emissions (such as might occur from sanitary facility vents, food preparation area ventilation systems, farming operations, etc.). Broadwater will consist of an offshore facility and a small onshore office/supply facility typical of many other small buildings on shore. Each facility was examined for the potential to emit air pollutants at a level that would result in a nuisance to the public. The nuisance response or determination is one that can only be described in a qualitative rather than a quantitative manner as there is no standard or threshold value defining nuisance.

The sector of the public that potentially could be affected by nuisance emissions from the FSRU/LNG carrier is marine interests (e.g. boaters). Due to the distance of the FSRU from the NY shore (9 miles) and the CT shore (11 miles), the long distance to shore would provide for the dissipation of any nuisance emissions from the FSRU prior to reaching shore and, therefore, any nuisance emissions from the FSRU/LNG carrier that might occur will have no effect on onshore locations.

Nuisance emissions from the FSRU and a docked LNG carrier might include a visible water vapor plume and odors from kitchen, sanitary and/or general space ventilation systems. The potential for visible emission of water vapor from the combustion sources onboard the FSRU and the potential impact to marine and onshore receptors was evaluated as part of Broadwater's New York Coastal Zone Consistency Determination. A model (the Combustion Source Visible Plume (CSVP)) model was used to evaluate the potential frequency of formation, duration and length of a visible water vapor plume from the FSRU (*see* the Air Modeling Protocol, Appendix A to Resource Report 9 Appendix C - Air Quality Modeling Report, for a description of the use of the CSVP model). The analysis concluded that a visible plume would not form under any weather conditions. Smoke emissions from vessel engines under maximum load (as may occur from an LNG carrier as it accelerates from dead stop or while maneuvering) may occur for short time periods. Emissions of this type will likely occur within the anticipated USCG safety and security zone surrounding the FSRU and the LNG carriers and therefore will not occur

near other boating interests minimizing the likelihood of a nuisance effect. Similarly, the separation of the FSRU and LNG carrier from other boating interests due to safety and security zones will provide enough distance for any ventilation system odors that might be emitted to diminish in intensity below nuisance levels prior to reaching a public marine receptor.

The permanent onshore facilities will not include compression equipment or any other pipeline-related equipment that will generate stationary source air emissions. A small two truck per day increase in deliveries to the waterfront site will occur. Fuel for refueling tug boats will be delivered by one road tanker truck per day directly to the tug boats. No intermediate storage tanks will be used. Material delivery to the waterfront facilities will generate an additional one truck trip per day.

Four tug boats will be docked at the facility when they are not in use assisting LNG carriers in the Sound and at the FSRU. The tugs will generate emissions during warm-up and departure from the facility, as well as during return and docking. These emissions have been quantified and are presented in Resource Report 9 for the LNG terminal in section 9.4.1 as part of the Carrier Transit and Support Tugs emission estimate. Tug emissions from activity in port are shown in Table 15 of Appendix B to Resource Report 9.

It is anticipated that up to two trucks (heavy duty vehicles) per day will make deliveries to the onshore facility beginning in 2009. While at the facility, trucks will minimize idling in compliance with the NYSDEC Idling Prohibition for Heavy Duty Vehicles which limits vehicle idling to a maximum of five minutes (NYSDEC Rule and Regulation Subpart 217-3). By 2009, EPA's diesel engine and diesel fuel sulfur regulations will be in effect; new on-road diesel engines will be required to meet in-use emission limits that are more stringent than current on-road diesel engines and on-road diesel fuel sulfur levels will be a maximum of 15 ppm. These practical mitigation measures will further minimize vehicle emissions from the onshore facility.

EIR-27

Request:

Quantify marine-related emission impacts to air quality in the region; discuss the feasibility of emission controls; and demonstrate compliance with associated regulations. Please detail the sources of the emission estimates, whether from manufacturer derived estimates, EPA AP-42 tables, or other models. In January 2006, a final report was prepared for EPA that provided guidance in preparing port emission inventories; refer to "Current Methodologies and Best Practices in Preparing Port Emission Inventories," Final Report, prepared by ICF Consulting for EPA (January 5, 2006) to update the emission inventory.

Response:

The emission study shown in Appendix B to Resource Report 9 provides the emission impacts to the region from the operational activities associated with the Broadwater Project. The emission estimates include contributions from operation of the FSRU, operation of support vessels and emissions associated with operation of LNG carriers from the entry of a LNG carrier into the Sound at the Race, its transit to and from the FSRU, and its transit out of the Sound. These detailed emission estimates quantify all marine-related emission impacts to the region. The emission documentation provided as Appendix B to Resource Report 9 contains the references used in Table 14 of Appendix B. This table documents the reference material used to prepare the emission estimates.

The referenced IFC report "Current Methodologies and Best Practices in Preparing Port Emission Inventories" was reviewed. The report presents three approaches to preparing a port emission inventory: a) a "detailed approach" in which each ship trip into and out of a port is quantified – harbor craft and land side emissions are calculated in detail; b) a "mid-tier" approach in which ship trips are averaged by ship type and dead weight tonnage followed by calculating average trip characteristics – harbor craft and land-side emissions are also averaged by type of ship or equipment; and c) a "streamlined approach" in which all emissions (marine vessel, harbor craft and land-side) are estimated from other detailed inventories. The emission inventory prepared for the Broadwater project is a "detailed approach". The LNG carrier trip into and out of the Sound was quantified in detail by breaking the ship's course from the Race to the FSRU and back out into segments characterized by the segment's length and the expected vessel speed (and hence, propulsion load and emissions). The emissions being quantified for the Broadwater project are estimates of future activity not historical, thus records of specific ship calls to a port are not available. As a result, the ship chosen to call on the FSRU for annual vessel emission inventory purposes in Resource Report 9 were

all assumed to be the type of ship that produces the highest "per trip" emissions. The highest "per trip" emissions were then multiplied by the projected number of trips per year to the FSRU to determine annual emissions. It is possible that actual vessel emissions could significantly decrease during Project operations depending on the mix of LNG carriers that deliver LNG to the Project.

The report shows in Table 1-1 a port inventory conducted for 2002 emissions for the port of New York/New Jersey performed by Starcrest, Inc. This specific inventory was reviewed during preparation of Appendix B of Resource Report 9 and is referenced in Table 14 of Appendix B (*see* reference No. 13 in Table 14 of Appendix B).

The procedure for conducting a detailed port emission inventory is described in Section 2 of the ICF report. First, port boundaries are defined. Second, oceangoing vessel emissions are determined using a combination of maximum power ratings of vessel equipment, load factors, activity hours and emission factors. The projected emission inventory for the Broadwater project defined the "port" boundary as Long Island Sound. Oceangoing vessel emissions and assist tug emissions were calculated from the Race to the FSRU location and return (*see* Table 15 in Appendix B of Resource Report 9). Tug activity between the FSRU and Port Jefferson was also included. The projected Broadwater vessel emission inventory used the maximum power ratings of the vessels expected to operate, load factors based on estimates provided by experienced vessel operators, activity hours determined from the distance traveled and vessel speed or duration maneuvering, and emission factors selected by reviewing the vessel emission factor reports cited in Table 14 of Appendix B to Resource Report 9. LNG carrier vessel characteristics analyzed in the vessel emission study range from current vessels operating throughout the world to vessels on-order to be built to concept vessels (for example, *see* Table 15 in Appendix B of Resource Report 9). Broadwater believes that the process and assumptions used to prepare the emissions inventory for the Project is consistent with the process and assumptions set forth in the IFC report.

For many of the proposed offshore LNG facilities, applicant owned and operated vessels will be used to deliver (and regasify) LNG to the port location. This arrangement provides for more direct control over vessel emissions. The vessels that will call on the Broadwater FSRU to deliver LNG will not be owned or operated by Broadwater. Thus, the opportunity to mitigate emissions from vessels not owned by the project is extremely limited since it is not possible for Broadwater to retrofit air pollution abatement equipment onto these vessels or specify what type of fuel they should burn.

EIR-28

Request:

Provide an assessment of potential noise impacts to birds and marine animals during operation of the FSRU (including noise from tugs, supply and service vessels, and LNG carriers), as well during pile-driving activities. In addition, clarify expected decibel level and duration underwater at various distances from these noise-generating activities (particularly pile-driving) and potential impacts at those distances to biological resources, and discuss potential underwater noise mitigation measures to avoid or minimize impacts, such as the use of air bubble curtains or vibratory piling methods.

Response:

The natural background noise levels in the undisturbed ocean vary from around 90 decibels (dB) to 110 dB, depending on ambient weather conditions (Woodside 2002). Noise impacts on fish and other marine biota during construction activities would be temporary. Operation of the Project would result in some minimal increase in noise to the marine environment, but in relation to existing noise levels would not be considered significant.

FSRU Operation

The FSRU is stationary and would produce a relatively constant underwater noise signal. The waterborne noise level from the FSRU would be above the known background level, but its relationship to background level would depend on ambient weather conditions and other marine activities. Noise predicted for a similar FSRU project reported by C.J. Engineering Consultants 2004 indicated that during operations the FSRU noise would attenuate to approximately 118 dB within 0.9 NM (1 mile or 1.7 km) of the FSRU and to 108 dB within 1.6 NM (1.9 miles or 3km) of the FSRU. Additionally, the slow approach of LNG carriers to the FSRU would likely produce a similar steady signal that would increase as the carrier approaches the FSRU. The FSRU would generate less noise when it is stationary than when the azimuth thrusters are in use during docking of the LNG carriers. The operation of these vessels would not likely produce startle or alarm reactions in fish.

Based on the pre-existing heavy use of Long Island Sound, both from commercial and recreational purposes, significant numbers of additional noise impacts are ongoing in the Sound. While the noise associated with the FSRU would be stationary (or nearly so) in comparison to the current mobile sources, the increases attributable to the FSRU are not expected to be significant.

Reference:

Woodside Energy Ltd (Woodside). 2002. WA-271-P Field Development Draft Environmental Impact Statement. Enfield Area Development Project.

Vessel Traffic

The primary sources of vessel noise are propeller cavitation, propeller singing, and propulsion. Other sources include auxiliaries, flow noise from water dragging along the hull, and bubbles breaking in the wake. Studies indicate that fish avoid approaching vessels to some degree, usually by swimming down or horizontally away from the vessel's path. The degree of observed effect weakens with depth, with normal schooling patterns resuming shortly after the noise passes.

Transportation equipment may disturb marine birds. However, the impact will be minor to negligible, given the short-term nature and infrequency of the disturbances. Birds leave their habitat as soon as it is disturbed. They return soon after the disturbance and generally undergo no effect.

Noise impacts associated with marine traffic, both commercial and recreational, are commonplace within the Sound. The infrequency of the LNG carriers, as well supply ships shuttling to the FSRU, would not result in any significant increase in overall traffic that is normally experienced in the Sound.

Pile Driving

As indicated in Resource Report 1 (Section 1.5.2.2, page 1-49), the pile driving methods and arrangement for the jacket installation are subject to a geotechnical investigation and site survey. If the exploratory deep corings completed for the geotechnical investigations demonstrate that vibratory pile driving is a feasible option, then Broadwater will consider using this methodology, subject to agency approval. Broadwater will consult with NOAA Fisheries, the NYSDEC, and the U.S. Army Corps of Engineers upon completion of the geotechnical investigations to assess the suitability of using vibratory piling methods.

Resource Report 3 includes distances at which marine noise levels due to pile driving activities will equal 190 dB and 180 dB for various hammer energies (Table 3-11 in Section 3.3.1.2) should it be necessary to use impact hammer pile driving. Vibratory hammers produce peak pressures that are approximately 17 dB lower than those from impact hammers (Nedwell and Edwards 2002). The sounds from the two types of hammer differ not only in intensity, but in frequency and impulse energy (the rate at which the pressure rises) as well. Most of the sound energy of impact hammers is concentrated between 100 and 800 Hz, the frequencies thought to be capable of

impacting fish, while the sound energy from the vibratory hammer is concentrated around 20 to 30 Hz.

Pile driving is expected to be conducted over a fourteen day period. Mitigation measures for pile driving marine noise impacts to finfish are discussed in Resource Report 3 section 3.3.4.2 and to marine mammals 3.3.4.6. Once the pile installation methodology has been specified, mitigation approaches can be more definitively established.

EIR-29

Request:

Provide technical justification that ambient airborne noise levels of 50 to 55 decibels typically occur in the vicinity of the proposed site for the FSRU. Since the values referenced in Resource Report 9 (January 2006) were for ambient noise measured at locations other than Long Island Sound, present additional support that would be more representative of ambient noise in the project area.

Response:

In preparing Resource Report 9, Broadwater conducted a literature search for ambient noise levels in air over Long Island Sound and other similar coastal/sound bodies of water. Ambient sound levels can be highly variable depending on existing boat traffic (industrial, commercial and pleasure craft), rain noise, breaking waves induced by the wind or shore breaks, and biological noise.

In addition to the references cited in Resource Report 9, Broadwater also identified two references to support the 50 to 55 dBA Leq range presented in Resource Report 9. For the proposed Cape Wind offshore wind project in Nantucket Sound, ambient overwater sound levels were measured at two locations. Nantucket Sound is an Atlantic coastal Sound bordered by Cape Code on the north, Martha's Vineyard to the west and Nantucket Island to the Sound; similar to Long Island Sound, Nantucket Sound is frequented by recreational boaters, ship traffic and other ambient sounds caused by other human activity. The Cape Wind Sound measurement locations were near where recreational boaters travel in the North Shipping Channel and the Main Channel; one location is approximately 6 miles south of Hyannis Massachusetts; the second location is approximately 12 miles sound of Hyannis. Under clear sky, light wind (~4 mph) and light wave conditions (<2 feet), background noise levels of 46 dBA and 51 dBA (Leq) are reported. *See* Draft EIS/EIR/DRI, Section 5.0 available at:

http://www.nae.usace.army.mil/projects/ma/ccwf/deis.htm

An additional reference for ambient noise levels in air over a water body is a report by URS Corporation for the South San Francisco Ferry Terminal Project EIR/EA. An ambient noise level of 53 dBA Leq was reported (based on an earlier EIP Associates study on August 26, 2005 in the San Francisco Bay). This noise level is also within the 50 to 55 dBA level reported in Resource Report 9.

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list in this proceeding in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure.

Dated at Washington, D.C. this 20th day of April, 2006.

/s/ Brett A. Snyder
Brett A. Snyder